

INFORMATION SHEET

PRESIDING: Commissioner Brown-Bland; Chair Mitchell; Commissioners Gray, Clodfelter, Duffley, Hughes, and McKissick

PLACE: via WebEx Videoconference

DATE: Tuesday, June 9, 2020

TIME: 1:33 p.m. – 5:17 p.m.

DOCKET NO.: E-7, Sub 1230

VOLUME NUMBER: 2

COMPANIES: Duke Energy Carolinas, LLC

DESCRIPTION: Application of Duke Energy Carolinas, LLC, for Approval of Demand-Side Management and Energy Efficiency Cost Recovery Rider Pursuant to N.C.G.S. § 62-133.9 and NCUC Rule R8-69

APPEARANCES

Please see attached.

WITNESSES

See attached.

EXHIBITS

See attached.

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DOCKET NO.: E-7, Sub 1230

BEFORE: Commissioner ToNola D. Brown-Blair, Presiding

Chair Charlotte A. Mitchell

Commissioner Lyons Gray

Commissioner Daniel G. Clodfelter

Commissioner Kimberly W. Duffley

Commissioner Jeffrey A. Hughes

Commissioner Floyd B. McKissick, Jr.

IN THE MATTER OF:

Application of Duke Energy Carolinas, LLC, for  
Approval of Demand-Side Management and Energy  
Efficiency Cost Recovery Rider Pursuant to N.C.G.S.  
62-133.9 and Commission Rule R8-69.

VOLUME: 2





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## BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-7, SUB 1230

|  |   |                               |
|--|---|-------------------------------|
| In the Matter of                           | ) |                               |
| Application of Duke Energy Carolinas, LLC  | ) | <b>APPLICATION OF</b>         |
| for Approval of Demand-Side Management     | ) | <b>DUKE ENERGY CAROLINAS,</b> |
| and Energy Efficiency Cost Recovery Rider  | ) | <b>LLC FOR APPROVAL OF</b>    |
| Pursuant to N.C. Gen. Stat. § 62-133.9 and | ) | <b>RIDER 12</b>               |
| Commission Rule R8-69                      | ) |                               |

Duke Energy Carolinas, LLC (“DEC,” “Company,” or “Applicant”), pursuant to North Carolina General Statutes (“N.C. Gen. Stat.”) § 62-133.9 and North Carolina Utilities Commission (the “Commission”) Rule R8-69, hereby applies to the Commission for approval of its demand-side management (“DSM”) and energy efficiency (“EE”) cost recovery rider, Rider EE, for 2021 (“Rider 12”). Rider 12 has been calculated in accordance with the Company’s DSM/EE cost recovery mechanism approved by the Commission in Docket No. E-7, Sub 1032, as revised in Docket No. E-7, Sub 1130. The prospective components of Rider 12 include estimates of the revenue requirements for Vintage 2021<sup>1</sup> DSM and EE programs, as well as an estimate of the second year of net lost revenues for Vintage 2020 EE programs, the third year of net lost revenues for Vintage 2019 EE programs, and the fourth year of net lost revenues for Vintage 2018 non-residential EE programs. The Rider 12 Experience Modification Factor (“EMF”) includes the following true-ups: a true-up of Vintage 2017 DSM/EE programs, a true-up of Vintage 2018 DSM/EE programs, and a true-up of Vintage 2019

<sup>1</sup> A vintage year is the twelve-month period in which a specific DSM or EE measure is installed for an individual participant or a group of participants. Each vintage is referred to by the calendar year of its respective rate period (*e.g.*, Vintage 2021).

DSM/EE programs.

In support of this Application, DEC respectfully shows the Commission the following:

1. The Applicant's general offices are located at 550 South Tryon Street, Charlotte, North Carolina, and its mailing address is:

Duke Energy Carolinas, LLC  
P. O. Box 1321  
Charlotte, North Carolina 28201-1006

2. The name and address of Applicant's attorney is:

Kendrick Fentress, Associate General Counsel  
Duke Energy Corporation  
P.O. Box 1551/NCRH 20  
Raleigh, North Carolina 27602  
(919) 546-6733  
[Kendrick.Fentress@duke-energy.com](mailto:Kendrick.Fentress@duke-energy.com)

3. N.C. Gen. Stat. § 62-133.9(d) authorizes the Commission to approve an annual rider to the rates of electric public utilities to recover all reasonable and prudent costs incurred for the adoption and implementation of DSM/EE programs. Recoverable costs include, but are not limited to, all capital costs, including cost of capital and depreciation expense, administrative costs, implementation costs, incentive payments to program participants, and operating costs. Such rider shall consist of the utility's forecasted cost during the rate period and an EMF rider to collect the difference between the utility's actual reasonable and prudent costs incurred during the test period and actual revenues realized during the test period. The Commission is also authorized to approve incentives for adopting and implementing DSM/EE programs, including appropriate rewards based on a percentage of avoided costs achieved by DSM/EE

measures.

4. The Company's cost recovery mechanism is described in the Agreement and Stipulation of Settlement DEC reached with the Public Staff, the North Carolina Sustainable Energy Association, Environmental Defense Fund, Southern Alliance for Clean Energy, the South Carolina Coastal Conservation League, Natural Resources Defense Council, and the Sierra Club filed with the Commission on August 19, 2013 (the "Stipulation"). The Commission approved the cost recovery mechanism as described in the Stipulation, as well as DEC's portfolio of DSM/EE programs, in its *Order Approving DSM/EE Programs and Stipulation of Settlement* issued October 29, 2013 ("Sub 1032 Order"). In addition, the Commission approved certain revisions to the cost recovery mechanism in its *Order Approving DSM/EE Rider, Revising DSM/EE Mechanism, and Requiring Filing of Proposed Customer Notice* issued August 23, 2017 in Docket No. E-7, Sub 1130. The approved cost recovery mechanism is designed to allow DEC to collect revenue equal to its incurred program costs for a rate period plus a Portfolio Performance Incentive based on shared savings achieved by DEC's DSM/EE programs, and to recover net lost revenues for EE programs only.

5. Rule R8-69(b) provides that the Commission will each year conduct a proceeding for each electric public utility to establish an annual DSM/EE rider to recover DSM/EE related costs.

6. Pursuant to the provisions of N.C. Gen. Stat. § 62-133.9 and Rule R8-69, DEC requests the establishment of Rider 12 to recover: (1) a prospective component consisting of the estimated revenue requirements associated with Vintage 2021 of DEC's current portfolio of DSM/EE programs, the second year of net lost revenues for



Vintage 2020 of DEC's EE programs, the third year of net lost revenues for Vintage 2019 of DEC's EE programs, and the fourth year of net lost revenues for Vintage 2018 of DEC's non-residential EE programs; and (2) an EMF component truing up Vintage 2017, Vintage 2018 and Vintage 2019 of DEC's DSM/EE programs.

7. Pursuant to the provisions of N.C. Gen. Stat. § 62-133.9 and Rule R8-69, the Company requests Commission approval of the following annual billing factors (all shown on a cents per kilowatt hour ("¢/kWh") basis, including gross receipts tax and regulatory fee):

| <b>Residential Billing Factors</b>                             | <b>¢/kWh</b> |
|--|--------------|
| Residential Billing Factor for Rider 12 Prospective Components | 0.4184       |
| Residential Billing Factor for Rider 12 EMF Components         | 0.1046       |

| <b>Non-Residential Billing Factors for Rider 12 Prospective Components</b> | <b>¢/kWh</b> |
|--|--------------|
| Vintage 2018 EE participant  | 0.0137       |
| Vintage 2019 EE participant  | 0.0687       |
| Vintage 2020 EE participant  | 0.0612       |
| Vintage 2021 EE participant  | 0.3522       |
| Vintage 2021 DSM participant   | 0.1200       |

| <b>Non-Residential Billing Factors for Rider 12 EMF Components</b> | <b>¢/kWh</b> |
|--|--------------|
| Vintage 2017 EE participant  | 0.0342       |
| Vintage 2017 DSM participant                                       | 0.0000       |
| Vintage 2018 EE participant  | (0.0049)     |
| Vintage 2018 DSM participant                                       | (0.0014)     |
| Vintage 2019 EE participant  | (0.0225)     |
| Vintage 2019 DSM participant                                       | 0.0018       |

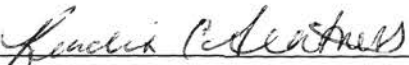
Consistent with the Commission's *Order on Motions for Reconsideration* issued on June 3, 2010 in Docket No. E-7, Sub 938 and the Sub 1032 Order, Rider 12 will be in effect for the twelve-month period January 1, 2021 through December 31, 2021. Also in accordance with these Orders, the test period for the Vintage 2019 EMF Component is the period January 1, 2019 through December 31, 2019; the test period for the Vintage 2018 EMF component is the period January 1, 2018 through December 31, 2018; and the test period for the Vintage 2017 EMF component is the period January 1, 2017 through December 31, 2017.

8. The Company has attached hereto, as required by Rule R8-69, the direct testimony and exhibits of witnesses Carolyn T. Miller and Robert P. Evans in support of the requested change in rates.

WHEREFORE, the Company respectfully prays:

That consistent with this Application, the Commission approve the rates as set forth in paragraph 7 above.

Respectfully submitted, this the 25<sup>th</sup> day of February 2020.

By:   
Kendrick Fentress  
Associate General Counsel  
Duke Energy Corporation  
P.O. Box 1551/NCRH 20  
Raleigh, North Carolina 27602  
Telephone: (919) 546-6733  
Kendrick.Fentress@duke-energy.com

ATTORNEY FOR DUKE ENERGY CAROLINAS,  
LLC

## VERIFICATION

STATE OF NORTH CAROLINA        )  
  )       DOCKET NO. E-7, SUB 1230  
COUNTY OF MECKLENBURG        )

Carolyn T. Miller, being first duly sworn, deposes and says:

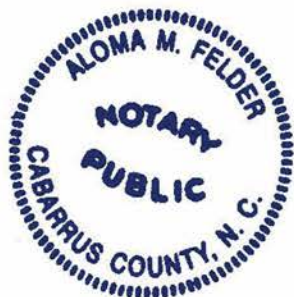
That she is MANAGER, RATES AND REGULATORY STRATEGY for Duke Energy Carolinas, LLC, applicant in the above-titled action; that she has read the foregoing Application and knows the contents thereof; that the same is true except as to those matters stated on information and belief; and as to those matters, she believes them to be true.

Carolyn T. Miller  
Carolyn T. Miller

Sworn to and subscribed before me  
this the 20<sup>th</sup> day of February, 2020.

Aloma M. Felder  
Notary Public Aloma M. Felder

My Commission Expires: July 21, 2020



Duke Energy Carolinas, LLC  
DSM/EE Cost Recovery Rider 12  
Docket Number E-7 Sub 1230  
Exhibit Summary of Rider EE Exhibits and Factors

### Residential Billing Factors

#### Residential Billing Factor for Rider 12 True-up (EMF) Components

|      |   |                                |                |
|------|---|--------------------------------|----------------|
| Line |   |                                |                |
| 1    | Year 2017 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg.1 Line 15  | (4,091,589)    |
| 2    | Year 2018 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg 2 Line 15  | 2,657,792      |
| 3    | Year 2019 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg 3 Line 15  | 24,548,789     |
| 4    | Total True-up (EMF) Revenue Requirement                             | Sum Lines 1-3                  | \$ 23,114,993  |
| 5    | Projected NC Residential Sales (kWh) for rate period                | Miller Exhibit 6 pg. 1, Line 1 | 22,092,324,452 |
| 6    | EE/DSM Revenue Requirement EMF Residential Rider EE (cents per kWh) | Line 4 / Line 5 * 100          | 0.1046         |

#### Residential Billing Factor for Rider 12 Prospective Components

|    |   |                                 |                |
|----|---|---------------------------------|----------------|
| 7  | Vintage 2018 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 2, Line 15 | -              |
| 8  | Vintage 2019 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 3, Line 15 | 5,296,780      |
| 9  | Vintage 2020 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 4, Line 1  | 4,495,479      |
| 10 | Vintage 2021 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg 5, Line 11  | 82,640,766     |
| 11 | Total Prospective Revenue Requirement                                       | Sum Lines 7-10                  | \$ 92,433,026  |
| 12 | Projected NC Residential Sales (kWh) for rate period                        | Miller Exhibit 6 pg. 1, Line 1  | 22,092,324,452 |
| 13 | EE/DSM Revenue Requirement Prospective Residential Rider EE (cents per kWh) | Line 11 / Line 12 * 100         | 0.4184         |

#### Total Revenue Requirements in Rider 12 from Residential Customers

|    |   |                   |                |
|----|---|-------------------|----------------|
| 14 | Total True-up (EMF) Revenue Requirement                                   | Line 4            | \$ 23,114,993  |
| 15 | Total Prospective Revenue Requirement                                     | Line 11           | 92,433,026     |
| 16 | Total EE/DSM Revenue Requirement for Residential Rider EE                 | Line 14 + Line 15 | \$ 115,548,019 |
| 17 | Total EE/DSM Revenue Requirement for Residential Rider EE (cents per kWh) | Line 6 + Line 13  | 0.5230         |

#### Non-Residential Billing Factors for Rider 12 True-up (EMF) Components

|    |   |                                 |                |
|----|---|---------------------------------|----------------|
| 18 | Vintage Year 2017 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 1, Line 25 | \$ 5,650,795   |
| 19 | Projected Year 2017 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 4         | 16,498,870,944 |
| 20 | EE Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)       | Line 18/Line 19 * 100           | 0.0342         |
| 21 | Vintage Year 2017 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 1, Line 35 | \$ 6,539       |
| 22 | Projected Year 2017 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 5         | 16,933,914,400 |
| 23 | DSM Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)      | Line 21/Line 22 * 100           | -              |
| 24 | Vintage Year 2018 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 2, Line 25 | \$ (784,173)   |
| 25 | Projected Year 2018 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 6         | 15,929,504,199 |
| 26 | EE Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)       | Line 24/Line 25 * 100           | (0.0049)       |
| 27 | Vintage Year 2018 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 2, Line 35 | \$ (243,015)   |
| 28 | Projected Year 2018 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 7         | 16,832,538,740 |
| 29 | DSM Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)      | Line 27/Line 28 * 100           | (0.0014)       |
| 30 | Vintage Year 2019 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 3, Line 25 | \$ (3,536,280) |
| 31 | Projected Year 2019 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 8         | 15,707,415,542 |
| 32 | EE Revenue Requirement Year 2019 EMF Non-Residential Rider EE (cents per kWh)       | Line 30/Line 31 * 100           | (0.0225)       |
| 33 | Vintage Year 2019 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 3, Line 35 | \$ 310,097     |
| 34 | Projected Year 2019 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 9         | 16,897,018,794 |
| 35 | DSM Revenue Requirement Year 2019 EMF Non-Residential Rider EE (cents per kWh)      | Line 33/Line 34 * 100           | 0.0018         |

Miller Exhibit 1, page 2

***Non-Residential Billing Factors for Rider 12 Prospective Components***

|    |  |                                 |    |                |
|----|--|---------------------------------|----|----------------|
| 36 | Vintage Year 2018 EE Prospective Amounts Revenue Requirement   | Miller Exhibit 2 pg. 2, Line 25 | \$ | 2,182,027      |
| 37 | Projected Program Year 2018 EE Participants NC Non-Residential Sales (kwh) for rate period                     | Miller Exhibit 6 Line 6         |    | 15,929,504,199 |
| 38 | <i>EE Revenue Requirement Vintage 2018 Prospective Component for Non-Residential Rider EE (cents per kWh)</i>  | Line 36/Line 37 * 100           |    | <b>0.0137</b>  |
| 39 | Vintage Year 2019 EE Prospective Amounts Revenue Requirement   | Miller Exhibit 2 pg. 3, Line 25 | \$ | 10,794,655     |
| 40 | Projected Vintage 2019 EE Participants NC Non-Residential Sales (kwh) for rate period                          | Miller Exhibit 6 Line 8         |    | 15,707,415,542 |
| 41 | <i>EE Revenue Requirement Vintage 2019 Prospective Component for Non-Residential Rider EE (cents per kWh)</i>  | Line 39/Line 40 * 100           |    | <b>0.0687</b>  |
| 42 | Vintage Year 2020 EE Prospective Amounts Revenue Requirement   | Miller Exhibit 2 pg. 4, Line 4  | \$ | 9,376,721      |
| 43 | Projected Vintage 2020 EE Participants NC Non-Residential Sales (kwh) for rate period                          | Miller Exhibit 6 Line 10        |    | 15,330,345,599 |
| 44 | <i>EE Revenue Requirement Vintage 2020 Prospective Component for Non-Residential Rider EE (cents per kWh)</i>  | Line 42/Line 43 * 100           |    | <b>0.0612</b>  |
| 45 | Vintage Year 2021 EE Prospective Amounts Revenue Requirement   | Miller Exhibit 2 pg. 5, Line 18 | \$ | 53,990,117     |
| 46 | Projected Vintage 2021 EE Participants NC Non-Residential Sales (kwh) for rate period                          | Miller Exhibit 6 Line 12        |    | 15,330,345,599 |
| 47 | <i>EE Revenue Requirement Vintage 2021 Prospective Component for Non-Residential Rider EE (cents per kWh)</i>  | Line 45/Line 46 * 100           |    | <b>0.3522</b>  |
| 48 | Vintage Year 2021 DSM Prospective Amounts Revenue Requirement  | Miller Exhibit 2 pg. 5, Line 25 | \$ | 20,278,628     |
| 49 | Projected Vintage 2021 DSM Participants NC Non-Residential Sales (kwh) for rate period                         | Miller Exhibit 6 Line 13        |    | 16,898,362,794 |
| 50 | <i>DSM Revenue Requirement Vintage 2021 Prospective Component for Non-Residential Rider EE (cents per kWh)</i> | Line 48/Line 49 * 100           |    | <b>0.1200</b>  |
|    | <b>Total EMF Rate</b>  |                                 |    | <b>0.0072</b>  |
|    | <b>Total Prospective Rate</b>  |                                 |    | <b>0.6158</b>  |

***Total Revenue Requirements in Rider 12 from Non-Residential Customers***

|    |   |                   |  |                   |
|----|---|-------------------|--|-------------------|
| 51 | Vintage Year 2017 EE True-up (EMF) Revenue Requirement        | Line 18           |  | 5,650,795         |
| 52 | Vintage Year 2017 DSM True-up (EMF) Revenue Requirement       | Line 21           |  | 6,539             |
| 53 | Vintage Year 2018 EE True-up (EMF) Revenue Requirement        | Line 24           |  | (784,173)         |
| 54 | Vintage Year 2018 DSM True-up (EMF) Revenue Requirement       | Line 27           |  | (243,015)         |
| 55 | Vintage Year 2019 EE True-up (EMF) Revenue Requirement        | Line 30           |  | (3,536,280)       |
| 56 | Vintage Year 2019 DSM True-up (EMF) Revenue Requirement       | Line 33           |  | 310,097           |
| 57 | Vintage Year 2018 EE Prospective Amounts Revenue Requirement  | Line 36           |  | 2,182,027         |
| 58 | Vintage Year 2019 EE Prospective Amounts Revenue Requirement  | Line 39           |  | 10,794,655        |
| 59 | Vintage Year 2020 EE Prospective Amounts Revenue Requirement  | Line 42           |  | 9,376,721         |
| 60 | Vintage Year 2021 EE Prospective Amounts Revenue Requirement  | Line 45           |  | 53,990,117        |
| 61 | Vintage Year 2021 DSM Prospective Amounts Revenue Requirement | Line 48           |  | 20,278,628        |
|    | <b>Total Non-Residential Revenue Requirement in Rider 12</b>  | Sum (Lines 51-61) |  | <b>98,026,112</b> |



Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
True Up of Year 1, 2 and 3 Lost Revenues for Vintage Year 2017

## RESIDENTIAL Energy Efficiency Programs

|      |  | E-7 Sub 1105            | E-7 Sub 1130               | E-7 Sub 1164     | E-7 Sub 1164              | E-7 Sub 1192     | E-7 Sub 1192               | E-7 Sub 1230     |           |
|------|--|-------------------------|----------------------------|------------------|---------------------------|------------------|----------------------------|------------------|-----------|
| Line | Reference  | Rider 8 Year 1 Estimate | Year 2017 Yr 2 LR Estimate | Rider 10 True up | Year 2017 Year 3 Estimate | Rider 11 True Up | Year 2017 Yr 4 LR Estimate | Rider 12 True up | Year 2017 |
| 1    | Residential EE Program Cost  |                         |                            |                  |                           |                  |                            |                  |           |
| 2    | Residential EE Earned Utility Incentive                            |                         |                            |                  |                           |                  |                            |                  |           |
| 3    | Return on undercollection of Residential EE Program Costs          |                         |                            |                  |                           |                  |                            |                  |           |
| 4    | Total EE Program Cost and Incentive Components                     |                         |                            |                  |                           |                  |                            |                  |           |
| 5    | Residential DSM Program Cost                                       |                         |                            |                  |                           |                  |                            |                  |           |
| 6    | Residential DSM Earned Utility Incentive                           |                         |                            |                  |                           |                  |                            |                  |           |
| 7    | Return on undercollection of Residential DSM Program Costs         |                         |                            |                  |                           |                  |                            |                  |           |
| 8    | Total DSM Program Cost and Incentive Components                    |                         |                            |                  |                           |                  |                            |                  |           |
| 9    | Total EE/DSM Program Cost and Incentive Components                 |                         |                            |                  |                           |                  |                            |                  |           |
| 10   | Revenue-related taxes and regulatory fees factor **                |                         |                            |                  |                           |                  |                            |                  |           |
| 11   | Total EE/DSM Program Cost and Incentive Revenue Requirement        |                         |                            |                  |                           |                  |                            |                  |           |
| 12   | Residential Net Lost Revenues                                      |                         |                            |                  |                           |                  |                            |                  |           |
| 13   | Total Residential EE/DSM Revenue Requirement                       |                         |                            |                  |                           |                  |                            |                  |           |
| 14   | Total Collected for Vintage Year 2017 (through estimated Rider 10) |                         |                            |                  |                           |                  |                            |                  |           |
| 15   | <b>Total Residential EE/DSM Revenue Requirement</b>                |                         |                            |                  |                           |                  |                            |                  |           |

See Miller Exhibit A for rate

## NON-RESIDENTIAL Energy Efficiency Programs

|      |  | E-7 Sub 1105            | E-7 Sub 1130               | E-7 Sub 1164     | E-7 Sub 1164              | E-7 Sub 1192     | E-7 Sub 1192               | E-7 Sub 1230     |           |
|------|--|-------------------------|----------------------------|------------------|---------------------------|------------------|----------------------------|------------------|-----------|
| Line | Reference  | Rider 8 Year 1 Estimate | Year 2017 Yr 2 LR Estimate | Rider 10 True up | Year 2017 Year 3 Estimate | Rider 11 True Up | Year 2017 Yr 4 LR Estimate | Rider 12 True up | Year 2017 |
| 16   | Non- Residential EE Program Cost   |                         |                            |                  |                           |                  |                            |                  |           |
| 17   | Non-Residential EE Earned Utility Incentive                              |                         |                            |                  |                           |                  |                            |                  |           |
| 18   | Return on undercollection of Non-Residential EE Program Costs            |                         |                            |                  |                           |                  |                            |                  |           |
| 19   | Total EE Program Cost and Incentive Components                           |                         |                            |                  |                           |                  |                            |                  |           |
| 20   | Revenue-related taxes and regulatory fees factor                         |                         |                            |                  |                           |                  |                            |                  |           |
| 21   | Total Non-Residential EE Program Cost and Incentive Revenue Requirements |                         |                            |                  |                           |                  |                            |                  |           |
| 22   | Non-Residential Net Lost Revenues  |                         |                            |                  |                           |                  |                            |                  |           |
| 23   | Total Non-Residential EE Revenue Requirement                             |                         |                            |                  |                           |                  |                            |                  |           |
| 24   | Total Collected for Vintage Year 2017 (through estimated Rider 10)       |                         |                            |                  |                           |                  |                            |                  |           |
| 25   | Non-Residential EE Revenue Requirement                                   |                         |                            |                  |                           |                  |                            |                  |           |
| 26   | Projected NC Residential Sales (kWh)                                     |                         |                            |                  |                           |                  |                            |                  |           |
| 27   | <b>NC Non-Residential EE billing factor (Cents/kWh)</b>                  |                         |                            |                  |                           |                  |                            |                  |           |

## DSM Programs

|      |  | E-7 Sub 1105            | E-7 Sub 1164     | E-7 Sub 1192     | E-7 Sub 1230     |           |
|------|--|-------------------------|------------------|------------------|------------------|-----------|
| Line | Reference  | Rider 8 Year 1 Estimate | Rider 10 True Up | Rider 11 True Up | Rider 12 True up | Year 2017 |
| 28   | Non-Residential DSM Program Cost                                   |                         |                  |                  |                  |           |
| 29   | Non-Residential DSM Earned Utility Incentive                       |                         |                  |                  |                  |           |
| 30   | Return on undercollection of Non-Residential DSM Program Costs     |                         |                  |                  |                  |           |
| 31   | Total Non-Residential DSM Program Cost and Incentive Components    |                         |                  |                  |                  |           |
| 32   | Revenue-related taxes and regulatory fees factor                   |                         |                  |                  |                  |           |
| 33   | Total Non-Residential DSM Revenue Requirement                      |                         |                  |                  |                  |           |
| 34   | Total Collected for Vintage Year 2017 (through estimated Rider 10) |                         |                  |                  |                  |           |
| 35   | Non-Residential EE Revenue Requirement True-up Amount              |                         |                  |                  |                  |           |
| 36   | Projected NC Non-Residential Sales (kWh)                           |                         |                  |                  |                  |           |
| 37   | <b>NC Non-Residential DSM billing factor</b>                       |                         |                  |                  |                  |           |

\*\* Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Year 4 Lost Revenue and True Up of Year 1 and Year 2 for Vintage Year 2018

**RESIDENTIAL**  
**Energy Efficiency Programs**

| Line  | Reference   | Year 2018 Yr 4<br>LR Estimate |
|---|---|-------------------------------|
| 1 Residential EE Program Cost   | Evans Exhibit 1 pg. 2, Line 10 * NC Alloc. Factor |                               |
| 2 Residential EE Earned Utility Incentive                             | Evans Exhibit 1 pg. 2, Line 10 * NC Alloc. Factor |                               |
| 3 Return on undercollection of Residential EE Program Costs           | Miller Exhibit 3 pg 5                             |                               |
| 4 Total EE Program Cost and Incentive Components                      | Line 1 + Line 2 + line 3                          |                               |
| 5 Residential DSM Program Cost  | Evans Exhibit 1 pg. 2, Line 11 * NC Alloc. Factor |                               |
| 6 Residential DSM Earned Utility Incentive                            | Evans Exhibit 1 pg. 2, Line 11 * NC Alloc. Factor |                               |
| 7 Return on undercollection of Residential DSM Program Costs          | Miller Exhibit 3 pg 6                             |                               |
| 8 Total DSM Program Cost and Incentive Components                     | Line 5 + Line 6 + Line 7                          |                               |
| 9 Total EE/DSM Program Cost and Incentive Components                  | Line 4 + Line 8                                   |                               |
| 10 Revenue-related taxes and regulatory fees factor **                | Miller Exhibit 2, pg. 6                           |                               |
| 11 Total EE/DSM Program Cost and Incentive Revenue Requirement        | Line 9 * Line 10                                  |                               |
| 12 Residential Net Lost Revenues                                      | Evans Exhibit 2 pg. 3                             | \$ -                          |
| 13 Total Residential EE/DSM Revenue Requirement                       | Line 11 + Line 12                                 | -                             |
| 14 Total Collected for Vintage Year 2018 (through estimated Rider 10) | Miller Exhibit 4 Line 2                           |                               |
| 15 <b>Total Residential EE/DSM Revenue Requirement</b>                | Line 13 - Line 14                                 | <b>\$ -</b>                   |

Note: No prospective Year 4 lost revenue is included in this exhibit because the rate case test period was extended for residential customers.

**NON-RESIDENTIAL**  
**Energy Efficiency Programs**

| Line  | Reference   | Year 2018 Yr 4<br>LR Estimate |
|---|---|-------------------------------|
| 16 Non- Residential EE Program Cost   | Evans Exhibit 1 pg. 2, Line 26 * NC Alloc. Factor |                               |
| 17 Non-Residential EE Earned Utility Incentive                              | Evans Exhibit 1 pg. 2, Line 26 * NC Alloc. Factor |                               |
| 18 Return on undercollection of Non-residential EE Program Costs            | Miller Exhibit 3 page 6                           |                               |
| 19 Total EE Program Cost and Incentive Components                           | Line 16 + Line 17 + Line 18                       |                               |
| 20 Revenue-related taxes and regulatory fees factor                         | Miller Exhibit 2, pg. 7                           |                               |
| 21 Total Non-Residential EE Program Cost and Incentive Revenue Requirements | Line 19 * Line 20                                 |                               |
| 22 Non-Residential Net Lost Revenues  | Evans Exhibit 2 pg. 3                             | 2,182,027                     |
| 23 Total Non-Residential EE Revenue Requirement                             | Line 21 + Line 22                                 | 2,182,027                     |
| 24 Total Collected for Vintage Year 2018 (through estimated Rider 10)       | Miller Exhibit 4 Line 7                           |                               |
| 25 Non-Residential EE Revenue Requirement                                   | Line 23 - Line 24                                 | 2,182,027                     |
| 26 Projected NC Residential Sales (kWh)                                     | Miller Exhibit 6, Line 6                          | 15,929,504,199                |
| 27 <b>NC Non-Residential EE billing factor (Cents/kWh)</b>                  | Line 25/Line 26*100                               | <b>0.0137</b>                 |

Note: Only non-residential customer lost revenues earned after the rate case test period have been included.

**DSM Programs**

| Line  | Reference   | Year 2018 Yr 4<br>LR Estimate |
|---|---|-------------------------------|
| 28 Non-Residential DSM Program Cost                                   | Evans Exhibit 1, pg. 2 Line 28 * NC Alloc. Factor |                               |
| 29 Non-Residential DSM Earned Utility Incentive                       | Evans Exhibit 1, pg. 2 Line 28 * NC Alloc. Factor |                               |
| 30 Return on undercollection of Non-Residential DSM Program Costs     | Miller Exhibit 3 page 8                           |                               |
| 31 Total Non-Residential DSM Program Cost and Incentive Components    | Line 28 + Line 29 + Line 30                       |                               |
| 32 Revenue-related taxes and regulatory fees factor                   | Miller Exhibit 2, pg. 6                           |                               |
| 33 Total Non-Residential DSM Revenue Requirement                      | Line 31 * Line 32                                 |                               |
| 34 Total Collected for Vintage Year 2018 (through estimated Rider 10) | Miller Exhibit 4 Line 11                          |                               |
| 35 Non-Residential EE Revenue Requirement True-up Amount              | Line 33- Line 34                                  |                               |
| 36 Projected NC Non-Residential Sales (kWh)                           | Miller Exhibit 6 Line 7                           |                               |
| 37 <b>NC Non-Residential DSM billing factor</b>                       | Line 35/Line 36*100                               |                               |

\*\* Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

| E-7 Sub 1130            | E-7 Sub 1164               | E-7 Sub 1192     | E-7 Sub 1192               | E-7 Sub 1230     |               |
|-------------------------|----------------------------|------------------|----------------------------|------------------|---------------|
| Rider 9 Year 1 Estimate | Year 2018 Yr 2 LR Estimate | Rider 11 True up | Year 2018 Yr 3 LR Estimate | Rider 12 True up | Year 2018     |
| \$ 41,623,609           |                            | \$ 14,606,717    |                            | \$ (0)           | \$ 56,230,326 |
| 5,511,264               |                            | 4,154,068        |                            | 140,649          | 9,805,981     |
|                         |                            | 244,540          |                            | 1,024,850        | 1,269,390     |
| 47,134,873              |                            | 19,005,325       |                            | 1,165,498        | 67,305,696    |
| 9,903,130               |                            | (124,235)        |                            | 0                | 9,778,895     |
| 2,569,925               |                            | 17,215           |                            | (5,581)          | 2,581,559     |
|                         |                            | (28,626)         |                            | (40,884)         | (69,510)      |
| 12,473,055              |                            | (135,646)        |                            | (46,465)         | 12,290,944    |
| 59,607,928              |                            | 18,869,679       |                            | 1,119,034        | 79,596,641    |
| 1,001,402               |                            | 1,001,352        |                            | 1,001,302        |               |
| 59,691,498              |                            | 18,895,191       |                            | 1,120,491        | 79,707,180    |
| 19,612,717              | 6,294,025                  | 894,901          | 9,715,212                  | 1,546,239        | 38,063,094    |
| 79,304,216              | 6,294,025                  | 19,790,092       | 9,715,212                  | 2,666,729        | 117,770,274   |
|                         |                            |                  |                            |                  | 115,112,481   |
|                         |                            |                  |                            |                  | \$ 2,657,792  |

See Miller Exhibit A for rate

| E-7 Sub 1105            | E-7 Sub 1130               | E-7 Sub 1192     | E-7 Sub 1192               | E-7 Sub 1230     |                |
|-------------------------|----------------------------|------------------|----------------------------|------------------|----------------|
| Rider 9 Year 1 Estimate | Year 2018 Yr 2 LR Estimate | Rider 11 True up | Year 2018 Yr 3 LR Estimate | Rider 12 True up | Year 2018      |
| 40,592,949              |                            | (3,317,005)      |                            | 0                | 37,275,944     |
| 11,623,199              |                            | 2,818,045        |                            | (25,396)         | 14,415,848     |
|                         |                            | 461,049          |                            | 592,305          | 1,053,354      |
| 52,216,148              |                            | (37,911)         |                            | 566,910          | 52,745,147     |
| 1,001,402               |                            | 1,001,352        |                            | 1,001,302        |                |
| 52,289,355              |                            | (37,962)         |                            | 567,648          | 52,819,041     |
| 5,167,253               | 8,746,000                  | 2,933,863        | 9,507,185                  | (1,090,744)      | 25,263,557     |
| 57,456,608              | 8,746,000                  | 2,895,901        | 9,507,185                  | (523,097)        | 78,082,597     |
|                         |                            |                  |                            |                  | 78,866,770     |
|                         |                            |                  |                            |                  | (784,173)      |
|                         |                            |                  |                            |                  | 15,929,504,199 |
|                         |                            |                  |                            |                  | (0.0049)       |

| E-7 Sub 1105            |  | E-7 Sub 1192     |  | E-7 Sub 1230     |                |
|-------------------------|--|------------------|--|------------------|----------------|
| Rider 9 Year 1 Estimate |  | Rider 11 True Up |  | Rider 12 True up | Year 2018      |
| 11,959,889              |  | 651,281          |  | (0)              | 12,611,170     |
| 3,103,667               |  | 232,789          |  | (7,197)          | 3,329,259      |
| -                       |  | 37,743           |  | 76,651           | 37,743         |
| 15,063,556              |  | 921,813          |  | 69,454           | 15,978,172     |
| 1,001,402               |  | 1,001,352        |  | 1,001,302        |                |
| 15,084,675              |  | 923,059          |  | 69,544           | 16,007,734     |
|                         |  |                  |  |                  | 16,250,749     |
|                         |  |                  |  |                  | (243,015)      |
|                         |  |                  |  |                  | 16,832,538,740 |
|                         |  |                  |  |                  | (0.0014)       |



Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Year 3 Lost Revenue and True Up of Year 1 for Vintage Year 2019

**RESIDENTIAL**  
**Energy Efficiency Programs**

| Line  | Reference   | Year 2019 Yr 3<br>LR Estimate |
|---|---|-------------------------------|
| 1 Residential EE Program Cost   | Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor |                               |
| 2 Residential EE Earned Utility Incentive                             | Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor |                               |
| 3 Return on undercollection of Residential EE Program Costs           | Miller Exhibit 3 pg 9                             |                               |
| 4 Total EE Program Cost and Incentive Components                      | Line 1 + Line 2 + line 3                          |                               |
| 5 Residential DSM Program Cost  | Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor |                               |
| 6 Residential DSM Earned Utility Incentive                            | Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor |                               |
| 7 Return on undercollection of Residential DSM Program Costs          | Miller Exhibit 3 pg 10                            |                               |
| 8 Total DSM Program Cost and Incentive Components                     | Line 5 + Line 6 + Line 7                          |                               |
| 9 Total EE/DSM Program Cost and Incentive Components                  | Line 4 + Line 8                                   |                               |
| 10 Revenue-related taxes and regulatory fees factor **                | Miller Exhibit 2, pg. 6                           |                               |
| 11 Total EE/DSM Program Cost and Incentive Revenue Requirement        | Line 9 * Line 10                                  |                               |
| 12 Residential Net Lost Revenues                                      | Evans Exhibit 2 pg. 3                             | \$ 5,296,780                  |
| 13 Total Residential EE/DSM Revenue Requirement                       | Line 11 + Line 12                                 | 5,296,780                     |
| 14 Total Collected for Vintage Year 2018 (through estimated Rider 10) | Miller Exhibit 4 Line 3                           |                               |
| 15 Total Residential EE/DSM Revenue Requirement                       | Line13 - Line 14                                  | \$ 5,296,780                  |

| E-7 Sub 1164                | E-7 Sub 1192                  | E-7 Sub 1230        |               |
|-----------------------------|-------------------------------|---------------------|---------------|
| Rider 10 Year 1<br>Estimate | Year 2019 Yr 2<br>LR Estimate | Rider 11 True<br>up | Year 2019     |
| \$ 41,002,874               |                               | \$ 13,983,083       | \$ 54,985,957 |
| 3,801,819                   |                               | 3,210,820           | 7,012,639     |
|                             |                               | 102,420             | 102,420       |
| 44,804,693                  |                               | 17,296,322          | 62,101,015    |
| 10,577,352                  |                               | (311,318)           | 10,266,034    |
| 2,773,086                   |                               | 542,116             | 3,315,202     |
|                             |                               | (6,742)             | (6,742)       |
| 13,350,438                  |                               | 224,055             | 13,574,493    |
| 58,155,131                  |                               | 17,520,377          | 75,675,508    |
| 1.001402                    |                               | 1.001352            |               |
| 58,236,664                  |                               | 17,544,065          | 75,780,729    |
| 18,783,204                  | 5,519,302                     | 6,717,857           | 31,020,363    |
| 77,019,869                  | 5,519,302                     | 24,261,921          | 106,801,092   |
|                             |                               |                     | 82,252,303    |
|                             |                               |                     | \$ 24,548,789 |

See Miller Exhibit A for rate

**NON-RESIDENTIAL**  
**Energy Efficiency Programs**

| Line  | Reference   | Year 2019 Yr 3 LR<br>Estimate |
|---|---|-------------------------------|
| 16 Non- Residential EE Program Cost   | Evans Exhibit 1 pg. 3, Line 26 * NC Alloc. Factor |                               |
| 17 Non-Residential EE Earned Utility Incentive                              | Evans Exhibit 1 pg. 3, Line 26 * NC Alloc. Factor |                               |
| 18 Return on undercollection of Non-residential EE Program Costs            | Miller Exhibit 3 page 12                          |                               |
| 19 Total EE Program Cost and Incentive Components                           | Line 16 + Line 17 + Line 18                       |                               |
| 20 Revenue-related taxes and regulatory fees factor                         | Miller Exhibit 2, pg. 6                           |                               |
| 21 Total Non-Residential EE Program Cost and Incentive Revenue Requirements | Line 19 * Line 20                                 |                               |
| 22 Non-Residential Net Lost Revenues  | Evans Exhibit 2 pg. 3                             | 10,794,655                    |
| 23 Total Non-Residential EE Revenue Requirement                             | Line 21 + Line 22                                 | 10,794,655                    |
| 24 Total Collected for Vintage Year 2018 (through estimated Rider 10)       | Miller Exhibit 4 Line 8                           |                               |
| 25 Non-Residential EE Revenue Requirement                                   | Line 23 - Line 24                                 | 10,794,655                    |
| 26 Projected NC Residential Sales (kWh)                                     | Miller Exhibit 6, Line 8                          | 15,707,415,542                |
| 27 NC Non-Residential EE billing factor (Cents/kWh)                         | Line 25/Line 26*100                               | 0.0687                        |

| E-7 Sub 1164                | E-7 Sub 1192                  | E-7 Sub 1230        |                |
|-----------------------------|-------------------------------|---------------------|----------------|
| Rider 10 Year 1<br>Estimate | Year 2019 Yr 2<br>LR Estimate | Rider 11 True<br>up | Year 2019      |
| 41,671,833                  |                               | (8,707,615)         | 32,964,218     |
| 8,464,629                   |                               | 1,874,884           | 10,339,513     |
|                             |                               | (554,249)           | (554,249)      |
| 50,136,462                  |                               | (7,386,979)         | 42,749,483     |
| 1.001402                    |                               | 1.001352            |                |
| 50,206,753                  |                               | (7,396,966)         | 42,809,787     |
| 5,590,446                   | 9,219,870                     | 452,216             | 15,262,532     |
| 55,797,199                  | 9,219,870                     | (6,944,751)         | 58,072,319     |
|                             |                               |                     | 61,608,599     |
|                             |                               |                     | (3,536,280)    |
|                             |                               |                     | 15,707,415,542 |
|                             |                               |                     | (0.0225)       |

**DSM Programs**

| Line  | Reference   |  |
|---|---|--|
| 28 Non-Residential DSM Program Cost                                   | Evans Exhibit 1, pg. 3 Line 28 * NC Alloc. Factor |  |
| 29 Non-Residential DSM Earned Utility Incentive                       | Evans Exhibit 1, pg. 3 Line 28 * NC Alloc. Factor |  |
| 30 Return on undercollection of Non-residential DSM Program Costs     | Miller Exhibit 3 page 16                          |  |
| 31 Total Non-Residential DSM Program Cost and Incentive Components    | Line 28 + Line 29 + Line 30                       |  |
| 32 Revenue-related taxes and regulatory fees factor                   | Miller Exhibit 2, pg. 6                           |  |
| 33 Total Non-Residential DSM Revenue Requirement                      | Line 31 * Line 32                                 |  |
| 34 Total Collected for Vintage Year 2018 (through estimated Rider 10) | Miller Exhibit 4 Line 12                          |  |
| 35 Non-Residential EE Revenue Requirement True-up Amount              | Line 33- Line 34                                  |  |
| 36 Projected NC Non-Residential Sales (kWh)                           | Miller Exhibit 6 Line 9                           |  |
| 37 NC Non-Residential DSM billing factor                              | Line 35/Line 36*100                               |  |

| E-7 Sub 1164                | E-7 Sub 1230        |                |
|-----------------------------|---------------------|----------------|
| Rider 10 Year 1<br>Estimate | Rider 11 True<br>Up | Year 2019      |
| 12,538,168                  | (465,183)           | 12,072,985     |
| 3,287,157                   | 611,563             | 3,898,720      |
| -                           | (9,911)             | (9,911)        |
| 15,825,325                  | 136,469             | 15,961,794     |
| 1.001402                    | 1.001352            |                |
| 15,847,512                  | 136,654             | 15,984,166     |
|                             |                     | 15,674,069     |
|                             |                     | 310,097        |
|                             |                     | 16,897,018,794 |
|                             |                     | 0.0018         |

\*\* Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Year 2 Lost Revenues for Vintage Year 2020

## ***RESIDENTIAL***

| Line   | Reference                | 2020              |
|--|--------------------------|-------------------|
| 1 Residential Net Lost Revenues                | Evans Exhibit 2 pg. 3    | 4,495,479         |
| 2 Projected NC Residential Sales (kWh)         | Miller Exhibit 6, Line 1 | \$ 22,092,324,452 |
| 3 NC Residential EE Billing Factor (Cents/kWh) | Line 1/Line 2*100        | 0.0203            |

## ***NON-RESIDENTIAL***

### ***Energy Efficiency Programs***

|  | Reference                 | 2020           |
|--|---------------------------|----------------|
| 4 Non-Residential Net Lost Revenues                | Evans Exhibit 2 pg. 3     | 9,376,721      |
| 5 Projected NC Non-Residential Sales (kWh)         | Miller Exhibit 6, Line 10 | 15,330,345,599 |
| 6 NC Non-Residential EE billing factor (Cents/kWh) | Line 4/Line 5*100         | 0.0612         |

Miller Exhibit 2, page 5

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Program Costs, Earned Incentive and Lost Revenues for Vintage Year 2021

**RESIDENTIAL**

| Line  | Reference                                 | 2021                 |
|---|---|----------------------|
| 1 Residential EE Program Cost                                 | Evans Exhibit 1, pg. 4 * NC Alloc. Factor | \$ 37,155,471        |
| 2 Residential EE Earned Utility Incentive                     | Evans Exhibit 1, pg. 4 * NC Alloc. Factor | 2,979,803            |
| 3 Total EE Program Cost and Incentive Components              | Line 1 + Line 2, Evans Exhibit 1, Line 10 | 40,135,274           |
| 4 Residential DSM Program Cost                                | Evans Exhibit 1, pg. 4 * NC Alloc. Factor | 13,699,485           |
| 5 Residential DSM Earned Utility Incentive                    | Evans Exhibit 1, pg. 4 * NC Alloc. Factor | 3,521,640            |
| 6 Total DSM Program Cost and Incentive Components             | Line 4 + Line 5, Evans Exhibit 1, Line 12 | 17,221,124           |
| 7 Total EE/DSM Program Cost and Incentive Components          | Line 3 + Line 6                           | 57,356,398           |
| 8 Revenue-related taxes and regulatory fees factor            | Miller Exhibit 2, pg. 6                   | 1.001302             |
| 9 Total EE/DSM Program Cost and Incentive Revenue Requirement | Line 7 * Line 8                           | 57,431,076           |
| 10 Residential Net Lost Revenues                              | Evans Exhibit 2 pg. 3                     | 25,209,690           |
| 11 <b>Total Residential EE Revenue Requirement</b>            | <b>Line 9 + Line 10</b>                   | <b>\$ 82,640,766</b> |

See Miller Exhibit 1  
for rate

**NON-RESIDENTIAL****Energy Efficiency Programs**

|   | Reference                                   | 2021           |
|---|---|----------------|
| 12 Non- Residential EE Program Cost   | Evans Exhibit 1, pg. 4 * NC Alloc. Factor   | \$ 38,264,959  |
| 13 Non-Residential EE Earned Utility Incentive                              | Evans Exhibit 1, pg. 4 * NC Alloc. Factor   | 9,302,510      |
| 14 Total EE Program Cost and Incentive Components                           | Line 12 + Line 13, Evans Exhibit 1, Line 27 | 47,567,470     |
| 15 Revenue-related taxes and regulatory fees factor                         | Miller Exhibit 2, pg. 6                     | 1.001302       |
| 16 Total Non-Residential EE Program Cost and Incentive Revenue Requirements | Line 14 * Line 15                           | 47,629,402     |
| 17 Non-Residential Net Lost Revenues  | Evans Exhibit 2 pg. 3                       | 6,360,715      |
| 18 Total Non-Residential EE Revenue Requirement                             | Line 16 + Line 17                           | \$ 53,990,117  |
| 19 Projected NC Residential Sales (kWh)                                     | Miller Exhibit 6, pg. 1, Line 12            | 15,330,345,599 |
| 20 <b>NC Non-Residential EE billing factor (Cents/kWh)</b>                  | <b>Line 18/Line 19*100</b>                  | <b>0.3522</b>  |

**DSM Programs**

|  |   | 2021           |
|--|---|----------------|
| 21 Non-Residential DSM Program Cost                                | Evans Exhibit 1, pg. 4 * NC Alloc. Factor   | \$ 16,110,767  |
| 22 Non-Residential DSM Earned Utility Incentive                    | Evans Exhibit 1, pg. 4 * NC Alloc. Factor   | 4,141,493      |
| 23 Total Non-Residential DSM Program Cost and Incentive Components | Line 21 + Line 22, Evans Exhibit 1, Line 29 | 20,252,260     |
| 24 Revenue-related taxes and regulatory fees factor                | Miller Exhibit 2, pg. 6                     | 1.001302       |
| 25 Total Non-Residential DSM Revenue Requirement                   | Line 23 * Line 24                           | 20,278,628     |
| 26 Projected NC Non-Residential Sales (kWh)                        | Miller Exhibit 6, pg. 1, Line 13            | 16,898,362,794 |
| 27 <b>NC Non-Residential DSM billing factor</b>                    | <b>Line 25/Line 26*100</b>                  | <b>0.1200</b>  |

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Gross Receipts Tax Years 2017 through estimated 2021

|          | <u>Year</u> |                  | <u>Actual GRT Rate In Effect</u> |
|----------|-------------|------------------|----------------------------------|
| Rider 8  | 2017        |                  | 1.001402                         |
| Rider 9  | 2018        |                  | 1.001402                         |
| Rider 10 | 2019        | Jan - June       | 1.001402                         |
|          |             | July - Dec       | 1.001302                         |
|          |             | Weighted Average | <u>1.001352</u>                  |
| Rider 11 | 2020        |                  | 1.001302                         |
| Rider 12 | 2021        |                  | 1.001302                         |

Note: the current rate is used as the estimate for 2020 and 2021. This will be subject to true-up based on actual rates in effect.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Residential EE Programs Vintage 2017

/A

| NC Residential EE |                          | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax Balance | Monthly Return | Monthly A/T<br>Return on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to Pretax<br>Rate | Gross up of Return<br>to Pretax |
|-------------------|--------------------------|--|----------------------------|-----------------------------------|--------------------------------------|-----------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                   |                          | 2019                                   |                            |                                   |                                      |                                   | 6.84%          |                                   |                           | 0.766497                                |                                 |
|                   | <b>Beginning Balance</b> | 18,108,325                             |                            |                                   | 4,276,263                            | 13,832,062                        |                |                                   |                           |   |                                 |
| 2019              | January                  | 17,333,797                             | 0.233503                   | (180,855)                         | 4,095,408                            | 13,238,389                        | 0.005700       | 77,151                            | 77,151                    | 0.766497                                | 100,654                         |
| 2019              | February                 | 15,462,902                             | 0.233503                   | (436,860)                         | 3,658,549                            | 11,804,354                        | 0.005700       | 71,372                            | 148,523                   | 0.766497                                | 193,768                         |
| 2019              | March                    | 13,944,847                             | 0.233503                   | (354,470)                         | 3,304,078                            | 10,640,769                        | 0.005700       | 63,969                            | 212,491                   | 0.766497                                | 277,224                         |
| 2019              | April                    | 12,660,896                             | 0.233503                   | (299,806)                         | 3,004,272                            | 9,656,624                         | 0.005700       | 57,848                            | 270,339                   | 0.766497                                | 352,694                         |
| 2019              | May                      | 11,384,093                             | 0.233503                   | (298,137)                         | 2,706,135                            | 8,677,959                         | 0.005700       | 52,254                            | 322,592                   | 0.766497                                | 420,866                         |
| 2019              | June                     | 9,751,263                              | 0.233503                   | (381,271)                         | 2,324,864                            | 7,426,399                         | 0.005700       | 45,897                            | 368,490                   | 0.766497                                | 480,745                         |
| 2019              | July                     | 7,835,080                              | 0.233503                   | (447,434)                         | 1,877,429                            | 5,957,651                         | 0.005700       | 38,145                            | 406,634                   | 0.766497                                | 530,510                         |
| 2019              | August                   | 5,860,857                              | 0.233503                   | (460,987)                         | 1,416,443                            | 4,444,415                         | 0.005700       | 29,646                            | 436,280                   | 0.766497                                | 569,187                         |
| 2019              | September                | 4,031,804                              | 0.233503                   | (427,089)                         | 989,353                              | 3,042,451                         | 0.005700       | 21,338                            | 457,618                   | 0.766497                                | 597,025                         |
| 2019              | October                  | 2,584,177                              | 0.233503                   | (338,025)                         | 651,328                              | 1,932,849                         | 0.005700       | 14,180                            | 471,797                   | 0.766497                                | 615,524                         |
| 2019              | November                 | 1,321,934                              | 0.233503                   | (294,738)                         | 356,590                              | 965,343                           | 0.005700       | 8,260                             | 480,057                   | 0.766497                                | 626,300                         |
| 2019              | December                 | (2,633,637)                            | 0.233503                   | (923,638)                         | (567,047)                            | (2,066,590)                       | 0.005700       | (3,139)                           | 476,919                   | 0.766497                                | 622,205                         |
|                   |                          |  |                            |                                   |                                      |                                   |                | 476,919                           |                           |   | 622,205                         |

Note 1: Amounts represent all revenue actually collected through 2019.

Interest Calculation

2019 - Rider 10

| NC Residential EE | NC Program Costs<br>Incurred | Revenue<br>Collected | Undercollected<br>Balance | Lost Revenues | Revenues<br>Collected | Undercollected<br>Balance | PPI       | Revenue<br>Collected | Undercollected<br>Balance | Total (Over)/Under<br>Collection |
|-------------------|------------------------------|----------------------|---------------------------|---------------|-----------------------|---------------------------|-----------|----------------------|---------------------------|----------------------------------|
| 2017 January      |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 February     |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 March        |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 April        |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 May          |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 June         |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 July         |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 August       |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 September    |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 October      |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 November     |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 December     | 47,487,858                   | 29,379,532           | 18,108,326                | 23,357,250    | 14,450,538            | 8,906,712                 | 8,570,768 | 5,302,517            | 3,268,251                 | 30,283,290                       |
| YTD Balance       | 47,487,858                   | 29,379,532           | 18,108,326                | 23,357,250    | 14,450,538            | 8,906,712                 | 8,570,768 | 5,302,517            | 3,268,251                 | 30,283,290                       |

|                              |            |      |
|------------------------------|------------|------|
| Revenue Requirement          |            |      |
| Res EE Program Costs         | 47,487,858 | 0.60 |
| Res EE PPI & GRT             | 8,570,768  | 0.11 |
| Res EE Lost Revenue          | 23,357,250 | 0.29 |
|                              | 79,415,876 |      |
| Total Revenue Collected      |            |      |
| Residential EE Rev Collected | 49,132,586 |      |

Interest Calculation

2020 - Rider 11

| NC Residential EE  | NC Program Costs<br>Incurred | Revenue<br>Collected | Undercollected<br>Balance | Lost Revenues | Revenues<br>Collected | Undercollected<br>Balance | PPI       | Revenue<br>Collected | Undercollected<br>Balance | Total (Over)/Under<br>Collection |
|--------------------|------------------------------|----------------------|---------------------------|---------------|-----------------------|---------------------------|-----------|----------------------|---------------------------|----------------------------------|
| Beginning Balance  | 47,487,858                   | 29,379,532           | 18,108,326                | 23,357,250    | 14,450,538            | 8,906,712                 | 8,570,768 | 5,302,517            | 3,268,251                 | 30,283,290                       |
| 2018 January       |                              |                      |                           |               | 234,785               |                           |           | (22,935)             |                           |                                  |
| 2018 February      |                              |                      |                           |               | 461,305               |                           |           | (45,062)             |                           |                                  |
| 2018 March         |                              |                      |                           |               | 339,367               |                           |           | (33,151)             |                           |                                  |
| 2018 April         |                              |                      |                           |               | 341,793               |                           |           | (33,388)             |                           |                                  |
| 2018 May           |                              |                      |                           |               | 298,837               |                           |           | (29,192)             |                           |                                  |
| 2018 June          |                              |                      |                           |               | 426,042               |                           |           | (41,618)             |                           |                                  |
| 2018 July          |                              |                      |                           |               | 489,050               |                           |           | (47,773)             |                           |                                  |
| 2018 August        |                              |                      |                           |               | 450,004               |                           |           | (43,958)             |                           |                                  |
| 2018 September     |                              |                      |                           |               | 483,004               |                           |           | (47,182)             |                           |                                  |
| 2018 October       |                              |                      |                           |               | 341,239               |                           |           | (33,334)             |                           |                                  |
| 2018 November      |                              |                      |                           |               | 315,399               |                           |           | (30,810)             |                           |                                  |
| 2018 December      |                              |                      |                           |               | 735,271               |                           |           | (71,824)             |                           |                                  |
| YTD Balance        | -                            | -                    | -                         | 2,572,270     | 4,916,096             | (2,343,826)               | (251,270) | (480,225)            | 228,955                   | (2,114,871)                      |
| Cumulative Balance | 47,487,858                   | 29,379,532           | 18,108,326                | 25,929,520    | 19,366,634            | 6,562,886                 | 8,319,498 | 4,822,291            | 3,497,207                 | 28,168,419                       |

|                               |           |        |
|-------------------------------|-----------|--------|
| Revenue Requirement           |           |        |
| Res EE PPI & GRT              | (251,270) | (0.11) |
| Res EE Lost Revenue           | 2,572,270 | 1.11   |
|                               | 2,321,000 |        |
| Revenue Collected per Exhibit |           |        |
| Checkpoint                    | 4,435,871 |        |

| Interest Calculation        |           | NC Program Costs | Revenue    | Undercollected |               | Revenues   | Undercollected |           | Revenue   | Undercollected | Total (Over)/Under |
|-----------------------------|-----------|------------------|------------|----------------|---------------|------------|----------------|-----------|-----------|----------------|--------------------|
| 2021 - Rider 12             |           | Incurred         | Collected  | Balance        | Lost Revenues | Collected  | Balance        | PPI       | Collected | Balance        | Collection         |
| Beg. Bal. - Source Rider 11 |           | 47,487,858       | 29,379,532 | 18,108,326     | 25,929,520    | 19,366,634 | 6,562,886      | 8,319,498 | 4,822,291 | 3,497,207      | 28,168,419         |
| 2019                        | January   |                  | 774,528    | 17,333,797     | 165,137       | 459,291    | 6,268,732      |           | 149,582   | 3,347,624      | 26,950,154         |
| 2019                        | February  |                  | 1,870,895  | 15,462,902     | 398,893       | 1,109,430  | 5,558,195      |           | 361,320   | 2,986,304      | 24,007,401         |
| 2019                        | March     |                  | 1,518,055  | 13,944,847     | 323,664       | 900,198    | 4,981,661      |           | 293,177   | 2,693,126      | 21,619,635         |
| 2019                        | April     |                  | 1,283,951  | 12,660,896     | 273,751       | 761,376    | 4,494,036      |           | 247,966   | 2,445,161      | 19,600,094         |
| 2019                        | May       |                  | 1,276,803  | 11,384,093     | 272,227       | 757,137    | 4,009,126      |           | 246,585   | 2,198,576      | 17,591,795         |
| 2019                        | June      |                  | 1,632,830  | 9,751,263      | 348,135       | 968,259    | 3,389,002      |           | 315,344   | 1,883,232      | 15,023,497         |
| 2019                        | July      |                  | 1,916,183  | 7,835,080      | 408,549       | 1,136,286  | 2,661,265      |           | 370,067   | 1,513,165      | 12,009,511         |
| 2019                        | August    |                  | 1,974,223  | 5,860,857      | 420,924       | 1,170,703  | 1,911,486      |           | 381,276   | 1,131,890      | 8,904,233          |
| 2019                        | September |                  | 1,829,053  | 4,031,804      | 389,972       | 1,084,618  | 1,216,839      |           | 353,240   | 778,650        | 6,027,294          |
| 2019                        | October   |                  | 1,447,627  | 2,584,177      | 308,648       | 858,435    | 667,053        |           | 279,576   | 499,074        | 3,750,304          |
| 2019                        | November  |                  | 1,262,243  | 1,321,934      | 269,123       | 748,503    | 187,672        |           | 243,773   | 255,301        | 1,764,907          |
| 2019                        | December  |                  | 2,796,434  | (1,474,501)    | 596,227       | 1,658,270  | (874,371)      |           | 540,067   | (284,766)      | (2,633,637)        |
| YTD Balance                 |           | -                | 19,582,827 | (1,474,501)    | 4,175,250     | 11,612,507 | (874,371)      | -         | 3,781,972 | (284,766)      | (2,633,637)        |
| Cumulative Balance          |           | 47,487,858       | 48,962,359 | (1,474,501)    | 30,104,770    | 30,979,141 | (874,371)      | 8,319,498 | 8,604,264 | (284,766)      | (2,633,637)        |

|                                    |            |      |
|------------------------------------|------------|------|
| Revenue Requirement                |            |      |
| Res Program Costs                  | 18,108,326 | 0.56 |
| Res PPI & GRT                      | 3,497,207  | 0.11 |
| Res Lost Revenue                   | 10,738,136 | 0.33 |
|                                    | 32,343,668 |      |
| Revenue Collected in 2019          | 35,500,650 |      |
| Less Interest Collected (and GRT): | 523,344    |      |
| Checkpoint                         | 34,977,306 |      |

**Duke Energy Carolinas, LLC**  
**Docket No. E-7, Sub 1230**  
**Estimated Return Calculation - Residential DSM Programs Vintage 2017**

| NC Residential DSM       | Total System NC<br>DSM Program<br>Costs Incurred | NC Residential<br>DSM Allocation<br>% | NC Allocated<br>DSM Residential<br>Program Costs | NC Residential<br>Revenue Collected | NC Residential<br>DSM Program<br>Collection % | DSM Program<br>Costs Revenue<br>Collected | (Over)/Under<br>Collection |
|--------------------------|--|---------------------------------------|--|-------------------------------------|---|---|----------------------------|
|                          | Miller Exhibit 5,<br>pg 3 Line 9                 |                                       |  |                                     | See calc. at right                            |   |                            |
| <b>Beginning Balance</b> | 29,822,653                                       |                                       | 10,082,297                                       | 12,781,955                          |   | (9,892,053)                               | 190,244                    |
| 2019 January             |  | 32.1574721%                           | -  | 10,519                              | 73.0104618%                                   | (7,680)                                   | (7,680)                    |
| 2019 February            |  | 32.1574721%                           | -  | 24,953                              | 73.0104618%                                   | (18,218)                                  | (18,218)                   |
| 2019 March               |  | 32.1574721%                           | -  | 20,307                              | 73.0104618%                                   | (14,827)                                  | (14,827)                   |
| 2019 April               |  | 32.1574721%                           | -  | 17,225                              | 73.0104618%                                   | (12,576)                                  | (12,576)                   |
| 2019 May                 |  | 32.1574721%                           | -  | 17,131                              | 73.0104618%                                   | (12,508)                                  | (12,508)                   |
| 2019 June                |  | 32.1574721%                           | -  | 21,819                              | 73.0104618%                                   | (15,930)                                  | (15,930)                   |
| 2019 July                |  | 32.1574721%                           | -  | 25,549                              | 73.0104618%                                   | (18,653)                                  | (18,653)                   |
| 2019 August              |  | 32.1574721%                           | -  | 26,313                              | 73.0104618%                                   | (19,211)                                  | (19,211)                   |
| 2019 September           |  | 32.1574721%                           | -  | 24,402                              | 73.0104618%                                   | (17,816)                                  | (17,816)                   |
| 2019 October             |  | 32.1574721%                           | -  | 19,380                              | 73.0104618%                                   | (14,150)                                  | (14,150)                   |
| 2019 November            |  | 32.1574721%                           | -  | 16,940                              | 73.0104618%                                   | (12,368)                                  | (12,368)                   |
| 2019 December            |  | 32.1574721%                           | -  | 37,138                              | 73.0104618%                                   | (27,115)                                  | (27,115)                   |
|                          | 29,822,653                                       |                                       | 10,082,297                                       | 261,676                             |   | (10,083,104)                              | (807)                      |

Program Costs to be Recovered in Rider 10 190,244  
Revenues to be Collected in Rider 10 260,571  
  
% Revenue to be assigned to Program Costs 73.01%

| NC Residential DSM       | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|--------------------------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                          | 2019                                   |                            |                                   |                                      |                                      | 6.84%          |                                   |                           | 0.766497                                |                                 |
| <b>Beginning Balance</b> | 190,244                                |                            |                                   | 44,926                               | 145,318                              |                |                                   |                           |   |                                 |
| 2019 January             | 182,564                                | 0.233503                   | (1,793)                           | 43,133                               | 139,432                              | 0.005700       | 812                               | 812                       | 0.766497                                | 1,059                           |
| 2019 February            | 164,346                                | 0.233503                   | (4,254)                           | 38,879                               | 125,467                              | 0.005700       | 755                               | 1,566                     | 0.766497                                | 2,044                           |
| 2019 March               | 149,520                                | 0.233503                   | (3,462)                           | 35,417                               | 114,103                              | 0.005700       | 683                               | 2,249                     | 0.766497                                | 2,934                           |
| 2019 April               | 136,943                                | 0.233503                   | (2,937)                           | 32,480                               | 104,463                              | 0.005700       | 623                               | 2,872                     | 0.766497                                | 3,747                           |
| 2019 May                 | 124,436                                | 0.233503                   | (2,921)                           | 29,560                               | 94,876                               | 0.005700       | 568                               | 3,440                     | 0.766497                                | 4,488                           |
| 2019 June                | 108,506                                | 0.233503                   | (3,720)                           | 25,840                               | 82,666                               | 0.005700       | 506                               | 3,946                     | 0.766497                                | 5,148                           |
| 2019 July                | 89,853                                 | 0.233503                   | (4,356)                           | 21,484                               | 68,368                               | 0.005700       | 430                               | 4,377                     | 0.766497                                | 5,710                           |
| 2019 August              | 70,641                                 | 0.233503                   | (4,486)                           | 16,998                               | 53,643                               | 0.005700       | 348                               | 4,724                     | 0.766497                                | 6,164                           |
| 2019 September           | 52,825                                 | 0.233503                   | (4,160)                           | 12,838                               | 39,987                               | 0.005700       | 267                               | 4,991                     | 0.766497                                | 6,512                           |
| 2019 October             | 38,676                                 | 0.233503                   | (3,304)                           | 9,534                                | 29,141                               | 0.005700       | 197                               | 5,188                     | 0.766497                                | 6,769                           |
| 2019 November            | 26,308                                 | 0.233503                   | (2,888)                           | 6,646                                | 19,662                               | 0.005700       | 139                               | 5,327                     | 0.766497                                | 6,950                           |
| 2019 December            | (807)                                  | 0.233503                   | (6,331)                           | 315                                  | (1,122)                              | 0.005700       | 53                                | 5,380                     | 0.766497                                | 7,019                           |
|                          |  |                            |                                   |                                      |                                      |                | 5,380                             |                           |   | 7,019                           |

Note 1: Amounts represent all revenue actually collected through 2019.

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**Duke Energy Carolinas, LLC**  
**Docket No. E-7, Sub 1230**  
**Estimated Return Calculation - Non- Residential EE Programs Vintage 2017**

|                        |           | Non-Residential<br>EE Program Costs |                 | NC Non-<br>Residential EE<br>Program |                                     | Non-Residential<br>EE Program Costs |                   |                            |
|------------------------|-----------|-------------------------------------|-----------------|--------------------------------------|-------------------------------------|-------------------------------------|-------------------|----------------------------|
| NC Non- Residential EE |           | Incurred                            | NC Allocation % | NC Allocated EE<br>Program Costs     | NC Residential<br>Revenue Collected | Collection %                        | Revenue Collected | (Over)/Under<br>Collection |
|                        |           | Miller Exhibit 5,<br>pg 3, Line 4   |                 |                                      | See calc. at right                  |                                     |                   |                            |
| Beginning Balance      |           | 97,443,527                          |                 | 70,947,415                           | 46,928,129                          |                                     | (30,933,661)      | 40,013,754                 |
| 2019                   | January   |                                     | 73.0903918%     | -                                    | 1,115,901                           | 59.0752989%                         | (659,222)         | (659,221)                  |
| 2019                   | February  |                                     | 73.0903918%     | -                                    | 5,298,136                           | 59.0752989%                         | (3,129,890)       | (3,129,890)                |
| 2019                   | March     |                                     | 73.0903918%     | -                                    | 4,769,940                           | 59.0752989%                         | (2,817,856)       | (2,817,856)                |
| 2019                   | April     |                                     | 73.0903918%     | -                                    | 4,871,558                           | 59.0752989%                         | (2,877,888)       | (2,877,888)                |
| 2019                   | May       |                                     | 73.0903918%     | -                                    | 5,351,721                           | 59.0752989%                         | (3,161,545)       | (3,161,545)                |
| 2019                   | June      |                                     | 73.0903918%     | -                                    | 5,741,655                           | 59.0752989%                         | (3,391,900)       | (3,391,900)                |
| 2019                   | July      |                                     | 73.0903918%     | -                                    | 6,484,109                           | 59.0752989%                         | (3,830,507)       | (3,830,507)                |
| 2019                   | August    |                                     | 73.0903918%     | -                                    | 6,541,734                           | 59.0752989%                         | (3,864,549)       | (3,864,549)                |
| 2019                   | September |                                     | 73.0903918%     | -                                    | 6,393,213                           | 59.0752989%                         | (3,776,809)       | (3,776,809)                |
| 2019                   | October   |                                     | 73.0903918%     | -                                    | 5,592,962                           | 59.0752989%                         | (3,304,059)       | (3,304,059)                |
| 2019                   | November  |                                     | 73.0903918%     | -                                    | 4,992,945                           | 59.0752989%                         | (2,949,597)       | (2,949,597)                |
| 2019                   | December  |                                     | 73.0903918%     | -                                    | 7,058,299                           | 59.0752989%                         | (4,169,711)       | (4,169,711)                |
|                        |           | 97,443,527                          |                 | 70,947,415                           | 64,212,173                          |                                     | (68,867,194)      | 2,080,222                  |

|   |            |
|---|------------|
| Program Costs to be Recovered in Rider 10 | 40,013,754 |
| Revenues to be Collected in Rider 10      | 67,733,477 |
| % Revenue to be assigned to Program Costs | 59.08%     |

| NC Non-Residential EE    | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return to<br>Pretax |
|--------------------------|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                          | 2019                                   |                            |                                |                                      |                                      | 6.84%          |                                   |                           | 0.766497                                |                                 |
| <b>Beginning Balance</b> | 40,013,754                             |                            |                                | 9,449,208                            | 30,564,546                           |                |                                   |                           |   |                                 |
| 2019 January             | 39,354,533                             | 0.233503                   | (153,930.06)                   | 8,710,978                            | 30,643,555                           | 0.005700       | 174,443                           | 174,443                   | 0.766497                                | 227,585                         |
| 2019 February            | 36,224,643                             | 0.233503                   | (730,838.68)                   | 7,980,139                            | 28,244,504                           | 0.005700       | 167,831                           | 342,274                   | 0.766497                                | 446,543                         |
| 2019 March               | 33,406,787                             | 0.233503                   | (657,977.87)                   | 7,322,161                            | 26,084,626                           | 0.005700       | 154,838                           | 497,112                   | 0.766497                                | 648,551                         |
| 2019 April               | 30,528,899                             | 0.233503                   | (671,995.41)                   | 6,650,166                            | 23,878,734                           | 0.005700       | 142,396                           | 639,508                   | 0.766497                                | 834,325                         |
| 2019 May                 | 27,367,354                             | 0.233503                   | (738,230.24)                   | 5,911,936                            | 21,455,419                           | 0.005700       | 129,202                           | 768,710                   | 0.766497                                | 1,002,887                       |
| 2019 June                | 23,975,454                             | 0.233503                   | (792,018.79)                   | 5,119,917                            | 18,855,538                           | 0.005700       | 114,886                           | 883,596                   | 0.766497                                | 1,152,772                       |
| 2019 July                | 20,144,948                             | 0.233503                   | (894,434.79)                   | 4,225,482                            | 15,919,466                           | 0.005700       | 99,109                            | 982,705                   | 0.766497                                | 1,282,073                       |
| 2019 August              | 16,280,399                             | 0.233503                   | (902,383.77)                   | 3,323,098                            | 12,957,301                           | 0.005700       | 82,299                            | 1,065,004                 | 0.766497                                | 1,389,443                       |
| 2019 September           | 12,503,589                             | 0.233503                   | (881,896.34)                   | 2,441,202                            | 10,062,388                           | 0.005700       | 65,606                            | 1,130,610                 | 0.766497                                | 1,475,035                       |
| 2019 October             | 9,199,531                              | 0.233503                   | (771,507.64)                   | 1,669,694                            | 7,529,836                            | 0.005700       | 50,138                            | 1,180,748                 | 0.766497                                | 1,540,447                       |
| 2019 November            | 6,249,933                              | 0.233503                   | (688,739.84)                   | 980,954                              | 5,268,979                            | 0.005700       | 36,477                            | 1,217,224                 | 0.766497                                | 1,588,035                       |
| 2019 December            | 2,080,222                              | 0.233503                   | (973,640.05)                   | 7,314                                | 2,072,908                            | 0.005700       | 20,924                            | 1,238,149                 | 0.766497                                | 1,615,334                       |
|                          |  |                            |                                |                                      |                                      |                | 1,238,149                         |                           |   | 1,615,334                       |

Note 1: Amounts represent all revenue actually collected through 2019.



**Duke Energy Carolinas, LLC**  
**Docket No. E-7, Sub 1230**  
**Estimated Return Calculation - Non - Residential DSM Programs Vintage 2017**

| NC Non- Residential DSM  | Total System NC<br>DSM Program<br>Costs Incurred | NC Non-<br>Residential DSM<br>Allocation % | NC Allocated DSM Non-<br>Residential Program<br>Costs | NC Non-Residential<br>DSM Revenue<br>Collected | NC Non-<br>Residential DSM<br>Program<br>Collection % | Non-Residential<br>DSM Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |
|--------------------------|--|--|---|--|---|---|----------------------------|
|                          |  |  |   |  |   |   |                            |
|                          |  | See Miller<br>Exhibit 5 pg. 3,<br>Line 10  |   |  |   |   |                            |
| <b>Beginning Balance</b> | 29,822,653                                       | 40.0747013%                                | 11,951,339  | 15,361,431                                     |   | (11,888,233)  | 63,106                     |
| 2019 January             | -  | 40.1233224%                                | -   | 1,278  | 73.1152446%   | (934)   | (934)                      |
| 2019 February            | -  | 40.1233224%                                | -   | 7,283  | 73.1152446%   | (5,325)   | (5,325)                    |
| 2019 March               | -  | 40.1233224%                                | -   | 6,513  | 73.1152446%   | (4,762)   | (4,762)                    |
| 2019 April               | -  | 40.1233224%                                | -   | 6,752  | 73.1152446%   | (4,937)   | (4,937)                    |
| 2019 May                 | -  | 40.1233224%                                | -   | 7,322  | 73.1152446%   | (5,353)   | (5,353)                    |
| 2019 June                | -  | 40.1233224%                                | -   | 7,794  | 73.1152446%   | (5,699)   | (5,699)                    |
| 2019 July                | -  | 40.1233224%                                | -   | 8,919  | 73.1152446%   | (6,521)   | (6,521)                    |
| 2019 August              | -  | 40.1233224%                                | -   | 8,938  | 73.1152446%   | (6,535)   | (6,535)                    |
| 2019 September           | -  | 40.1233224%                                | -   | 8,747  | 73.1152446%   | (6,396)   | (6,396)                    |
| 2019 October             | -  | 40.1233224%                                | -   | 7,718  | 73.1152446%   | (5,643)   | (5,643)                    |
| 2019 November            | -  | 40.1233224%                                | -   | 6,913  | 73.1152446%   | (5,055)   | (5,055)                    |
| 2019 December            | -  | 40.1233224%                                | -   | 8,271  | 73.1152446%   | (6,048)   | (6,048)                    |
|                          | 29,822,653                                       |  | 11,951,339  | 15,447,879                                     |   | (11,951,439)  | (100)                      |

|   |        |
|---|--------|
| Program Costs to be Recovered in Rider 10 | 63,106 |
| Revenues to be Collected in Rider 10      | 86,311 |
| % Revenue to be assigned to Program Costs | 73.12% |

| NC Non-Residential DSM   | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return<br>6.84% | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|--------------------------|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|-------------------------|-----------------------------------|---------------------------|---|---------------------------------|
|                          |  |                            |                                |                                      |                                      |                         |                                   |                           |   |                                 |
|                          | 2019                                   |                            |                                |                                      |                                      |                         |                                   |                           | 0.766497                                |                                 |
| <b>Beginning Balance</b> | 63,945                                 |                            |                                | 15,101                               | 48,845                               |                         |                                   |                           |   |                                 |
| 2019 January             | 63,011                                 | 0.233503                   | (218)                          | 14,883                               | 48,128                               | 0.005700                | 276                               | 276                       | 0.766497                                | 361                             |
| 2019 February            | 57,686                                 | 0.233503                   | (1,243)                        | 13,639                               | 44,046                               | 0.005700                | 263                               | 539                       | 0.766497                                | 703                             |
| 2019 March               | 52,924                                 | 0.233503                   | (1,112)                        | 12,527                               | 40,396                               | 0.005700                | 241                               | 780                       | 0.766497                                | 1,017                           |
| 2019 April               | 47,987                                 | 0.233503                   | (1,153)                        | 11,375                               | 36,612                               | 0.005700                | 219                               | 999                       | 0.766497                                | 1,304                           |
| 2019 May                 | 42,634                                 | 0.233503                   | (1,250)                        | 10,125                               | 32,509                               | 0.005700                | 197                               | 1,196                     | 0.766497                                | 1,561                           |
| 2019 June                | 36,935                                 | 0.233503                   | (1,331)                        | 8,794                                | 28,141                               | 0.005700                | 173                               | 1,369                     | 0.766497                                | 1,786                           |
| 2019 July                | 30,414                                 | 0.233503                   | (1,523)                        | 7,271                                | 23,143                               | 0.005700                | 146                               | 1,515                     | 0.766497                                | 1,977                           |
| 2019 August              | 23,879                                 | 0.233503                   | (1,526)                        | 5,745                                | 18,133                               | 0.005700                | 118                               | 1,633                     | 0.766497                                | 2,130                           |
| 2019 September           | 17,483                                 | 0.233503                   | (1,493)                        | 4,252                                | 13,231                               | 0.005700                | 89                                | 1,722                     | 0.766497                                | 2,247                           |
| 2019 October             | 11,840                                 | 0.233503                   | (1,318)                        | 2,934                                | 8,906                                | 0.005700                | 63                                | 1,785                     | 0.766497                                | 2,329                           |
| 2019 November            | 6,786                                  | 0.233503                   | (1,180)                        | 1,754                                | 5,032                                | 0.005700                | 40                                | 1,825                     | 0.766497                                | 2,381                           |
| 2019 December            | 738                                    | 0.233503                   | (1,412)                        | 342                                  | 396                                  | 0.005700                | 15                                | 1,841                     | 0.766497                                | 2,401                           |
|                          |  |                            |                                |                                      |                                      |                         | 1,841                             |                           |   | 2,401                           |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Residential EE Programs Vintage 2018

|                   |           | Residential EE<br>Program Costs<br>Incurred | NC Allocation % | NC Allocated EE<br>Program Costs | NC Residential<br>Revenue Collected | NC Residential<br>EE Program<br>Collection % | EE Program Costs<br>Revenue<br>Collected | (Over)/Under<br>Collection |   |
|-------------------|-----------|---|-----------------|----------------------------------|-------------------------------------|--|--|----------------------------|---|
| NC Residential EE |           | Miller Exhibit 5<br>pg. 3, Line 4           |                 |                                  | see calc. at right                  |  |  |                            |   |
| 2019              | January   | 77,331,818                                  |                 | 56,230,324                       | 70,458,658                          |  |  | 15,050,447                 | Note: All revenues collected in Rider 10 were to collect Y2 of lost revenue. Therefore, no revenue received in 2019 would offset the under collected balance of program costs and a return would still be earned. |
| 2019              | February  |   | 0.00000000%     |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | March     |   | 0.00000000%     |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | April     |   | 0.00000000%     |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | May       |   | 0.00000000%     |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | June      |   | 0.00000000%     |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | July      |   | 0.00000000%     |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | August    |   | 0.00000000%     |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | September |   | 0.00000000%     |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | October   |   | 0.00000000%     |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | November  |   | 0.00000000%     |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | December  | 77,331,818                                  | 0.00000000%     | 56,230,324                       | 70,458,658                          | 0.0000%                                      |  | 15,050,447                 |   |

|                   |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T<br>Return on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|-------------------|-----------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
| NC Residential EE |           | 2019                                   |                            |                                   | 6.84%                                |                                      |                |                                   | 0.766497                  |   |                                 |
| 2019              | January   | 15,050,447                             | 0.233503                   | 3,514,324                         | 3,514,324                            | 11,536,122                           | 0.005700       | 62,230                            | 62,230                    | 0.766497                                | 81,187                          |
| 2019              | February  | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 127,985                   | 0.766497                                | 166,974                         |
| 2019              | March     | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 193,741                   | 0.766497                                | 252,762                         |
| 2019              | April     | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 259,497                   | 0.766497                                | 338,550                         |
| 2019              | May       | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 325,253                   | 0.766497                                | 424,337                         |
| 2019              | June      | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 391,009                   | 0.766497                                | 510,125                         |
| 2019              | July      | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 456,765                   | 0.766497                                | 595,912                         |
| 2019              | August    | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 522,521                   | 0.766497                                | 681,700                         |
| 2019              | September | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 588,277                   | 0.766497                                | 767,487                         |
| 2019              | October   | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 654,033                   | 0.766497                                | 853,275                         |
| 2019              | November  | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 719,789                   | 0.766497                                | 939,062                         |
| 2019              | December  | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 785,544                   | 0.766497                                | 1,024,850                       |

Note 1: Amounts represent all revenue actually collected through 2019.

**Duke Energy Carolinas, LLC**  
**Docket No. E-7, Sub 1230**  
**Estimated Return Calculation - Residential DSM Programs Vintage 2018**

|                   |           | Total System NC<br>DSM Program<br>Costs Incurred  | NC Allocation % | NC Allocated<br>DSM Program<br>Costs | NC Residential<br>Revenue Collected | NC Residential<br>DSM Program<br>Collection % | DSM Program<br>Costs Revenue<br>Collected | (Over)/Under<br>Collection |
|-------------------|-----------|---|-----------------|--------------------------------------|-------------------------------------|---|---|----------------------------|
| NC Residential EE |           | <div style="display: flex; justify-content: space-between;"> <span>Miller Exhibit 5<br/>pg. 3, Line 9</span> <span>see calc. at right</span> </div> |                 |                                      |                                     |   |   |                            |
| 2019              | January   | 30,409,405  |                 | 9,778,896                            | 13,173,193                          |   | (10,402,600)                              | (623,705)                  |
| 2019              | February  |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | March     |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | April     |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | May       |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | June      |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | July      |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | August    |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | September |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | October   |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | November  |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | December  |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
|                   |           | 30,409,405  |                 | 9,778,896                            | 13,173,193                          |   | (10,402,600)                              | (623,705)                  |

Note: All revenues collected in Rider 10 were to collect Y2 of lost revenue. Therefore, no revenue received in 2019 would offset the under collected balance of program costs and a return would still be earned.

|                   |           | Cumulative<br>(Over)/Under<br>Recovery   | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|-------------------|-----------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
| NC Residential EE |           | <div style="display: flex; justify-content: space-between;"> <span>2019</span> <span>6.84%</span> <span>0.766497</span> </div> |                            |                                   |                                      |                                      |                |                                   |                           |   |                                 |
| 2019              | January   | (623,705)  | 0.233503                   | (145,637)                         | (145,637)                            | (478,068)                            | 0.005700       | (1,362)                           | (1,362)                   | 0.766497                                | (1,778)                         |
| 2019              | February  | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (4,087)                   | 0.766497                                | (5,333)                         |
| 2019              | March     | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (6,812)                   | 0.766497                                | (8,888)                         |
| 2019              | April     | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (9,537)                   | 0.766497                                | (12,443)                        |
| 2019              | May       | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (12,262)                  | 0.766497                                | (15,998)                        |
| 2019              | June      | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (14,987)                  | 0.766497                                | (19,553)                        |
| 2019              | July      | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (17,712)                  | 0.766497                                | (23,108)                        |
| 2019              | August    | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (20,437)                  | 0.766497                                | (26,663)                        |
| 2019              | September | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (23,162)                  | 0.766497                                | (30,219)                        |
| 2019              | October   | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (25,887)                  | 0.766497                                | (33,774)                        |
| 2019              | November  | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (28,612)                  | 0.766497                                | (37,329)                        |
| 2019              | December  | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (31,337)                  | 0.766497                                | (40,884)                        |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Non- Residential EE Programs Vintage 2018

| NC Non- Residential EE |           | Non-Residential<br>EE Program Costs | NC Allocation %                    | NC Allocated EE    | NC Residential    | NC Non-<br>Residential EE<br>Program | Non-Residential<br>EE Program Costs | (Over)/Under<br>Collection |
|------------------------|-----------|-------------------------------------|------------------------------------|--------------------|-------------------|--------------------------------------|-------------------------------------|----------------------------|
|                        |           | Incurred                            |                                    | Program Costs      | Revenue Collected | Collection %                         | Revenue Collected                   |                            |
|                        |           |                                     | Miller Exhibit 5,<br>pg 3 , Line 4 | See calc. at right |                   |                                      |                                     |                            |
| 2019                   | January   | 51,264,448                          |                                    | 37,275,944         | 51,998,801        |                                      | 28,240,012                          | 9,035,932                  |
| 2019                   | February  |                                     | 0.0000000%                         | -                  |                   | 0.0000000%                           | -                                   | -                          |
| 2019                   | March     |                                     | 0.0000000%                         | -                  |                   | 0.0000000%                           | -                                   | -                          |
| 2019                   | April     |                                     | 0.0000000%                         | -                  |                   | 0.0000000%                           | -                                   | -                          |
| 2019                   | May       |                                     | 0.0000000%                         | -                  |                   | 0.0000000%                           | -                                   | -                          |
| 2019                   | June      |                                     | 0.0000000%                         | -                  |                   | 0.0000000%                           | -                                   | -                          |
| 2019                   | July      |                                     | 0.0000000%                         | -                  |                   | 0.0000000%                           | -                                   | -                          |
| 2019                   | August    |                                     | 0.0000000%                         | -                  |                   | 0.0000000%                           | -                                   | -                          |
| 2019                   | September |                                     | 0.0000000%                         | -                  |                   | 0.0000000%                           | -                                   | -                          |
| 2019                   | October   |                                     | 0.0000000%                         | -                  |                   | 0.0000000%                           | -                                   | -                          |
| 2019                   | November  |                                     | 0.0000000%                         | -                  |                   | 0.0000000%                           | -                                   | -                          |
| 2019                   | December  |                                     | 0.0000000%                         | -                  |                   | 0.0000000%                           | -                                   | -                          |
|                        |           | 51,264,448                          |                                    | 37,275,944         | 51,998,801        |                                      | 28,240,012                          | 9,035,932                  |

Note: All revenues collected in Rider 10 were to collect Y2 of lost revenue. Therefore, no revenue received in 2019 would offset the under collected balance of program costs and a return would still be earned.

| NC Non-Residential EE |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return to<br>Pretax |
|-----------------------|-----------|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                       |           | 2019                                   |                            | 6.84%                          |                                      |                                      |                |                                   |                           |   |                                 |
| 2019                  | January   | 9,035,932                              | 0.233503                   | 2,109,917.24                   | 2,109,917                            | 6,926,015                            | 0.005700       | 19,739                            | 19,739                    | 0.766497                                | 25,752                          |
| 2019                  | February  | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 59,217                    | 0.766497                                | 77,257                          |
| 2019                  | March     | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 98,696                    | 0.766497                                | 128,762                         |
| 2019                  | April     | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 138,174                   | 0.766497                                | 180,267                         |
| 2019                  | May       | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 177,652                   | 0.766497                                | 231,772                         |
| 2019                  | June      | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 217,131                   | 0.766497                                | 283,276                         |
| 2019                  | July      | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 256,609                   | 0.766497                                | 334,781                         |
| 2019                  | August    | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 296,087                   | 0.766497                                | 386,286                         |
| 2019                  | September | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 335,565                   | 0.766497                                | 437,791                         |
| 2019                  | October   | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 375,044                   | 0.766497                                | 489,296                         |
| 2019                  | November  | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 414,522                   | 0.766497                                | 540,801                         |
| 2019                  | December  | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 454,000                   | 0.766497                                | 592,305                         |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Non - Residential DSM Programs Vintage 2018

| NC Non- Residential DSM |           | Total System NC<br>DSM Program<br>Costs Incurred | NC Non-<br>Residential DSM<br>Allocation % | NC Allocated DSM Non-<br>Residential Program<br>Costs | NC Non-Residential<br>DSM Revenue<br>Collected | NC Non-<br>Residential DSM<br>Program<br>Collection % | Non-Residential<br>DSM Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |
|-------------------------|-----------|--|--|---|--|---|---|----------------------------|
|                         |           | See Miller<br>Exhibit 5 pg. 3,<br>Line 10        |  |   |  |   |   |                            |
| 2019                    | January   | 30,409,405                                       | 41.4712829%                                | 12,611,170  | 14,074,924                                     |   | (11,114,680)  | 1,496,490                  |
| 2019                    | February  | -  | 41.4712829%                                | -   | 249,056  | 78.9679563%   | (196,674)   | (196,674)                  |
| 2019                    | March     | -  | 41.4712829%                                | -   | 32,655   | 78.9679563%   | (25,787)  | (25,787)                   |
| 2019                    | April     | -  | 41.4712829%                                | -   | 38,629   | 78.9679563%   | (30,505)  | (30,505)                   |
| 2019                    | May       | -  | 41.4712829%                                | -   | 40,518   | 78.9679563%   | (31,996)  | (31,996)                   |
| 2019                    | June      | -  | 41.4712829%                                | -   | 43,631   | 78.9679563%   | (34,455)  | (34,455)                   |
| 2019                    | July      | -  | 41.4712829%                                | -   | 46,592   | 78.9679563%   | (36,793)  | (36,793)                   |
| 2019                    | August    | -  | 41.4712829%                                | -   | 53,325   | 78.9679563%   | (42,110)  | (42,110)                   |
| 2019                    | September | -  | 41.4712829%                                | -   | 53,359   | 78.9679563%   | (42,137)  | (42,137)                   |
| 2019                    | October   | -  | 41.4712829%                                | -   | 52,348   | 78.9679563%   | (41,338)  | (41,338)                   |
| 2019                    | November  | -  | 41.4712829%                                | -   | 46,029   | 78.9679563%   | (36,348)  | (36,348)                   |
| 2019                    | December  | -  | 41.4712829%                                | -   | 80,167   | 78.9679563%   | (63,306)  | (63,306)                   |
|                         |           | 30,409,405                                       |  | 12,611,170  | 41,424   |   | (11,696,128)  | 915,042                    |

Rider 10 included a true-up for the impact of opt-outs.  
All revenue collected in 2019 represents  
additional collections associated with that true-up.  
Amounts allocated at same % as calculated in Rider 10.

| NC Non-Residential DSM |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|------------------------|-----------|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                        |           | 2019                                   |                            |                                |                                      | 6.84%                                |                |                                   |                           | 0.766497                                |                                 |
| 2019                   | January   | 1,496,490                              | 0.233503                   | 349,435                        | 349,435                              | 1,147,055                            | 0.005700       | 3,269                             | 3,269                     | 0.766497                                | 4,265                           |
| 2019                   | February  | 1,299,816                              | 0.233503                   | (45,924)                       | 303,511                              | 996,305                              | 0.005700       | 6,109                             | 9,378                     | 0.766497                                | 12,234                          |
| 2019                   | March     | 1,274,029                              | 0.233503                   | (6,021)                        | 297,490                              | 976,540                              | 0.005700       | 5,623                             | 15,000                    | 0.766497                                | 19,570                          |
| 2019                   | April     | 1,243,524                              | 0.233503                   | (7,123)                        | 290,367                              | 953,158                              | 0.005700       | 5,500                             | 20,500                    | 0.766497                                | 26,745                          |
| 2019                   | May       | 1,211,528                              | 0.233503                   | (7,471)                        | 282,895                              | 928,633                              | 0.005700       | 5,363                             | 25,863                    | 0.766497                                | 33,742                          |
| 2019                   | June      | 1,177,074                              | 0.233503                   | (8,045)                        | 274,850                              | 902,223                              | 0.005700       | 5,218                             | 31,081                    | 0.766497                                | 40,549                          |
| 2019                   | July      | 1,140,281                              | 0.233503                   | (8,591)                        | 266,259                              | 874,022                              | 0.005700       | 5,062                             | 36,143                    | 0.766497                                | 47,154                          |
| 2019                   | August    | 1,098,171                              | 0.233503                   | (9,833)                        | 256,426                              | 841,745                              | 0.005700       | 4,890                             | 41,033                    | 0.766497                                | 53,533                          |
| 2019                   | September | 1,056,034                              | 0.233503                   | (9,839)                        | 246,587                              | 809,447                              | 0.005700       | 4,706                             | 45,739                    | 0.766497                                | 59,673                          |
| 2019                   | October   | 1,014,696                              | 0.233503                   | (9,653)                        | 236,935                              | 777,762                              | 0.005700       | 4,524                             | 50,263                    | 0.766497                                | 65,574                          |
| 2019                   | November  | 978,348                                | 0.233503                   | (8,487)                        | 228,447                              | 749,901                              | 0.005700       | 4,354                             | 54,616                    | 0.766497                                | 71,255                          |
| 2019                   | December  | 915,042                                | 0.233503                   | (14,782)                       | 213,665                              | 701,377                              | 0.005700       | 4,136                             | 58,753                    | 0.766497                                | 76,651                          |
|                        |           |  |                            |                                |                                      |                                      |                | 58,753                            |                           |   | 76,651                          |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Residential EE Programs Vintage 2019

|                   |           | Residential EE<br>Program Costs<br>Incurred | NC Allocation % | NC Allocated EE<br>Program Costs | NC Residential<br>Revenue Collected | NC Residential<br>EE Program<br>Collection % | EE Program Costs<br>Revenue<br>Collected | (Over)/Under<br>Collection |  |
|-------------------|-----------|---|-----------------|----------------------------------|-------------------------------------|--|--|----------------------------|--|
| NC Residential EE |           | Miller Exhibit 5<br>pg. 3, Line 4           |                 |                                  | see calc. at right                  |  |  |                            |  |
| 2019              | January   | 4,224,800                                   | 73.0903918%     | 3,087,923                        | 2,558,632                           | 62.7796%                                     | (1,606,299)                              | 1,481,624                  | <div>EE Program Costs</div> <div>54,985,957</div> <div>EE Revenue Requirement</div> <div>87,585,718</div> <div>% Revenues related to program Costs</div> <div>62.7796%</div> |
| 2019              | February  | 5,158,756                                   | 73.0903918%     | 3,770,555                        | 6,069,759                           | 62.7796%                                     | (3,810,570)                              | (40,015)                   |  |
| 2019              | March     | 5,303,004                                   | 73.0903918%     | 3,875,986                        | 4,939,785                           | 62.7796%                                     | (3,101,177)                              | 774,810                    |  |
| 2019              | April     | 6,291,523                                   | 73.0903918%     | 4,598,499                        | 4,190,063                           | 62.7796%                                     | (2,630,505)                              | 1,967,994                  |  |
| 2019              | May       | 9,618,631                                   | 73.0903918%     | 7,030,295                        | 4,167,172                           | 62.7796%                                     | (2,616,134)                              | 4,414,161                  |  |
| 2019              | June      | 6,533,627                                   | 73.0903918%     | 4,775,454                        | 5,307,354                           | 62.7796%                                     | (3,331,935)                              | 1,443,518                  |  |
| 2019              | July      | 6,248,948                                   | 73.0903918%     | 4,567,381                        | 6,214,794                           | 62.7796%                                     | (3,901,622)                              | 665,759                    |  |
| 2019              | August    | 6,098,612                                   | 73.0903918%     | 4,457,499                        | 6,400,667                           | 62.7796%                                     | (4,018,313)                              | 439,187                    |  |
| 2019              | September | 4,923,805                                   | 73.0903918%     | 3,598,828                        | 5,935,759                           | 62.7796%                                     | (3,726,446)                              | (127,617)                  |  |
| 2019              | October   | 4,430,131                                   | 73.0903918%     | 3,238,000                        | 4,714,238                           | 62.7796%                                     | (2,959,580)                              | 278,421                    |  |
| 2019              | November  | 5,485,441                                   | 73.0903918%     | 4,009,330                        | 4,120,545                           | 62.7796%                                     | (2,586,861)                              | 1,422,469                  |  |
| 2019              | December  | 10,912,797                                  | 73.0903918%     | 7,976,206                        | 9,033,809                           | 62.7796%                                     | (5,671,388)                              | 2,304,818                  |  |
|                   |           | 75,230,075                                  |                 | 54,985,957                       | 63,652,577                          |  | (39,960,828)                             | 15,025,128                 |  |

|                   |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T<br>Return on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|-------------------|-----------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
| NC Residential EE |           | 2019                                   |                            |                                   |                                      |                                      | 6.84%          |                                   |                           | 0.766497                                |                                 |
| 2019              | January   | 1,481,624                              | 0.233503                   | 345,964                           | 345,964                              | 1,135,660                            | 0.005700       | 62,230                            | 62,230                    | 0.766497                                | 81,187                          |
| 2019              | February  | 1,481,624                              | 0.233503                   | (9,344)                           | 345,964                              | 1,135,660                            | 0.005700       | 6,473                             | 68,703                    | 0.766497                                | 89,632                          |
| 2019              | March     | 1,481,624                              | 0.233503                   | 180,920                           | 526,884                              | 954,740                              | 0.005700       | 5,958                             | 74,660                    | 0.766497                                | 97,405                          |
| 2019              | April     | 1,481,624                              | 0.233503                   | 459,533                           | 805,496                              | 676,128                              | 0.005700       | 4,648                             | 79,308                    | 0.766497                                | 103,469                         |
| 2019              | May       | 1,481,624                              | 0.233503                   | 1,030,720                         | 1,557,604                            | (75,980)                             | 0.005700       | 1,710                             | 81,019                    | 0.766497                                | 105,700                         |
| 2019              | June      | 1,481,624                              | 0.233503                   | 337,066                           | 1,142,562                            | 339,062                              | 0.005700       | 750                               | 81,769                    | 0.766497                                | 106,678                         |
| 2019              | July      | 1,481,624                              | 0.233503                   | 155,457                           | 1,713,061                            | (231,436)                            | 0.005700       | 307                               | 82,075                    | 0.766497                                | 107,079                         |
| 2019              | August    | 1,481,624                              | 0.233503                   | 102,551                           | 1,245,114                            | 236,511                              | 0.005700       | 14                                | 82,090                    | 0.766497                                | 107,097                         |
| 2019              | September | 1,481,624                              | 0.233503                   | (29,799)                          | 1,683,262                            | (201,637)                            | 0.005700       | 99                                | 82,189                    | 0.766497                                | 107,227                         |
| 2019              | October   | 1,481,624                              | 0.233503                   | 65,012                            | 1,310,126                            | 171,499                              | 0.005700       | (86)                              | 82,103                    | 0.766497                                | 107,115                         |
| 2019              | November  | 1,481,624                              | 0.233503                   | 332,151                           | 2,015,412                            | (533,788)                            | 0.005700       | (1,033)                           | 81,071                    | 0.766497                                | 105,768                         |
| 2019              | December  | 1,481,624                              | 0.233503                   | 538,182                           | 1,848,307                            | (366,683)                            | 0.005700       | (2,566)                           | 78,504                    | 0.766497                                | 102,420                         |
|                   |           |  |                            |                                   |                                      |                                      |                | 78,504                            |                           |   | 102,420                         |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Residential DSM Programs Vintage 2019

|                   |           | Total System NC<br>DSM Program<br>Costs Incurred  | NC Allocation % | NC Allocated EE<br>Program Costs | NC Residential<br>Revenue Collected | NC Residential<br>EE Program<br>Collection % | EE Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |
|-------------------|-----------|---|-----------------|----------------------------------|-------------------------------------|--|---------------------------------------|----------------------------|
| NC Residential EE |           | <div style="display: flex; justify-content: space-between;"> <span>Miller Exhibit 5<br/>pg. 3, Line 9</span> <span>see calc. at right</span> </div> |                 |                                  |                                     |  |                                       |                            |
| 2019              | January   | 1,582,032   | 34.1181040%     | 539,759                          | 537,321                             | 75.4841%                                     | (405,592)                             | 134,167                    |
| 2019              | February  | 1,353,150   | 34.1181040%     | 461,669                          | 1,274,670                           | 75.4841%                                     | (962,173)                             | (500,504)                  |
| 2019              | March     | 2,084,263   | 34.1181040%     | 711,111                          | 1,037,372                           | 75.4841%                                     | (783,050)                             | (71,939)                   |
| 2019              | April     | 1,820,414   | 34.1181040%     | 621,091                          | 879,928                             | 75.4841%                                     | (664,205)                             | (43,114)                   |
| 2019              | May       | 1,926,897   | 34.1181040%     | 657,421                          | 875,120                             | 75.4841%                                     | (660,577)                             | (3,156)                    |
| 2019              | June      | 1,979,139   | 34.1181040%     | 675,245                          | 1,114,563                           | 75.4841%                                     | (841,317)                             | (166,072)                  |
| 2019              | July      | 3,696,829   | 34.1181040%     | 1,261,288                        | 1,305,128                           | 75.4841%                                     | (985,164)                             | 276,124                    |
| 2019              | August    | 3,437,773   | 34.1181040%     | 1,172,903                        | 1,344,162                           | 75.4841%                                     | (1,014,628)                           | 158,275                    |
| 2019              | September | 4,173,115   | 34.1181040%     | 1,423,788                        | 1,246,530                           | 75.4841%                                     | (940,931)                             | 482,856                    |
| 2019              | October   | 3,499,351   | 34.1181040%     | 1,193,912                        | 990,006                             | 75.4841%                                     | (747,297)                             | 446,615                    |
| 2019              | November  | 1,661,681   | 34.1181040%     | 566,934                          | 865,329                             | 75.4841%                                     | (653,185)                             | (86,251)                   |
| 2019              | December  | 2,875,050   | 34.1181040%     | 980,913                          | 1,897,131                           | 75.4841%                                     | (1,432,032)                           | (451,119)                  |
|                   |           | 30,089,694  |                 | 10,266,033                       | 13,367,259                          |  | (10,090,151)                          | 175,882                    |

|                                     |            |
|-------------------------------------|------------|
| Program Costs                       | 10,266,034 |
| Revenue Requirement                 | 13,600,265 |
| % Revenues related to Program Costs | 75.4841%   |

|                   |           | Cumulative<br>(Over)/Under<br>Recovery   | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|-------------------|-----------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
| NC Residential EE |           | <div style="display: flex; justify-content: space-between;"> <span>2019</span> <span>6.84%</span> <span>0.766497</span> </div> |                            |                                   |                                      |                                      |                |                                   |                           |   |                                 |
| 2019              | January   | 134,167  | 0.233503                   | 31,328                            | 31,328                               | 102,839                              | 0.005700       | 293                               | 293                       | 0.766497                                | 382                             |
| 2019              | February  | (366,337)  | 0.233503                   | (116,869)                         | (85,541)                             | (280,796)                            | 0.005700       | (507)                             | (214)                     | 0.766497                                | (279)                           |
| 2019              | March     | (438,276)  | 0.233503                   | (16,798)                          | (102,339)                            | (335,937)                            | 0.005700       | (1,758)                           | (1,972)                   | 0.766497                                | (2,572)                         |
| 2019              | April     | (481,390)  | 0.233503                   | (10,067)                          | (112,406)                            | (368,984)                            | 0.005700       | (2,009)                           | (3,981)                   | 0.766497                                | (5,194)                         |
| 2019              | May       | (484,546)  | 0.233503                   | (737)                             | (113,143)                            | (371,403)                            | 0.005700       | (2,110)                           | (6,091)                   | 0.766497                                | (7,946)                         |
| 2019              | June      | (650,619)  | 0.233503                   | (38,778)                          | (151,921)                            | (498,697)                            | 0.005700       | (2,480)                           | (8,571)                   | 0.766497                                | (11,182)                        |
| 2019              | July      | (374,494)  | 0.233503                   | 64,476                            | (87,446)                             | (287,049)                            | 0.005700       | (2,239)                           | (10,810)                  | 0.766497                                | (14,103)                        |
| 2019              | August    | (216,220)  | 0.233503                   | 36,958                            | (50,488)                             | (165,732)                            | 0.005700       | (1,290)                           | (12,100)                  | 0.766497                                | (15,787)                        |
| 2019              | September | 266,637  | 0.233503                   | 112,748                           | 62,260                               | 204,376                              | 0.005700       | 110                               | (11,990)                  | 0.766497                                | (15,643)                        |
| 2019              | October   | 713,252  | 0.233503                   | 104,286                           | 166,546                              | 546,705                              | 0.005700       | 2,141                             | (9,850)                   | 0.766497                                | (12,850)                        |
| 2019              | November  | 627,001  | 0.233503                   | (20,140)                          | 146,407                              | 480,594                              | 0.005700       | 2,928                             | (6,922)                   | 0.766497                                | (9,031)                         |
| 2019              | December  | 175,882  | 0.233503                   | (105,338)                         | 41,069                               | 134,813                              | 0.005700       | 1,754                             | (5,168)                   | 0.766497                                | (6,742)                         |
|                   |           |  |                            |                                   |                                      |                                      |                | (5,168)                           |                           |   | (6,742)                         |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Non- Residential EE Programs Vintage 2019

| NC Non- Residential EE |           | Non-Residential<br>EE Program Costs |                 | NC Allocated EE |                                     | Program Incentives | Lost Revenues | Total Costs | NC Non-<br>Residential EE |              | Non-Residential<br>EE Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |
|------------------------|-----------|-------------------------------------|-----------------|-----------------|-------------------------------------|--------------------|---------------|-------------|---------------------------|--------------|--|----------------------------|
|                        |           | Incurred                            | NC Allocation % | Program Costs   | NC Residential<br>Revenue Collected |                    |               |             | Program<br>Collection %   |              |  |                            |
|                        |           | Miller Exhibit 5,<br>pg 3, Line 4   |                 |                 |                                     |                    |               |             |                           |              |  |                            |
|                        |           | See calc. at right                  |                 |                 |                                     |                    |               |             |                           |              |  |                            |
| 2019                   | January   | 3,898,361                           | 73.0903918%     | 2,849,327       | 893,716                             | 1,319,247          | 5,062,291     | 1,961,495   | 100.00000000%             | (1,961,495)  | 887,832  |                            |
| 2019                   | February  | 4,042,579                           | 73.0903918%     | 2,954,737       | 926,779                             | 1,368,052          | 5,249,568     | 4,273,378   | 100.00000000%             | (4,273,378)  | (1,318,641)  |                            |
| 2019                   | March     | 3,315,615                           | 73.0903918%     | 2,423,396       | 760,119                             | 1,122,040          | 4,305,555     | 3,861,979   | 100.00000000%             | (3,861,979)  | (1,438,583)  |                            |
| 2019                   | April     | 3,318,152                           | 73.0903918%     | 2,425,250       | 760,701                             | 1,122,898          | 4,308,849     | 3,919,819   | 100.00000000%             | (3,919,819)  | (1,494,568)  |                            |
| 2019                   | May       | 3,870,647                           | 73.0903918%     | 2,829,071       | 887,363                             | 1,309,868          | 5,026,302     | 4,328,089   | 100.00000000%             | (4,328,089)  | (1,499,018)  |                            |
| 2019                   | June      | 3,876,733                           | 73.0903918%     | 2,833,519       | 888,758                             | 1,311,928          | 5,034,205     | 4,656,923   | 100.00000000%             | (4,656,923)  | (1,823,404)  |                            |
| 2019                   | July      | 3,886,284                           | 73.0903918%     | 2,840,500       | 890,948                             | 1,315,160          | 5,046,608     | 5,260,960   | 100.00000000%             | (5,260,960)  | (2,420,460)  |                            |
| 2019                   | August    | 3,186,558                           | 73.0903918%     | 2,329,068       | 730,532                             | 1,078,365          | 4,137,965     | 5,303,365   | 100.00000000%             | (5,303,365)  | (2,974,297)  |                            |
| 2019                   | September | 3,413,373                           | 73.0903918%     | 2,494,848       | 782,531                             | 1,155,122          | 4,432,500     | 5,176,057   | 100.00000000%             | (5,176,057)  | (2,681,210)  |                            |
| 2019                   | October   | 3,726,001                           | 73.0903918%     | 2,723,349       | 854,202                             | 1,260,919          | 4,838,469     | 4,522,554   | 100.00000000%             | (4,522,554)  | (1,799,205)  |                            |
| 2019                   | November  | 2,909,750                           | 73.0903918%     | 2,126,748       | 667,073                             | 984,691            | 3,778,511     | 4,015,015   | 100.00000000%             | (4,015,015)  | (1,888,267)  |                            |
| 2019                   | December  | 5,656,566                           | 73.0903918%     | 4,134,406       | 1,296,792                           | 1,914,242          | 7,345,441     | 5,582,965   | 100.00000000%             | (5,582,965)  | (1,448,558)  |                            |
|                        |           | 45,100,619                          |                 | 32,964,219      | 10,339,513                          | 15,262,532         | 58,566,264    | 52,862,599  |                           | (52,862,599) | (19,898,380)   |                            |

Vintage is overcollected. Interest is calculated on all components.

| NC Non-Residential EE |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative Deferred<br>Income Tax | Net Deferred After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to Pretax<br>Rate | Gross up of Return<br>to Pretax |
|-----------------------|-----------|--|----------------------------|--------------------------------|-----------------------------------|-----------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                       |           | 2019                                   |                            |                                |                                   |                                   | 6.84%          |                                   |                           | 0.766497                                |                                 |
| 2019                  | January   | 887,832                                | 0.233503                   | 207,312                        | 207,312                           | 680,521                           | 0.005700       | 1,939                             | 1,939                     | 0.766497                                | 2,530                           |
| 2019                  | February  | (430,809)                              | 0.233503                   | (307,907)                      | (100,595)                         | (330,214)                         | 0.005700       | 998                               | 2,938                     | 0.766497                                | 3,833                           |
| 2019                  | March     | (1,869,392)                            | 0.233503                   | (335,913)                      | (436,509)                         | (1,432,883)                       | 0.005700       | (5,025)                           | (2,087)                   | 0.766497                                | (2,723)                         |
| 2019                  | April     | (3,363,960)                            | 0.233503                   | (348,986)                      | (785,495)                         | (2,578,465)                       | 0.005700       | (11,432)                          | (13,519)                  | 0.766497                                | (17,638)                        |
| 2019                  | May       | (4,862,978)                            | 0.233503                   | (350,025)                      | (1,135,520)                       | (3,727,458)                       | 0.005700       | (17,972)                          | (31,491)                  | 0.766497                                | (41,085)                        |
| 2019                  | June      | (6,686,382)                            | 0.233503                   | (425,770)                      | (1,561,290)                       | (5,125,092)                       | 0.005700       | (25,230)                          | (56,721)                  | 0.766497                                | (74,000)                        |
| 2019                  | July      | (9,106,842)                            | 0.233503                   | (565,185)                      | (2,126,475)                       | (6,980,367)                       | 0.005700       | (34,501)                          | (91,222)                  | 0.766497                                | (119,011)                       |
| 2019                  | August    | (12,081,139)                           | 0.233503                   | (694,507)                      | (2,820,982)                       | (9,260,157)                       | 0.005700       | (46,285)                          | (137,507)                 | 0.766497                                | (179,397)                       |
| 2019                  | September | (14,762,349)                           | 0.233503                   | (626,070)                      | (3,447,053)                       | (11,315,296)                      | 0.005700       | (58,640)                          | (196,147)                 | 0.766497                                | (255,901)                       |
| 2019                  | October   | (16,561,554)                           | 0.233503                   | (420,120)                      | (3,867,172)                       | (12,694,381)                      | 0.005700       | (68,428)                          | (264,575)                 | 0.766497                                | (345,174)                       |
| 2019                  | November  | (18,449,821)                           | 0.233503                   | (440,916)                      | (4,308,089)                       | (14,141,733)                      | 0.005700       | (76,483)                          | (341,058)                 | 0.766497                                | (444,956)                       |
| 2019                  | December  | (19,898,380)                           | 0.233503                   | (338,243)                      | (4,646,331)                       | (15,252,048)                      | 0.005700       | (83,772)                          | (424,830)                 | 0.766497                                | (554,249)                       |
|                       |           |  |                            |                                |                                   |                                   |                | (424,830)                         |                           |   | (554,249)                       |

Note 1: Amounts represent all revenue actually collected through 2019.



**Duke Energy Carolinas, LLC**  
**Docket No. E-7, Sub 1230**  
**Estimated Return Calculation - Non - Residential DSM Programs Vintage 2019**

| NC Non- Residential DSM |           | Total System NC<br>DSM Program<br>Costs Incurred | NC Non-<br>Residential DSM<br>Allocation % | NC Allocated DSM Non-<br>Residential Program<br>Costs | NC Non-Residential<br>DSM Revenue<br>Collected | NC Non-<br>Residential DSM<br>Program<br>Collection % | Non-Residential<br>DSM Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |
|-------------------------|-----------|--|--|---|--|---|---|----------------------------|
|                         |           | See Miller<br>Exhibit 5 pg. 3,<br>Line 10        |  |   |  |   |   |                            |
| 2019                    | January   | 1,582,032  | 40.1233224%                                | 634,764   | 560,289  | 75.4840706%   | (422,929)   | 211,835                    |
| 2019                    | February  | 1,353,150  | 40.1233224%                                | 542,929   | 1,274,361                                      | 75.4840706%   | (961,940)   | (419,011)                  |
| 2019                    | March     | 2,084,263  | 40.1233224%                                | 836,276   | 1,141,540                                      | 75.4840706%   | (861,681)   | (25,405)                   |
| 2019                    | April     | 1,820,414  | 40.1233224%                                | 730,411   | 1,195,041                                      | 75.4840706%   | (902,066)   | (171,655)                  |
| 2019                    | May       | 1,926,897  | 40.1233224%                                | 773,135   | 1,281,300                                      | 75.4840706%   | (967,177)   | (194,042)                  |
| 2019                    | June      | 1,979,139  | 40.1233224%                                | 794,096   | 1,367,817                                      | 75.4840706%   | (1,032,484)   | (238,388)                  |
| 2019                    | July      | 3,696,829  | 40.1233224%                                | 1,483,291   | 1,562,478                                      | 75.4840706%   | (1,179,422)   | 303,868                    |
| 2019                    | August    | 3,437,773  | 40.1233224%                                | 1,379,349   | 1,564,861                                      | 75.4840706%   | (1,181,221)   | 198,128                    |
| 2019                    | September | 4,173,115  | 40.1233224%                                | 1,674,392   | 1,530,946                                      | 75.4840706%   | (1,155,620)   | 518,772                    |
| 2019                    | October   | 3,499,351  | 40.1233224%                                | 1,404,056   | 1,350,191                                      | 75.4840706%   | (1,019,179)   | 384,877                    |
| 2019                    | November  | 1,661,681  | 40.1233224%                                | 666,722   | 1,210,511                                      | 75.4840706%   | (913,743)   | (247,022)                  |
| 2019                    | December  | 2,875,050  | 40.1233224%                                | 1,153,566   | 1,634,733                                      | 75.4840706%   | (1,233,963)   | (80,398)                   |
|                         |           | 30,089,694                                       |  | 12,072,985  | 15,674,069                                     |   | (11,831,425)  | 241,560                    |

|                                     |            |
|-------------------------------------|------------|
| Program Costs                       | 12,072,985 |
| Revenue Requirement                 | 15,994,090 |
| % Revenues related to Program Costs | 75.4840%   |

| NC Non-Residential DSM |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|------------------------|-----------|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                        |           | 2019                                   |                            |                                |                                      | 6.84%                                |                |                                   |                           | 0.766497                                |                                 |
| 2019                   | January   | 211,835                                | 0.233503                   | 49,464                         | 49,464                               | 162,371                              | 0.005700       | 463                               | 463                       | 0.766497                                | 604                             |
| 2019                   | February  | (207,176)                              | 0.233503                   | (97,840)                       | (48,376)                             | (158,800)                            | 0.005700       | 10                                | 473                       | 0.766497                                | 617                             |
| 2019                   | March     | (232,581)                              | 0.233503                   | (5,932)                        | (54,308)                             | (178,273)                            | 0.005700       | (961)                             | (488)                     | 0.766497                                | (636)                           |
| 2019                   | April     | (404,236)                              | 0.233503                   | (40,082)                       | (94,390)                             | (309,846)                            | 0.005700       | (1,391)                           | (1,879)                   | 0.766497                                | (2,451)                         |
| 2019                   | May       | (598,278)                              | 0.233503                   | (45,309)                       | (139,700)                            | (458,579)                            | 0.005700       | (2,190)                           | (4,069)                   | 0.766497                                | (5,308)                         |
| 2019                   | June      | (836,666)                              | 0.233503                   | (55,664)                       | (195,364)                            | (641,302)                            | 0.005700       | (3,135)                           | (7,204)                   | 0.766497                                | (9,398)                         |
| 2019                   | July      | (532,798)                              | 0.233503                   | 70,954                         | (124,410)                            | (408,388)                            | 0.005700       | (2,992)                           | (10,195)                  | 0.766497                                | (13,301)                        |
| 2019                   | August    | (334,670)                              | 0.233503                   | 46,263                         | (78,146)                             | (256,524)                            | 0.005700       | (1,895)                           | (12,090)                  | 0.766497                                | (15,773)                        |
| 2019                   | September | 184,102                                | 0.233503                   | 121,135                        | 42,988                               | 141,114                              | 0.005700       | (329)                             | (12,419)                  | 0.766497                                | (16,202)                        |
| 2019                   | October   | 568,979                                | 0.233503                   | 89,870                         | 132,858                              | 436,121                              | 0.005700       | 1,645                             | (10,774)                  | 0.766497                                | (14,056)                        |
| 2019                   | November  | 321,957                                | 0.233503                   | (57,680)                       | 75,178                               | 246,779                              | 0.005700       | 1,946                             | (8,828)                   | 0.766497                                | (11,517)                        |
| 2019                   | December  | 241,560                                | 0.233503                   | (18,773)                       | 56,405                               | 185,155                              | 0.005700       | 1,231                             | (7,597)                   | 0.766497                                | (9,911)                         |
|                        |           |  |                            |                                |                                      |                                      |                | (7,597)                           |                           |   | (9,911)                         |

Note 1: Amounts represent all revenue actually collected through 2019.

**Duke Energy Carolinas, LLC**  
**DSM/EE Actual Revenues Collected from Years 2015-2019 (By Vintage)**  
**and Estimated 2020 Collections from Rider 11 (by Vintage)**  
**Docket Number E-7, Sub 1230**  
**For Vintage Year 2015-2020 Estimate and True Up Calculations**

|                        |                              |                | Actual<br>2017<br>Rider 8 | Actual<br>2018<br>Rider 9 | Actual<br>2019<br>Rider 10 | Estimated<br>2020<br>Rider 11 <sup>(1)</sup> | Total                 |
|------------------------|------------------------------|----------------|---------------------------|---------------------------|----------------------------|--|-----------------------|
| <b>Residential</b>     |                              |                |                           |                           |                            |  |                       |
| <b>Line</b>            |                              | <b>Vintage</b> |                           |                           |                            |  |                       |
| 1                      | EE/DSM                       | Year 2017      | 61,914,541                | 4,435,871                 | 35,762,325                 | 5,078,935                                    | 107,191,672           |
| 2                      |                              | Year 2018      |                           | 83,631,851                | 6,302,019                  | 25,178,611                                   | 115,112,481           |
| 3                      |                              | Year 2019      |                           |                           | 77,019,837                 | 5,232,466                                    | 82,252,303            |
| 4                      |                              | Year 2020      |                           |                           |                            | 66,898,601                                   | 66,898,601            |
| 5                      | <b>Total Residential</b>     |                | <b>\$ 61,914,541</b>      | <b>\$ 88,067,722</b>      | <b>\$ 119,084,181</b>      | <b>\$ 102,388,613</b>                        | <b>\$ 371,455,057</b> |
| <b>Non-Residential</b> |                              |                |                           |                           |                            |  |                       |
| 6                      | EE                           | Year 2017      | 46,928,129                | 10,882,796                | 64,212,173                 | 17,144,751                                   | 139,167,848           |
| 7                      |                              | Year 2018      |                           | 51,998,801                | 12,546,122                 | 14,321,847                                   | 78,866,770            |
| 8                      |                              | Year 2019      |                           |                           | 52,862,599                 | 8,746,000                                    | 61,608,599            |
| 9                      |                              | Year 2020      |                           |                           |                            | 52,968,365                                   | 52,968,365            |
| 10                     | DSM                          | Year 2017      | 15,361,431                | (1,084)                   | 86,448                     | 1,084  | 15,447,879            |
| 11                     |                              | Year 2018      |                           | 14,074,924                | 777,733                    | 1,398,093                                    | 16,250,749            |
| 12                     |                              | Year 2019      |                           |                           | 15,674,069                 |  | 15,674,069            |
| 13                     |                              | Year 2020      |                           |                           |                            | 19,931,130                                   | 19,931,130            |
| 14                     | <b>Total Non-Residential</b> |                | <b>\$ 62,289,560</b>      | <b>\$ 76,955,437</b>      | <b>\$ 146,159,143</b>      | <b>\$ 114,511,270</b>                        | <b>\$ 399,915,410</b> |
| 15                     | <b>Total Revenue</b>         |                | <b>\$ 124,204,101</b>     | <b>\$ 165,023,159</b>     | <b>\$ 265,243,324</b>      | <b>\$ 216,899,883</b>                        | <b>\$ 771,370,467</b> |

<sup>(1)</sup> Rider 11 estimates are based on Order issued in Docket No. E-7 Sub 1192 dated 10/18/19

Duke Energy Carolinas, LLC  
 Vintage Year 2017 Allocation Factors for the Period January 1, 2017 - December 31, 2017  
 Docket Number E-7, Sub 1230  
 Allocation Factors

|  |                                |                           | MWH         |           |            |       |
|--|--------------------------------|---------------------------|-------------|-----------|------------|-------|
| Line New Mechanism Sales Allocator at Generator                  |                                |                           |             |           |            |       |
| 1  | NC Retail MWH Sales Allocation | Company Records           | 60,219,051  |           |            |       |
| 2  | SC Retail MWH Sales Allocation | Company Records           | 22,489,484  |           |            |       |
| 3  | Total Retail                   | Line 1 + Line 2           | 82,708,535  |           |            |       |
| Allocation 1 to state based on kWh sales                         |                                |                           |             |           |            |       |
| 4  | NC Retail                      | Line 1 / Line 3           | 72.8087506% |           |            |       |
| Demand Allocators  |                                |                           |             | NC        | SC         | Total |
| 5  | Residential                    | Company Records           | 5,545,784   | 1,803,958 | 7,349,742  |       |
| 6  | Non Residential                | Company Records           | 6,573,854   | 2,480,404 | 9,054,258  |       |
| 7  | Total                          | Line 5 + Line 6           | 12,119,638  | 4,284,362 | 16,404,000 |       |
| Allocation 2 to state based on peak demand                       |                                |                           |             |           |            |       |
| 8  | NC Retail                      | Line 7, NC / Line 7 Total | 73.8822117% |           |            |       |
| Allocation 3 NC res vs non-res Peak Demand to retail system peak |                                |                           |             |           |            |       |
| 9  | NC Residential                 | Line 5 NC/ Line 7 Total   | 33.8075104% |           |            |       |
| 10   | NC Non-residential             | Line 6 NC/ Line 7 Total   | 40.0747013% |           |            |       |

Duke Energy Carolinas, LLC  
 Vintage Year 2018 Allocation Factors for the Period January 1, 2018 - December 31, 2018  
 Docket Number E-7, Sub 1230  
 Allocation Factors

|   |   |                           | MWH         |           |            |       |
|---|---|---------------------------|-------------|-----------|------------|-------|
|   |   |                           |             |           |            |       |
| Line  | <b>New Mechanism Sales Allocator at Generator</b> |                           |             |           |            |       |
| 1   | NC Retail MWH Sales Allocation                    | Company Records           | 58,534,269  |           |            |       |
| 2   | SC Retail MWH Sales Allocation                    | Company Records           | 21,966,093  |           |            |       |
| 3   | Total Retail                                      | Line 1 + Line 2           | 80,500,362  |           |            |       |
|   |   |                           |             |           |            |       |
| <b>Allocation 1 to state based on kWh sales</b>                         |   |                           |             |           |            |       |
| 4   | NC Retail   | Line 1 / Line 3           | 72.7130507% |           |            |       |
|   |   |                           |             |           |            |       |
| <b>Demand Allocators</b>  |   |                           |             | NC        | SC         | Total |
| 5   | Residential                                       | Company Records           | 5,078,308   | 1,617,566 | 6,695,874  |       |
| 6   | Non Residential                                   | Company Records           | 6,549,145   | 2,546,981 | 9,096,126  |       |
| 7   | Total   | Line 5 + Line 6           | 11,627,453  | 4,164,547 | 15,792,000 |       |
|   |   |                           |             |           |            |       |
| <b>Allocation 2 to state based on peak demand</b>                       |   |                           |             |           |            |       |
| 8   | NC Retail   | Line 7, NC / Line 7 Total | 73.6287551% |           |            |       |
|   |   |                           |             |           |            |       |
| <b>Allocation 3 NC res vs non-res Peak Demand to retail system peak</b> |   |                           |             |           |            |       |
| 9   | NC Residential                                    | Line 5 NC/ Line 7 Total   | 32.1574721% |           |            |       |
| 10  | NC Non-residential                                | Line 6 NC/ Line 7 Total   | 41.4712829% |           |            |       |

Duke Energy Carolinas, LLC  
Vintage Year 2019 Allocation Factors for the Period January 1, 2019 - December 31, 2021  
Docket Number E-7, Sub 1230  
Allocation Factors

|  |                                |                           | MWH         |           |            |       |
|--|--------------------------------|---------------------------|-------------|-----------|------------|-------|
| Line New Mechanism Sales Allocator at Generator                  |                                |                           |             |           |            |       |
| 1  | NC Retail MWH Sales Allocation | Company Records           | 62,147,533  |           |            |       |
| 2  | SC Retail MWH Sales Allocation | Company Records           | 22,880,788  |           |            |       |
| 3  | Total Retail                   | Line 1 + Line 2           | 85,028,321  |           |            |       |
| Allocation 1 to state based on kWh sales                         |                                |                           |             |           |            |       |
| 4  | NC Retail                      | Line 1 / Line 3           | 73.0903918% |           |            |       |
| Demand Allocators  |                                |                           |             | NC        | SC         | Total |
| 5  | Residential                    | Company Records           | 5,420,002   | 1,681,673 | 7,101,675  |       |
| 6  | Non Residential                | Company Records           | 6,373,991   | 2,410,334 | 8,784,325  |       |
| 7  | Total                          | Line 5 + Line 6           | 11,793,993  | 4,092,007 | 15,886,000 |       |
| Allocation 2 to state based on peak demand                       |                                |                           |             |           |            |       |
| 8  | NC Retail                      | Line 7, NC / Line 7 Total | 74.2414264% |           |            |       |
| Allocation 3 NC res vs non-res Peak Demand to retail system peak |                                |                           |             |           |            |       |
| 9  | NC Residential                 | Line 5 NC/ Line 7 Total   | 34.1181040% |           |            |       |
| 10   | NC Non-residential             | Line 6 NC/ Line 7 Total   | 40.1233224% |           |            |       |

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Duke Energy Carolinas, LLC  
DSM/EE Cost Recovery Rider 12  
Docket Number E-7 Sub 1230  
Forecasted 2021 kWh Sales for Rate Period for Vintage Years 2017-2021

**Fall 2019 Sales Forecast - kWhs**

**Forecasted 2021 sales**

**North Carolina Retail:**

Line

|   |                 |                |
|---|-----------------|----------------|
| 1 | Residential     | 22,092,324,452 |
| 2 | Non-Residential | 35,749,634,396 |
| 3 | Total Retail    | 57,841,958,848 |

**NC Opt Out Sales**

|                                | Total Usage    | Revised<br>Opt-Outs | Net Usage      |
|--------------------------------|----------------|---------------------|----------------|
| Vintage 2017 Actual Opt Out    |                |                     |                |
| 4 EE                           | 35,749,634,396 | 19,250,763,452      | 16,498,870,944 |
| 5 DSM                          | 35,749,634,396 | 18,815,719,996      | 16,933,914,400 |
| Vintage 2018 Actual Opt Out    |                |                     |                |
| 6 EE                           | 35,749,634,396 | 19,820,130,197      | 15,929,504,199 |
| 7 DSM                          | 35,749,634,396 | 18,917,095,657      | 16,832,538,740 |
| Vintage 2019 Actual Opt Out    |                |                     |                |
| 8 EE                           | 35,749,634,396 | 20,042,218,854      | 15,707,415,542 |
| 9 DSM                          | 35,749,634,396 | 18,852,615,603      | 16,897,018,794 |
| Vintage 2020 Estimated Opt Out |                |                     |                |
| 10 EE                          | 35,749,634,396 | 20,419,288,797      | 15,330,345,599 |
| 11 DSM                         | 35,749,634,396 | 18,851,271,603      | 16,898,362,794 |
| Vintage 2021 Estimated Opt Out |                |                     |                |
| 12 EE                          | 35,749,634,396 | 20,419,288,797      | 15,330,345,599 |
| 13 DSM                         | 35,749,634,396 | 18,851,271,603      | 16,898,362,794 |

Rider EE (NC)  
ENERGY EFFICIENCY RIDERAPPLICABILITY (North Carolina Only)

Service supplied under the Company's rate schedules is subject to approved adjustments for new energy efficiency and demand-side management programs approved by the North Carolina Utilities Commission (NCUC). The Rider Adjustments are not included in the Rate Schedules of the Company and therefore, must be applied to the bill as calculated under the applicable rate.

As of January 1, 2021, cost recovery under Rider EE consists of the four-year term program, years 2014-2017, as well as rates under the continuation of that program for years 2018-2021 as outlined below. This Rider applies to service supplied under all rate schedules, except rate schedules OL, FL, PL, GL and NL for program years 2017-2021.

GENERAL PROVISIONS

This Rider will recover the cost of new energy efficiency and demand-side management programs beginning January 1, 2014, using the method approved by the NCUC as set forth in Docket No. E-7 Sub 1032, Order dated October 29, 2013, as revised by Docket No. E-7, Sub 1130, Order dated August 23, 2017.

TRUE-UP PROVISIONS

Rider amounts will initially be determined based on estimated kW and kWh impacts related to expected customer participation in the programs, and will be true-up as actual customer participation and actual kW and kWh impacts are verified. If a customer participates in any vintage of programs, the customer is subject to the true-ups as discussed in this section for any vintage of programs in which the customer participated.

RIDER EE OPT OUT PROVISION FOR QUALIFYING NON-RESIDENTIAL CUSTOMERS

The Rider EE increment applicable to energy efficiency programs and/or demand-side management programs will not be applied to the energy charge of the applicable rate schedule for customers qualified to opt out of the programs where:

- a. The customer has notified the Company that it has implemented, or has plans for implementing, alternative energy efficiency measures in accordance with quantifiable goals.
- b. Electric service to the customer must be provided under:
  1. An electric service agreement where the establishment is classified as a "manufacturing industry" by the Standard Industrial Classification Manual published by the United States Government and where more than 50% of the electric energy consumption of such establishment is used for its manufacturing processes. Additionally, all other agreements billed to the same entity associated with the manufacturing industry located on the same or contiguous properties are also eligible to opt out.
  2. An electric service agreement for general service as provided for under the Company's rate schedules where the customer's annual energy use is 1,000,000 kilowatt hours or more. Additionally, all other agreements billed to the same entity with lesser annual usage located on the same or contiguous properties are also eligible to opt out.

The following additional provisions apply for qualifying customers who elect to opt out:

For customers who elect to opt out of energy efficiency programs, the following provisions also apply:

- Qualifying customers may opt out of the Company's energy efficiency programs each calendar year only during the annual two-month enrollment period between November 1 and December 31 immediately prior to a new Rider EE becoming effective on January 1. (Qualifying new customers have sixty days after beginning service to opt out).
- Customers may not opt out of individual energy efficiency programs offered by the Company. The choice to opt out applies to the Company's entire portfolio of energy efficiency programs.
- If a customer participates in any vintage of energy efficiency programs, the customer, irrespective of future opt out decisions, remains obligated to pay the remaining portion of the lost revenues for each vintage of energy efficiency programs in which the customer participated.
- Customers who elect to opt out during the two-month annual enrollment period immediately prior to the new Rider EE becoming effective may elect to opt in to the Company's energy efficiency programs during the first 5 business days of March each calendar year. Customers making this election will be back-billed retroactively to the effective date of the new Rider EE.

For customers who elect to opt out of demand-side management programs, the following provisions also apply:

- Qualifying customers may opt out of the Company's demand-side management program during the enrollment period between November 1 and December 31 immediately prior to a new Rider EE becoming effective on January 1 of the applicable year. (Qualifying new customers have sixty days after beginning service to opt out).

Rider EE (NC)  
ENERGY EFFICIENCY RIDER

- If a customer elects to participate in a demand-side management program, the customer may not subsequently choose to opt out of demand-side management programs for three years.
- Customers who elect to opt out during the two-month annual enrollment period immediately prior to the new Rider EE becoming effective may elect to opt in to the Company's demand-side management program during the first 5 business days of March each calendar year. Customers making this election will be back-billed to the effective date of the new Rider EE.

Any qualifying non-residential customer that has not participated in an energy efficiency or demand-side management program may opt out during any enrollment period, and has no further responsibility to pay Rider EE amounts associated with the customer's opt out election for energy efficiency and/or demand-side management programs.

ENERGY EFFICIENCY RIDER ADJUSTMENTS (EEA) FOR ALL PROGRAM YEARS

The Rider EE amounts applicable to the residential and nonresidential rate schedules for the period January 1, 2021 through December 31, 2021 including utility assessments are as follows:

|                       |   |                   |
|-----------------------|---|-------------------|
| <u>Residential</u>    | Vintage 2017 <sup>1</sup> , 2018 <sup>1</sup> , 2019 <sup>1</sup> | 0.1046¢ per kWh   |
|                       | Vintage 2019 <sup>2</sup> , 2020 <sup>2</sup> , 2021 <sup>2</sup> | 0.4184¢ per kWh   |
|                       | Total Residential Rate  | 0.5230¢ per kWh   |
| <u>Nonresidential</u> |   |                   |
|                       | Vintage 2017 <sup>3</sup>   |                   |
|                       | Energy Efficiency   | 0.0342¢ per kWh   |
|                       | Demand Side Management  | 0.0000¢ per kWh   |
|                       | Vintage 2018 <sup>3</sup>   |                   |
|                       | Energy Efficiency   | 0.0088¢ per kWh   |
|                       | Demand Side Management  | (0.0014)¢ per kWh |
|                       | Vintage 2019 <sup>3</sup>   |                   |
|                       | Energy Efficiency   | 0.0462¢ per kWh   |
|                       | Demand Side Management  | 0.0018¢ per kWh   |
|                       | Vintage 2020 <sup>3</sup>   |                   |
|                       | Energy Efficiency   | 0.0612¢ per kWh   |
|                       | Demand Side Management  | 0.0000¢ per kWh   |
|                       | Vintage 2021 <sup>3</sup>   |                   |
|                       | Energy Efficiency   | 0.3522¢ per kWh   |
|                       | Demand Side Management  | 0.1200¢ per kWh   |
|                       | Total Nonresidential  | 0.6230¢ per kWh   |

<sup>1</sup> Includes the true-up of program costs, shared savings and lost revenues from Year 1 of Vintage 2019 and Year 2 of Vintage 2018, and Year 3 of 2017

<sup>2</sup> Includes prospective component of Vintage 2019, 2020 and 2021

<sup>3</sup> Not Applicable to Rate Schedules OL, FL, PL, GL, and NL.

Each factor listed under Nonresidential is applicable to nonresidential customers who are not eligible to opt out and to eligible customers who have not opted out. If a nonresidential customer has opted out of a Vintage(s), then the applicable energy efficiency and/or demand-side management charge(s) shown above for the Vintage(s) during which the customer has opted out, will not apply to the bill.



Duke Energy Carolinas, LLC  
DSM/EE Cost Recovery Rider 12  
Docket Number E-7 Sub 1230  
Exhibit Summary of Rider EE Exhibits and Factors

**Residential Billing Factor for Rider 12 True-up (EMF) Components**

|      |   |                                   |                |
|------|---|-----------------------------------|----------------|
| Line |   |                                   |                |
| 1    | Year 2016 EE/DSM True-up (EMF) Revenue Requirement                  | Miller Exhibit 2, pg. 1a, Line 15 | \$ (57,239)    |
| 2    | Year 2017 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg.1 Line 15     | (4,091,589)    |
| 3    | Year 2018 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg 2 Line 15     | 2,645,710      |
| 4    | Year 2019 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg 3 Line 15     | 23,835,420     |
| 5    | Total True-up (EMF) Revenue Requirement                             | Sum Lines 1-3                     | \$ 22,332,301  |
| 6    | Projected NC Residential Sales (kWh) for rate period                | Miller Exhibit 6 pg. 1, Line 1    | 22,092,324,452 |
| 7    | EE/DSM Revenue Requirement EMF Residential Rider EE (cents per kWh) | Line 4 / Line 5 * 100             | 0.1011         |

**Residential Billing Factor for Rider 12 Prospective Components**

|    |   |                                 |                |
|----|---|---------------------------------|----------------|
| 8  | Vintage 2018 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 2, Line 15 | -              |
| 9  | Vintage 2019 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 3, Line 15 | 5,292,331      |
| 10 | Vintage 2020 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 4, Line 1  | 4,495,479      |
| 11 | Vintage 2021 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg 5, Line 11  | 82,636,375     |
| 12 | Total Prospective Revenue Requirement                                       | Sum Lines 7-10                  | \$ 92,424,185  |
| 13 | Projected NC Residential Sales (kWh) for rate period                        | Miller Exhibit 6 pg. 1, Line 1  | 22,092,324,452 |
| 14 | EE/DSM Revenue Requirement Prospective Residential Rider EE (cents per kWh) | Line 11 / Line 12 * 100         | 0.4184         |

Total Revenue Requirements in Rider 12 from Residential Customers

|    |  |                   |                       |
|----|--|-------------------|-----------------------|
| 15 | Total True-up (EMF) Revenue Requirement  | Line 4            | \$ 22,332,301         |
| 16 | Total Prospective Revenue Requirement  | Line 11           | 92,424,185            |
| 17 | <b>Total EE/DSM Revenue Requirement for Residential Rider EE</b>                 | Line 14 + Line 15 | <b>\$ 114,756,486</b> |
| 18 | <b>Total EE/DSM Revenue Requirement for Residential Rider EE (cents per kWh)</b> | Line 6 + Line 13  | <b>0.5195</b>         |

**Non-Residential Billing Factors for Rider 12 True-up (EMF) Components**

|    |   |                                  |                |
|----|---|----------------------------------|----------------|
| 19 | Vintage Year 2016 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 1a, Line 25 | \$ 3,217,376   |
| 20 | Projected Year 2016 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 4          | 16,670,610,353 |
| 21 | EE Revenue Requirement Year 2016 EMF Non-Residential Rider EE (cents per kWh)       | Line 18/Line 19 * 100            | 0.0193         |
| 22 | Vintage Year 2016 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 1a, Line 35 | \$ (18,608)    |
| 23 | Projected Year 2016 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 5          | 16,964,126,808 |
| 24 | DSM Revenue Requirement Year 2016 EMF Non-Residential Rider EE (cents per kWh)      | Line 21/Line 22 * 100            | (0.0001)       |
| 25 | Vintage Year 2017 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 1, Line 25  | \$ 5,650,795   |
| 26 | Projected Year 2017 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 4          | 16,498,870,944 |
| 27 | EE Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)       | Line 18/Line 19 * 100            | 0.0342         |
| 28 | Vintage Year 2017 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 1, Line 35  | \$ 6,539       |
| 29 | Projected Year 2017 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 5          | 16,933,914,400 |
| 30 | DSM Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)      | Line 21/Line 22 * 100            | -              |
| 31 | Vintage Year 2018 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 2, Line 25  | \$ (784,173)   |
| 32 | Projected Year 2018 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 6          | 15,929,504,199 |
| 33 | EE Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)       | Line 24/Line 25 * 100            | (0.0049)       |
| 34 | Vintage Year 2018 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 2, Line 35  | \$ (243,015)   |
| 35 | Projected Year 2018 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 7          | 16,832,538,740 |
| 36 | DSM Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)      | Line 27/Line 28 * 100            | (0.0014)       |
| 37 | Vintage Year 2019 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 3, Line 25  | \$ (3,527,723) |
| 38 | Projected Year 2019 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 8          | 15,707,415,542 |
| 39 | EE Revenue Requirement Year 2019 EMF Non-Residential Rider EE (cents per kWh)       | Line 30/Line 31 * 100            | (0.0225)       |
| 40 | Vintage Year 2019 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 3, Line 35  | \$ 312,940     |
| 41 | Projected Year 2019 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 9          | 16,897,018,794 |
| 42 | DSM Revenue Requirement Year 2019 EMF Non-Residential Rider EE (cents per kWh)      | Line 33/Line 34 * 100            | 0.0019         |

***Non-Residential Billing Factors for Rider 12 Prospective Components***

|    |  |                                 |    |                |
|----|--|---------------------------------|----|----------------|
| 43 | Vintage Year 2018 EE Prospective Amounts Revenue Requirement   | Miller Exhibit 2 pg. 2, Line 25 | \$ | 2,182,027      |
| 44 | Projected Program Year 2018 EE Participants NC Non-Residential Sales (kwh) for rate period                     | Miller Exhibit 6 Line 6         |    | 15,929,504,199 |
| 45 | <i>EE Revenue Requirement Vintage 2018 Prospective Component for Non-Residential Rider EE (cents per kWh)</i>  | Line 36/Line 37 * 100           |    | <b>0.0137</b>  |
| 46 | Vintage Year 2019 EE Prospective Amounts Revenue Requirement   | Miller Exhibit 2 pg. 3, Line 25 | \$ | 10,794,655     |
| 47 | Projected Vintage 2019 EE Participants NC Non-Residential Sales (kwh) for rate period                          | Miller Exhibit 6 Line 8         |    | 15,707,415,542 |
| 48 | <i>EE Revenue Requirement Vintage 2019 Prospective Component for Non-Residential Rider EE (cents per kWh)</i>  | Line 39/Line 40 * 100           |    | <b>0.0687</b>  |
| 49 | Vintage Year 2020 EE Prospective Amounts Revenue Requirement   | Miller Exhibit 2 pg. 4, Line 4  | \$ | 9,376,721      |
| 50 | Projected Vintage 2020 EE Participants NC Non-Residential Sales (kwh) for rate period                          | Miller Exhibit 6 Line 10        |    | 15,330,345,599 |
| 51 | <i>EE Revenue Requirement Vintage 2020 Prospective Component for Non-Residential Rider EE (cents per kWh)</i>  | Line 42/Line 43 * 100           |    | <b>0.0612</b>  |
| 52 | Vintage Year 2021 EE Prospective Amounts Revenue Requirement   | Miller Exhibit 2 pg. 5, Line 18 | \$ | 53,990,117     |
| 53 | Projected Vintage 2021 EE Participants NC Non-Residential Sales (kwh) for rate period                          | Miller Exhibit 6 Line 12        |    | 15,330,345,599 |
| 54 | <i>EE Revenue Requirement Vintage 2021 Prospective Component for Non-Residential Rider EE (cents per kWh)</i>  | Line 45/Line 46 * 100           |    | <b>0.3522</b>  |
| 55 | Vintage Year 2021 DSM Prospective Amounts Revenue Requirement  | Miller Exhibit 2 pg. 5, Line 25 | \$ | 20,278,628     |
| 56 | Projected Vintage 2021 DSM Participants NC Non-Residential Sales (kwh) for rate period                         | Miller Exhibit 6 Line 13        |    | 16,898,362,794 |
| 57 | <i>DSM Revenue Requirement Vintage 2021 Prospective Component for Non-Residential Rider EE (cents per kWh)</i> | Line 48/Line 49 * 100           |    | <b>0.1200</b>  |
|    | <b>Total EMF Rate</b>  |                                 |    | <b>0.0265</b>  |
|    | <b>Total Prospective Rate</b>  |                                 |    | <b>0.6158</b>  |

***Total Revenue Requirements in Rider 12 from Non-Residential Customers***

|    |   |                   |  |                    |
|----|---|-------------------|--|--------------------|
| 58 | Vintage Year 2016 EE True-up (EMF) Revenue Requirement        | Line 19           |  | 3,217,376          |
| 59 | Vintage Year 2016 DSM True-up (EMF) Revenue Requirement       | Line 22           |  | (18,608)           |
| 60 | Vintage Year 2017 EE True-up (EMF) Revenue Requirement        | Line 25           |  | 5,650,795          |
| 61 | Vintage Year 2017 DSM True-up (EMF) Revenue Requirement       | Line 28           |  | 6,539              |
| 62 | Vintage Year 2018 EE True-up (EMF) Revenue Requirement        | Line 31           |  | (784,173)          |
| 63 | Vintage Year 2018 DSM True-up (EMF) Revenue Requirement       | Line 34           |  | (243,015)          |
| 64 | Vintage Year 2019 EE True-up (EMF) Revenue Requirement        | Line 37           |  | (3,527,723)        |
| 65 | Vintage Year 2019 DSM True-up (EMF) Revenue Requirement       | Line 40           |  | 312,940            |
| 66 | Vintage Year 2018 EE Prospective Amounts Revenue Requirement  | Line 43           |  | 2,182,027          |
| 67 | Vintage Year 2019 EE Prospective Amounts Revenue Requirement  | Line 46           |  | 10,794,655         |
| 68 | Vintage Year 2020 EE Prospective Amounts Revenue Requirement  | Line 49           |  | 9,376,721          |
| 69 | Vintage Year 2021 EE Prospective Amounts Revenue Requirement  | Line 52           |  | 53,990,117         |
| 70 | Vintage Year 2021 DSM Prospective Amounts Revenue Requirement | Line 55           |  | 20,278,628         |
|    | <b>Total Non-Residential Revenue Requirement in Rider 12</b>  | Sum (Lines 58-70) |  | <b>101,236,279</b> |

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1192  
True Up of Year 1, 2 and 3 for Vintage Year 2016

## RESIDENTIAL Energy Efficiency Programs

|      |  | E-7 Sub 1073                                      | E-7 Sub 1105                 | E-7 Sub 1130             | E-7 Sub 1130               | E-7 Sub 1164              | E-7 Sub 1192              |                           |
|------|--|---|------------------------------|--------------------------|----------------------------|---------------------------|---------------------------|---------------------------|
| Line | Reference  | Rider 7 Original Estimate                         | Rider 8 Year 2 Lost Revenues | Rider 9 True up (Year 1) | Year 2016 Yr 3 LR Estimate | Rider 10 True up (Year 2) | Rider 11 True Up (Year 3) | Rider 12 True Up (Year 4) |
| 1    | Residential EE Program Cost  | Evans Exhibit 1 pg. 2, Line 10 * NC Alloc. Factor | \$ 31,056,079                | \$ 8,965,024             |                            | \$ (2)                    |                           | \$ 40,021,101             |
| 2    | Residential EE Earned Utility Incentive                            | Evans Exhibit 1 pg. 2, Line 10 * NC Alloc. Factor | 2,392,652                    | 4,361,799                |                            | (52,098)                  |                           | 6,702,353                 |
| 3    | Return on undercollection of Residential EE Program Costs          | Miller Exhibit 3 pg 5                             |                              | 272,476                  |                            | 710,786                   | 430,926                   | 1,366,961                 |
| 4    | Total EE Program Cost and Incentive Components                     | Line 1 + Line 2 + line 3                          | 33,448,731                   | 13,599,299               |                            | 658,686                   | 430,926                   | 48,090,415                |
| 5    | Residential DSM Program Cost                                       | Evans Exhibit 1 pg. 2, Line 11 * NC Alloc. Factor | 10,613,016                   | (1,012,441)              |                            | 0                         |                           | 9,600,575                 |
| 6    | Residential DSM Earned Utility Incentive                           | Evans Exhibit 1 pg. 2, Line 11 * NC Alloc. Factor | 2,887,418                    | (129,612)                |                            | (27,890)                  |                           | 2,729,916                 |
| 7    | Return on overcollection of Residential DSM Program Costs          | Miller Exhibit 3 pg 6                             |                              | (26,322)                 |                            | (46,199)                  | (39,872)                  | (113,354)                 |
| 8    | Total DSM Program Cost and Incentive Components                    | Line 5 + Line 6 + Line 7                          | 13,500,434                   | (1,168,375)              |                            | (74,089)                  | (39,872)                  | 12,217,137                |
| 9    | Total EE/DSM Program Cost and Incentive Components                 | Line 4 + Line 8                                   | 46,949,165                   | 12,430,924               |                            | 584,597                   | 391,055                   | 60,307,552                |
| 10   | Revenue-related taxes and regulatory fees factor **                | Miller Exhibit 2, pg. 7                           | 1,001,442                    | 1,001,402                |                            | 1,001,402                 | 1,001,352                 | 1,001,302                 |
| 11   | Total EE/DSM Program Cost and Incentive Revenue Requirement        | Line 9 * Line 10                                  | 47,016,866                   | 12,448,352               |                            | 585,417                   | 391,583                   | 60,393,967                |
| 12   | Residential Net Lost Revenues                                      | Evans Exhibit 2 pg. 2                             | 11,873,767                   | 4,795,359                | 7,765,323                  | (3,299,616)               | 1,969,313                 | 28,828,063                |
| 13   | Total Residential EE/DSM Revenue Requirement                       | Line 11 + Line 12                                 | 58,890,633                   | 17,243,711               | 7,765,323                  | (2,714,199)               | 2,360,897                 | 89,222,030                |
| 14   | Total Collected for Vintage Year 2016 (through estimated Rider 10) | Miller Exhibit 4 Line 2                           |                              |                          |                            |                           |                           | 89,279,269                |
| 15   | <b>Total Residential EE/DSM Revenue Requirement</b>                | Line 11 + Line 12                                 |                              |                          |                            |                           |                           | <b>\$ (57,239)</b>        |

See Miller Exhibit A for rate

## NON-RESIDENTIAL Energy Efficiency Programs

|      |  | E-7 Sub 1073                                      | E-7 Sub 1105                 | E-7 Sub 1130   | E-7 Sub 1130               | E-7 Sub 1164              | E-7 Sub 1192              |                           |
|------|--|---|------------------------------|----------------|----------------------------|---------------------------|---------------------------|---------------------------|
| Line | Reference  | Rider 7 Original Estimate                         | Rider 8 Year 2 Lost Revenues | Year 1 True up | Year 2016 Yr 3 LR Estimate | Rider 10 True up (Year 2) | Rider 11 True Up (Year 3) | Rider 12 True up (Year 4) |
| 16   | Non- Residential EE Program Cost   | Evans Exhibit 1 pg. 2, Line 25 * NC Alloc. Factor | 36,494,611                   | 13,515,376     |                            | 1                         |                           | 50,009,988                |
| 17   | Non-Residential EE Earned Utility Incentive                              | Evans Exhibit 1 pg. 2, Line 25 * NC Alloc. Factor | 10,105,721                   | 4,261,607      |                            | (353,368)                 |                           | 14,013,960                |
| 18   | Return on undercollection of Non-residential EE Program Costs            | Miller Exhibit 3 page 7                           |                              | 378,293        |                            | 1,051,375                 | 731,576                   | 2,247,377                 |
| 19   | Total EE Program Cost and Incentive Components                           | Line 16 + Line 17 + Line 18                       | 46,600,332                   | 18,155,276     |                            | 698,008                   | 731,576                   | 66,271,325                |
| 20   | Revenue-related taxes and regulatory fees factor                         | Miller Exhibit 2, pg. 7                           | 1,001,442                    | 1,001,402      |                            | 1,001,402                 | 1,001,352                 | 1,001,302                 |
| 21   | Total Non-Residential EE Program Cost and Incentive Revenue Requirements | Line 19 * Line 20                                 | 46,667,530                   | 18,180,730     |                            | 698,987                   | 732,565                   | 66,366,056                |
| 22   | Non-Residential Net Lost Revenues  | Evans Exhibit 2 pg. 2                             | 4,745,315                    | 8,309,444      | 2,524,047                  | 13,375,187                | (4,085,026)               | 6,383,046                 |
| 23   | Total Non-Residential EE Revenue Requirement                             | Line 21 + Line 22                                 | 51,412,845                   | 8,309,444      | 20,704,776                 | 13,375,187                | (3,386,039)               | 7,115,611                 |
| 24   | Total Collected for Vintage Year 2016 (through estimated Rider 10)       | Miller Exhibit 4 Line 8                           |                              |                |                            |                           |                           | 4,108,727                 |
| 25   | Non-Residential EE Revenue Requirement                                   | Line 23 - Line 24                                 |                              |                |                            |                           |                           |                           |
| 26   | Projected NC Residential Sales (kWh)                                     | Miller Exhibit 6, Line 6                          |                              |                |                            |                           |                           |                           |
| 27   | <b>NC Non-Residential EE billing factor (Cents/kWh)</b>                  | Line 25/Line 26*100                               |                              |                |                            |                           |                           | <b>0.0193</b>             |

## DSM Programs

|      |  | E-7 Sub 1073                                      | E-7 Sub 1130    | E-7 Sub 1164     | E-7 Sub 1192              |                           |
|------|--|---|-----------------|------------------|---------------------------|---------------------------|
| Line | Reference  | Rider 7 Original Estimate                         | Rider 9 True up | Rider 10 True Up | Rider 11 True Up (Year 3) | Rider 12 True Up (Year 4) |
| 28   | Non-Residential DSM Program Cost                                   | Evans Exhibit 1, pg. 2 Line 26 * NC Alloc. Factor | 12,855,910      | (1,261,413)      | 0                         |                           |
| 29   | Non-Residential DSM Earned Utility Incentive                       | Evans Exhibit 1, pg. 2 Line 26 * NC Alloc. Factor | 3,497,628       | (167,059)        | (33,683)                  |                           |
| 30   | Return on undercollection of Non-residential DSM Program Costs     | Miller Exhibit 3 page 8                           | 1,759           | 3,420            | (6,087)                   | (9,421)                   |
| 31   | Total Non-Residential DSM Program Cost and Incentive Components    | Line 28 + Line 29 + Line 30                       | 16,353,538      | (1,426,713)      | (30,262)                  | (9,421)                   |
| 32   | Revenue-related taxes and regulatory fees factor                   | Miller Exhibit 2, pg. 7                           | 1,001,442       | 1,001,402        | 1,001,402                 | 1,001,352                 |
| 33   | Total Non-Residential DSM Revenue Requirement                      | Line 31 * Line 32                                 | 16,377,120      | (1,428,713)      | (30,305)                  | (6,095)                   |
| 34   | Total Collected for Vintage Year 2016 (through estimated Rider 10) | Miller Exhibit 4 Line 13                          |                 |                  |                           |                           |
| 35   | Non-Residential EE Revenue Requirement True-up Amount              | Line 33- Line 34                                  |                 |                  |                           |                           |
| 36   | Projected NC Non-Residential Sales (kWh)                           | Miller Exhibit 6, Line 7                          |                 |                  |                           |                           |
| 37   | <b>NC Non-Residential DSM billing factor</b>                       | Line 35/Line 36*100                               |                 |                  |                           |                           |

- \* Year 4 Projected Lost Revenue is not being requested in this filing because lost revenue through the test period of Docket E7 Sub XXXX was requested as part of base rates.
- \*\* Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
True Up of Year 1, 2 and 3 Lost Revenues for Vintage Year 2017

## RESIDENTIAL Energy Efficiency Programs

| Line | Reference  | E-7 Sub 1105                                      | E-7 Sub 1130               | E-7 Sub 1164     | E-7 Sub 1164              | E-7 Sub 1192     | E-7 Sub 1192               | E-7 Sub 1230     | Year 2017      |
|------|--|---|----------------------------|------------------|---------------------------|------------------|----------------------------|------------------|----------------|
|      |  | Rider 8 Year 1 Estimate                           | Year 2017 Yr 2 LR Estimate | Rider 10 True up | Year 2017 Year 3 Estimate | Rider 11 True Up | Year 2017 Yr 4 LR Estimate | Rider 12 True up |                |
| 1    | Residential EE Program Cost  | Evans Exhibit 1 pg. 1, Line 10 * NC Alloc. Factor | \$ 33,488,974              | \$ 13,998,885    |                           | \$ -             |                            | \$ -             | \$ 47,487,859  |
| 2    | Residential EE Earned Utility Incentive                            | Evans Exhibit 1 pg. 1, Line 10 * NC Alloc. Factor | 4,149,244                  | 4,340,033        |                           | (250,931)        |                            | (0)              | 8,238,346      |
| 3    | Return on undercollection of Residential EE Program Costs          | Miller Exhibit 3 pg 1                             |                            | 522,611          |                           | 1,226,138        |                            | 622,205          | 2,370,954      |
| 4    | Total EE Program Cost and Incentive Components                     | Line 1 + Line 2 + line 3                          |                            | 18,861,529       |                           | 975,207          |                            | 622,205          | 58,097,159     |
| 5    | Residential DSM Program Cost                                       | Evans Exhibit 1 pg. 1, Line 11 * NC Alloc. Factor | 10,258,751                 | (176,455)        |                           | -                |                            | -                | 10,082,296     |
| 6    | Residential DSM Earned Utility Incentive                           | Evans Exhibit 1 pg. 1, Line 11 * NC Alloc. Factor | 2,837,134                  | 89,061           |                           | -                |                            | -                | 2,926,195      |
| 7    | Return on undercollection of Residential DSM Program Costs         | Miller Exhibit 3 pg 2                             |                            | 15,015           |                           | 12,882           |                            | 7,019            | 34,916         |
| 8    | Total DSM Program Cost and Incentive Components                    | Line 5 + Line 6 + Line 7                          |                            | (72,379)         |                           | 12,882           |                            | 7,019            | 13,043,408     |
| 9    | Total EE/DSM Program Cost and Incentive Components                 | Line 4 + Line 8                                   |                            | 18,789,150       |                           | 988,089          |                            | 629,224          | 71,140,567     |
| 10   | Revenue-related taxes and regulatory fees factor **                | Miller Exhibit 2, pg. 6                           | 1.001482                   | 1.001402         |                           | 1.001352         |                            | 1.001302         |                |
| 11   | Total EE/DSM Program Cost and Incentive Revenue Requirement        | Line 9 * Line 10                                  |                            | 18,815,493       |                           | 989,425          |                            | 630,044          | 71,244,252     |
| 12   | Residential Net Lost Revenues                                      | Evans Exhibit 2 pg. 2                             | 50,809,291                 | 6,456,129        | 8,904,587                 | 2,572,270        | 1,751,061                  | (4,729,337)      | 31,855,831     |
| 13   | Total Residential EE/DSM Revenue Requirement                       | Line 11 + Line 12                                 | 4,202,002                  | 25,271,622       | 8,904,587                 | 3,561,695        | 1,751,061                  | (4,099,293)      | 103,100,083    |
| 14   | Total Collected for Vintage Year 2017 (through estimated Rider 10) | Miller Exhibit 4 Line 1                           |                            |                  |                           |                  |                            |                  | 107,191,672    |
| 15   | Total Residential EE/DSM Revenue Requirement                       | Line 13 - Line 14                                 |                            |                  |                           |                  |                            |                  | \$ (4,091,589) |

See Miller Exhibit A for rate

## NON-RESIDENTIAL Energy Efficiency Programs

| Line | Reference  | E-7 Sub 1105                                      | E-7 Sub 1130               | E-7 Sub 1164     | E-7 Sub 1164              | E-7 Sub 1192     | E-7 Sub 1192               | E-7 Sub 1230     | Year 2017      |
|------|--|---|----------------------------|------------------|---------------------------|------------------|----------------------------|------------------|----------------|
|      |  | Rider 8 Year 1 Estimate                           | Year 2017 Yr 2 LR Estimate | Rider 10 True up | Year 2017 Year 3 Estimate | Rider 11 True Up | Year 2017 Yr 4 LR Estimate | Rider 12 True up |                |
| 16   | Non- Residential EE Program Cost   | Evans Exhibit 1 pg. 1, Line 26 * NC Alloc. Factor | 38,791,601                 | 32,155,814       |                           | -                |                            | -                | 70,947,415     |
| 17   | Non-Residential EE Earned Utility Incentive                              | Evans Exhibit 1 pg. 1, Line 26 * NC Alloc. Factor | 9,347,504                  | 9,073,243        |                           | 3,304,511        |                            | (0)              | 21,725,258     |
| 18   | Return on undercollection of Non-residential EE Program Costs            | Miller Exhibit 3 page 3                           |                            | 1,588,185        |                           | 2,709,383        |                            | 1,615,334        | 5,912,902      |
| 19   | Total EE Program Cost and Incentive Components                           | Line 16 + Line 17 + Line 18                       |                            | 42,817,242       |                           | 6,013,894        |                            | 1,615,334        | 98,585,574     |
| 20   | Revenue-related taxes and regulatory fees factor                         | Miller Exhibit 2, pg. 6                           | 1.001482                   | 1.001402         |                           | 1.001352         |                            | 1.001302         |                |
| 21   | Total Non-Residential EE Program Cost and Incentive Revenue Requirements | Line 19 * Line 20                                 |                            | 42,877,271       |                           | 6,022,025        |                            | 1,617,437        | 98,727,180     |
| 22   | Non-Residential Net Lost Revenues  | Evans Exhibit 2 pg. 2                             | 6,039,892                  | 2,627,210        | 14,570,381                | 7,280,971        | 5,593,790                  | 512,352          | 46,091,463     |
| 23   | Total Non-Residential EE Revenue Requirement                             | Line 21 + Line 22                                 | 9,466,867                  | 45,504,481       | 14,570,381                | 13,302,996       | 5,593,790                  | 2,129,789        | 144,818,644    |
| 24   | Total Collected for Vintage Year 2017 (through estimated Rider 10)       | Miller Exhibit 4 Line 6                           |                            |                  |                           |                  |                            |                  | 139,167,848    |
| 25   | Non-Residential EE Revenue Requirement                                   | Line 23 - Line 24                                 |                            |                  |                           |                  |                            |                  | 5,650,795      |
| 26   | Projected NC Residential Sales (kWh)                                     | Miller Exhibit 6, pg. 1, Line 4                   |                            |                  |                           |                  |                            |                  | 16,498,870,944 |
| 27   | NC Non-Residential EE billing factor (Cents/kWh)                         | Line 25/Line 26*100                               |                            |                  |                           |                  |                            |                  | 0.0342         |

## DSM Programs

| Line | Reference  | E-7 Sub 1105                                      | E-7 Sub 1164     | E-7 Sub 1192     | E-7 Sub 1230     | Year 2017      |
|------|--|---|------------------|------------------|------------------|----------------|
|      |  | Rider 8 Year 1 Estimate                           | Rider 10 True Up | Rider 11 True Up | Rider 12 True up |                |
| 28   | Non-Residential DSM Program Cost                                   | Evans Exhibit 1, pg. 1 Line 28 * NC Alloc. Factor | 13,389,985       | (1,438,646)      | -                | 11,951,339     |
| 29   | Non-Residential DSM Earned Utility Incentive                       | Evans Exhibit 1, pg. 1 Line 28 * NC Alloc. Factor | 3,703,101        | (234,452)        | -                | 3,468,649      |
| 30   | Return on undercollection of Non-Residential DSM Program Costs     | Miller Exhibit 3 page 4                           | -                | 4,761            | 2,401            | 11,428         |
| 31   | Total Non-Residential DSM Program Cost and Incentive Components    | Line 28 + Line 29 + Line 30                       | 17,093,086       | (1,668,337)      | 4,266            | 15,431,416     |
| 32   | Revenue-related taxes and regulatory fees factor                   | Miller Exhibit 2, pg. 6                           | 1.001482         | 1.001402         | 1.001352         | 1.001302       |
| 33   | Total Non-Residential DSM Revenue Requirement                      | Line 31 * Line 32                                 | 17,118,418       | (1,670,676)      | 4,272            | 15,454,418     |
| 34   | Total Collected for Vintage Year 2017 (through estimated Rider 10) | Miller Exhibit 4 Line 10                          |                  |                  |                  | 15,447,879     |
| 35   | Non-Residential EE Revenue Requirement True-up Amount              | Line 33- Line 34                                  |                  |                  |                  | 6,539          |
| 36   | Projected NC Non-Residential Sales (kWh)                           | Miller Exhibit 6 pg. 1, Line 5                    |                  |                  |                  | 16,933,914,400 |
| 37   | NC Non-Residential DSM billing factor                              | Line 35/Line 36*100                               |                  |                  |                  | -              |

\*\* Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Year 4 Lost Revenue and True Up of Year 1 and Year 2 for Vintage Year 2018

## RESIDENTIAL Energy Efficiency Programs

| Line  | Reference   | Year 2018 Yr 4<br>LR Estimate |
|---|---|-------------------------------|
| 1 Residential EE Program Cost   | Evans Exhibit 1 pg. 2, Line 10 * NC Alloc. Factor |                               |
| 2 Residential EE Earned Utility Incentive                             | Evans Exhibit 1 pg. 2, Line 10 * NC Alloc. Factor |                               |
| 3 Return on undercollection of Residential EE Program Costs           | Miller Exhibit 3 pg. 5                            |                               |
| 4 Total EE Program Cost and Incentive Components                      | Line 1 + Line 2 + line 3                          |                               |
| 5 Residential DSM Program Cost  | Evans Exhibit 1 pg. 2, Line 11 * NC Alloc. Factor |                               |
| 6 Residential DSM Earned Utility Incentive                            | Evans Exhibit 1 pg. 2, Line 11 * NC Alloc. Factor |                               |
| 7 Return on undercollection of Residential DSM Program Costs          | Miller Exhibit 3 pg. 6                            |                               |
| 8 Total DSM Program Cost and Incentive Components                     | Line 5 + Line 6 + Line 7                          |                               |
| 9 Total EE/DSM Program Cost and Incentive Components                  | Line 4 + Line 8                                   |                               |
| 10 Revenue-related taxes and regulatory fees factor **                | Miller Exhibit 2, pg. 6                           |                               |
| 11 Total EE/DSM Program Cost and Incentive Revenue Requirement        | Line 9 * Line 10                                  |                               |
| 12 Residential Net Lost Revenues                                      | Evans Exhibit 2 pg. 3                             | \$ -                          |
| 13 Total Residential EE/DSM Revenue Requirement                       | Line 11 + Line 12                                 | -                             |
| 14 Total Collected for Vintage Year 2018 (through estimated Rider 10) | Miller Exhibit 4 Line 2                           |                               |
| 15 <b>Total Residential EE/DSM Revenue Requirement</b>                | Line 13 - Line 14                                 | <b>\$ -</b>                   |

Note: No prospective Year 4 lost revenue is included in this exhibit because the rate case test period was extended for residential customers.

## NON-RESIDENTIAL Energy Efficiency Programs

| Line  | Reference   | Year 2018 Yr 4<br>LR Estimate |
|---|---|-------------------------------|
| 16 Non- Residential EE Program Cost   | Evans Exhibit 1 pg. 2, Line 26 * NC Alloc. Factor |                               |
| 17 Non-Residential EE Earned Utility Incentive                              | Evans Exhibit 1 pg. 2, Line 26 * NC Alloc. Factor |                               |
| 18 Return on undercollection of Non-residential EE Program Costs            | Miller Exhibit 3 page 6                           |                               |
| 19 Total EE Program Cost and Incentive Components                           | Line 16 + Line 17 + Line 18                       |                               |
| 20 Revenue-related taxes and regulatory fees factor                         | Miller Exhibit 2, pg. 7                           |                               |
| 21 Total Non-Residential EE Program Cost and Incentive Revenue Requirements | Line 19 * Line 20                                 |                               |
| 22 Non-Residential Net Lost Revenues  | Evans Exhibit 2 pg. 3                             | 2,182,027                     |
| 23 Total Non-Residential EE Revenue Requirement                             | Line 21 + Line 22                                 | 2,182,027                     |
| 24 Total Collected for Vintage Year 2018 (through estimated Rider 10)       | Miller Exhibit 4 Line 7                           |                               |
| 25 Non-Residential EE Revenue Requirement                                   | Line 23 - Line 24                                 | 2,182,027                     |
| 26 Projected NC Residential Sales (kWh)                                     | Miller Exhibit 6, Line 6                          | 15,929,504,199                |
| 27 <b>NC Non-Residential EE billing factor (Cents/kWh)</b>                  | Line 25/Line 26*100                               | <b>0.0137</b>                 |

Note: Only non-residential customer lost revenues earned after the rate case test period have been included.

## DSM Programs

| Line  | Reference   | Year 2018 Yr 4<br>LR Estimate |
|---|---|-------------------------------|
| 28 Non-Residential DSM Program Cost                                   | Evans Exhibit 1, pg. 2 Line 28 * NC Alloc. Factor |                               |
| 29 Non-Residential DSM Earned Utility Incentive                       | Evans Exhibit 1, pg. 2 Line 28 * NC Alloc. Factor |                               |
| 30 Return on undercollection of Non-Residential DSM Program Costs     | Miller Exhibit 3 page 8                           |                               |
| 31 Total Non-Residential DSM Program Cost and Incentive Components    | Line 28 + Line 29 + Line 30                       |                               |
| 32 Revenue-related taxes and regulatory fees factor                   | Miller Exhibit 2, pg. 6                           |                               |
| 33 Total Non-Residential DSM Revenue Requirement                      | Line 31 * Line 32                                 |                               |
| 34 Total Collected for Vintage Year 2018 (through estimated Rider 10) | Miller Exhibit 4 Line 11                          |                               |
| 35 Non-Residential EE Revenue Requirement True-up Amount              | Line 33- Line 34                                  |                               |
| 36 Projected NC Non-Residential Sales (kWh)                           | Miller Exhibit 6 Line 7                           |                               |
| 37 <b>NC Non-Residential DSM billing factor</b>                       | Line 35/Line 36*100                               |                               |

\*\* Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

| E-7 Sub 1130            | E-7 Sub 1164               | E-7 Sub 1192     | E-7 Sub 1192               | E-7 Sub 1230     |               |
|-------------------------|----------------------------|------------------|----------------------------|------------------|---------------|
| Rider 9 Year 1 Estimate | Year 2018 Yr 2 LR Estimate | Rider 11 True up | Year 2018 Yr 3 LR Estimate | Rider 12 True up | Year 2018     |
| \$ 41,623,609           |                            | \$ 14,606,717    |                            | \$ (0)           | \$ 56,230,326 |
| 5,511,264               |                            | 4,154,068        |                            | 140,649          | 9,805,981     |
|                         |                            | 244,540          |                            | 1,024,850        | 1,269,390     |
| 47,134,873              |                            | 19,005,325       |                            | 1,165,498        | 67,305,696    |
| 9,903,130               |                            | (124,235)        |                            | 0                | 9,778,895     |
| 2,569,925               |                            | 17,215           |                            | (5,581)          | 2,581,559     |
|                         |                            | (28,626)         |                            | (40,884)         | (69,510)      |
| 12,473,055              |                            | (135,646)        |                            | (46,465)         | 12,290,944    |
| 59,607,928              |                            | 18,869,679       |                            | 1,119,034        | 79,596,641    |
| 1,001,402               |                            | 1,001,352        |                            | 1,001,302        |               |
| 59,691,498              |                            | 18,895,191       |                            | 1,120,491        | 79,707,180    |
| 19,612,717              | 6,294,025                  | 894,901          | 9,715,212                  | 1,534,156        | 38,051,011    |
| 79,304,216              | 6,294,025                  | 19,790,092       | 9,715,212                  | 2,654,647        | 117,758,191   |
|                         |                            |                  |                            |                  | 115,112,481   |
|                         |                            |                  |                            |                  | \$ 2,645,710  |

See Miller Exhibit A for rate

| E-7 Sub 1105            | E-7 Sub 1130               | E-7 Sub 1192     | E-7 Sub 1192               | E-7 Sub 1230     |                |
|-------------------------|----------------------------|------------------|----------------------------|------------------|----------------|
| Rider 9 Year 1 Estimate | Year 2018 Yr 2 LR Estimate | Rider 11 True up | Year 2018 Yr 3 LR Estimate | Rider 12 True up | Year 2018      |
| 40,592,949              |                            | (3,317,005)      |                            | 0                | 37,275,944     |
| 11,623,199              |                            | 2,818,045        |                            | (25,396)         | 14,415,848     |
|                         |                            | 461,049          |                            | 592,305          | 1,053,354      |
| 52,216,148              |                            | (37,911)         |                            | 566,910          | 52,745,147     |
| 1,001,402               |                            | 1,001,352        |                            | 1,001,302        |                |
| 52,289,355              |                            | (37,962)         |                            | 567,648          | 52,819,041     |
| 5,167,253               | 8,746,000                  | 2,933,863        | 9,507,185                  | (1,090,744)      | 25,263,557     |
| 57,456,608              | 8,746,000                  | 2,895,901        | 9,507,185                  | (523,097)        | 78,082,597     |
|                         |                            |                  |                            |                  | 78,866,770     |
|                         |                            |                  |                            |                  | (784,173)      |
|                         |                            |                  |                            |                  | 15,929,504,199 |
|                         |                            |                  |                            |                  | (0.0049)       |

| E-7 Sub 1105            |  | E-7 Sub 1192     |  | E-7 Sub 1230     |                |
|-------------------------|--|------------------|--|------------------|----------------|
| Rider 9 Year 1 Estimate |  | Rider 11 True Up |  | Rider 12 True up | Year 2018      |
| 11,959,889              |  | 651,281          |  | (0)              | 12,611,170     |
| 3,103,667               |  | 232,789          |  | (7,197)          | 3,329,259      |
| -                       |  | 37,743           |  | 76,651           | 37,743         |
| 15,063,556              |  | 921,813          |  | 69,454           | 15,978,172     |
| 1,001,402               |  | 1,001,352        |  | 1,001,302        |                |
| 15,084,675              |  | 923,059          |  | 69,544           | 16,007,734     |
|                         |  |                  |  |                  | 16,250,749     |
|                         |  |                  |  |                  | (243,015)      |
|                         |  |                  |  |                  | 16,832,538,740 |
|                         |  |                  |  |                  | (0.0014)       |

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Year 3 Lost Revenue and True Up of Year 1 for Vintage Year 2019

## RESIDENTIAL Energy Efficiency Programs

| Line  | Reference   | Year 2019 Yr 3<br>LR Estimate |
|---|---|-------------------------------|
| 1 Residential EE Program Cost   | Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor |                               |
| 2 Residential EE Earned Utility Incentive                             | Evans Exhibit 1 pg. 3, Line 10 * NC Alloc. Factor |                               |
| 3 Return on undercollection of Residential EE Program Costs           | Miller Exhibit 3 pg 9                             |                               |
| 4 Total EE Program Cost and Incentive Components                      | Line 1 + Line 2 + line 3                          |                               |
| 5 Residential DSM Program Cost  | Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor |                               |
| 6 Residential DSM Earned Utility Incentive                            | Evans Exhibit 1 pg. 3, Line 11 * NC Alloc. Factor |                               |
| 7 Return on undercollection of Residential DSM Program Costs          | Miller Exhibit 3 pg 10                            |                               |
| 8 Total DSM Program Cost and Incentive Components                     | Line 5 + Line 6 + Line 7                          |                               |
| 9 Total EE/DSM Program Cost and Incentive Components                  | Line 4 + Line 8                                   |                               |
| 10 Revenue-related taxes and regulatory fees factor **                | Miller Exhibit 2, pg. 6                           |                               |
| 11 Total EE/DSM Program Cost and Incentive Revenue Requirement        | Line 9 * Line 10                                  |                               |
| 12 Residential Net Lost Revenues                                      | Evans Exhibit 2 pg. 3                             | \$ 5,292,331                  |
| 13 Total Residential EE/DSM Revenue Requirement                       | Line 11 + Line 12                                 | 5,292,331                     |
| 14 Total Collected for Vintage Year 2018 (through estimated Rider 10) | Miller Exhibit 4 Line 3                           |                               |
| 15 <b>Total Residential EE/DSM Revenue Requirement</b>                | Line13 - Line 14                                  | <b>\$ 5,292,331</b>           |

| E-7 Sub 1164                | E-7 Sub 1192                  | E-7 Sub 1230        |                      |
|-----------------------------|-------------------------------|---------------------|----------------------|
| Rider 10 Year 1<br>Estimate | Year 2019 Yr 2<br>LR Estimate | Rider 11 True<br>up | Year 2019            |
| \$ 41,002,874               |                               | \$ 13,243,503       | \$ 54,246,377        |
| 3,801,819                   |                               | 3,296,056           | 7,097,875            |
|                             |                               | 55,738              | 55,738               |
| 44,804,693                  |                               | 16,595,296          | 61,399,989           |
| 10,577,352                  |                               | (308,751)           | 10,268,601           |
| 2,773,086                   |                               | 541,821             | 3,314,907            |
|                             |                               | (6,600)             | (6,600)              |
| 13,350,438                  |                               | 226,469             | 13,576,907           |
| 58,155,131                  |                               | 16,821,766          | 74,976,897           |
| 1,001402                    |                               | 1,001352            |                      |
| 58,236,664                  |                               | 16,844,509          | 75,081,173           |
| 18,783,204                  | 5,519,302                     | 6,704,043           | 31,006,549           |
| 77,019,869                  | 5,519,302                     | 23,548,552          | 106,087,723          |
|                             |                               |                     | 82,252,303           |
|                             |                               |                     | <b>\$ 23,835,420</b> |

See Miller Exhibit A for rate

## NON-RESIDENTIAL Energy Efficiency Programs

|   | Reference   | Year 2019 Yr 3 LR<br>Estimate |
|---|---|-------------------------------|
| 16 Non- Residential EE Program Cost   | Evans Exhibit 1 pg. 3, Line 26 * NC Alloc. Factor |                               |
| 17 Non-Residential EE Earned Utility Incentive                              | Evans Exhibit 1 pg. 3, Line 26 * NC Alloc. Factor |                               |
| 18 Return on undercollection of Non-residential EE Program Costs            | Miller Exhibit 3 page 12                          |                               |
| 19 Total EE Program Cost and Incentive Components                           | Line 16 + Line 17 + Line 18                       |                               |
| 20 Revenue-related taxes and regulatory fees factor                         | Miller Exhibit 2, pg. 6                           |                               |
| 21 Total Non-Residential EE Program Cost and Incentive Revenue Requirements | Line 19 * Line 20                                 |                               |
| 22 Non-Residential Net Lost Revenues  | Evans Exhibit 2 pg. 3                             | 10,794,655                    |
| 23 Total Non-Residential EE Revenue Requirement                             | Line 21 + Line 22                                 | 10,794,655                    |
| 24 Total Collected for Vintage Year 2018 (through estimated Rider 10)       | Miller Exhibit 4 Line 8                           |                               |
| 25 Non-Residential EE Revenue Requirement                                   | Line 23 - Line 24                                 | 10,794,655                    |
| 26 Projected NC Residential Sales (kWh)                                     | Miller Exhibit 6, Line 8                          | 15,707,415,542                |
| 27 <b>NC Non-Residential EE billing factor (Cents/kWh)</b>                  | Line 25/Line 26*100                               | <b>0.0687</b>                 |

| E-7 Sub 1164                | E-7 Sub 1192                  | E-7 Sub 1230        |                 |
|-----------------------------|-------------------------------|---------------------|-----------------|
| Rider 10 Year 1<br>Estimate | Year 2019 Yr 2<br>LR Estimate | Rider 11 True<br>up | Year 2019       |
| 41,671,833                  |                               | (8,698,625)         | 32,973,208      |
| 8,464,629                   |                               | 1,873,850           | 10,338,479      |
|                             |                               | (553,659)           | (553,659)       |
| 50,136,462                  |                               | (7,378,434)         | 42,758,028      |
| 1,001402                    |                               | 1,001352            |                 |
| 50,206,753                  |                               | (7,388,410)         | 42,818,344      |
| 5,590,446                   | 9,219,870                     | 452,216             | 15,262,532      |
| 55,797,199                  | 9,219,870                     | (6,936,194)         | 58,080,876      |
|                             |                               |                     | 61,608,599      |
|                             |                               |                     | (3,527,723)     |
|                             |                               |                     | 15,707,415,542  |
|                             |                               |                     | <b>(0.0225)</b> |

## DSM Programs

|   | Reference   |  |
|---|---|--|
| 28 Non-Residential DSM Program Cost                                   | Evans Exhibit 1, pg. 3 Line 28 * NC Alloc. Factor |  |
| 29 Non-Residential DSM Earned Utility Incentive                       | Evans Exhibit 1, pg. 3 Line 28 * NC Alloc. Factor |  |
| 30 Return on undercollection of Non-residential DSM Program Costs     | Miller Exhibit 3 page 16                          |  |
| 31 Total Non-Residential DSM Program Cost and Incentive Components    | Line 28 + Line 29 + Line 30                       |  |
| 32 Revenue-related taxes and regulatory fees factor                   | Miller Exhibit 2, pg. 6                           |  |
| 33 Total Non-Residential DSM Revenue Requirement                      | Line 31 * Line 32                                 |  |
| 34 Total Collected for Vintage Year 2018 (through estimated Rider 10) | Miller Exhibit 4 Line 12                          |  |
| 35 Non-Residential EE Revenue Requirement True-up Amount              | Line 33- Line 34                                  |  |
| 36 Projected NC Non-Residential Sales (kWh)                           | Miller Exhibit 6 Line 9                           |  |
| 37 <b>NC Non-Residential DSM billing factor</b>                       | Line 35/Line 36*100                               |  |

| E-7 Sub 1164                |  | E-7 Sub 1230        |                |
|-----------------------------|--|---------------------|----------------|
| Rider 10 Year 1<br>Estimate |  | Rider 11 True<br>Up | Year 2019      |
| 12,538,168                  |  | (462,163)           | 12,076,005     |
| 3,287,157                   |  | 611,215             | 3,898,372      |
| -                           |  | (9,744)             | (9,744)        |
| 15,825,325                  |  | 139,308             | 15,964,633     |
| 1,001402                    |  | 1,001352            |                |
| 15,847,512                  |  | 139,497             | 15,987,009     |
|                             |  |                     | 15,674,069     |
|                             |  |                     | 312,940        |
|                             |  |                     | 16,897,018,794 |
|                             |  |                     | <b>0.0019</b>  |

\*\* Actual regulatory fee rate in effect in year of collection. May differ from original filed estimates.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Year 2 Lost Revenues for Vintage Year 2020

## ***RESIDENTIAL***

| Line   | Reference                | 2020              |
|--|--------------------------|-------------------|
| 1 Residential Net Lost Revenues                | Evans Exhibit 2 pg. 3    | 4,495,479         |
| 2 Projected NC Residential Sales (kWh)         | Miller Exhibit 6, Line 1 | \$ 22,092,324,452 |
| 3 NC Residential EE Billing Factor (Cents/kWh) | Line 1/Line 2*100        | 0.0203            |

## ***NON-RESIDENTIAL***

### ***Energy Efficiency Programs***

|  | Reference                 | 2020           |
|--|---------------------------|----------------|
| 4 Non-Residential Net Lost Revenues                | Evans Exhibit 2 pg. 3     | 9,376,721      |
| 5 Projected NC Non-Residential Sales (kWh)         | Miller Exhibit 6, Line 10 | 15,330,345,599 |
| 6 NC Non-Residential EE billing factor (Cents/kWh) | Line 4/Line 5*100         | 0.0612         |

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Program Costs, Earned Incentive and Lost Revenues for Vintage Year 2021

## RESIDENTIAL

| Line  | Reference                                 | 2021                 |
|---|---|----------------------|
| 1 Residential EE Program Cost                                 | Evans Exhibit 1, pg. 4 * NC Alloc. Factor | \$ 37,155,471        |
| 2 Residential EE Earned Utility Incentive                     | Evans Exhibit 1, pg. 4 * NC Alloc. Factor | 2,979,803            |
| 3 Total EE Program Cost and Incentive Components              | Line 1 + Line 2, Evans Exhibit 1, Line 10 | 40,135,274           |
| 4 Residential DSM Program Cost                                | Evans Exhibit 1, pg. 4 * NC Alloc. Factor | 13,699,485           |
| 5 Residential DSM Earned Utility Incentive                    | Evans Exhibit 1, pg. 4 * NC Alloc. Factor | 3,521,640            |
| 6 Total DSM Program Cost and Incentive Components             | Line 4 + Line 5, Evans Exhibit 1, Line 12 | 17,221,124           |
| 7 Total EE/DSM Program Cost and Incentive Components          | Line 3 + Line 6                           | 57,356,398           |
| 8 Revenue-related taxes and regulatory fees factor            | Miller Exhibit 2, pg. 6                   | 1.001302             |
| 9 Total EE/DSM Program Cost and Incentive Revenue Requirement | Line 7 * Line 8                           | 57,431,076           |
| 10 Residential Net Lost Revenues                              | Evans Exhibit 2 pg. 3                     | 25,205,298           |
| 11 <b>Total Residential EE Revenue Requirement</b>            | <b>Line 9 + Line 10</b>                   | <b>\$ 82,636,375</b> |

See Miller Exhibit 1  
for rate

## NON-RESIDENTIAL

### Energy Efficiency Programs

|   | Reference                                   | 2021           |
|---|---|----------------|
| 12 Non- Residential EE Program Cost   | Evans Exhibit 1, pg. 4 * NC Alloc. Factor   | \$ 38,264,959  |
| 13 Non-Residential EE Earned Utility Incentive                              | Evans Exhibit 1, pg. 4 * NC Alloc. Factor   | 9,302,510      |
| 14 Total EE Program Cost and Incentive Components                           | Line 12 + Line 13, Evans Exhibit 1, Line 27 | 47,567,470     |
| 15 Revenue-related taxes and regulatory fees factor                         | Miller Exhibit 2, pg. 6                     | 1.001302       |
| 16 Total Non-Residential EE Program Cost and Incentive Revenue Requirements | Line 14 * Line 15                           | 47,629,402     |
| 17 Non-Residential Net Lost Revenues  | Evans Exhibit 2 pg. 3                       | 6,360,715      |
| 18 Total Non-Residential EE Revenue Requirement                             | Line 16 + Line 17                           | \$ 53,990,117  |
| 19 Projected NC Residential Sales (kWh)                                     | Miller Exhibit 6, pg. 1, Line 12            | 15,330,345,599 |
| 20 <b>NC Non-Residential EE billing factor (Cents/kWh)</b>                  | <b>Line 18/Line 19*100</b>                  | <b>0.3522</b>  |

## DSM Programs

|  |   | 2021           |
|--|---|----------------|
| 21 Non-Residential DSM Program Cost                                | Evans Exhibit 1, pg. 4 * NC Alloc. Factor   | \$ 16,110,767  |
| 22 Non-Residential DSM Earned Utility Incentive                    | Evans Exhibit 1, pg. 4 * NC Alloc. Factor   | 4,141,493      |
| 23 Total Non-Residential DSM Program Cost and Incentive Components | Line 21 + Line 22, Evans Exhibit 1, Line 29 | 20,252,260     |
| 24 Revenue-related taxes and regulatory fees factor                | Miller Exhibit 2, pg. 6                     | 1.001302       |
| 25 Total Non-Residential DSM Revenue Requirement                   | Line 23 * Line 24                           | 20,278,628     |
| 26 Projected NC Non-Residential Sales (kWh)                        | Miller Exhibit 6, pg. 1, Line 13            | 16,898,362,794 |
| 27 <b>NC Non-Residential DSM billing factor</b>                    | <b>Line 25/Line 26*100</b>                  | <b>0.1200</b>  |



**Duke Energy Carolinas, LLC**  
**Docket No. E-7, Sub 1230**  
**Gross Receipts Tax Years 2017 through estimated 2021**

|          | <u>Year</u> |                  | <u>Actual GRT Rate In Effect</u> |
|----------|-------------|------------------|----------------------------------|
| Rider 8  | 2017        |                  | 1.001402                         |
| Rider 9  | 2018        |                  | 1.001402                         |
| Rider 10 | 2019        | Jan - June       | 1.001402                         |
|          |             | July - Dec       | 1.001302                         |
|          |             | Weighted Average | <u>1.001352</u>                  |
| Rider 11 | 2020        |                  | 1.001302                         |
| Rider 12 | 2021        |                  | 1.001302                         |

Note: the current rate is used as the estimate for 2020 and 2021. This will be subject to true-up based on actual rates in effect.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Residential EE Programs Vintage 2017

/A

| NC Residential EE        | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax Balance | Monthly Return | Monthly A/T<br>Return on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to Pretax<br>Rate | Gross up of Return<br>to Pretax |
|--------------------------|--|----------------------------|-----------------------------------|--------------------------------------|-----------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                          | 2019                                   |                            |                                   |                                      |                                   | 6.84%          |                                   |                           | 0.766497                                |                                 |
| <b>Beginning Balance</b> | 18,108,325                             |                            |                                   | 4,276,263                            | 13,832,062                        |                |                                   |                           |   |                                 |
| 2019 January             | 17,333,797                             | 0.233503                   | (180,855)                         | 4,095,408                            | 13,238,389                        | 0.005700       | 77,151                            | 77,151                    | 0.766497                                | 100,654                         |
| 2019 February            | 15,462,902                             | 0.233503                   | (436,860)                         | 3,658,549                            | 11,804,354                        | 0.005700       | 71,372                            | 148,523                   | 0.766497                                | 193,768                         |
| 2019 March               | 13,944,847                             | 0.233503                   | (354,470)                         | 3,304,078                            | 10,640,769                        | 0.005700       | 63,969                            | 212,491                   | 0.766497                                | 277,224                         |
| 2019 April               | 12,660,896                             | 0.233503                   | (299,806)                         | 3,004,272                            | 9,656,624                         | 0.005700       | 57,848                            | 270,339                   | 0.766497                                | 352,694                         |
| 2019 May                 | 11,384,093                             | 0.233503                   | (298,137)                         | 2,706,135                            | 8,677,959                         | 0.005700       | 52,254                            | 322,592                   | 0.766497                                | 420,866                         |
| 2019 June                | 9,751,263                              | 0.233503                   | (381,271)                         | 2,324,864                            | 7,426,399                         | 0.005700       | 45,897                            | 368,490                   | 0.766497                                | 480,745                         |
| 2019 July                | 7,835,080                              | 0.233503                   | (447,434)                         | 1,877,429                            | 5,957,651                         | 0.005700       | 38,145                            | 406,634                   | 0.766497                                | 530,510                         |
| 2019 August              | 5,860,857                              | 0.233503                   | (460,987)                         | 1,416,443                            | 4,444,415                         | 0.005700       | 29,646                            | 436,280                   | 0.766497                                | 569,187                         |
| 2019 September           | 4,031,804                              | 0.233503                   | (427,089)                         | 989,353                              | 3,042,451                         | 0.005700       | 21,338                            | 457,618                   | 0.766497                                | 597,025                         |
| 2019 October             | 2,584,177                              | 0.233503                   | (338,025)                         | 651,328                              | 1,932,849                         | 0.005700       | 14,180                            | 471,797                   | 0.766497                                | 615,524                         |
| 2019 November            | 1,321,934                              | 0.233503                   | (294,738)                         | 356,590                              | 965,343                           | 0.005700       | 8,260                             | 480,057                   | 0.766497                                | 626,300                         |
| 2019 December            | (2,633,637)                            | 0.233503                   | (923,638)                         | (567,047)                            | (2,066,590)                       | 0.005700       | (3,139)                           | 476,919                   | 0.766497                                | 622,205                         |
|                          |  |                            |                                   |                                      |                                   |                | 476,919                           |                           |   | 622,205                         |

Note 1: Amounts represent all revenue actually collected through 2019.

Interest Calculation

2019 - Rider 10

| NC Residential EE | NC Program Costs<br>Incurred | Revenue<br>Collected | Undercollected<br>Balance | Lost Revenues | Revenues<br>Collected | Undercollected<br>Balance | PPI       | Revenue<br>Collected | Undercollected<br>Balance | Total (Over)/Under<br>Collection |
|-------------------|------------------------------|----------------------|---------------------------|---------------|-----------------------|---------------------------|-----------|----------------------|---------------------------|----------------------------------|
| 2017 January      |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 February     |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 March        |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 April        |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 May          |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 June         |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 July         |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 August       |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 September    |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 October      |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 November     |                              |                      |                           |               |                       |                           |           |                      |                           |                                  |
| 2017 December     | 47,487,858                   | 29,379,532           | 18,108,326                | 23,357,250    | 14,450,538            | 8,906,712                 | 8,570,768 | 5,302,517            | 3,268,251                 | 30,283,290                       |
| YTD Balance       | 47,487,858                   | 29,379,532           | 18,108,326                | 23,357,250    | 14,450,538            | 8,906,712                 | 8,570,768 | 5,302,517            | 3,268,251                 | 30,283,290                       |

|                              |            |      |
|------------------------------|------------|------|
| Revenue Requirement          |            |      |
| Res EE Program Costs         | 47,487,858 | 0.60 |
| Res EE PPI & GRT             | 8,570,768  | 0.11 |
| Res EE Lost Revenue          | 23,357,250 | 0.29 |
|                              | 79,415,876 |      |
| Total Revenue Collected      | 49,132,586 |      |
| Residential EE Rev Collected | 49,132,586 |      |

Interest Calculation

2020 - Rider 11

| NC Residential EE  | NC Program Costs<br>Incurred | Revenue<br>Collected | Undercollected<br>Balance | Lost Revenues | Revenues<br>Collected | Undercollected<br>Balance | PPI       | Revenue<br>Collected | Undercollected<br>Balance | Total (Over)/Under<br>Collection |
|--------------------|------------------------------|----------------------|---------------------------|---------------|-----------------------|---------------------------|-----------|----------------------|---------------------------|----------------------------------|
| Beginning Balance  | 47,487,858                   | 29,379,532           | 18,108,326                | 23,357,250    | 14,450,538            | 8,906,712                 | 8,570,768 | 5,302,517            | 3,268,251                 | 30,283,290                       |
| 2018 January       |                              |                      |                           |               | 234,785               |                           |           | (22,935)             |                           |                                  |
| 2018 February      |                              |                      |                           |               | 461,305               |                           |           | (45,062)             |                           |                                  |
| 2018 March         |                              |                      |                           |               | 339,367               |                           |           | (33,151)             |                           |                                  |
| 2018 April         |                              |                      |                           |               | 341,793               |                           |           | (33,388)             |                           |                                  |
| 2018 May           |                              |                      |                           |               | 298,837               |                           |           | (29,192)             |                           |                                  |
| 2018 June          |                              |                      |                           |               | 426,042               |                           |           | (41,618)             |                           |                                  |
| 2018 July          |                              |                      |                           |               | 489,050               |                           |           | (47,773)             |                           |                                  |
| 2018 August        |                              |                      |                           |               | 450,004               |                           |           | (43,958)             |                           |                                  |
| 2018 September     |                              |                      |                           |               | 483,004               |                           |           | (47,182)             |                           |                                  |
| 2018 October       |                              |                      |                           |               | 341,239               |                           |           | (33,334)             |                           |                                  |
| 2018 November      |                              |                      |                           |               | 315,399               |                           |           | (30,810)             |                           |                                  |
| 2018 December      |                              |                      |                           |               | 735,271               |                           |           | (71,824)             |                           |                                  |
| YTD Balance        | -                            | -                    | -                         | 2,572,270     | 4,916,096             | (2,343,826)               | (251,270) | (480,225)            | 228,955                   | (2,114,871)                      |
| Cumulative Balance | 47,487,858                   | 29,379,532           | 18,108,326                | 25,929,520    | 19,366,634            | 6,562,886                 | 8,319,498 | 4,822,291            | 3,497,207                 | 28,168,419                       |

|                               |           |        |
|-------------------------------|-----------|--------|
| Revenue Requirement           |           |        |
| Res EE PPI & GRT              | (251,270) | (0.11) |
| Res EE Lost Revenue           | 2,572,270 | 1.11   |
|                               | 2,321,000 |        |
| Revenue Collected per Exhibit | 4,435,871 |        |
| Checkpoint                    | 4,435,871 |        |

| Interest Calculation               |  | NC Program Costs | Revenue    | Undercollected |               | Revenues   | Undercollected |           | Revenue   | Undercollected | Total (Over)/Under |
|------------------------------------|--|------------------|------------|----------------|---------------|------------|----------------|-----------|-----------|----------------|--------------------|
| 2021 - Rider 12                    |  | Incurred         | Collected  | Balance        | Lost Revenues | Collected  | Balance        | PPI       | Collected | Balance        | Collection         |
| <b>Beg. Bal. - Source Rider 11</b> |  | 47,487,858       | 29,379,532 | 18,108,326     | 25,929,520    | 19,366,634 | 6,562,886      | 8,319,498 | 4,822,291 | 3,497,207      | 28,168,419         |
| 2019 January                       |  |                  | 774,528    | 17,333,797     | 165,137       | 459,291    | 6,268,732      |           | 149,582   | 3,347,624      | 26,950,154         |
| 2019 February                      |  |                  | 1,870,895  | 15,462,902     | 398,893       | 1,109,430  | 5,558,195      |           | 361,320   | 2,986,304      | 24,007,401         |
| 2019 March                         |  |                  | 1,518,055  | 13,944,847     | 323,664       | 900,198    | 4,981,661      |           | 293,177   | 2,693,126      | 21,619,635         |
| 2019 April                         |  |                  | 1,283,951  | 12,660,896     | 273,751       | 761,376    | 4,494,036      |           | 247,966   | 2,445,161      | 19,600,094         |
| 2019 May                           |  |                  | 1,276,803  | 11,384,093     | 272,227       | 757,137    | 4,009,126      |           | 246,585   | 2,198,576      | 17,591,795         |
| 2019 June                          |  |                  | 1,632,830  | 9,751,263      | 348,135       | 968,259    | 3,389,002      |           | 315,344   | 1,883,232      | 15,023,497         |
| 2019 July                          |  |                  | 1,916,183  | 7,835,080      | 408,549       | 1,136,286  | 2,661,265      |           | 370,067   | 1,513,165      | 12,009,511         |
| 2019 August                        |  |                  | 1,974,223  | 5,860,857      | 420,924       | 1,170,703  | 1,911,486      |           | 381,276   | 1,131,890      | 8,904,233          |
| 2019 September                     |  |                  | 1,829,053  | 4,031,804      | 389,972       | 1,084,618  | 1,216,839      |           | 353,240   | 778,650        | 6,027,294          |
| 2019 October                       |  |                  | 1,447,627  | 2,584,177      | 308,648       | 858,435    | 667,053        |           | 279,576   | 499,074        | 3,750,304          |
| 2019 November                      |  |                  | 1,262,243  | 1,321,934      | 269,123       | 748,503    | 187,672        |           | 243,773   | 255,301        | 1,764,907          |
| 2019 December                      |  |                  | 2,796,434  | (1,474,501)    | 596,227       | 1,658,270  | (874,371)      |           | 540,067   | (284,766)      | (2,633,637)        |
| YTD Balance                        |  | -                | 19,582,827 | (1,474,501)    | 4,175,250     | 11,612,507 | (874,371)      | -         | 3,781,972 | (284,766)      | (2,633,637)        |
| Cumulative Balance                 |  | 47,487,858       | 48,962,359 | (1,474,501)    | 30,104,770    | 30,979,141 | (874,371)      | 8,319,498 | 8,604,264 | (284,766)      | (2,633,637)        |

|                                    |                   |      |
|------------------------------------|-------------------|------|
| Revenue Requirement                |                   |      |
| Res Program Costs                  | 18,108,326        | 0.56 |
| Res PPI & GRT                      | 3,497,207         | 0.11 |
| Res Lost Revenue                   | 10,738,136        | 0.33 |
|                                    | <u>32,343,668</u> |      |
| Revenue Collected in 2019          | 35,500,650        |      |
| Less Interest Collected (and GRT): | <u>523,344</u>    |      |
| Checkpoint                         | 34,977,306        |      |

NO CHANGE

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Residential DSM Programs Vintage 2017

| NC Residential DSM       | Total System NC<br>DSM Program<br>Costs Incurred | NC Residential<br>DSM Allocation<br>% | NC Allocated<br>DSM Residential<br>Program Costs | NC Residential<br>Revenue Collected | NC Residential<br>DSM Program<br>Collection % | DSM Program<br>Costs Revenue<br>Collected | (Over)/Under<br>Collection |
|--------------------------|--|---------------------------------------|--|-------------------------------------|---|---|----------------------------|
|                          | Miller Exhibit 5,<br>pg 3 Line 9                 |                                       |  |                                     | See calc. at right                            |   |                            |
| <b>Beginning Balance</b> | 29,822,653                                       |                                       | 10,082,297                                       | 12,781,955                          |   | (9,892,053)                               | 190,244                    |
| 2019 January             |  | 32.1574721%                           | -  | 10,519                              | 73.0104618%                                   | (7,680)                                   | (7,680)                    |
| 2019 February            |  | 32.1574721%                           | -  | 24,953                              | 73.0104618%                                   | (18,218)                                  | (18,218)                   |
| 2019 March               |  | 32.1574721%                           | -  | 20,307                              | 73.0104618%                                   | (14,827)                                  | (14,827)                   |
| 2019 April               |  | 32.1574721%                           | -  | 17,225                              | 73.0104618%                                   | (12,576)                                  | (12,576)                   |
| 2019 May                 |  | 32.1574721%                           | -  | 17,131                              | 73.0104618%                                   | (12,508)                                  | (12,508)                   |
| 2019 June                |  | 32.1574721%                           | -  | 21,819                              | 73.0104618%                                   | (15,930)                                  | (15,930)                   |
| 2019 July                |  | 32.1574721%                           | -  | 25,549                              | 73.0104618%                                   | (18,653)                                  | (18,653)                   |
| 2019 August              |  | 32.1574721%                           | -  | 26,313                              | 73.0104618%                                   | (19,211)                                  | (19,211)                   |
| 2019 September           |  | 32.1574721%                           | -  | 24,402                              | 73.0104618%                                   | (17,816)                                  | (17,816)                   |
| 2019 October             |  | 32.1574721%                           | -  | 19,380                              | 73.0104618%                                   | (14,150)                                  | (14,150)                   |
| 2019 November            |  | 32.1574721%                           | -  | 16,940                              | 73.0104618%                                   | (12,368)                                  | (12,368)                   |
| 2019 December            |  | 32.1574721%                           | -  | 37,138                              | 73.0104618%                                   | (27,115)                                  | (27,115)                   |
|                          | 29,822,653                                       |                                       | 10,082,297                                       | 261,676                             |   | (10,083,104)                              | (807)                      |

Program Costs to be Recovered in Rider 10 190,244  
Revenues to be Collected in Rider 10 260,571  
  
% Revenue to be assigned to Program Costs 73.01%

| NC Residential DSM       | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|--------------------------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                          |  | 2019                       |                                   |                                      |                                      | 6.84%          |                                   |                           | 0.766497                                |                                 |
| <b>Beginning Balance</b> | 190,244                                |                            |                                   | 44,926                               | 145,318                              |                |                                   |                           |   |                                 |
| 2019 January             | 182,564                                | 0.233503                   | (1,793)                           | 43,133                               | 139,432                              | 0.005700       | 812                               | 812                       | 0.766497                                | 1,059                           |
| 2019 February            | 164,346                                | 0.233503                   | (4,254)                           | 38,879                               | 125,467                              | 0.005700       | 755                               | 1,566                     | 0.766497                                | 2,044                           |
| 2019 March               | 149,520                                | 0.233503                   | (3,462)                           | 35,417                               | 114,103                              | 0.005700       | 683                               | 2,249                     | 0.766497                                | 2,934                           |
| 2019 April               | 136,943                                | 0.233503                   | (2,937)                           | 32,480                               | 104,463                              | 0.005700       | 623                               | 2,872                     | 0.766497                                | 3,747                           |
| 2019 May                 | 124,436                                | 0.233503                   | (2,921)                           | 29,560                               | 94,876                               | 0.005700       | 568                               | 3,440                     | 0.766497                                | 4,488                           |
| 2019 June                | 108,506                                | 0.233503                   | (3,720)                           | 25,840                               | 82,666                               | 0.005700       | 506                               | 3,946                     | 0.766497                                | 5,148                           |
| 2019 July                | 89,853                                 | 0.233503                   | (4,356)                           | 21,484                               | 68,368                               | 0.005700       | 430                               | 4,377                     | 0.766497                                | 5,710                           |
| 2019 August              | 70,641                                 | 0.233503                   | (4,486)                           | 16,998                               | 53,643                               | 0.005700       | 348                               | 4,724                     | 0.766497                                | 6,164                           |
| 2019 September           | 52,825                                 | 0.233503                   | (4,160)                           | 12,838                               | 39,987                               | 0.005700       | 267                               | 4,991                     | 0.766497                                | 6,512                           |
| 2019 October             | 38,676                                 | 0.233503                   | (3,304)                           | 9,534                                | 29,141                               | 0.005700       | 197                               | 5,188                     | 0.766497                                | 6,769                           |
| 2019 November            | 26,308                                 | 0.233503                   | (2,888)                           | 6,646                                | 19,662                               | 0.005700       | 139                               | 5,327                     | 0.766497                                | 6,950                           |
| 2019 December            | (807)                                  | 0.233503                   | (6,331)                           | 315                                  | (1,122)                              | 0.005700       | 53                                | 5,380                     | 0.766497                                | 7,019                           |
|                          |  |                            |                                   |                                      |                                      |                | 5,380                             |                           |   | 7,019                           |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Non- Residential EE Programs Vintage 2017

|                          |           | Non-Residential<br>EE Program Costs |                 | NC Allocated EE<br>Program Costs | NC Residential<br>Revenue Collected | NC Non-<br>Residential EE<br>Program<br>Collection % | Non-Residential<br>EE Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |
|--------------------------|-----------|-------------------------------------|-----------------|----------------------------------|-------------------------------------|--|--|----------------------------|
| NC Non- Residential EE   |           | Incurred                            | NC Allocation % |                                  |                                     |  |  |                            |
|                          |           | Miller Exhibit 5,<br>pg 3, Line 4   |                 |                                  |                                     | See calc. at right                                   |  |                            |
| <b>Beginning Balance</b> |           | 97,443,527                          |                 | 70,947,415                       | 46,928,129                          |  | (30,933,661)   | 40,013,754                 |
| 2019                     | January   |                                     | 73.0903918%     | -                                | 1,115,901                           | 59.0752989%  | (659,222)  | (659,221)                  |
| 2019                     | February  |                                     | 73.0903918%     | -                                | 5,298,136                           | 59.0752989%  | (3,129,890)  | (3,129,890)                |
| 2019                     | March     |                                     | 73.0903918%     | -                                | 4,769,940                           | 59.0752989%  | (2,817,856)  | (2,817,856)                |
| 2019                     | April     |                                     | 73.0903918%     | -                                | 4,871,558                           | 59.0752989%  | (2,877,888)  | (2,877,888)                |
| 2019                     | May       |                                     | 73.0903918%     | -                                | 5,351,721                           | 59.0752989%  | (3,161,545)  | (3,161,545)                |
| 2019                     | June      |                                     | 73.0903918%     | -                                | 5,741,655                           | 59.0752989%  | (3,391,900)  | (3,391,900)                |
| 2019                     | July      |                                     | 73.0903918%     | -                                | 6,484,109                           | 59.0752989%  | (3,830,507)  | (3,830,507)                |
| 2019                     | August    |                                     | 73.0903918%     | -                                | 6,541,734                           | 59.0752989%  | (3,864,549)  | (3,864,549)                |
| 2019                     | September |                                     | 73.0903918%     | -                                | 6,393,213                           | 59.0752989%  | (3,776,809)  | (3,776,809)                |
| 2019                     | October   |                                     | 73.0903918%     | -                                | 5,592,962                           | 59.0752989%  | (3,304,059)  | (3,304,059)                |
| 2019                     | November  |                                     | 73.0903918%     | -                                | 4,992,945                           | 59.0752989%  | (2,949,597)  | (2,949,597)                |
| 2019                     | December  |                                     | 73.0903918%     | -                                | 7,058,299                           | 59.0752989%  | (4,169,711)  | (4,169,711)                |
|                          |           | 97,443,527                          |                 | 70,947,415                       | 64,212,173                          |  | (68,867,194)   | 2,080,222                  |

|   |            |
|---|------------|
| Program Costs to be Recovered in Rider 10 | 40,013,754 |
| Revenues to be Collected in Rider 10      | 67,733,477 |
| % Revenue to be assigned to Program Costs | 59.08%     |

| NC Non-Residential EE    | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of              |                                 |
|--------------------------|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|--------------------------|---------------------------------|
|                          |  |                            |                                |                                      |                                      |                |                                   |                           | Return to<br>Pretax Rate | Gross up of Return to<br>Pretax |
|                          |  | 2019                       |                                |                                      |                                      | 6.84%          |                                   |                           | 0.766497                 |                                 |
| <b>Beginning Balance</b> | 40,013,754                             |                            |                                | 9,449,208                            | 30,564,546                           |                |                                   |                           |                          |                                 |
| 2019 January             | 39,354,533                             | 0.233503                   | (153,930.06)                   | 8,710,978                            | 30,643,555                           | 0.005700       | 174,443                           | 174,443                   | 0.766497                 | 227,585                         |
| 2019 February            | 36,224,643                             | 0.233503                   | (730,838.68)                   | 7,980,139                            | 28,244,504                           | 0.005700       | 167,831                           | 342,274                   | 0.766497                 | 446,543                         |
| 2019 March               | 33,406,787                             | 0.233503                   | (657,977.87)                   | 7,322,161                            | 26,084,626                           | 0.005700       | 154,838                           | 497,112                   | 0.766497                 | 648,551                         |
| 2019 April               | 30,528,899                             | 0.233503                   | (671,995.41)                   | 6,650,166                            | 23,878,734                           | 0.005700       | 142,396                           | 639,508                   | 0.766497                 | 834,325                         |
| 2019 May                 | 27,367,354                             | 0.233503                   | (738,230.24)                   | 5,911,936                            | 21,455,419                           | 0.005700       | 129,202                           | 768,710                   | 0.766497                 | 1,002,887                       |
| 2019 June                | 23,975,454                             | 0.233503                   | (792,018.79)                   | 5,119,917                            | 18,855,538                           | 0.005700       | 114,886                           | 883,596                   | 0.766497                 | 1,152,772                       |
| 2019 July                | 20,144,948                             | 0.233503                   | (894,434.79)                   | 4,225,482                            | 15,919,466                           | 0.005700       | 99,109                            | 982,705                   | 0.766497                 | 1,282,073                       |
| 2019 August              | 16,280,399                             | 0.233503                   | (902,383.77)                   | 3,323,098                            | 12,957,301                           | 0.005700       | 82,299                            | 1,065,004                 | 0.766497                 | 1,389,443                       |
| 2019 September           | 12,503,589                             | 0.233503                   | (881,896.34)                   | 2,441,202                            | 10,062,388                           | 0.005700       | 65,606                            | 1,130,610                 | 0.766497                 | 1,475,035                       |
| 2019 October             | 9,199,531                              | 0.233503                   | (771,507.64)                   | 1,669,694                            | 7,529,836                            | 0.005700       | 50,138                            | 1,180,748                 | 0.766497                 | 1,540,447                       |
| 2019 November            | 6,249,933                              | 0.233503                   | (688,739.84)                   | 980,954                              | 5,268,979                            | 0.005700       | 36,477                            | 1,217,224                 | 0.766497                 | 1,588,035                       |
| 2019 December            | 2,080,222                              | 0.233503                   | (973,640.05)                   | 7,314                                | 2,072,908                            | 0.005700       | 20,924                            | 1,238,149                 | 0.766497                 | 1,615,334                       |
|                          |  |                            |                                |                                      |                                      |                | 1,238,149                         |                           |                          | 1,615,334                       |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Non - Residential DSM Programs Vintage 2017

| NC Non- Residential DSM  |           | Total System NC<br>DSM Program<br>Costs Incurred | NC Non-<br>Residential DSM<br>Allocation % | NC Allocated DSM Non-<br>Residential Program<br>Costs | NC Non-Residential<br>DSM Revenue<br>Collected | NC Non-<br>Residential DSM<br>Program<br>Collection % | Non-Residential<br>DSM Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |  |  |
|--------------------------|-----------|--|--|---|--|---|---|----------------------------|--|--|
|                          |           | See Miller<br>Exhibit 5 pg. 3,<br>Line 10        |  |   |  |   |   |                            |  |  |
| <b>Beginning Balance</b> |           | 29,822,653                                       | 40.0747013%                                | 11,951,339  | 15,361,431                                     |   | (11,888,233)  | 63,106                     |  |  |
| 2019                     | January   | -  | 40.1233224%                                | -   | 1,278  | 73.1152446%   | (934)   | (934)                      |  |  |
| 2019                     | February  | -  | 40.1233224%                                | -   | 7,283  | 73.1152446%   | (5,325)   | (5,325)                    |  |  |
| 2019                     | March     | -  | 40.1233224%                                | -   | 6,513  | 73.1152446%   | (4,762)   | (4,762)                    |  |  |
| 2019                     | April     | -  | 40.1233224%                                | -   | 6,752  | 73.1152446%   | (4,937)   | (4,937)                    |  |  |
| 2019                     | May       | -  | 40.1233224%                                | -   | 7,322  | 73.1152446%   | (5,353)   | (5,353)                    |  |  |
| 2019                     | June      | -  | 40.1233224%                                | -   | 7,794  | 73.1152446%   | (5,699)   | (5,699)                    |  |  |
| 2019                     | July      | -  | 40.1233224%                                | -   | 8,919  | 73.1152446%   | (6,521)   | (6,521)                    |  |  |
| 2019                     | August    | -  | 40.1233224%                                | -   | 8,938  | 73.1152446%   | (6,535)   | (6,535)                    |  |  |
| 2019                     | September | -  | 40.1233224%                                | -   | 8,747  | 73.1152446%   | (6,396)   | (6,396)                    |  |  |
| 2019                     | October   | -  | 40.1233224%                                | -   | 7,718  | 73.1152446%   | (5,643)   | (5,643)                    |  |  |
| 2019                     | November  | -  | 40.1233224%                                | -   | 6,913  | 73.1152446%   | (5,055)   | (5,055)                    |  |  |
| 2019                     | December  | -  | 40.1233224%                                | -   | 8,271  | 73.1152446%   | (6,048)   | (6,048)                    |  |  |
|                          |           | 29,822,653                                       |  | 11,951,339  | 15,447,879                                     |   | (11,951,439)  | (100)                      |  |  |

|   |        |
|---|--------|
| Program Costs to be Recovered in Rider 10 | 63,106 |
| Revenues to be Collected in Rider 10      | 86,311 |
| % Revenue to be assigned to Program Costs | 73.12% |

| NC Non-Residential DSM   |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|--------------------------|-----------|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                          |           | 2019                                   |                            |                                |                                      | 6.84%                                |                |                                   |                           | 0.766497                                |                                 |
| <b>Beginning Balance</b> |           | 63,945                                 |                            |                                | 15,101                               | 48,845                               |                |                                   |                           |   |                                 |
| 2019                     | January   | 63,011                                 | 0.233503                   | (218)                          | 14,883                               | 48,128                               | 0.005700       | 276                               | 276                       | 0.766497                                | 361                             |
| 2019                     | February  | 57,686                                 | 0.233503                   | (1,243)                        | 13,639                               | 44,046                               | 0.005700       | 263                               | 539                       | 0.766497                                | 703                             |
| 2019                     | March     | 52,924                                 | 0.233503                   | (1,112)                        | 12,527                               | 40,396                               | 0.005700       | 241                               | 780                       | 0.766497                                | 1,017                           |
| 2019                     | April     | 47,987                                 | 0.233503                   | (1,153)                        | 11,375                               | 36,612                               | 0.005700       | 219                               | 999                       | 0.766497                                | 1,304                           |
| 2019                     | May       | 42,634                                 | 0.233503                   | (1,250)                        | 10,125                               | 32,509                               | 0.005700       | 197                               | 1,196                     | 0.766497                                | 1,561                           |
| 2019                     | June      | 36,935                                 | 0.233503                   | (1,331)                        | 8,794                                | 28,141                               | 0.005700       | 173                               | 1,369                     | 0.766497                                | 1,786                           |
| 2019                     | July      | 30,414                                 | 0.233503                   | (1,523)                        | 7,271                                | 23,143                               | 0.005700       | 146                               | 1,515                     | 0.766497                                | 1,977                           |
| 2019                     | August    | 23,879                                 | 0.233503                   | (1,526)                        | 5,745                                | 18,133                               | 0.005700       | 118                               | 1,633                     | 0.766497                                | 2,130                           |
| 2019                     | September | 17,483                                 | 0.233503                   | (1,493)                        | 4,252                                | 13,231                               | 0.005700       | 89                                | 1,722                     | 0.766497                                | 2,247                           |
| 2019                     | October   | 11,840                                 | 0.233503                   | (1,318)                        | 2,934                                | 8,906                                | 0.005700       | 63                                | 1,785                     | 0.766497                                | 2,329                           |
| 2019                     | November  | 6,786                                  | 0.233503                   | (1,180)                        | 1,754                                | 5,032                                | 0.005700       | 40                                | 1,825                     | 0.766497                                | 2,381                           |
| 2019                     | December  | 738                                    | 0.233503                   | (1,412)                        | 342                                  | 396                                  | 0.005700       | 15                                | 1,841                     | 0.766497                                | 2,401                           |
|                          |           |  |                            |                                |                                      |                                      |                | 1,841                             |                           |   | 2,401                           |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Residential EE Programs Vintage 2018

|                   |           | Residential EE<br>Program Costs<br>Incurred | NC Allocation % | NC Allocated EE<br>Program Costs | NC Residential<br>Revenue Collected | NC Residential<br>EE Program<br>Collection % | EE Program Costs<br>Revenue<br>Collected | (Over)/Under<br>Collection |   |
|-------------------|-----------|---|-----------------|----------------------------------|-------------------------------------|--|--|----------------------------|---|
| NC Residential EE |           | Miller Exhibit 5<br>pg. 3, Line 4           |                 |                                  | see calc. at right                  |  |  |                            |   |
| 2019              | January   | 77,331,818                                  |                 | 56,230,324                       | 70,458,658                          |  |  | 15,050,447                 | Note: All revenues collected in Rider 10 were to collect Y2 of lost revenue. Therefore, no revenue received in 2019 would offset the under collected balance of program costs and a return would still be earned. |
| 2019              | February  |   | 0.0000000%      |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | March     |   | 0.0000000%      |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | April     |   | 0.0000000%      |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | May       |   | 0.0000000%      |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | June      |   | 0.0000000%      |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | July      |   | 0.0000000%      |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | August    |   | 0.0000000%      |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | September |   | 0.0000000%      |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | October   |   | 0.0000000%      |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | November  |   | 0.0000000%      |                                  |                                     | 0.0000%                                      |  |                            |   |
| 2019              | December  | 77,331,818                                  | 0.0000000%      | 56,230,324                       | 70,458,658                          | 0.0000%                                      |  | 15,050,447                 |   |

|                   |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T<br>Return on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|-------------------|-----------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
| NC Residential EE |           | 2019                                   |                            |                                   |                                      |                                      | 6.84%          |                                   |                           | 0.766497                                |                                 |
| 2019              | January   | 15,050,447                             | 0.233503                   | 3,514,324                         | 3,514,324                            | 11,536,122                           | 0.005700       | 62,230                            | 62,230                    | 0.766497                                | 81,187                          |
| 2019              | February  | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 127,985                   | 0.766497                                | 166,974                         |
| 2019              | March     | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 193,741                   | 0.766497                                | 252,762                         |
| 2019              | April     | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 259,497                   | 0.766497                                | 338,550                         |
| 2019              | May       | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 325,253                   | 0.766497                                | 424,337                         |
| 2019              | June      | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 391,009                   | 0.766497                                | 510,125                         |
| 2019              | July      | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 456,765                   | 0.766497                                | 595,912                         |
| 2019              | August    | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 522,521                   | 0.766497                                | 681,700                         |
| 2019              | September | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 588,277                   | 0.766497                                | 767,487                         |
| 2019              | October   | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 654,033                   | 0.766497                                | 853,275                         |
| 2019              | November  | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 719,789                   | 0.766497                                | 939,062                         |
| 2019              | December  | 15,050,447                             | 0.233503                   | -                                 | 3,514,324                            | 11,536,122                           | 0.005700       | 65,756                            | 785,544                   | 0.766497                                | 1,024,850                       |

Note 1: Amounts represent all revenue actually collected through 2019.

**Duke Energy Carolinas, LLC**  
**Docket No. E-7, Sub 1230**  
**Estimated Return Calculation - Residential DSM Programs Vintage 2018**

|                   |           | Total System NC<br>DSM Program<br>Costs Incurred  | NC Allocation % | NC Allocated<br>DSM Program<br>Costs | NC Residential<br>Revenue Collected | NC Residential<br>DSM Program<br>Collection % | DSM Program<br>Costs Revenue<br>Collected | (Over)/Under<br>Collection |
|-------------------|-----------|---|-----------------|--------------------------------------|-------------------------------------|---|---|----------------------------|
| NC Residential EE |           | <div style="display: flex; justify-content: space-between;"> <span>Miller Exhibit 5<br/>pg. 3, Line 9</span> <span>see calc. at right</span> </div> |                 |                                      |                                     |   |   |                            |
| 2019              | January   | 30,409,405  |                 | 9,778,896                            | 13,173,193                          |   | (10,402,600)                              | (623,705)                  |
| 2019              | February  |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | March     |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | April     |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | May       |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | June      |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | July      |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | August    |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | September |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | October   |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | November  |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
| 2019              | December  |   | 0.00000000%     | -                                    |                                     | 0.0000%                                       | -   | -                          |
|                   |           | 30,409,405  |                 | 9,778,896                            | 13,173,193                          |   | (10,402,600)                              | (623,705)                  |

Note: All revenues collected in Rider 10 were to collect Y2 of lost revenue. Therefore, no revenue received in 2019 would offset the under collected balance of program costs and a return would still be earned.

|                   |           | Cumulative<br>(Over)/Under<br>Recovery   | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|-------------------|-----------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
| NC Residential EE |           | <div style="display: flex; justify-content: space-between;"> <span>2019</span> <span>6.84%</span> <span>0.766497</span> </div> |                            |                                   |                                      |                                      |                |                                   |                           |   |                                 |
| 2019              | January   | (623,705)  | 0.233503                   | (145,637)                         | (145,637)                            | (478,068)                            | 0.005700       | (1,362)                           | (1,362)                   | 0.766497                                | (1,778)                         |
| 2019              | February  | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (4,087)                   | 0.766497                                | (5,333)                         |
| 2019              | March     | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (6,812)                   | 0.766497                                | (8,888)                         |
| 2019              | April     | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (9,537)                   | 0.766497                                | (12,443)                        |
| 2019              | May       | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (12,262)                  | 0.766497                                | (15,998)                        |
| 2019              | June      | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (14,987)                  | 0.766497                                | (19,553)                        |
| 2019              | July      | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (17,712)                  | 0.766497                                | (23,108)                        |
| 2019              | August    | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (20,437)                  | 0.766497                                | (26,663)                        |
| 2019              | September | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (23,162)                  | 0.766497                                | (30,219)                        |
| 2019              | October   | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (25,887)                  | 0.766497                                | (33,774)                        |
| 2019              | November  | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (28,612)                  | 0.766497                                | (37,329)                        |
| 2019              | December  | (623,705)  | 0.233503                   | -                                 | (145,637)                            | (478,068)                            | 0.005700       | (2,725)                           | (31,337)                  | 0.766497                                | (40,884)                        |
|                   |           |  |                            |                                   |                                      |                                      |                | (31,337)                          |                           |   | (40,884)                        |

Note 1: Amounts represent all revenue actually collected through 2019.



Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Non- Residential EE Programs Vintage 2018

|                        |           | Non-Residential<br>EE Program Costs | NC Allocation % | NC Allocated EE<br>Program Costs | NC Residential<br>Revenue Collected | NC Non-<br>Residential EE<br>Program<br>Collection % | Non-Residential<br>EE Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |
|------------------------|-----------|-------------------------------------|-----------------|----------------------------------|-------------------------------------|--|--|----------------------------|
| NC Non- Residential EE |           | Incurred                            |                 |                                  |                                     |  |  |                            |
|                        |           | Miller Exhibit 5.<br>pg 3 , Line 4  |                 |                                  | See calc. at right                  |  |  |                            |
| 2019                   | January   | 51,264,448                          |                 | 37,275,944                       | 51,998,801                          |  | 28,240,012   | 9,035,932                  |
| 2019                   | February  |                                     | 0.0000000%      | -                                |                                     | 0.0000000%   | -  | -                          |
| 2019                   | March     |                                     | 0.0000000%      | -                                |                                     | 0.0000000%   | -  | -                          |
| 2019                   | April     |                                     | 0.0000000%      | -                                |                                     | 0.0000000%   | -  | -                          |
| 2019                   | May       |                                     | 0.0000000%      | -                                |                                     | 0.0000000%   | -  | -                          |
| 2019                   | June      |                                     | 0.0000000%      | -                                |                                     | 0.0000000%   | -  | -                          |
| 2019                   | July      |                                     | 0.0000000%      | -                                |                                     | 0.0000000%   | -  | -                          |
| 2019                   | August    |                                     | 0.0000000%      | -                                |                                     | 0.0000000%   | -  | -                          |
| 2019                   | September |                                     | 0.0000000%      | -                                |                                     | 0.0000000%   | -  | -                          |
| 2019                   | October   |                                     | 0.0000000%      | -                                |                                     | 0.0000000%   | -  | -                          |
| 2019                   | November  |                                     | 0.0000000%      | -                                |                                     | 0.0000000%   | -  | -                          |
| 2019                   | December  |                                     | 0.0000000%      | -                                |                                     | 0.0000000%   | -  | -                          |
|                        |           | 51,264,448                          |                 | 37,275,944                       | 51,998,801                          |  | 28,240,012   | 9,035,932                  |

Note: All revenues collected in Rider 10 were to collect Y2 of lost revenue. Therefore, no revenue received in 2019 would offset the under collected balance of program costs and a return would still be earned.

|                       |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return to<br>Pretax |
|-----------------------|-----------|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
| NC Non-Residential EE |           |  | 2019                       |                                |                                      |                                      | 6.84%          |                                   |                           | 0.766497                                |                                 |
| 2019                  | January   | 9,035,932                              | 0.233503                   | 2,109,917.24                   | 2,109,917                            | 6,926,015                            | 0.005700       | 19,739                            | 19,739                    | 0.766497                                | 25,752                          |
| 2019                  | February  | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 59,217                    | 0.766497                                | 77,257                          |
| 2019                  | March     | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 98,696                    | 0.766497                                | 128,762                         |
| 2019                  | April     | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 138,174                   | 0.766497                                | 180,267                         |
| 2019                  | May       | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 177,652                   | 0.766497                                | 231,772                         |
| 2019                  | June      | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 217,131                   | 0.766497                                | 283,276                         |
| 2019                  | July      | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 256,609                   | 0.766497                                | 334,781                         |
| 2019                  | August    | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 296,087                   | 0.766497                                | 386,286                         |
| 2019                  | September | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 335,565                   | 0.766497                                | 437,791                         |
| 2019                  | October   | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 375,044                   | 0.766497                                | 489,296                         |
| 2019                  | November  | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 414,522                   | 0.766497                                | 540,801                         |
| 2019                  | December  | 9,035,932                              | 0.233503                   | -                              | 2,109,917                            | 6,926,015                            | 0.005700       | 39,478                            | 454,000                   | 0.766497                                | 592,305                         |
|                       |           |  |                            |                                |                                      |                                      |                | 454,000                           |                           |   | 592,305                         |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Non - Residential DSM Programs Vintage 2018

| NC Non- Residential DSM |           | Total System NC<br>DSM Program<br>Costs Incurred | NC Non-<br>Residential DSM<br>Allocation % | NC Allocated DSM Non-<br>Residential Program<br>Costs | NC Non-Residential<br>DSM Revenue<br>Collected | NC Non-<br>Residential DSM<br>Program<br>Collection % | Non-Residential<br>DSM Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |
|-------------------------|-----------|--|--|---|--|---|---|----------------------------|
|                         |           | See Miller<br>Exhibit 5 pg. 3,<br>Line 10        |  |   |  |   |   |                            |
| 2019                    | January   | 30,409,405                                       | 41.4712829%                                | 12,611,170  | 14,074,924                                     |   | (11,114,680)  | 1,496,490                  |
| 2019                    | February  | -  | 41.4712829%                                | -   | 249,056  | 78.9679563%   | (196,674)   | (196,674)                  |
| 2019                    | March     | -  | 41.4712829%                                | -   | 32,655   | 78.9679563%   | (25,787)  | (25,787)                   |
| 2019                    | April     | -  | 41.4712829%                                | -   | 38,629   | 78.9679563%   | (30,505)  | (30,505)                   |
| 2019                    | May       | -  | 41.4712829%                                | -   | 40,518   | 78.9679563%   | (31,996)  | (31,996)                   |
| 2019                    | June      | -  | 41.4712829%                                | -   | 43,631   | 78.9679563%   | (34,455)  | (34,455)                   |
| 2019                    | July      | -  | 41.4712829%                                | -   | 46,592   | 78.9679563%   | (36,793)  | (36,793)                   |
| 2019                    | August    | -  | 41.4712829%                                | -   | 53,325   | 78.9679563%   | (42,110)  | (42,110)                   |
| 2019                    | September | -  | 41.4712829%                                | -   | 53,359   | 78.9679563%   | (42,137)  | (42,137)                   |
| 2019                    | October   | -  | 41.4712829%                                | -   | 52,348   | 78.9679563%   | (41,338)  | (41,338)                   |
| 2019                    | November  | -  | 41.4712829%                                | -   | 46,029   | 78.9679563%   | (36,348)  | (36,348)                   |
| 2019                    | December  | -  | 41.4712829%                                | -   | 80,167   | 78.9679563%   | (63,306)  | (63,306)                   |
|                         |           | 30,409,405                                       |  | 12,611,170  | 41,424   |   | (11,696,128)  | 915,042                    |

Rider 10 included a true-up for the impact of opt-outs.  
All revenue collected in 2019 represents  
additional collections associated with that true-up.  
Amounts allocated at same % as calculated in Rider 10.

| NC Non-Residential DSM |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|------------------------|-----------|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                        |           | 2019                                   |                            |                                |                                      | 6.84%                                |                |                                   |                           | 0.766497                                |                                 |
| 2019                   | January   | 1,496,490                              | 0.233503                   | 349,435                        | 349,435                              | 1,147,055                            | 0.005700       | 3,269                             | 3,269                     | 0.766497                                | 4,265                           |
| 2019                   | February  | 1,299,816                              | 0.233503                   | (45,924)                       | 303,511                              | 996,305                              | 0.005700       | 6,109                             | 9,378                     | 0.766497                                | 12,234                          |
| 2019                   | March     | 1,274,029                              | 0.233503                   | (6,021)                        | 297,490                              | 976,540                              | 0.005700       | 5,623                             | 15,000                    | 0.766497                                | 19,570                          |
| 2019                   | April     | 1,243,524                              | 0.233503                   | (7,123)                        | 290,367                              | 953,158                              | 0.005700       | 5,500                             | 20,500                    | 0.766497                                | 26,745                          |
| 2019                   | May       | 1,211,528                              | 0.233503                   | (7,471)                        | 282,895                              | 928,633                              | 0.005700       | 5,363                             | 25,863                    | 0.766497                                | 33,742                          |
| 2019                   | June      | 1,177,074                              | 0.233503                   | (8,045)                        | 274,850                              | 902,223                              | 0.005700       | 5,218                             | 31,081                    | 0.766497                                | 40,549                          |
| 2019                   | July      | 1,140,281                              | 0.233503                   | (8,591)                        | 266,259                              | 874,022                              | 0.005700       | 5,062                             | 36,143                    | 0.766497                                | 47,154                          |
| 2019                   | August    | 1,098,171                              | 0.233503                   | (9,833)                        | 256,426                              | 841,745                              | 0.005700       | 4,890                             | 41,033                    | 0.766497                                | 53,533                          |
| 2019                   | September | 1,056,034                              | 0.233503                   | (9,839)                        | 246,587                              | 809,447                              | 0.005700       | 4,706                             | 45,739                    | 0.766497                                | 59,673                          |
| 2019                   | October   | 1,014,696                              | 0.233503                   | (9,653)                        | 236,935                              | 777,762                              | 0.005700       | 4,524                             | 50,263                    | 0.766497                                | 65,574                          |
| 2019                   | November  | 978,348                                | 0.233503                   | (8,487)                        | 228,447                              | 749,901                              | 0.005700       | 4,354                             | 54,616                    | 0.766497                                | 71,255                          |
| 2019                   | December  | 915,042                                | 0.233503                   | (14,782)                       | 213,665                              | 701,377                              | 0.005700       | 4,136                             | 58,753                    | 0.766497                                | 76,651                          |
|                        |           |  |                            |                                |                                      |                                      |                | 58,753                            |                           |   | 76,651                          |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Residential EE Programs Vintage 2019

|                   |           | Residential EE<br>Program Costs<br>Incurred   | NC Allocation % | NC Allocated EE<br>Program Costs | NC Residential<br>Revenue Collected | NC Residential<br>EE Program<br>Collection % | EE Program Costs<br>Revenue<br>Collected | (Over)/Under<br>Collection |  |
|-------------------|-----------|---|-----------------|----------------------------------|-------------------------------------|--|--|----------------------------|--|
| NC Residential EE |           | <div style="display: flex; justify-content: space-between;"> <span>Miller Exhibit 5<br/>pg. 3, Line 4</span> <span>see calc. at right</span> </div> |                 |                                  |                                     |  |  |                            |  |
| 2019              | January   | 3,212,930   | 73.0903918%     | 2,348,343                        | 2,558,632                           | 62.4119%                                     | (1,596,892)                              | 751,452                    | <div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between;"> <div>EE Program Costs</div> <div>54,246,377</div> </div> <div style="display: flex; justify-content: space-between;"> <div>EE Revenue Requirement</div> <div>86,916,677</div> </div> <div style="display: flex; justify-content: space-between; border-top: 1px solid black; border-bottom: 3px double black;"> <div>% Revenues related to program Costs</div> <div>62.4119%</div> </div> </div> |
| 2019              | February  | 5,158,756   | 73.0903918%     | 3,770,555                        | 6,069,759                           | 62.4119%                                     | (3,788,254)                              | (17,699)                   |  |
| 2019              | March     | 5,303,004   | 73.0903918%     | 3,875,986                        | 4,939,785                           | 62.4119%                                     | (3,083,015)                              | 792,971                    |  |
| 2019              | April     | 6,291,523   | 73.0903918%     | 4,598,499                        | 4,190,063                           | 62.4119%                                     | (2,615,099)                              | 1,983,399                  |  |
| 2019              | May       | 9,618,631   | 73.0903918%     | 7,030,295                        | 4,167,172                           | 62.4119%                                     | (2,600,813)                              | 4,429,482                  |  |
| 2019              | June      | 6,533,627   | 73.0903918%     | 4,775,454                        | 5,307,354                           | 62.4119%                                     | (3,312,422)                              | 1,463,031                  |  |
| 2019              | July      | 6,248,948   | 73.0903918%     | 4,567,381                        | 6,214,794                           | 62.4119%                                     | (3,878,773)                              | 688,608                    |  |
| 2019              | August    | 6,098,612   | 73.0903918%     | 4,457,499                        | 6,400,667                           | 62.4119%                                     | (3,994,780)                              | 462,719                    |  |
| 2019              | September | 4,923,805   | 73.0903918%     | 3,598,828                        | 5,935,759                           | 62.4119%                                     | (3,704,622)                              | (105,794)                  |  |
| 2019              | October   | 4,430,131   | 73.0903918%     | 3,238,000                        | 4,714,238                           | 62.4119%                                     | (2,942,247)                              | 295,753                    |  |
| 2019              | November  | 5,485,441   | 73.0903918%     | 4,009,330                        | 4,120,545                           | 62.4119%                                     | (2,571,712)                              | 1,437,619                  |  |
| 2019              | December  | 10,912,797  | 73.0903918%     | 7,976,206                        | 9,033,809                           | 62.4119%                                     | (5,638,175)                              | 2,338,031                  |  |
|                   |           | 74,218,205  |                 | 54,246,377                       | 63,652,577                          |  | (39,726,803)                             | 14,519,574                 |  |

|                   |           | Cumulative<br>(Over)/Under<br>Recovery   | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T<br>Return on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|-------------------|-----------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
| NC Residential EE |           | <div style="display: flex; justify-content: space-between;"> <span>2019</span> <span>6.84%</span> <span>0.766497</span> </div> |                            |                                   |                                      |                                      |                |                                   |                           |   |                                 |
| 2019              | January   | 751,452  | 0.233503                   | 175,466                           | 175,466                              | 575,985                              | 0.005700       | 62,230                            | 62,230                    | 0.766497                                | 81,187                          |
| 2019              | February  | 751,452  | 0.233503                   | (4,133)                           | 175,466                              | 575,985                              | 0.005700       | 3,283                             | 65,513                    | 0.766497                                | 85,470                          |
| 2019              | March     | 751,452  | 0.233503                   | 185,161                           | 360,627                              | 390,824                              | 0.005700       | 2,755                             | 68,268                    | 0.766497                                | 89,065                          |
| 2019              | April     | 751,452  | 0.233503                   | 463,130                           | 638,596                              | 112,856                              | 0.005700       | 1,435                             | 69,704                    | 0.766497                                | 90,938                          |
| 2019              | May       | 751,452  | 0.233503                   | 1,034,297                         | 1,394,925                            | (643,473)                            | 0.005700       | (1,512)                           | 68,191                    | 0.766497                                | 88,965                          |
| 2019              | June      | 751,452  | 0.233503                   | 341,622                           | 980,218                              | (228,767)                            | 0.005700       | (2,486)                           | 65,705                    | 0.766497                                | 85,722                          |
| 2019              | July      | 751,452  | 0.233503                   | 160,792                           | 1,555,717                            | (804,265)                            | 0.005700       | (2,944)                           | 62,761                    | 0.766497                                | 81,881                          |
| 2019              | August    | 751,452  | 0.233503                   | 108,046                           | 1,088,264                            | (336,813)                            | 0.005700       | (3,252)                           | 59,509                    | 0.766497                                | 77,638                          |
| 2019              | September | 751,452  | 0.233503                   | (24,703)                          | 1,531,014                            | (779,562)                            | 0.005700       | (3,182)                           | 56,328                    | 0.766497                                | 73,487                          |
| 2019              | October   | 751,452  | 0.233503                   | 69,059                            | 1,157,324                            | (405,872)                            | 0.005700       | (3,378)                           | 52,949                    | 0.766497                                | 69,079                          |
| 2019              | November  | 751,452  | 0.233503                   | 335,688                           | 1,866,702                            | (1,115,250)                          | 0.005700       | (4,335)                           | 48,614                    | 0.766497                                | 63,423                          |
| 2019              | December  | 751,452  | 0.233503                   | 545,937                           | 1,703,261                            | (951,809)                            | 0.005700       | (5,891)                           | 42,723                    | 0.766497                                | 55,738                          |
|                   |           |  |                            |                                   |                                      |                                      |                | 42,723                            |                           |   | 55,738                          |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Residential DSM Programs Vintage 2019

|                   |           | Total System NC<br>DSM Program    | NC Allocation % | NC Allocated EE<br>Program Costs | NC Residential<br>Revenue Collected | NC Residential<br>EE Program<br>Collection % | EE Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |
|-------------------|-----------|-----------------------------------|-----------------|----------------------------------|-------------------------------------|--|---------------------------------------|----------------------------|
| NC Residential EE |           | Costs Incurred                    |                 |                                  |                                     |  |                                       |                            |
|                   |           | Miller Exhibit 5<br>pg. 3, Line 9 |                 | see calc. at right               |                                     |  |                                       |                            |
| 2019              | January   | 1,589,557                         | 34.1181040%     | 542,327                          | 537,321                             | 75.4903%                                     | (405,626)                             | 136,701                    |
| 2019              | February  | 1,353,150                         | 34.1181040%     | 461,669                          | 1,274,670                           | 75.4903%                                     | (962,253)                             | (500,583)                  |
| 2019              | March     | 2,084,263                         | 34.1181040%     | 711,111                          | 1,037,372                           | 75.4903%                                     | (783,115)                             | (72,004)                   |
| 2019              | April     | 1,820,414                         | 34.1181040%     | 621,091                          | 879,928                             | 75.4903%                                     | (664,260)                             | (43,169)                   |
| 2019              | May       | 1,926,897                         | 34.1181040%     | 657,421                          | 875,120                             | 75.4903%                                     | (660,631)                             | (3,210)                    |
| 2019              | June      | 1,979,139                         | 34.1181040%     | 675,245                          | 1,114,563                           | 75.4903%                                     | (841,387)                             | (166,142)                  |
| 2019              | July      | 3,696,829                         | 34.1181040%     | 1,261,288                        | 1,305,128                           | 75.4903%                                     | (985,245)                             | 276,043                    |
| 2019              | August    | 3,437,773                         | 34.1181040%     | 1,172,903                        | 1,344,162                           | 75.4903%                                     | (1,014,712)                           | 158,191                    |
| 2019              | September | 4,173,115                         | 34.1181040%     | 1,423,788                        | 1,246,530                           | 75.4903%                                     | (941,009)                             | 482,778                    |
| 2019              | October   | 3,499,351                         | 34.1181040%     | 1,193,912                        | 990,006                             | 75.4903%                                     | (747,359)                             | 446,553                    |
| 2019              | November  | 1,661,681                         | 34.1181040%     | 566,934                          | 865,329                             | 75.4903%                                     | (653,239)                             | (86,305)                   |
| 2019              | December  | 2,875,050                         | 34.1181040%     | 980,913                          | 1,897,131                           | 75.4903%                                     | (1,432,150)                           | (451,238)                  |
|                   |           | 30,097,219                        |                 | 10,268,600                       | 13,367,259                          |  | (10,090,987)                          | 177,614                    |

|                                     |            |
|-------------------------------------|------------|
| Program Costs                       | 10,268,601 |
| Revenue Requirement                 | 13,602,540 |
| % Revenues related to Program Costs | 75.4903%   |

|                   |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|-------------------|-----------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
| NC Residential EE |           |  | 2019                       |                                   |                                      |                                      | 6.84%          |                                   |                           | 0.766497                                |                                 |
| 2019              | January   | 136,701                                | 0.233503                   | 31,920                            | 31,920                               | 104,781                              | 0.005700       | 299                               | 299                       | 0.766497                                | 390                             |
| 2019              | February  | (363,883)                              | 0.233503                   | (116,888)                         | (84,968)                             | (278,915)                            | 0.005700       | (496)                             | (198)                     | 0.766497                                | (258)                           |
| 2019              | March     | (435,887)                              | 0.233503                   | (16,813)                          | (101,781)                            | (334,106)                            | 0.005700       | (1,747)                           | (1,945)                   | 0.766497                                | (2,537)                         |
| 2019              | April     | (479,056)                              | 0.233503                   | (10,080)                          | (111,861)                            | (367,195)                            | 0.005700       | (1,999)                           | (3,943)                   | 0.766497                                | (5,145)                         |
| 2019              | May       | (482,267)                              | 0.233503                   | (750)                             | (112,611)                            | (369,656)                            | 0.005700       | (2,100)                           | (6,043)                   | 0.766497                                | (7,885)                         |
| 2019              | June      | (648,409)                              | 0.233503                   | (38,795)                          | (151,405)                            | (497,003)                            | 0.005700       | (2,470)                           | (8,513)                   | 0.766497                                | (11,107)                        |
| 2019              | July      | (372,366)                              | 0.233503                   | 64,457                            | (86,949)                             | (285,417)                            | 0.005700       | (2,230)                           | (10,743)                  | 0.766497                                | (14,016)                        |
| 2019              | August    | (214,175)                              | 0.233503                   | 36,938                            | (50,011)                             | (164,165)                            | 0.005700       | (1,281)                           | (12,025)                  | 0.766497                                | (15,688)                        |
| 2019              | September | 268,603                                | 0.233503                   | 112,730                           | 62,720                               | 205,883                              | 0.005700       | 119                               | (11,906)                  | 0.766497                                | (15,533)                        |
| 2019              | October   | 715,156                                | 0.233503                   | 104,272                           | 166,991                              | 548,165                              | 0.005700       | 2,149                             | (9,757)                   | 0.766497                                | (12,729)                        |
| 2019              | November  | 628,851                                | 0.233503                   | (20,153)                          | 146,839                              | 482,013                              | 0.005700       | 2,936                             | (6,821)                   | 0.766497                                | (8,899)                         |
| 2019              | December  | 177,614                                | 0.233503                   | (105,365)                         | 41,473                               | 136,140                              | 0.005700       | 1,762                             | (5,059)                   | 0.766497                                | (6,600)                         |
|                   |           |  |                            |                                   |                                      |                                      |                | (5,059)                           |                           |   | (6,600)                         |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Non- Residential EE Programs Vintage 2019

| NC Non- Residential EE |           | Non-Residential<br>EE Program Costs |                                   | NC Allocated EE |                                     | Program Incentives | Lost Revenues | Total Costs | NC Non-<br>Residential EE |                    | Non-Residential<br>EE Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |
|------------------------|-----------|-------------------------------------|-----------------------------------|-----------------|-------------------------------------|--------------------|---------------|-------------|---------------------------|--------------------|--|----------------------------|
|                        |           | Incurred                            | NC Allocation %                   | Program Costs   | NC Residential<br>Revenue Collected |                    |               |             | Program<br>Collection %   |                    |  |                            |
|                        |           |                                     | Miller Exhibit 5,<br>pg 3, Line 4 |                 |                                     |                    |               |             |                           | See calc. at right |  |                            |
| 2019                   | January   | 3,910,661                           | 73.0903918%                       | 2,858,317       | 896,202                             | 1,323,049          | 5,077,568     | 1,961,495   | 100.00000000%             | (1,961,495)        | 896,822  |                            |
| 2019                   | February  | 4,042,579                           | 73.0903918%                       | 2,954,737       | 926,434                             | 1,367,679          | 5,248,849     | 4,273,378   | 100.00000000%             | (4,273,378)        | (1,318,641)  |                            |
| 2019                   | March     | 3,315,615                           | 73.0903918%                       | 2,423,396       | 759,836                             | 1,121,734          | 4,304,966     | 3,861,979   | 100.00000000%             | (3,861,979)        | (1,438,583)  |                            |
| 2019                   | April     | 3,318,152                           | 73.0903918%                       | 2,425,250       | 760,417                             | 1,122,592          | 4,308,260     | 3,919,819   | 100.00000000%             | (3,919,819)        | (1,494,568)  |                            |
| 2019                   | May       | 3,870,647                           | 73.0903918%                       | 2,829,071       | 887,032                             | 1,309,511          | 5,025,614     | 4,328,089   | 100.00000000%             | (4,328,089)        | (1,499,018)  |                            |
| 2019                   | June      | 3,876,733                           | 73.0903918%                       | 2,833,519       | 888,427                             | 1,311,570          | 5,033,516     | 4,656,923   | 100.00000000%             | (4,656,923)        | (1,823,404)  |                            |
| 2019                   | July      | 3,886,284                           | 73.0903918%                       | 2,840,500       | 890,616                             | 1,314,801          | 5,045,917     | 5,260,960   | 100.00000000%             | (5,260,960)        | (2,420,460)  |                            |
| 2019                   | August    | 3,186,558                           | 73.0903918%                       | 2,329,068       | 730,260                             | 1,078,071          | 4,137,399     | 5,303,365   | 100.00000000%             | (5,303,365)        | (2,974,297)  |                            |
| 2019                   | September | 3,413,373                           | 73.0903918%                       | 2,494,848       | 782,239                             | 1,154,807          | 4,431,894     | 5,176,057   | 100.00000000%             | (5,176,057)        | (2,681,210)  |                            |
| 2019                   | October   | 3,726,001                           | 73.0903918%                       | 2,723,349       | 853,884                             | 1,260,575          | 4,837,807     | 4,522,554   | 100.00000000%             | (4,522,554)        | (1,799,205)  |                            |
| 2019                   | November  | 2,909,750                           | 73.0903918%                       | 2,126,748       | 666,824                             | 984,422            | 3,777,994     | 4,015,015   | 100.00000000%             | (4,015,015)        | (1,888,267)  |                            |
| 2019                   | December  | 5,656,566                           | 73.0903918%                       | 4,134,406       | 1,296,309                           | 1,913,721          | 7,344,436     | 5,582,965   | 100.00000000%             | (5,582,965)        | (1,448,558)  |                            |
|                        |           | 45,112,919                          |                                   | 32,973,209      | 10,338,479                          | 15,262,532         | 58,574,220    | 52,862,599  |                           | (52,862,599)       | (19,889,390)   |                            |

Vintage is overcollected. Interest is calculated on all components.

| NC Non-Residential EE |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative Deferred<br>Income Tax | Net Deferred After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to Pretax<br>Rate | Gross up of Return<br>to Pretax |
|-----------------------|-----------|--|----------------------------|--------------------------------|-----------------------------------|-----------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                       |           | 2019                                   |                            |                                |                                   |                                   | 6.84%          |                                   |                           | 0.766497                                |                                 |
| 2019                  | January   | 896,822                                | 0.233503                   | 209,411                        | 209,411                           | 687,412                           | 0.005700       | 1,959                             | 1,959                     | 0.766497                                | 2,556                           |
| 2019                  | February  | (421,819)                              | 0.233503                   | (307,907)                      | (98,496)                          | (323,323)                         | 0.005700       | 1,038                             | 2,997                     | 0.766497                                | 3,910                           |
| 2019                  | March     | (1,860,402)                            | 0.233503                   | (335,913)                      | (434,409)                         | (1,425,992)                       | 0.005700       | (4,986)                           | (1,989)                   | 0.766497                                | (2,595)                         |
| 2019                  | April     | (3,354,970)                            | 0.233503                   | (348,986)                      | (783,396)                         | (2,571,575)                       | 0.005700       | (11,393)                          | (13,382)                  | 0.766497                                | (17,458)                        |
| 2019                  | May       | (4,853,988)                            | 0.233503                   | (350,025)                      | (1,133,421)                       | (3,720,567)                       | 0.005700       | (17,933)                          | (31,314)                  | 0.766497                                | (40,854)                        |
| 2019                  | June      | (6,677,392)                            | 0.233503                   | (425,770)                      | (1,559,191)                       | (5,118,201)                       | 0.005700       | (25,190)                          | (56,505)                  | 0.766497                                | (73,718)                        |
| 2019                  | July      | (9,097,852)                            | 0.233503                   | (565,185)                      | (2,124,376)                       | (6,973,476)                       | 0.005700       | (34,461)                          | (90,966)                  | 0.766497                                | (118,678)                       |
| 2019                  | August    | (12,072,149)                           | 0.233503                   | (694,507)                      | (2,818,883)                       | (9,253,266)                       | 0.005700       | (46,246)                          | (137,212)                 | 0.766497                                | (179,012)                       |
| 2019                  | September | (14,753,359)                           | 0.233503                   | (626,070)                      | (3,444,954)                       | (11,308,405)                      | 0.005700       | (58,601)                          | (195,813)                 | 0.766497                                | (255,465)                       |
| 2019                  | October   | (16,552,564)                           | 0.233503                   | (420,120)                      | (3,865,073)                       | (12,687,491)                      | 0.005700       | (68,388)                          | (264,201)                 | 0.766497                                | (344,687)                       |
| 2019                  | November  | (18,440,831)                           | 0.233503                   | (440,916)                      | (4,305,989)                       | (14,134,842)                      | 0.005700       | (76,444)                          | (340,645)                 | 0.766497                                | (444,418)                       |
| 2019                  | December  | (19,889,390)                           | 0.233503                   | (338,243)                      | (4,644,232)                       | (15,245,158)                      | 0.005700       | (83,733)                          | (424,378)                 | 0.766497                                | (553,659)                       |
|                       |           |  |                            |                                |                                   |                                   |                | (424,378)                         |                           |   | (553,659)                       |

Note 1: Amounts represent all revenue actually collected through 2019.

**Duke Energy Carolinas, LLC**  
**Docket No. E-7, Sub 1230**  
**Estimated Return Calculation - Non - Residential DSM Programs Vintage 2019**

| NC Non- Residential DSM |           | Total System NC<br>DSM Program<br>Costs Incurred | NC Non-<br>Residential DSM<br>Allocation % | NC Allocated DSM Non-<br>Residential Program<br>Costs | NC Non-Residential<br>DSM Revenue<br>Collected | NC Non-<br>Residential DSM<br>Program<br>Collection % | Non-Residential<br>DSM Program Costs<br>Revenue Collected | (Over)/Under<br>Collection |
|-------------------------|-----------|--|--|---|--|---|---|----------------------------|
|                         |           | See Miller<br>Exhibit 5 pg. 3,<br>Line 10        |  |   |  |   |   |                            |
| 2019                    | January   | 1,589,557  | 40.1233224%                                | 637,783   | 560,289  | 75.4903188%   | (422,964)   | 214,819                    |
| 2019                    | February  | 1,353,150  | 40.1233224%                                | 542,929   | 1,274,361                                      | 75.4903188%   | (962,019)   | (419,091)                  |
| 2019                    | March     | 2,084,263  | 40.1233224%                                | 836,276   | 1,141,540                                      | 75.4903188%   | (861,752)   | (25,476)                   |
| 2019                    | April     | 1,820,414  | 40.1233224%                                | 730,411   | 1,195,041                                      | 75.4903188%   | (902,141)   | (171,730)                  |
| 2019                    | May       | 1,926,897  | 40.1233224%                                | 773,135   | 1,281,300                                      | 75.4903188%   | (967,257)   | (194,122)                  |
| 2019                    | June      | 1,979,139  | 40.1233224%                                | 794,096   | 1,367,817                                      | 75.4903188%   | (1,032,569)   | (238,473)                  |
| 2019                    | July      | 3,696,829  | 40.1233224%                                | 1,483,291   | 1,562,478                                      | 75.4903188%   | (1,179,520)   | 303,771                    |
| 2019                    | August    | 3,437,773  | 40.1233224%                                | 1,379,349   | 1,564,861                                      | 75.4903188%   | (1,181,319)   | 198,030                    |
| 2019                    | September | 4,173,115  | 40.1233224%                                | 1,674,392   | 1,530,946                                      | 75.4903188%   | (1,155,716)   | 518,676                    |
| 2019                    | October   | 3,499,351  | 40.1233224%                                | 1,404,056   | 1,350,191                                      | 75.4903188%   | (1,019,263)   | 384,793                    |
| 2019                    | November  | 1,661,681  | 40.1233224%                                | 666,722   | 1,210,511                                      | 75.4903188%   | (913,819)   | (247,097)                  |
| 2019                    | December  | 2,875,050  | 40.1233224%                                | 1,153,566   | 1,634,733                                      | 75.4903188%   | (1,234,065)   | (80,500)                   |
|                         |           | 30,097,219                                       |  | 12,076,004  | 15,674,069                                     |   | (11,832,404)  | 243,600                    |

|                                     |            |
|-------------------------------------|------------|
| Program Costs                       | 12,076,005 |
| Revenue Requirement                 | 15,996,766 |
| % Revenues related to Program Costs | 75.4903%   |

| NC Non-Residential DSM |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|------------------------|-----------|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                        |           | 2019                                   |                            |                                |                                      | 6.84%                                |                |                                   |                           | 0.766497                                |                                 |
| 2019                   | January   | 214,819                                | 0.233503                   | 50,161                         | 50,161                               | 164,658                              | 0.005700       | 469                               | 469                       | 0.766497                                | 612                             |
| 2019                   | February  | (204,271)                              | 0.233503                   | (97,859)                       | (47,698)                             | (156,573)                            | 0.005700       | 23                                | 492                       | 0.766497                                | 642                             |
| 2019                   | March     | (229,748)                              | 0.233503                   | (5,949)                        | (53,647)                             | (176,101)                            | 0.005700       | (948)                             | (456)                     | 0.766497                                | (595)                           |
| 2019                   | April     | (401,478)                              | 0.233503                   | (40,099)                       | (93,746)                             | (307,732)                            | 0.005700       | (1,379)                           | (1,835)                   | 0.766497                                | (2,394)                         |
| 2019                   | May       | (595,600)                              | 0.233503                   | (45,328)                       | (139,074)                            | (456,526)                            | 0.005700       | (2,178)                           | (4,013)                   | 0.766497                                | (5,235)                         |
| 2019                   | June      | (834,073)                              | 0.233503                   | (55,684)                       | (194,759)                            | (639,315)                            | 0.005700       | (3,123)                           | (7,136)                   | 0.766497                                | (9,310)                         |
| 2019                   | July      | (530,302)                              | 0.233503                   | 70,931                         | (123,827)                            | (406,475)                            | 0.005700       | (2,981)                           | (10,117)                  | 0.766497                                | (13,198)                        |
| 2019                   | August    | (332,272)                              | 0.233503                   | 46,241                         | (77,587)                             | (254,686)                            | 0.005700       | (1,884)                           | (12,001)                  | 0.766497                                | (15,657)                        |
| 2019                   | September | 186,404                                | 0.233503                   | 121,112                        | 43,526                               | 142,878                              | 0.005700       | (319)                             | (12,319)                  | 0.766497                                | (16,072)                        |
| 2019                   | October   | 571,196                                | 0.233503                   | 89,850                         | 133,376                              | 437,820                              | 0.005700       | 1,655                             | (10,664)                  | 0.766497                                | (13,913)                        |
| 2019                   | November  | 324,099                                | 0.233503                   | (57,698)                       | 75,678                               | 248,421                              | 0.005700       | 1,956                             | (8,709)                   | 0.766497                                | (11,362)                        |
| 2019                   | December  | 243,600                                | 0.233503                   | (18,797)                       | 56,881                               | 186,718                              | 0.005700       | 1,240                             | (7,469)                   | 0.766497                                | (9,744)                         |
|                        |           |  |                            |                                |                                      |                                      |                | (7,469)                           |                           |   | (9,744)                         |

Note 1: Amounts represent all revenue actually collected through 2019.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Residential EE Programs Vintage 2016

| NC Residential EE                 | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to Pretax<br>Rate | Gross up of Return<br>to Pretax |
|-----------------------------------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                                   | 2019                                   |                            |                                   |                                      |                                      | 6.84%          |                                   |                           | 0.766497                                |                                 |
| <b>Beginning Balance - source</b> | (1,972,320)                            |                            |                                   | (465,762)                            | (1,506,559)                          |                |                                   |                           |   |                                 |
| 2019 January                      | (1,836,434)                            | 0.236149                   | 32,090                            | (433,672)                            | (1,402,762)                          | 0.005700       | (8,292)                           | (8,292)                   | 0.766497                                | (10,817)                        |
| 2019 February                     | (1,563,421)                            | 0.236149                   | 64,472                            | (369,200)                            | (1,194,221)                          | 0.005700       | (7,401)                           | (15,693)                  | 0.766497                                | (20,474)                        |
| 2019 March                        | (1,334,540)                            | 0.236149                   | 54,050                            | (315,150)                            | (1,019,390)                          | 0.005700       | (6,309)                           | (22,002)                  | 0.766497                                | (28,704)                        |
| 2019 April                        | (1,134,938)                            | 0.236149                   | 47,136                            | (268,015)                            | (866,924)                            | 0.005700       | (5,376)                           | (27,378)                  | 0.766497                                | (35,718)                        |
| 2019 May                          | (936,231)                              | 0.236149                   | 46,925                            | (221,090)                            | (715,141)                            | 0.005700       | (4,509)                           | (31,887)                  | 0.766497                                | (41,600)                        |
| 2019 June                         | (692,994)                              | 0.236149                   | 57,440                            | (163,650)                            | (529,344)                            | 0.005700       | (3,547)                           | (35,433)                  | 0.766497                                | (46,228)                        |
| 2019 July                         | (414,318)                              | 0.236149                   | 65,809                            | (97,841)                             | (316,477)                            | 0.005700       | (2,411)                           | (37,844)                  | 0.766497                                | (49,373)                        |
| 2019 August                       | (128,382)                              | 0.236149                   | 67,523                            | (30,317)                             | (98,065)                             | 0.005700       | (1,181)                           | (39,025)                  | 0.766497                                | (50,914)                        |
| 2019 September                    | 65,075                                 | 0.236149                   | 45,685                            | 15,367                               | 49,707                               | 0.005700       | (138)                             | (39,163)                  | 0.766497                                | (51,094)                        |
| 2019 October                      | 167,811                                | 0.236149                   | 24,261                            | 39,628                               | 128,183                              | 0.005700       | 507                               | (38,656)                  | 0.766497                                | (50,432)                        |
| 2019 November                     | 259,724                                | 0.236149                   | 21,705                            | 61,334                               | 198,390                              | 0.005700       | 931                               | (37,726)                  | 0.766497                                | (49,218)                        |
| 2019 December                     | 441,214                                | 0.236149                   | 42,859                            | 104,192                              | 337,022                              | 0.005700       | 1,526                             | (36,200)                  | 0.766497                                | (47,227)                        |
|                                   |  |                            |                                   |                                      |                                      |                | (36,200)                          |                           |   | (47,227)                        |

Note 1: Amounts represent all revenue actually collected through 2018.

Interest Calculation

| 2018 -<br>Rider 9 | Month | NC Program Costs<br>Incurred | Revenue<br>Collected | Undercollected<br>Balance | PPI       | Revenue<br>Collected | Undercollected<br>Balance | Lost Revenue | Revenue Collected | Undercollected<br>Balance | Total Cumulative<br>Under/Over<br>Collected | %    |
|-------------------|-------|------------------------------|----------------------|---------------------------|-----------|----------------------|---------------------------|--------------|-------------------|---------------------------|---|------|
| Beginning Balance |       | 40,021,103                   | 28,243,964           | 11,777,138                | 6,821,368 | 4,814,022            | 2,007,346                 | 16,669,126   | 11,763,849        | 4,905,277                 | 18,689,761                                  | 0.63 |
| January           |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  | 0.11 |
| February          |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  | 0.26 |
| March             |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  |      |
| April             |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  |      |
| May               |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  |      |
| June              |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  |      |
| July              |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  |      |
| August            |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  |      |
| September         |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  |      |
| October           |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  |      |
| November          |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  |      |
| December          |       |                              |                      |                           |           | -                    | -                         |              |                   |                           | 18,689,761                                  |      |
| YTD Balance       |       | 40,021,103                   | 28,243,964           | 11,777,138                | 6,821,368 | 4,814,022            | 2,007,346                 | 16,669,126   | 11,763,849        | 4,905,277                 | 18,689,761                                  |      |

|                              |            |  |
|------------------------------|------------|--|
| EE Program Costs             | 40,021,103 |  |
| EE PPI & GRT                 | 6,821,368  |  |
| EE Lost Revenue              | 16,669,126 |  |
| Total EE Revenue Requirement | 63,511,597 |  |

**Duke Energy Carolinas, LLC**  
**Docket No. E-7, Sub 1192**  
**Estimated Return Calculation - Residential EE Programs Vintage 2016**

**Interest Calculation**

| <b>2019 - Rider 10</b> | Month                     | NC Program Costs Incurred | Revenue Collected | Undercollected Balance | PPI         | Revenue Collected | Undercollected Balance | Lost Revenue | Revenue Collected | Undercollected Balance | <b>Total Cumulative Over/Under Collected</b> |
|------------------------|---------------------------|---------------------------|-------------------|------------------------|-------------|-------------------|------------------------|--------------|-------------------|------------------------|--|
|                        | Beginning Balance         | 40,021,103                | 28,243,964        | 11,777,138             | 6,821,368   | 4,814,022         | 2,007,346              | 16,669,126   | 11,763,849        | 4,905,277              | 18,689,761                                   |
|                        | January                   |                           |                   | -                      |             |                   | -                      |              |                   |                        | 18,689,761                                   |
|                        | February                  |                           |                   | -                      |             |                   | -                      |              |                   |                        | 18,689,761                                   |
|                        | March                     |                           |                   | -                      |             |                   | -                      |              |                   |                        | 18,689,761                                   |
|                        | April                     |                           |                   | -                      |             |                   | -                      |              |                   |                        | 18,689,761                                   |
|                        | May                       |                           |                   | -                      |             |                   | -                      |              |                   |                        | 18,689,761                                   |
|                        | June                      |                           |                   | -                      |             |                   | -                      |              |                   |                        | 18,689,761                                   |
|                        | July                      |                           |                   | -                      |             |                   | -                      |              |                   |                        | 18,689,761                                   |
|                        | August                    |                           |                   | -                      |             |                   | -                      |              |                   |                        | 18,689,761                                   |
|                        | September                 |                           |                   | -                      |             |                   | -                      |              |                   |                        | 18,689,761                                   |
|                        | October                   |                           |                   | -                      |             |                   | -                      |              |                   |                        | 18,689,761                                   |
|                        | November                  |                           |                   | -                      |             |                   | -                      |              |                   |                        | 18,689,761                                   |
|                        | December                  | (2)                       |                   | (2)                    | (51,566.50) |                   | (51,567)               | 2,424,300    | 5,570,022         | (3,145,722)            | 15,492,471                                   |
|                        | YTD Balance               | (2)                       | -                 | (2)                    | (51,567)    | -                 | (51,567)               | 2,424,300    | 5,570,022         | (3,145,722)            | 15,492,471                                   |
|                        | Cumulative Ending Balance | 40,021,101                | 28,243,964        | 11,777,137             | 6,769,802   | 4,814,022         | 1,955,779              | 19,093,426   | 17,333,871        | 1,759,555              | 15,492,471                                   |

Note: Year 2 of all residential vintages goes toward the collection of Year 2 lost revenues. Therefore, no revenues offset the undercollection of Year 1 Program costs or PPI. Interest continued to accrue on beginning balance.

**Interest Calculation**

| <b>2020- Rider 11</b> | Month                     | NC Program Costs Incurred | Revenue Collected | Cumulative Under/(Over)collected Balance | PPI       | Revenue Collected | Cumulative Under/(Over)collected Balance | Lost Revenue | Revenue Collected | Cumulative Under/(Over)collected Balance | <b>Total Cumulative Over/Under Collected</b> |
|-----------------------|---------------------------|---------------------------|-------------------|--|-----------|-------------------|--|--------------|-------------------|--|--|
|                       | Beginning Balance         | 40,021,101                | 28,243,964        | 11,777,137                               | 6,770,575 | 4,814,022         | 1,956,553                                | 19,093,426   | 17,333,871        | 1,759,555                                | 15,493,244                                   |
|                       | January                   |                           | 590,101           | 11,187,036                               |           | 98,034            | 1,858,519                                | 1,390,664    | 575,924           | 2,574,295                                | 15,619,850                                   |
|                       | February                  |                           | 1,196,334         | 9,990,702                                |           | 198,749           | 1,659,770                                | 1,167,592    | 2,797,367         |  | 14,447,839                                   |
|                       | March                     |                           | 869,993           | 9,120,709                                |           | 144,533           | 1,515,237                                | 1,390,664    | 849,091           | 3,338,940                                | 13,974,885                                   |
|                       | April                     |                           | 876,484           | 8,244,224                                |           | 145,612           | 1,369,625                                | 1,390,664    | 855,427           | 3,874,178                                | 13,488,027                                   |
|                       | May                       |                           | 761,524           | 7,482,701                                |           | 126,513           | 1,243,112                                | 1,390,664    | 743,228           | 4,521,614                                | 13,247,426                                   |
|                       | June                      |                           | 1,101,959         | 6,380,741                                |           | 183,070           | 1,060,042                                | 1,390,664    | 1,075,485         | 4,836,793                                | 12,277,576                                   |
|                       | July                      |                           | 1,270,589         | 5,110,153                                |           | 211,085           | 848,957                                  | 1,390,651    | 1,240,063         | 4,987,381                                | 10,946,491                                   |
|                       | August                    |                           | 1,166,088         | 3,944,064                                |           | 193,724           | 655,233                                  |              | 1,138,073         | 3,849,308                                | 8,448,606                                    |
|                       | September                 |                           | 1,254,406         | 2,689,658                                |           | 208,396           | 446,837                                  |              | 1,224,269         | 2,625,039                                | 5,761,535                                    |
|                       | October                   |                           | 875,003           | 1,814,656                                |           | 145,365           | 301,471                                  |              | 853,981           | 1,771,059                                | 3,887,186                                    |
|                       | November                  |                           | 805,848           | 1,008,808                                |           | 133,877           | 167,595                                  |              | 786,488           | 984,571                                  | 2,160,973                                    |
|                       | December                  |                           | 1,929,546         | (920,739)                                |           | 320,558           | (152,964)                                |              | 1,883,189         | (898,618)                                | (1,972,320)                                  |
|                       | Cumulative Ending Balance | 40,021,101                | 40,941,840        | (920,739)                                | 6,770,575 | 6,923,539         | (152,964)                                | 28,828,063   | 29,726,681        | (898,618)                                | (1,972,320)                                  |

Revenue Requirement:  
Program Costs 11,777,137 0.47  
PPI & GRT 1,956,553 0.08  
Lost Revenue 11,494,191 0.46  
Total Revenue Requirement 25,227,881  
78575321.89 (2,485,918) 76,089,404  
77,592,059.53  
(2,917,448.31)  
74,674,611.22

**Interest Calculation**

| <b>2021- Rider 12</b> | Month                     | NC Program Costs Incurred | Revenue Collected         | Cumulative Under/(Over)collected Balance | PPI       | Revenue Collected      | Cumulative Under/(Over)collected Balance | Lost Revenue | Revenue Collected         | Cumulative Under/(Over)collected Balance | <b>Total Cumulative Over/Under Collected</b> |
|-----------------------|---------------------------|---------------------------|---------------------------|--|-----------|------------------------|--|--------------|---------------------------|--|--|
|                       | Beginning Balance         | 40,021,101                | 40,941,840                | (920,739)                                | 6,770,575 | 6,923,539              | (152,964)                                | 28,828,063   | 29,726,681                | (898,618)                                | (1,972,320)                                  |
|                       | January                   |                           | (63,436)                  | (857,303)                                |           | (10,539)               | (142,425)                                |              | (61,912)                  | (836,706)                                | (1,836,434)                                  |
|                       | February                  |                           | (127,450)                 | (729,852)                                |           | (21,174)               | (121,251)                                |              | (124,388)                 | (712,318)                                | (1,563,421)                                  |
|                       | March                     |                           | (106,849)                 | (623,004)                                |           | (17,751)               | (103,500)                                |              | (104,282)                 | (608,036)                                | (1,334,540)                                  |
|                       | April                     |                           | (93,180)                  | (529,823)                                |           | (15,480)               | (88,020)                                 |              | (90,941)                  | (517,094)                                | (1,134,938)                                  |
|                       | May                       |                           | (92,763)                  | (437,061)                                |           | (15,411)               | (72,610)                                 |              | (90,534)                  | (426,560)                                | (936,231)                                    |
|                       | June                      |                           | (113,550)                 | (323,511)                                |           | (18,864)               | (53,745)                                 |              | (110,822)                 | (315,738)                                | (692,994)                                    |
|                       | July                      |                           | (130,095)                 | (193,416)                                |           | (21,613)               | (32,132)                                 |              | (126,969)                 | (188,769)                                | (414,318)                                    |
|                       | August                    |                           | (133,483)                 | (59,933)                                 |           | (22,176)               | (9,957)                                  |              | (130,276)                 | (58,493)                                 | (128,382)                                    |
|                       | September                 |                           | (125,007)                 | 65,075                                   |           | (20,768)               | 10,811                                   |              | (122,004)                 | 63,511                                   | 139,397                                      |
|                       | October                   |                           | (102,737)                 | 167,811                                  |           | (17,068)               | 27,879                                   |              | (100,268)                 | 163,780                                  | 359,470                                      |
|                       | November                  |                           | (91,913)                  | 259,724                                  |           | (15,270)               | 43,148                                   |              | (89,704)                  | 253,484                                  | 556,356                                      |
|                       | December                  |                           | (181,490)                 | 441,214                                  |           | (30,151)               | 73,300                                   |              | (177,130)                 | 430,614                                  | 945,128                                      |
|                       | Cumulative Ending Balance | 40,021,101                | 39,579,887<br>(1,361,953) | 441,214                                  | 6,770,575 | 6,697,276<br>(226,263) | 73,300                                   | 28,828,063   | 28,397,449<br>(1,329,232) | 430,614                                  | 945,128                                      |

Revenue Requirement:  
Program Costs (920,739) 0.47  
PPI & GRT (152,964) 0.08  
Lost Revenue (898,618) 0.46  
Total Revenue Requirement (1,972,320)



Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation - Residential DSM Programs Vintage 2016

| NC Residential DSM                | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly<br>Deferred Income<br>Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T Return<br>on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|-----------------------------------|--|----------------------------|-----------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|                                   | 2019                                   |                            |                                   |                                      |                                      | 6.84%          |                                   |                           | 0.766497                                |                                 |
| <b>Beginning Balance - source</b> | (11,973)                               |                            |                                   | (2,827)                              | (9,146)                              |                |                                   |                           |   |                                 |
| 2018 January                      | (12,671)                               | 0.236149                   | (165)                             | (2,992)                              | (9,679)                              | 0.005700       | (54)                              | (54)                      | 0.766497                                | (70)                            |
| 2018 February                     | (9,760)                                | 0.236149                   | 687                               | (2,305)                              | (7,455)                              | 0.005700       | (49)                              | (102)                     | 0.766497                                | (134)                           |
| 2018 March                        | (8,011)                                | 0.236149                   | 413                               | (1,892)                              | (6,119)                              | 0.005700       | (39)                              | (141)                     | 0.766497                                | (184)                           |
| 2018 April                        | (7,032)                                | 0.236149                   | 231                               | (1,661)                              | (5,371)                              | 0.005700       | (33)                              | (174)                     | 0.766497                                | (227)                           |
| 2018 May                          | (6,076)                                | 0.236149                   | 226                               | (1,435)                              | (4,641)                              | 0.005700       | (29)                              | (202)                     | 0.766497                                | (264)                           |
| 2018 June                         | (3,949)                                | 0.236149                   | 502                               | (932)                                | (3,016)                              | 0.005700       | (22)                              | (224)                     | 0.766497                                | (293)                           |
| 2018 July                         | (889)                                  | 0.236149                   | 723                               | (210)                                | (679)                                | 0.005700       | (11)                              | (235)                     | 0.766497                                | (306)                           |
| 2018 August                       | (9,528)                                | 0.236149                   | (2,040)                           | (2,250)                              | (7,278)                              | 0.005700       | (23)                              | (257)                     | 0.766497                                | (336)                           |
| 2018 September                    | (20,713)                               | 0.236149                   | (2,641)                           | (4,891)                              | (15,822)                             | 0.005700       | (66)                              | (323)                     | 0.766497                                | (422)                           |
| 2018 October                      | (26,835)                               | 0.236149                   | (1,446)                           | (6,337)                              | (20,498)                             | 0.005700       | (104)                             | (427)                     | 0.766497                                | (557)                           |
| 2018 November                     | (30,495)                               | 0.236149                   | (864)                             | (7,201)                              | (23,294)                             | 0.005700       | (125)                             | (552)                     | 0.766497                                | (720)                           |
| 2018 December                     | (54,523)                               | 0.236149                   | (5,674)                           | (12,876)                             | (41,648)                             | 0.005700       | (185)                             | (737)                     | 0.766497                                | (961)                           |
|                                   |  |                            |                                   |                                      |                                      |                | (737)                             |                           |   | (961)                           |

Note 1: Amounts represent all revenue actually collected through 2018.

**Interest Calculation**

| 2018 -<br>Rider 9 |       |                              |                      |                           |           |                      |                           | Total Cumulative        |                           |            |      |
|-------------------|-------|------------------------------|----------------------|---------------------------|-----------|----------------------|---------------------------|-------------------------|---------------------------|------------|------|
|                   | Month | NC Program Costs<br>Incurred | Revenue<br>Collected | Undercollected<br>Balance | PPI       | Revenue<br>Collected | Undercollected<br>Balance | Under/Over<br>Collected |                           |            | %    |
| Beginning Balance |       | 9,600,575                    | 10,366,049           | (765,474)                 | 2,775,672 | 2,996,983.02         | (221,311)                 | (986,784)               | DSM Program Costs         | 9,600,575  | 0.78 |
| January           |       |                              |                      |                           |           | -                    | -                         | (986,784)               | DSM PPI & GRT             | 2,775,672  | 0.22 |
| February          |       |                              |                      |                           |           | -                    | -                         | (986,784)               | Total Revenue Requirement | 12,376,248 |      |
| March             |       |                              |                      |                           |           | -                    | -                         | (986,784)               |                           |            |      |
| April             |       |                              |                      |                           |           | -                    | -                         | (986,784)               |                           |            |      |
| May               |       |                              |                      |                           |           | -                    | -                         | (986,784)               |                           |            |      |
| June              |       |                              |                      |                           |           | -                    | -                         | (986,784)               |                           |            |      |
| July              |       |                              |                      |                           |           | -                    | -                         | (986,784)               |                           |            |      |
| August            |       |                              |                      |                           |           | -                    | -                         | (986,784)               |                           |            |      |
| September         |       |                              |                      |                           |           | -                    | -                         | (986,784)               |                           |            |      |
| October           |       |                              |                      |                           |           | -                    | -                         | (986,784)               |                           |            |      |
| November          |       |                              |                      |                           |           | -                    | -                         | (986,784)               |                           |            |      |
| December          |       |                              |                      |                           |           | -                    | -                         | (986,784)               |                           |            |      |
| YTD Balance       |       | 9,600,575                    | 10,366,049           | (765,474)                 | 2,775,672 | 2,996,983            | (221,311)                 |                         |                           |            |      |

**Duke Energy Carolinas, LLC**  
**Docket No. E-7, Sub 1192**  
**Estimated Return Calculation - Residential DSM Programs Vintage 2016**

**Interest Calculation**

| 2019 -<br>Rider 10 | Month                     | NC Program Costs<br>Incurred | Revenue<br>Collected | Undercollected<br>Balance | PPI       | Revenue<br>Collected | Undercollected<br>Balance | Total Cumulative<br>Over/Under<br>Collected |
|--------------------|---------------------------|------------------------------|----------------------|---------------------------|-----------|----------------------|---------------------------|---|
|                    | Beginning Balance         | 9,600,575                    | 10,366,049           | (765,474)                 | 2,775,672 | 2,996,983            | (221,311)                 | (986,784)                                   |
|                    | January                   |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | February                  |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | March                     |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | April                     |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | May                       |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | June                      |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | July                      |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | August                    |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | September                 |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | October                   |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | November                  |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | December                  |                              |                      | -                         |           |                      | -                         | (986,784)                                   |
|                    | YTD Balance               | -                            | -                    | -                         |           | -                    | -                         | (986,784)                                   |
|                    | Cumulative Ending Balance | 9,600,575                    | 10,366,049           | (765,474)                 | 2,775,672 | 2,996,983            | (221,311)                 | (986,784)                                   |

Note: Year 2 of all residential vintages goes toward the collection of Year 2 lost revenues. Therefore, no revenues offset the overcollection of Program costs or PPI. Interest continued to accrue on beginning balance.

**Interest Calculation**

| 2020-<br>Rider 11 | Month                     | NC Program Costs<br>Incurred | Revenue<br>Collected | Cumulative<br>Under/(Over)colle<br>cted Balance | PPI       | Revenue<br>Collected | Cumulative<br>Under/(Over)colle<br>cted Balance | Total Cumulative<br>Over/Under<br>Collected |
|-------------------|---------------------------|------------------------------|----------------------|---|-----------|----------------------|---|---|
|                   | Beginning Balance         | 9,600,575                    | 10,366,049           | (765,474)                                       | 2,775,672 | 2,996,983            | (221,311)                                       | (986,784)                                   |
|                   | January                   |                              | (38,138)             | (727,336)                                       | (6,183)   | (11,026)             | (216,467)                                       | (943,803)                                   |
|                   | February                  |                              | (76,575)             | (650,761)                                       | (6,183)   | (22,139)             | (200,511)                                       | (851,272)                                   |
|                   | March                     |                              | (55,884)             | (594,877)                                       | (6,183)   | (16,157)             | (190,537)                                       | (785,414)                                   |
|                   | April                     |                              | (56,295)             | (538,582)                                       | (6,183)   | (16,276)             | (180,443)                                       | (719,025)                                   |
|                   | May                       |                              | (49,007)             | (489,575)                                       | (6,183)   | (14,169)             | (172,458)                                       | (662,033)                                   |
|                   | June                      |                              | (70,591)             | (418,984)                                       | (6,183)   | (20,409)             | (158,231)                                       | (577,215)                                   |
|                   | July                      |                              | (81,283)             | (337,701)                                       | (6,183)   | (23,500)             | (140,914)                                       | (478,615)                                   |
|                   | August                    |                              | (74,657)             | (263,044)                                       | (6,183)   | (21,585)             | (125,512)                                       | (388,556)                                   |
|                   | September                 |                              | (80,257)             | (182,787)                                       | (6,183)   | (23,204)             | (108,491)                                       | (291,278)                                   |
|                   | October                   |                              | (56,201)             | (126,586)                                       | (6,183)   | (16,249)             | (98,425)  | (225,011)                                   |
|                   | November                  |                              | (51,817)             | (74,769)  | (6,183)   | (14,981)             | (89,627)  | (164,396)                                   |
|                   | December                  |                              | (123,063)            | 48,294  | (6,220)   | (35,579)             | (60,267)  | (11,973)                                    |
|                   | YTD Balance               | -                            | (813,768)            | (74,230)  | (74,230)  | (235,273)            | (60,267)  | (11,973)                                    |
|                   | Cumulative Ending Balance | 9,600,575                    | 9,552,281            | 48,294  | 2,701,443 | 2,761,710            | (60,267)  | (11,973)                                    |

## Revenue Requirement:

|                          |             |      |
|--------------------------|-------------|------|
| Program Costs            | (765,474)   | 0.78 |
| PPI                      | (221,311)   | 0.22 |
| Total                    | (986,784)   |      |
| Revenue Given back       | (1,075,363) |      |
| Less Interest given back | (26,322)    |      |
| Total                    | (1,049,041) |      |

**Interest Calculation**

| 2021-<br>Rider 12 | Month                     | NC Program Costs<br>Incurred | Revenue<br>Collected | Cumulative<br>Under/(Over)colle<br>cted Balance | PPI       | Revenue<br>Collected | Cumulative<br>Under/(Over)colle<br>cted Balance | Total Cumulative<br>Over/Under<br>Collected |
|-------------------|---------------------------|------------------------------|----------------------|---|-----------|----------------------|---|---|
|                   | Beginning Balance         | 9,600,575                    | 9,552,281            | 48,294  | 2,701,443 | 2,761,710            | (60,267)  | (11,973)                                    |
|                   | January                   |                              | (2,814)              | 51,108  |           | 3,512                | (63,779)  | (12,671)                                    |
|                   | February                  |                              | 11,741               | 39,367  |           | (14,652)             | (49,127)  | (9,760)                                     |
|                   | March                     |                              | 7,057                | 32,310  |           | (8,806)              | (40,321)  | (8,011)                                     |
|                   | April                     |                              | 3,949                | 28,362  |           | (4,928)              | (35,393)  | (7,032)                                     |
|                   | May                       |                              | 3,854                | 24,508  |           | (4,809)              | (30,584)  | (6,076)                                     |
|                   | June                      |                              | 8,580                | 15,927  |           | (10,708)             | (19,876)  | (3,949)                                     |
|                   | July                      |                              | 12,342               | 3,585   |           | (15,402)             | (4,474)   | (889)                                       |
|                   | August                    |                              | 13,113               | (9,528)   |           | (16,364)             | 11,890  | 2,362                                       |
|                   | September                 |                              | 11,185               | (20,713)  |           | (13,959)             | 25,848  | 5,135                                       |
|                   | October                   |                              | 6,122                | (26,835)  |           | (7,640)              | 33,488  | 6,653                                       |
|                   | November                  |                              | 3,661                | (30,495)  |           | (4,568)              | 38,056  | 7,561                                       |
|                   | December                  |                              | 24,028               | (54,523)  |           | (29,985)             | 68,041  | 13,518                                      |
|                   | YTD Balance               | -                            | 102,817              | -   | -         | (128,309)            | 68,041  | 13,518                                      |
|                   | Cumulative Ending Balance | 9,600,575                    | 9,655,099            | (54,523)  | 2,701,443 | 2,633,401            | 68,041  | 13,518                                      |

## Revenue Requirement:

|   |          |        |
|---|----------|--------|
| 698 Program Costs                       | 48,294   | (4.03) |
| (2,911) PPI                             | (60,267) | 5.03   |
| (1,750) Total                           | (11,973) |        |
| (979)                                   |          |        |
| (955) Revenue given back                | (65,419) |        |
| (2,127) Less: Interest given back + GRT | (39,928) |        |
| (3,060)                                 | (25,491) |        |
| (3,251)                                 |          |        |
| (2,773)                                 | (25,491) |        |
| (1,518)                                 | -        |        |
| (908)                                   |          |        |
| (5,957)                                 |          |        |

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1192  
Estimated Return Calculation - Non- Residential EE Programs Vintage 2016

| NC Non- Residential EE                 | Non-Residential<br>EE Program Costs |                                   | NC Allocated EE<br>Program Costs | Total Revenue<br>Collected | Percent<br>Attributable to<br>Program Costs |              | NC Residential<br>Revenue Collected | (Over)/Under<br>Collection |  |
|--|-------------------------------------|-----------------------------------|----------------------------------|----------------------------|---|--------------|-------------------------------------|----------------------------|--|
|  | Incurred                            | NC Allocation %                   |                                  |                            |   |              |                                     |                            |  |
|  |                                     | Miller Exhibit 5.<br>pg 3, Line 4 |                                  |                            |   |              |                                     |                            |  |
| <b>Beginning Balance - Source Ride</b> | -                                   |                                   | 50,009,987                       | 81,955,731                 |   | (48,395,713) | 1,614,274                           |                            |  |
| 2018 January                           |                                     | 73.0962827%                       | -                                | 587,043                    | -69.29044%                                  | 406,765      | 406,765                             |                            |  |
| 2018 February                          |                                     | 73.0962827%                       | -                                | (210,295)                  | -69.29044%                                  | (145,714)    | (145,714)                           |                            |  |
| 2018 March                             |                                     | 73.0962827%                       | -                                | (163,394)                  | -69.29044%                                  | (113,216)    | (113,216)                           |                            |  |
| 2018 April                             |                                     | 73.0962827%                       | -                                | (167,528)                  | -69.29044%                                  | (116,081)    | (116,081)                           |                            |  |
| 2018 May                               |                                     | 73.0962827%                       | -                                | (183,113)                  | -69.29044%                                  | (126,880)    | (126,880)                           |                            |  |
| 2018 June                              |                                     | 73.0962827%                       | -                                | (197,490)                  | -69.29044%                                  | (136,842)    | (136,842)                           |                            |  |
| 2018 July                              |                                     | 73.0962827%                       | -                                | (221,358)                  | -69.29044%                                  | (153,380)    | (153,380)                           |                            |  |
| 2018 August                            |                                     | 73.0962827%                       | -                                | (228,025)                  | -69.29044%                                  | (157,999)    | (157,999)                           |                            |  |
| 2018 September                         |                                     | 73.0962827%                       | -                                | (218,575)                  | -69.29044%                                  | (151,452)    | (151,452)                           |                            |  |
| 2018 October                           |                                     | 73.0962827%                       | -                                | (208,788)                  | -69.29044%                                  | (144,670)    | (144,670)                           |                            |  |
| 2018 November                          |                                     | 73.0962827%                       | -                                | (173,646)                  | -69.29044%                                  | (120,320)    | (120,320)                           |                            |  |
| 2018 December                          |                                     | 73.0962827%                       | -                                | (53,238)                   | -69.29044%                                  | (36,889)     | (36,889)                            |                            |  |
|  | -                                   |                                   | 50,009,987                       | 80,517,324                 |   | (49,392,392) | 617,596                             |                            |  |

**Program Costs to be Recovered in Rider 10** **1,614,274**

Revenues to be Collected in Rider 10 (2,329,721)

% Revenue to be assigned to Program Costs (0.6929)

|                                 |           | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T<br>Return on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|---------------------------------|-----------|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
| NC Non-Residential EE           |           |  | 2019                       |                                |                                      |                                      | 6.84%          |                                   |                           | 0.766497                                |                                 |
| Beginning Balance - Source Ride |           | 1,614,274                              |                            |                                | 381,209                              |                                      |                |                                   |                           |   |                                 |
| 2018                            | January   | 2,021,039                              | 0.236149                   | 96,057.10                      | 477,266                              | 1,543,773                            | 0.005700       | 4,400                             | 4,400                     | 0.766497                                | 5,740                           |
| 2018                            | February  | 1,875,324                              | 0.236149                   | (34,410.31)                    | 442,856                              | 1,432,468                            | 0.005700       | 8,482                             | 12,882                    | 0.766497                                | 16,806                          |
| 2018                            | March     | 1,762,108                              | 0.236149                   | (26,735.95)                    | 416,120                              | 1,345,988                            | 0.005700       | 7,919                             | 20,801                    | 0.766497                                | 27,137                          |
| 2018                            | April     | 1,646,027                              | 0.236149                   | (27,412.43)                    | 388,708                              | 1,257,319                            | 0.005700       | 7,419                             | 28,220                    | 0.766497                                | 36,817                          |
| 2018                            | May       | 1,519,147                              | 0.236149                   | (29,962.51)                    | 358,745                              | 1,160,402                            | 0.005700       | 6,891                             | 35,111                    | 0.766497                                | 45,807                          |
| 2018                            | June      | 1,382,306                              | 0.236149                   | (32,314.99)                    | 326,430                              | 1,055,876                            | 0.005700       | 6,316                             | 41,427                    | 0.766497                                | 54,047                          |
| 2018                            | July      | 1,228,926                              | 0.236149                   | (36,220.57)                    | 290,210                              | 938,716                              | 0.005700       | 5,685                             | 47,112                    | 0.766497                                | 61,463                          |
| 2018                            | August    | 1,070,926                              | 0.236149                   | (37,311.37)                    | 252,898                              | 818,028                              | 0.005700       | 5,007                             | 52,118                    | 0.766497                                | 67,995                          |
| 2018                            | September | 919,475                                | 0.236149                   | (35,765.15)                    | 217,133                              | 702,342                              | 0.005700       | 4,333                             | 56,451                    | 0.766497                                | 73,648                          |
| 2018                            | October   | 774,804                                | 0.236149                   | (34,163.73)                    | 182,969                              | 591,835                              | 0.005700       | 3,688                             | 60,140                    | 0.766497                                | 78,460                          |
| 2018                            | November  | 654,485                                | 0.236149                   | (28,413.42)                    | 154,556                              | 499,929                              | 0.005700       | 3,112                             | 63,251                    | 0.766497                                | 82,520                          |
| 2018                            | December  | 617,596                                | 0.236149                   | (8,711.31)                     | 145,845                              | 471,751                              | 0.005700       | 2,769                             | 66,021                    | 0.766497                                | 86,133                          |
|                                 |           |  |                            |                                |                                      |                                      |                | 66,021                            |                           |   | 86,133                          |

Note 1: Amounts represent all revenue actually collected through 2018.

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Return Calculation -Non - Residential DSM Programs Vintage 2016

| NC Non-Residential DSM                 | Cumulative<br>(Over)/Under<br>Recovery | Current Income<br>Tax Rate | Monthly Deferred<br>Income Tax | Cumulative<br>Deferred Income<br>Tax | Net Deferred<br>After Tax<br>Balance | Monthly Return | Monthly A/T<br>Return on Deferral | YTD After Tax<br>Interest | Gross up of<br>Return to<br>Pretax Rate | Gross up of Return<br>to Pretax |
|--|--|----------------------------|--------------------------------|--------------------------------------|--------------------------------------|----------------|-----------------------------------|---------------------------|---|---------------------------------|
|  |  | 2019                       |                                |                                      |                                      | 6.84%          |                                   |                           | 0.766497                                |                                 |
| <b>Beginning Balance - Source Ride</b> | (250,374)                              |                            |                                | (59,126)                             | (191,249)                            |                |                                   |                           |   |                                 |
| 2018 January                           | (251,927)                              | 0.236149                   | (367)                          | (59,492)                             | (192,435)                            | 0.005700       | (1,093)                           | (1,093)                   | 0.766497                                | (1,427)                         |
| 2018 February                          | (230,010)                              | 0.236149                   | 5,176                          | (54,317)                             | (175,694)                            | 0.005700       | (1,049)                           | (2,143)                   | 0.766497                                | (2,795)                         |
| 2018 March                             | (210,641)                              | 0.236149                   | 4,574                          | (49,743)                             | (160,898)                            | 0.005700       | (959)                             | (3,102)                   | 0.766497                                | (4,047)                         |
| 2018 April                             | (190,319)                              | 0.236149                   | 4,799                          | (44,944)                             | (145,375)                            | 0.005700       | (873)                             | (3,975)                   | 0.766497                                | (5,186)                         |
| 2018 May                               | (168,522)                              | 0.236149                   | 5,147                          | (39,796)                             | (128,725)                            | 0.005700       | (781)                             | (4,756)                   | 0.766497                                | (6,205)                         |
| 2018 June                              | (145,244)                              | 0.236149                   | 5,497                          | (34,299)                             | (110,945)                            | 0.005700       | (683)                             | (5,439)                   | 0.766497                                | (7,096)                         |
| 2018 July                              | (118,634)                              | 0.236149                   | 6,284                          | (28,015)                             | (90,619)                             | 0.005700       | (574)                             | (6,014)                   | 0.766497                                | (7,845)                         |
| 2018 August                            | (91,977)                               | 0.236149                   | 6,295                          | (21,720)                             | (70,257)                             | 0.005700       | (458)                             | (6,472)                   | 0.766497                                | (8,444)                         |
| 2018 September                         | (65,905)                               | 0.236149                   | 6,157                          | (15,563)                             | (50,341)                             | 0.005700       | (344)                             | (6,816)                   | 0.766497                                | (8,892)                         |
| 2018 October                           | (42,923)                               | 0.236149                   | 5,427                          | (10,136)                             | (32,786)                             | 0.005700       | (237)                             | (7,053)                   | 0.766497                                | (9,201)                         |
| 2018 November                          | (22,317)                               | 0.236149                   | 4,866                          | (5,270)                              | (17,047)                             | 0.005700       | (142)                             | (7,195)                   | 0.766497                                | (9,386)                         |
| 2018 December                          | 10,075                                 | 0.236149                   | 7,649                          | 2,379                                | 7,696                                | 0.005700       | (27)                              | (7,221)                   | 0.766497                                | (9,421)                         |
|  |  |                            |                                |                                      |                                      |                | (7,221)                           |                           |   | (9,421)                         |

Note 1: Amounts represent all revenue actually collected through 2018.

Interest Calculation

| 2018 -<br>Rider 9 | Month | NC Program Costs<br>Incurred | Revenue<br>Collected | Undercollected<br>Balance | PPI       | Revenue<br>Collected | Undercollected Balance | Total Cumulative<br>Under/Over<br>Collected | %                                    |
|-------------------|-------|------------------------------|----------------------|---------------------------|-----------|----------------------|------------------------|---|--------------------------------------|
| Beginning Balance |       | 11,594,497                   | 11,354,396           | 240,102                   | 3,352,151 | 3,282,731            | 69,419                 | 309,521                                     |                                      |
| January           |       |                              |                      |                           |           | -                    | -                      | 309,521                                     | DSM Program Costs 11,594,497 0.78    |
| February          |       |                              |                      |                           |           | -                    | -                      | 309,521                                     | DSM PPI & GRT 3,352,151 0.22         |
| March             |       |                              |                      |                           |           | -                    | -                      | 309,521                                     | Total Revenue Requirement 14,946,648 |
| April             |       |                              |                      |                           |           | -                    | -                      | 309,521                                     |                                      |
| May               |       |                              |                      |                           |           | -                    | -                      | 309,521                                     |                                      |
| June              |       |                              |                      |                           |           | -                    | -                      | 309,521                                     |                                      |
| July              |       |                              |                      |                           |           | -                    | -                      | 309,521                                     |                                      |
| August            |       |                              |                      |                           |           | -                    | -                      | 309,521                                     |                                      |
| September         |       |                              |                      |                           |           | -                    | -                      | 309,521                                     |                                      |
| October           |       |                              |                      |                           |           | -                    | -                      | 309,521                                     |                                      |
| November          |       |                              |                      |                           |           | -                    | -                      | 309,521                                     |                                      |
| December          |       |                              |                      |                           |           | -                    | -                      | 309,521                                     |                                      |
| YTD Balance       |       | 11,594,497                   | 11,354,396           | 240,102                   | 3,352,151 | 3,282,731            | 69,419                 |   |                                      |

**Duke Energy Carolinas, LLC**  
**Docket No. E-7, Sub 1192**  
**Estimated Return Calculation -Non - Residential DSM Programs Vintage 2016**

**Interest Calculation**

| <b>2019 - Rider 10</b>    | <b>Month</b> | <b>NC Program Costs Incurred</b> | <b>Revenue Collected</b> | <b>Undercollected Balance</b> | <b>PPI</b> | <b>Revenue Collected</b> | <b>Undercollected Balance</b> | <b>Total Cumulative Over/Under Collected</b> |
|---------------------------|--------------|----------------------------------|--------------------------|-------------------------------|------------|--------------------------|-------------------------------|--|
| Beginning Balance         |              | 11,594,497                       | 11,354,396               | 240,102                       | 3,352,151  | 3,282,731                | 69,419                        | 309,521                                      |
| January                   |              |                                  | 192,582                  | (192,582)                     |            | 55,678                   | (55,678)                      | 61,261                                       |
| February                  |              |                                  | 1,806                    | (1,806)                       |            | 522                      | (522)                         | 58,933                                       |
| March                     |              |                                  | (2,074)                  | 2,074                         |            | (600)                    | 600                           | 61,607                                       |
| April                     |              |                                  | (294)                    | 294                           |            | (85)                     | 85                            | 61,986                                       |
| May                       |              |                                  | 20                       | (20)                          |            | 6                        | (6)                           | 61,960                                       |
| June                      |              |                                  | (7)                      | 7                             |            | (2)                      | 2                             | 61,969                                       |
| July                      |              |                                  | (4)                      | 4                             |            | (1)                      | 1                             | 61,974                                       |
| August                    |              |                                  | (2,270)                  | 2,270                         |            | (656)                    | 656                           | 64,901                                       |
| September                 |              |                                  | (31)                     | 31                            |            | (9)                      | 9                             | 64,940                                       |
| October                   |              |                                  | 8                        | (8)                           |            | 2                        | (2)                           | 64,930                                       |
| November                  |              |                                  | (8)                      | 8                             |            | (2)                      | 2                             | 64,940                                       |
| December                  |              |                                  | 4,982                    | (4,982)                       |            | 1,440                    | (1,440)                       | 58,517                                       |
| YTD Balance               |              | -                                | 194,710                  | (194,710)                     | -          | 56,294                   | (56,294)                      | 58,517                                       |
| Cumulative Ending Balance |              | 11,594,497                       | 11,549,106               | 45,391                        | 3,352,151  | 3,339,025                | 13,125                        | 58,517                                       |

Note: There was no Non-Residential DSM Rider in Rider 10. All revenues collected represented bill corrections, so all revenues were allocated on the same basis as prior year.

**Interest Calculation**

| <b>2020- Rider 11</b>     | <b>Month</b> | <b>NC Program Costs Incurred</b> | <b>Revenue Collected</b> | <b>Cumulative Under/(Over)collected Balance</b> | <b>PPI</b> | <b>Revenue Collected</b> | <b>Cumulative Under/(Over)collected Balance</b> | <b>Total Cumulative Over/Under Collected</b> |
|---------------------------|--------------|----------------------------------|--------------------------|---|------------|--------------------------|---|--|
| Beginning Balance         |              | 11,594,497                       | 11,549,106               | 45,391  | 3,352,151  | 3,339,025                | 13,125  | 58,517                                       |
| January                   |              |                                  | 7,239                    | 38,152  | (485)      | (3,286)                  | 15,927  | 54,079                                       |
| February                  |              |                                  | 41,527                   | (3,374)   | (2,780)    | (18,850)                 | 31,998  | 28,623                                       |
| March                     |              |                                  | 36,432                   | (39,807)  | (2,439)    | (16,538)                 | 46,097  | 6,290  |
| April                     |              |                                  | 39,543                   | (79,349)  | (2,647)    | (17,950)                 | 61,400  | (17,950)                                     |
| May                       |              |                                  | 39,817                   | (119,166)                                       | (2,665)    | (18,074)                 | 76,808  | (42,358)                                     |
| June                      |              |                                  | 47,726                   | (166,892)                                       | (3,195)    | (21,664)                 | 95,278  | (71,614)                                     |
| July                      |              |                                  | 49,697                   | (216,589)                                       | (3,327)    | (22,559)                 | 114,510   | (102,078)                                    |
| August                    |              |                                  | 48,648                   | (265,237)                                       | (3,256)    | (22,083)                 | 133,337   | (131,900)                                    |
| September                 |              |                                  | 53,915                   | (319,152)                                       | (3,609)    | (24,474)                 | 154,202   | (164,950)                                    |
| October                   |              |                                  | 56,754                   | (375,906)                                       | (3,799)    | (25,762)                 | 176,165   | (199,741)                                    |
| November                  |              |                                  | 39,299                   | (415,205)                                       | (2,631)    | (17,839)                 | 191,374   | (223,831)                                    |
| December                  |              |                                  | 43,300                   | (458,505)                                       | (2,898)    | (19,655)                 | 208,130   | (250,374)                                    |
| YTD Balance               |              | -                                | 503,896                  | (458,505)                                       | (33,730)   | (228,735)                | 208,130   | (250,374)                                    |
| Cumulative Ending Balance |              | 11,594,497                       | 12,053,002               | (458,505)                                       | 3,318,420  | 3,110,290                | 208,130   | (250,374)                                    |

|                          |          |        |
|--------------------------|----------|--------|
| Revenue Requirement:     |          |        |
| Program Costs            | 45,391   | 1.83   |
| PPI                      | (20,605) | (0.83) |
| Total                    | 24,787   |        |
| Revenue Collected:       | 276,923  |        |
| Less Interest collected: | 1,761    |        |
| Total                    | 275,161  |        |

**Interest Calculation**

| <b>2021- Rider 12</b>     | <b>Month</b> | <b>NC Program Costs Incurred</b> | <b>Revenue Collected</b> | <b>Cumulative Under/(Over)collected Balance</b> | <b>PPI</b> | <b>Revenue Collected</b> | <b>Cumulative Under/(Over)collected Balance</b> | <b>Total Cumulative Over/Under Collected</b> |
|---------------------------|--------------|----------------------------------|--------------------------|---|------------|--------------------------|---|--|
| Beginning Balance         |              | 11,594,497                       | 12,053,002               | (458,505)                                       | 3,318,420  | 3,110,290                | 208,130   | (250,374)                                    |
| January                   |              |                                  | 2,504                    | (461,009)                                       |            | (952)                    | 209,082   | (251,927)                                    |
| February                  |              |                                  | (40,135)                 | (420,874)                                       |            | 18,219                   | 190,864   | (230,010)                                    |
| March                     |              |                                  | (35,471)                 | (385,403)                                       |            | 16,101                   | 174,762   | (210,641)                                    |
| April                     |              |                                  | (37,215)                 | (348,188)                                       |            | 16,893                   | 157,869   | (190,319)                                    |
| May                       |              |                                  | (39,917)                 | (308,271)                                       |            | 18,120                   | 139,750   | (168,522)                                    |
| June                      |              |                                  | (42,628)                 | (265,643)                                       |            | 19,350                   | 120,399   | (145,244)                                    |
| July                      |              |                                  | (48,729)                 | (216,914)                                       |            | 22,120                   | 98,279  | (118,634)                                    |
| August                    |              |                                  | (48,816)                 | (168,097)                                       |            | 22,159                   | 76,120  | (91,977)                                     |
| September                 |              |                                  | (47,746)                 | (120,351)                                       |            | 21,673                   | 54,446  | (65,905)                                     |
| October                   |              |                                  | (42,087)                 | (78,264)  |            | 19,105                   | 35,342  | (42,923)                                     |
| November                  |              |                                  | (37,734)                 | (40,530)  |            | 17,129                   | 18,213  | (22,317)                                     |
| December                  |              |                                  | (50,606)                 | 10,075  |            | 22,789                   | (4,575)   | 5,500  |
| YTD Balance               |              | -                                | (468,580)                | 10,075  |            | 212,706                  | (4,575)   | 5,500  |
| Cumulative Ending Balance |              | 11,594,497                       | 11,584,422               | 10,075  | 3,318,420  | 3,322,996                | (4,575)   | 5,500  |

|                          |           |        |
|--------------------------|-----------|--------|
| Revenue Requirement:     |           |        |
| Program Costs            | (458,505) | 1.83   |
| PPI                      | 208,130   | (0.83) |
| Total                    | (250,374) |        |
| Revenue Collected:       | (258,546) |        |
| Less Interest collected: | (2,670)   |        |
| Total                    | (255,876) |        |

## Supplemental Miller Exhibit 4

Duke Energy Carolinas, LLC  
DSM/EE Actual Revenues Collected from Years 2017-2019 (By Vintage)  
and Estimated 2020 Collections from Rider 11 (by Vintage)  
Docket Number E-7, Sub 1230  
For Vintage Year 2017-2020 Estimate and True Up Calculations

|                        |                       |           | Actual<br>2016 | Actual<br>2017 | Actual<br>2018 | Actual<br>2019 | Estimated<br>2020 |                    |
|------------------------|-----------------------|-----------|----------------|----------------|----------------|----------------|-------------------|--------------------|
|                        |                       |           | Rider 7        | Rider 8        | Rider 9        | Rider 10       | Rider 11          | (1) Total          |
| <b>Residential</b>     |                       |           |                |                |                |                |                   |                    |
| Line                   |                       | Vintage   |                |                |                |                |                   |                    |
| 1                      | EE/DSM                | Year 2016 | 58,184,868     | 5,570,022      | 27,108,101     | (2,551,337)    | 967,614           | 89,279,269         |
| 2                      | EE/DSM                | Year 2017 |                | 61,914,541     | 4,435,871      | 35,762,325     | 5,078,935         | 107,191,672        |
| 3                      |                       | Year 2018 |                |                | 83,631,851     | 6,302,019      | 25,178,611        | 115,112,481        |
| 4                      |                       | Year 2019 |                |                |                | 77,019,837     | 5,232,466         | 82,252,303         |
| 5                      |                       | Year 2020 |                |                |                |                | 66,898,601        | 66,898,601         |
| 6                      | Total Residential     |           | \$ 58,184,868  | \$ 67,484,563  | \$ 115,175,822 | \$ 116,532,845 | \$ 103,356,227    | \$ 371,455,057     |
| <b>Non-Residential</b> |                       |           |                |                |                |                |                   |                    |
| 7                      | EE                    | Year 2016 | 45,662,897     | 8,632,771      | 36,292,834     | (1,438,407)    | 9,273,079         | 98,423,175         |
| 8                      |                       | Year 2017 |                | 46,928,129     | 10,882,796     | 64,212,173     | 17,144,751        | 139,167,848        |
| 9                      |                       | Year 2018 |                |                | 51,998,801     | 12,546,122     | 14,321,847        | 78,866,770         |
| 10                     |                       | Year 2019 |                |                |                | 52,862,599     | 8,746,000         | 61,608,599         |
| 11                     |                       | Year 2020 |                |                |                |                | 52,968,365        | 52,968,365         |
| 12                     | DSM                   | Year 2016 | 14,637,127     | 251,004        | 276,923        | (258,546)      | 14,674            | 14,921,181         |
| 13                     |                       | Year 2017 |                | 15,361,431     | (1,084)        | 86,448         | 1,084             | 15,447,879         |
| 14                     |                       | Year 2018 |                |                | 14,074,924     | 777,733        | 1,398,093         | 16,250,749         |
| 15                     |                       | Year 2019 |                |                |                | 15,674,069     |                   | 15,674,069         |
| 16                     |                       | Year 2020 |                |                |                |                | 19,931,130        | 19,931,130         |
| 17                     | Total Non-Residential |           | \$ 60,300,024  | \$ 71,173,336  | \$ 113,525,193 | \$ 144,462,190 | \$ 123,799,023    | \$- \$ 513,259,766 |
| 18                     | Total Revenue         |           |                | \$ 138,657,899 | \$ 228,701,016 | \$ 260,995,035 | \$ 227,155,250    | \$ 884,714,823     |

(1) Rider 11 estimates are based on Order issued in Docket No. E-7 Sub 1192 dated 10/18/19

Duke Energy Carolinas, LLC  
Vintage Year 2017 Allocation Factors for the Period January 1, 2017 - December 31, 2017  
Docket Number E-7, Sub 1230  
Allocation Factors

|  |                                |                           | MWH         |           |            |       |
|--|--------------------------------|---------------------------|-------------|-----------|------------|-------|
| Line New Mechanism Sales Allocator at Generator                  |                                |                           |             |           |            |       |
| 1  | NC Retail MWH Sales Allocation | Company Records           | 60,219,051  |           |            |       |
| 2  | SC Retail MWH Sales Allocation | Company Records           | 22,489,484  |           |            |       |
| 3  | Total Retail                   | Line 1 + Line 2           | 82,708,535  |           |            |       |
| Allocation 1 to state based on kWh sales                         |                                |                           |             |           |            |       |
| 4  | NC Retail                      | Line 1 / Line 3           | 72.8087506% |           |            |       |
| Demand Allocators  |                                |                           |             | NC        | SC         | Total |
| 5  | Residential                    | Company Records           | 5,545,784   | 1,803,958 | 7,349,742  |       |
| 6  | Non Residential                | Company Records           | 6,573,854   | 2,480,404 | 9,054,258  |       |
| 7  | Total                          | Line 5 + Line 6           | 12,119,638  | 4,284,362 | 16,404,000 |       |
| Allocation 2 to state based on peak demand                       |                                |                           |             |           |            |       |
| 8  | NC Retail                      | Line 7, NC / Line 7 Total | 73.8822117% |           |            |       |
| Allocation 3 NC res vs non-res Peak Demand to retail system peak |                                |                           |             |           |            |       |
| 9  | NC Residential                 | Line 5 NC/ Line 7 Total   | 33.8075104% |           |            |       |
| 10   | NC Non-residential             | Line 6 NC/ Line 7 Total   | 40.0747013% |           |            |       |

Duke Energy Carolinas, LLC  
Vintage Year 2018 Allocation Factors for the Period January 1, 2018 - December 31, 2018  
Docket Number E-7, Sub 1230  
Allocation Factors

|  |                                |                           | MWH         |           |            |       |
|--|--------------------------------|---------------------------|-------------|-----------|------------|-------|
| New Mechanism Sales Allocator at Generator                       |                                |                           |             |           |            |       |
| 1  | NC Retail MWH Sales Allocation | Company Records           | 58,534,269  |           |            |       |
| 2  | SC Retail MWH Sales Allocation | Company Records           | 21,966,093  |           |            |       |
| 3  | Total Retail                   | Line 1 + Line 2           | 80,500,362  |           |            |       |
| Allocation 1 to state based on kWh sales                         |                                |                           |             |           |            |       |
| 4  | NC Retail                      | Line 1 / Line 3           | 72.7130507% |           |            |       |
| Demand Allocators  |                                |                           |             | NC        | SC         | Total |
| 5  | Residential                    | Company Records           | 5,078,308   | 1,617,566 | 6,695,874  |       |
| 6  | Non Residential                | Company Records           | 6,549,145   | 2,546,981 | 9,096,126  |       |
| 7  | Total                          | Line 5 + Line 6           | 11,627,453  | 4,164,547 | 15,792,000 |       |
| Allocation 2 to state based on peak demand                       |                                |                           |             |           |            |       |
| 8  | NC Retail                      | Line 7, NC / Line 7 Total | 73.6287551% |           |            |       |
| Allocation 3 NC res vs non-res Peak Demand to retail system peak |                                |                           |             |           |            |       |
| 9  | NC Residential                 | Line 5 NC/ Line 7 Total   | 32.1574721% |           |            |       |
| 10   | NC Non-residential             | Line 6 NC/ Line 7 Total   | 41.4712829% |           |            |       |



Duke Energy Carolinas, LLC  
Vintage Year 2019 Allocation Factors for the Period January 1, 2019 - December 31, 2021  
Docket Number E-7, Sub 1230  
Allocation Factors

|  |                                |                           | MWH         |           |            |       |
|--|--------------------------------|---------------------------|-------------|-----------|------------|-------|
| New Mechanism Sales Allocator at Generator                       |                                |                           |             |           |            |       |
| 1  | NC Retail MWH Sales Allocation | Company Records           | 62,147,533  |           |            |       |
| 2  | SC Retail MWH Sales Allocation | Company Records           | 22,880,788  |           |            |       |
| 3  | Total Retail                   | Line 1 + Line 2           | 85,028,321  |           |            |       |
| Allocation 1 to state based on kWh sales                         |                                |                           |             |           |            |       |
| 4  | NC Retail                      | Line 1 / Line 3           | 73.0903918% |           |            |       |
| Demand Allocators  |                                |                           |             | NC        | SC         | Total |
| 5  | Residential                    | Company Records           | 5,420,002   | 1,681,673 | 7,101,675  |       |
| 6  | Non Residential                | Company Records           | 6,373,991   | 2,410,334 | 8,784,325  |       |
| 7  | Total                          | Line 5 + Line 6           | 11,793,993  | 4,092,007 | 15,886,000 |       |
| Allocation 2 to state based on peak demand                       |                                |                           |             |           |            |       |
| 8  | NC Retail                      | Line 7, NC / Line 7 Total | 74.2414264% |           |            |       |
| Allocation 3 NC res vs non-res Peak Demand to retail system peak |                                |                           |             |           |            |       |
| 9  | NC Residential                 | Line 5 NC/ Line 7 Total   | 34.1181040% |           |            |       |
| 10   | NC Non-residential             | Line 6 NC/ Line 7 Total   | 40.1233224% |           |            |       |

Duke Energy Carolinas, LLC  
DSM/EE Cost Recovery Rider 12  
Docket Number E-7 Sub 1230  
Forecasted 2021 kWh Sales for Rate Period for Vintage Years 2016-2021

| Fall 2019 Sales Forecast - kWhs |                 | Forecasted 2021 sales |                |                |
|---------------------------------|-----------------|-----------------------|----------------|----------------|
| North Carolina Retail:          |                 |                       |                |                |
| Line                            |                 |                       |                |                |
| 1                               | Residential     | 22,092,324,452        |                |                |
| 2                               | Non-Residential | 35,749,634,396        |                |                |
| 3                               | Total Retail    | 57,841,958,848        |                |                |
| NC Opt Out Sales                |                 | Total Usage           | Opt-Outs       | Net Usage      |
| Vintage 2016 Actual Opt Out     |                 |                       |                |                |
| 2                               | EE              | 35,749,634,396        | 19,079,024,043 | 16,670,610,353 |
| 3                               | DSM             | 35,749,634,396        | 18,785,507,588 | 16,964,126,808 |
| Vintage 2017 Actual Opt Out     |                 |                       |                |                |
| 4                               | EE              | 35,749,634,396        | 19,250,763,452 | 16,498,870,944 |
| 5                               | DSM             | 35,749,634,396        | 18,815,719,996 | 16,933,914,400 |
| Vintage 2018 Actual Opt Out     |                 |                       |                |                |
| 6                               | EE              | 35,749,634,396        | 19,820,130,197 | 15,929,504,199 |
| 7                               | DSM             | 35,749,634,396        | 18,917,095,657 | 16,832,538,740 |
| Vintage 2019 Actual Opt Out     |                 |                       |                |                |
| 8                               | EE              | 35,749,634,396        | 20,042,218,854 | 15,707,415,542 |
| 9                               | DSM             | 35,749,634,396        | 18,852,615,603 | 16,897,018,794 |
| Vintage 2020 Estimated Opt Out  |                 |                       |                |                |
| 10                              | EE              | 35,749,634,396        | 20,419,288,797 | 15,330,345,599 |
| 11                              | DSM             | 35,749,634,396        | 18,851,271,603 | 16,898,362,794 |
| Vintage 2021 Estimated Opt Out  |                 |                       |                |                |
| 12                              | EE              | 35,749,634,396        | 20,419,288,797 | 15,330,345,599 |
| 13                              | DSM             | 35,749,634,396        | 18,851,271,603 | 16,898,362,794 |

Rider EE (NC)  
ENERGY EFFICIENCY RIDER

/A

APPLICABILITY (North Carolina Only)

Service supplied under the Company's rate schedules is subject to approved adjustments for new energy efficiency and demand-side management programs approved by the North Carolina Utilities Commission (NCUC). The Rider Adjustments are not included in the Rate Schedules of the Company and therefore, must be applied to the bill as calculated under the applicable rate.

As of January 1, 2021, cost recovery under Rider EE consists of the four-year term program, years 2014-2017, as well as rates under the continuation of that program for years 2018-2021 as outlined below. This Rider applies to service supplied under all rate schedules, except rate schedules OL, FL, PL, GL and NL for program years 2017-2021.

GENERAL PROVISIONS

This Rider will recover the cost of new energy efficiency and demand-side management programs beginning January 1, 2014, using the method approved by the NCUC as set forth in Docket No. E-7 Sub 1032, Order dated October 29, 2013, as revised by Docket No. E-7, Sub 1130, Order dated August 23, 2017.

TRUE-UP PROVISIONS

Rider amounts will initially be determined based on estimated kW and kWh impacts related to expected customer participation in the programs, and will be true-up as actual customer participation and actual kW and kWh impacts are verified. If a customer participates in any vintage of programs, the customer is subject to the true-ups as discussed in this section for any vintage of programs in which the customer participated.

RIDER EE OPT OUT PROVISION FOR QUALIFYING NON-RESIDENTIAL CUSTOMERS

The Rider EE increment applicable to energy efficiency programs and/or demand-side management programs will not be applied to the energy charge of the applicable rate schedule for customers qualified to opt out of the programs where:

- a. The customer has notified the Company that it has implemented, or has plans for implementing, alternative energy efficiency measures in accordance with quantifiable goals.
- b. Electric service to the customer must be provided under:
  1. An electric service agreement where the establishment is classified as a "manufacturing industry" by the Standard Industrial Classification Manual published by the United States Government and where more than 50% of the electric energy consumption of such establishment is used for its manufacturing processes. Additionally, all other agreements billed to the same entity associated with the manufacturing industry located on the same or contiguous properties are also eligible to opt out.
  2. An electric service agreement for general service as provided for under the Company's rate schedules where the customer's annual energy use is 1,000,000 kilowatt hours or more. Additionally, all other agreements billed to the same entity with lesser annual usage located on the same or contiguous properties are also eligible to opt out.

The following additional provisions apply for qualifying customers who elect to opt out:

For customers who elect to opt out of energy efficiency programs, the following provisions also apply:

- Qualifying customers may opt out of the Company's energy efficiency programs each calendar year only during the annual two-month enrollment period between November 1 and December 31 immediately prior to a new Rider EE becoming effective on January 1. (Qualifying new customers have sixty days after beginning service to opt out).
- Customers may not opt out of individual energy efficiency programs offered by the Company. The choice to opt out applies to the Company's entire portfolio of energy efficiency programs.
- If a customer participates in any vintage of energy efficiency programs, the customer, irrespective of future opt out decisions, remains obligated to pay the remaining portion of the lost revenues for each vintage of energy efficiency programs in which the customer participated.
- Customers who elect to opt out during the two-month annual enrollment period immediately prior to the new Rider EE becoming effective may elect to opt in to the Company's energy efficiency programs during the first 5 business days of March each calendar year. Customers making this election will be back-billed retroactively to the effective date of the new Rider EE.

For customers who elect to opt out of demand-side management programs, the following provisions also apply:

- Qualifying customers may opt out of the Company's demand-side management program during the enrollment period between November 1 and December 31 immediately prior to a new Rider EE becoming effective on January 1 of the applicable year. (Qualifying new customers have sixty days after beginning service to opt out).

Rider EE (NC)  
ENERGY EFFICIENCY RIDER

- If a customer elects to participate in a demand-side management program, the customer may not subsequently choose to opt out of demand-side management programs for three years.
- Customers who elect to opt out during the two-month annual enrollment period immediately prior to the new Rider EE becoming effective may elect to opt in to the Company's demand-side management program during the first 5 business days of March each calendar year. Customers making this election will be back-billed to the effective date of the new Rider EE.

Any qualifying non-residential customer that has not participated in an energy efficiency or demand-side management program may opt out during any enrollment period, and has no further responsibility to pay Rider EE amounts associated with the customer's opt out election for energy efficiency and/or demand-side management programs.

ENERGY EFFICIENCY RIDER ADJUSTMENTS (EEA) FOR ALL PROGRAM YEARS

The Rider EE amounts applicable to the residential and nonresidential rate schedules for the period January 1, 2021 through December 31, 2021 including utility assessments are as follows:

|                       |   |                        |
|-----------------------|---|------------------------|
| <u>Residential</u>    | Vintage 2016 <sup>1</sup> , 2017 <sup>1</sup> , 2018 <sup>1</sup> , 2019 <sup>1</sup> | 0.1011¢ per kWh        |
|                       | Vintage 2019 <sup>2</sup> , 2020 <sup>2</sup> , 2021 <sup>2</sup>                     | <u>0.4184¢ per kWh</u> |
|                       | Total Residential Rate  | 0.5195¢ per kWh        |
| <u>Nonresidential</u> |   |                        |
|                       | Vintage 2016 <sup>3</sup>   |                        |
|                       | Energy Efficiency   | 0.0193¢ per kWh        |
|                       | Demand Side Management  | (0.0001)¢ per kWh      |
|                       | Vintage 2017 <sup>3</sup>   |                        |
|                       | Energy Efficiency   | 0.0342¢ per kWh        |
|                       | Demand Side Management  | 0.0000¢ per kWh        |
|                       | Vintage 2018 <sup>3</sup>   |                        |
|                       | Energy Efficiency   | 0.0088¢ per kWh        |
|                       | Demand Side Management  | (0.0014)¢ per kWh      |
|                       | Vintage 2019 <sup>3</sup>   |                        |
|                       | Energy Efficiency   | 0.0462¢ per kWh        |
|                       | Demand Side Management  | 0.0019¢ per kWh        |
|                       | Vintage 2020 <sup>3</sup>   |                        |
|                       | Energy Efficiency   | 0.0612¢ per kWh        |
|                       | Demand Side Management  | 0.0000¢ per kWh        |
|                       | Vintage 2021 <sup>3</sup>   |                        |
|                       | Energy Efficiency   | 0.3522¢ per kWh        |
|                       | Demand Side Management  | 0.1200¢ per kWh        |
|                       | Total Nonresidential  | 0.6423¢ per kWh        |

<sup>1</sup> Includes the true-up of program costs, shared savings and lost revenues from Year 1 of Vintage 2019 and Year 2 of Vintage 2018, Year 3 of 2017 and Year 4 of 2016

<sup>2</sup> Includes prospective component of Vintage 2019, 2020 and 2021

<sup>3</sup> Not Applicable to Rate Schedules OL, FL, PL, GL, and NL.

Each factor listed under Nonresidential is applicable to nonresidential customers who are not eligible to opt out and to eligible customers who have not opted out. If a nonresidential customer has opted out of a Vintage(s), then the applicable energy efficiency and/or demand-side management charge(s) shown above for the Vintage(s) during which the customer has opted out, will not apply to the bill.

Duke Energy Carolinas, LLC  
Vintage 2017 Actual for January 1, 2017 to December 31, 2017  
Docket Number E-7, Sub 1230  
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

| Residential Programs  |   | System kW Reduction -<br>Summer Peak | System Energy<br>Reduction (kWh) | A<br>System NPV of<br>Avoided Cost | B<br>System Cost | C = (A-B) *11.5%<br>Earned Utility Incentive | D= B+C<br>System Cost Plus Incentive | E<br>NC Retail kWh Sales Allocation<br>Factor (Miller Exhibit 5 pg. 1) | NC Residential Revenue Requirement<br>D * E     |
|---|---|--------------------------------------|----------------------------------|------------------------------------|------------------|--|--------------------------------------|--|---|
| EE Programs   |   |                                      |                                  |                                    |                  |  |                                      |  |   |
| 1   | Appliance Recycling Program   | -                                    | -                                | \$ -                               | \$ 5,307         | \$ (610)                                     | \$ 4,697                             | 72.8087506%  | \$ 3,420  |
| 2   | Energy Efficiency Education   | 1,393                                | 5,932,086                        | 3,597,724                          | 2,077,611        | 174,813                                      | 2,252,424                            | 72.8087506%  | 1,639,962                                       |
| 3   | Energy Efficient Appliances and Devices                                 | 24,605                               | 137,909,103                      | 105,352,687                        | 30,340,728       | 8,626,375                                    | 38,967,103                           | 72.8087506%  | 28,371,461                                      |
| 4   | Residential – Smart \$aver Energy Efficiency Program                    | 1,850                                | 6,712,977                        | 7,287,263                          | 7,403,327        | (13,347)                                     | 7,389,980                            | 72.8087506%  | 5,380,552                                       |
| 5   | Income Qualified Energy Efficiency and Weatherization Assistance        | 771                                  | 5,341,624                        | 3,185,867                          | 5,505,992        | -  | 5,505,992                            | 72.8087506%  | 4,008,844                                       |
| 6   | Multi-Family Energy Efficiency  | 2,056                                | 19,038,529                       | 13,539,656                         | 3,168,422        | 1,192,692                                    | 4,361,114                            | 72.8087506%  | 3,175,272                                       |
| 7   | Energy Assessments  | 1,040                                | 7,720,549                        | 6,602,773                          | 2,909,098        | 424,773                                      | 3,333,871                            | 72.8087506%  | 2,427,350                                       |
| 8   | Subtotal  | 31,715                               | 182,654,868                      | \$ 139,565,970                     | \$ 51,410,486    | \$ 10,404,695                                | \$ 61,815,181                        |  | \$ 45,006,861                                   |
| 9   | My Home Energy Report (1)   | 79,070                               | 311,368,855                      | 21,728,369                         | 13,812,250       | 910,354                                      | 14,722,603                           | 72.8087506%  | 10,719,344                                      |
| 10  | Total for Residential Energy Efficiency Programs                        | 110,786                              | 494,023,724                      | \$ 161,294,339                     | \$ 65,222,736    | \$ 11,315,049                                | \$ 76,537,785                        |  | \$ 55,726,205                                   |
| NC Residential Peak Demand<br>Allocation Factor (Miller Exhibit 5<br>pg. 1)     |   |                                      |                                  |                                    |                  |  |                                      |  | D11* E11  |
| 11  | SubTotal DSM Programs (2)   | 846,941                              | 2,943,906                        | 105,087,510                        | \$ 29,822,652    | \$ 8,655,459                                 | \$ 38,478,111                        | 33.8075104%  | \$ 13,008,491                                   |
| 12  | Total DSM Programs  |                                      |                                  |                                    |                  |  |                                      |  | 13,008,491                                      |
| 13  | Total Residential Revenue Requirement                                   |                                      |                                  |                                    |                  |  |                                      |  | \$ 68,734,696                                   |
| Non-Residential Programs  |   | System kW Reduction -<br>Summer Peak | System Energy<br>Reduction (kWh) | System NPV of<br>Avoided Cost      | System Cost      | Earned Utility Incentive                     | System Cost Plus Incentive           | NC Retail kWh Sales Allocation<br>Factor (Miller Exhibit 5 pg. 2)      | NC Non-Residential Revenue Requirement<br>D * E |
| EE Programs   |   |                                      |                                  |                                    |                  |  |                                      |  |   |
| 14  | Non Residential Smart Saver Custom Energy Assessments                   | 1,627                                | 15,791,732                       | \$ 10,272,302                      | \$ 2,139,875     | \$ 935,229                                   | \$ 3,075,104                         | 72.8087506%  | \$ 2,238,945                                    |
| 15  | Non Residential Smart Saver Custom                                      | 6,010                                | 40,609,855                       | 34,693,083                         | 7,304,838        | 3,149,648                                    | 10,454,486                           | 72.8087506%  | 7,611,781                                       |
| 16  | Non Residential Smart Saver Energy Efficient Food Service Products      | 112                                  | 1,383,542                        | 959,251                            | 306,488          | 75,068                                       | 381,556                              | 72.8087506%  | 277,806   |
| 17  | Non Residential Smart Saver Energy Efficient HVAC Products              | 894                                  | 2,954,877                        | 2,958,336                          | 1,560,769        | 160,720                                      | 1,721,489                            | 72.8087506%  | 1,253,395                                       |
| 18  | Non Residential Smart Saver Energy Efficient Lighting Products          | 47,322                               | 270,572,885                      | 240,054,511                        | 66,689,770       | 19,936,945                                   | 86,626,715                           | 72.8087506%  | 63,071,829                                      |
| 19  | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 687                                  | 4,806,849                        | 3,070,044                          | 528,937          | 292,227                                      | 821,164                              | 72.8087506%  | 597,879   |
| 20  | Non Residential Smart Saver Energy Efficient IT Products                | -                                    | 2,945                            | 523                                | 61,215           | (6,980)                                      | 54,235                               | 72.8087506%  | 39,488  |
| 21  | Non Residential Smart Saver Energy Efficient Process Equipment Products | 99                                   | 651,289                          | 530,295                            | 162,413          | 42,306                                       | 204,719                              | 72.8087506%  | 149,054   |
| 22  | Non Residential Smart Saver Performance Incentive                       | 3                                    | 12,373                           | 8,958                              | 320,559          | (35,834)                                     | 284,725                              | 72.8087506%  | 207,305   |
| 23  | Small Business Energy Saver   | 17,263                               | 90,297,362                       | 63,169,894                         | 17,350,972       | 5,269,176                                    | 22,620,148                           | 72.8087506%  | 16,469,447                                      |
| 24  | Smart Energy in Offices   | 2,138                                | 10,272,154                       | 1,067,480                          | 891,010          | 20,294                                       | 911,304                              | 72.8087506%  | 663,509   |
| 25  | Business Energy Report  | 3                                    | 42,398                           | 696                                | 126,680          | -  | 126,680                              | 72.8087506%  | 92,234  |
| 26  | Sub-Total for Non-Residential Energy Efficiency Programs                | 76,158                               | 437,398,260                      | \$ 356,785,373                     | \$ 97,443,527    | \$ 29,838,800                                | \$ 127,282,328                       |  | \$ 92,672,672                                   |
| 27  | Total for Non-Residential Energy Efficiency Programs                    |                                      |                                  |                                    |                  |  |                                      |  | \$ 92,672,672                                   |
| NC Non-Residential Peak Demand<br>Allocation Factor (Miller Exhibit 5<br>pg. 1) |   |                                      |                                  |                                    |                  |  |                                      |  | D24*E24   |
| 28  | Total DSM Programs(2)   | 846,941                              | 2,943,906                        | \$ 105,087,510                     | \$ 29,822,652    | \$ 8,655,459                                 | \$ 38,478,111                        | 40.0747013%  | \$ 15,419,988                                   |
| 29  | Total Non-Residential DSM Programs                                      |                                      |                                  |                                    |                  |  |                                      |  | 15,419,988                                      |
| 30  | Total Non-Residential Revenue Requirement                               |                                      |                                  |                                    |                  |  |                                      |  | \$ 108,092,661                                  |
| NC Retail Peak Demand<br>Allocation Factor (Miller Exhibit 5<br>pg. 1)          |   |                                      |                                  |                                    |                  |  |                                      |  | D29* E29  |
| 31  | Power Manager (Residential)   | 501,118                              | -                                | \$ 61,074,105                      | \$ 14,021,500    | \$ 5,411,050                                 | \$ 19,432,549                        |  |   |
| 32  | EnergyWise for Business (Non-Residential)                               | 5,453                                | 2,943,906                        | \$ 2,530,761                       | \$ 2,484,618     | \$ 5,306                                     | \$ 2,489,924                         |  |   |
| 33  | Power Share CallOption (Non-Residential)                                | -                                    | -                                | \$ -                               | \$ -             | \$ -   | \$ -                                 |  |   |
| 34  | Power Share (Non-Residential)   | 340,369                              | -                                | \$ 41,482,644                      | \$ 13,316,535    | \$ 3,239,103                                 | \$ 16,555,638                        |  |   |
| 35  | Total DSM   | 846,941                              | 2,943,906                        | \$ 105,087,510                     | \$ 29,822,652    | \$ 8,655,459                                 | \$ 38,478,111                        | 73.8822117%  | \$ 28,428,479                                   |

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage  
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

**Duke Energy Carolinas  
Evans Exhibit 1  
Vintage 2018 True Up - January 1, 2018 to December 31, 2018  
Docket Number E-7, Sub 1230  
Load Impacts and Estimated Revenue Requirements by Program**

| 2023-2024 |  |   |   |   |          |        |   |   |   |  |  |
|-----------|--|---|---|---|----------|--------|---|---|---|--|--|
|           |  | A | B | C | D        | E      | F | G | H |  |  |
|           |  |   |   |   | =(A-B)*C | =(B+D) |   |   |   |  |  |
| 2024-2025 |  |   |   |   |          |        |   |   |   |  |  |
|           |  |   |   |   |          |        |   |   |   |  |  |
| 2025-2026 |  |   |   |   |          |        |   |   |   |  |  |
| 2026-2027 |  |   |   |   |          |        |   |   |   |  |  |
| 2027-2028 |  |   |   |   |          |        |   |   |   |  |  |
| 2028-2029 |  |   |   |   |          |        |   |   |   |  |  |
| 2029-2030 |  |   |   |   |          |        |   |   |   |  |  |
| 2030-2031 |  |   |   |   |          |        |   |   |   |  |  |
| 2031-2032 |  |   |   |   |          |        |   |   |   |  |  |
| 2032-2033 |  |   |   |   |          |        |   |   |   |  |  |
| 2033-2034 |  |   |   |   |          |        |   |   |   |  |  |
| 2034-2035 |  |   |   |   |          |        |   |   |   |  |  |
| 2035-2036 |  |   |   |   |          |        |   |   |   |  |  |
| 2036-2037 |  |   |   |   |          |        |   |   |   |  |  |
| 2037-2038 |  |   |   |   |          |        |   |   |   |  |  |
| 2038-2039 |  |   |   |   |          |        |   |   |   |  |  |
| 2039-2040 |  |   |   |   |          |        |   |   |   |  |  |
| 2040-2041 |  |   |   |   |          |        |   |   |   |  |  |
| 2041-2042 |  |   |   |   |          |        |   |   |   |  |  |
| 2042-2043 |  |   |   |   |          |        |   |   |   |  |  |
| 2043-2044 |  |   |   |   |          |        |   |   |   |  |  |
| 2044-2045 |  |   |   |   |          |        |   |   |   |  |  |
| 2045-2046 |  |   |   |   |          |        |   |   |   |  |  |
| 2046-2047 |  |   |   |   |          |        |   |   |   |  |  |
| 2047-2048 |  |   |   |   |          |        |   |   |   |  |  |
| 2048-2049 |  |   |   |   |          |        |   |   |   |  |  |
| 2049-2050 |  |   |   |   |          |        |   |   |   |  |  |
| 2050-2051 |  |   |   |   |          |        |   |   |   |  |  |
| 2051-2052 |  |   |   |   |          |        |   |   |   |  |  |
| 2052-2053 |  |   |   |   |          |        |   |   |   |  |  |
| 2053-2054 |  |   |   |   |          |        |   |   |   |  |  |
| 2054-2055 |  |   |   |   |          |        |   |   |   |  |  |
| 2055-2056 |  |   |   |   |          |        |   |   |   |  |  |
| 2056-2057 |  |   |   |   |          |        |   |   |   |  |  |
| 2057-2058 |  |   |   |   |          |        |   |   |   |  |  |
| 2058-2059 |  |   |   |   |          |        |   |   |   |  |  |
| 2059-2060 |  |   |   |   |          |        |   |   |   |  |  |
| 2060-2061 |  |   |   |   |          |        |   |   |   |  |  |
| 2061-2062 |  |   |   |   |          |        |   |   |   |  |  |
| 2062-2063 |  |   |   |   |          |        |   |   |   |  |  |
| 2063-2064 |  |   |   |   |          |        |   |   |   |  |  |
| 2064-2065 |  |   |   |   |          |        |   |   |   |  |  |
| 2065-2066 |  |   |   |   |          |        |   |   |   |  |  |
| 2066-2067 |  |   |   |   |          |        |   |   |   |  |  |
| 2067-2068 |  |   |   |   |          |        |   |   |   |  |  |
| 2068-2069 |  |   |   |   |          |        |   |   |   |  |  |
| 2069-2070 |  |   |   |   |          |        |   |   |   |  |  |
| 2070-2071 |  |   |   |   |          |        |   |   |   |  |  |
| 2071-2072 |  |   |   |   |          |        |   |   |   |  |  |
| 2072-2073 |  |   |   |   |          |        |   |   |   |  |  |
| 2073-2074 |  |   |   |   |          |        |   |   |   |  |  |
| 2074-2075 |  |   |   |   |          |        |   |   |   |  |  |
| 2075-2076 |  |   |   |   |          |        |   |   |   |  |  |
| 2076-2077 |  |   |   |   |          |        |   |   |   |  |  |
| 2077-2078 |  |   |   |   |          |        |   |   |   |  |  |
| 2078-2079 |  |   |   |   |          |        |   |   |   |  |  |
| 2079-2080 |  |   |   |   |          |        |   |   |   |  |  |
| 2080-2081 |  |   |   |   |          |        |   |   |   |  |  |
| 2081-2082 |  |   |   |   |          |        |   |   |   |  |  |
| 2082-2083 |  |   |   |   |          |        |   |   |   |  |  |
| 2083-2084 |  |   |   |   |          |        |   |   |   |  |  |
| 2084-2085 |  |   |   |   |          |        |   |   |   |  |  |
| 2085-2086 |  |   |   |   |          |        |   |   |   |  |  |
| 2086-2087 |  |   |   |   |          |        |   |   |   |  |  |
| 2087-2088 |  |   |   |   |          |        |   |   |   |  |  |
| 2088-2089 |  |   |   |   |          |        |   |   |   |  |  |
| 2089-2090 |  |   |   |   |          |        |   |   |   |  |  |
| 2090-2091 |  |   |   |   |          |        |   |   |   |  |  |
| 2091-2092 |  |   |   |   |          |        |   |   |   |  |  |
| 2092-2093 |  |   |   |   |          |        |   |   |   |  |  |
| 2093-2094 |  |   |   |   |          |        |   |   |   |  |  |
| 2094-2095 |  |   |   |   |          |        |   |   |   |  |  |
| 2095-2096 |  |   |   |   |          |        |   |   |   |  |  |
| 2096-2097 |  |   |   |   |          |        |   |   |   |  |  |
| 2097-2098 |  |   |   |   |          |        |   |   |   |  |  |
| 2098-2099 |  |   |   |   |          |        |   |   |   |  |  |
| 2099-2100 |  |   |   |   |          |        |   |   |   |  |  |
| 2100-2101 |  |   |   |   |          |        |   |   |   |  |  |
| 2101-2102 |  |   |   |   |          |        |   |   |   |  |  |
| 2102-2103 |  |   |   |   |          |        |   |   |   |  |  |
| 2103-2104 |  |   |   |   |          |        |   |   |   |  |  |
| 2104-2105 |  |   |   |   |          |        |   |   |   |  |  |
| 2105-2106 |  |   |   |   |          |        |   |   |   |  |  |
| 2106-2107 |  |   |   |   |          |        |   |   |   |  |  |
| 2107-2108 |  |   |   |   |          |        |   |   |   |  |  |
| 2108-2109 |  |   |   |   |          |        |   |   |   |  |  |
| 2109-2110 |  |   |   |   |          |        |   |   |   |  |  |
| 2110-2111 |  |   |   |   |          |        |   |   |   |  |  |
| 2111-2112 |  |   |   |   |          |        |   |   |   |  |  |
| 2112-2113 |  |   |   |   |          |        |   |   |   |  |  |
| 2113-2114 |  |   |   |   |          |        |   |   |   |  |  |
| 2114-2115 |  |   |   |   |          |        |   |   |   |  |  |
| 2115-2116 |  |   |   |   |          |        |   |   |   |  |  |
| 2116-2117 |  |   |   |   |          |        |   |   |   |  |  |
| 2117-2118 |  |   |   |   |          |        |   |   |   |  |  |
| 2118-2119 |  |   |   |   |          |        |   |   |   |  |  |
| 2119-2120 |  |   |   |   |          |        |   |   |   |  |  |
| 2120-2121 |  |   |   |   |          |        |   |   |   |  |  |
| 2121-2122 |  |   |   |   |          |        |   |   |   |  |  |
| 2122-2123 |  |   |   |   |          |        |   |   |   |  |  |
| 2123-2124 |  |   |   |   |          |        |   |   |   |  |  |
| 2124-2125 |  |   |   |   |          |        |   |   |   |  |  |
| 2125-2126 |  |   |   |   |          |        |   |   |   |  |  |
| 2126-2127 |  |   |   |   |          |        |   |   |   |  |  |
| 2127-2128 |  |   |   |   |          |        |   |   |   |  |  |
| 2128-2129 |  |   |   |   |          |        |   |   |   |  |  |
| 2129-2130 |  |   |   |   |          |        |   |   |   |  |  |
| 2130-2131 |  |   |   |   |          |        |   |   |   |  |  |
| 2131-2132 |  |   |   |   |          |        |   |   |   |  |  |
| 2132-2133 |  |   |   |   |          |        |   |   |   |  |  |
| 2133-2134 |  |   |   |   |          |        |   |   |   |  |  |
| 2134-2135 |  |   |   |   |          |        |   |   |   |  |  |
| 2135-2136 |  |   |   |   |          |        |   |   |   |  |  |
| 2136-2137 |  |   |   |   |          |        |   |   |   |  |  |
| 2137-2138 |  |   |   |   |          |        |   |   |   |  |  |
| 2138-2139 |  |   |   |   |          |        |   |   |   |  |  |
| 2139-2140 |  |   |   |   |          |        |   |   |   |  |  |
| 2140-2141 |  |   |   |   |          |        |   |   |   |  |  |
| 2141-2142 |  |   |   |   |          |        |   |   |   |  |  |
| 2142-2143 |  |   |   |   |          |        |   |   |   |  |  |
| 2143-2144 |  |   |   |   |          |        |   |   |   |  |  |
| 2144-2145 |  |   |   |   |          |        |   |   |   |  |  |
| 2145-2146 |  |   |   |   |          |        |   |   |   |  |  |
| 2146-2147 |  |   |   |   |          |        |   |   |   |  |  |
| 2147-2148 |  |   |   |   |          |        |   |   |   |  |  |
| 2148-2149 |  |   |   |   |          |        |   |   |   |  |  |
| 2149-2150 |  |   |   |   |          |        |   |   |   |  |  |
| 2150-2151 |  |   |   |   |          |        |   |   |   |  |  |
| 2151-2152 |  |   |   |   |          |        |   |   |   |  |  |
| 2152-2153 |  |   |   |   |          |        |   |   |   |  |  |
| 2153-2154 |  |   |   |   |          |        |   |   |   |  |  |
| 2154-2155 |  |   |   |   |          |        |   |   |   |  |  |
| 2155-2156 |  |   |   |   |          |        |   |   |   |  |  |
| 2156-2157 |  |   |   |   |          |        |   |   |   |  |  |
| 2157-2158 |  |   |   |   |          |        |   |   |   |  |  |
| 2158-2159 |  |   |   |   |          |        |   |   |   |  |  |
| 2159-2160 |  |   |   |   |          |        |   |   |   |  |  |
| 2160-2161 |  |   |   |   |          |        |   |   |   |  |  |
| 2161-2162 |  |   |   |   |          |        |   |   |   |  |  |
| 2162-2163 |  |   |   |   |          |        |   |   |   |  |  |
| 2163-2164 |  |   |   |   |          |        |   |   |   |  |  |
| 2164-2165 |  |   |   |   |          |        |   |   |   |  |  |
| 2165-2166 |  |   |   |   |          |        |   |   |   |  |  |
| 2166-2167 |  |   |   |   |          |        |   |   |   |  |  |
| 2167-2168 |  |   |   |   |          |        |   |   |   |  |  |
| 2168-2169 |  |   |   |   |          |        |   |   |   |  |  |
| 2169-2170 |  |   |   |   |          |        |   |   |   |  |  |
| 2170-2171 |  |   |   |   |          |        |   |   |   |  |  |
| 2171-2172 |  |   |   |   |          |        |   |   |   |  |  |
| 2172-2173 |  |   |   |   |          |        |   |   |   |  |  |
| 2173-2174 |  |   |   |   |          |        |   |   |   |  |  |
| 2174-2175 |  |   |   |   |          |        |   |   |   |  |  |
| 2175-2176 |  |   |   |   |          |        |   |   |   |  |  |
| 2176-2177 |  |   |   |   |          |        |   |   |   |  |  |
| 2177-2178 |  |   |   |   |          |        |   |   |   |  |  |
| 2178-2179 |  |   |   |   |          |        |   |   |   |  |  |
| 2179-2180 |  |   |   |   |          |        |   |   |   |  |  |
| 2180-2181 |  |   |   |   |          |        |   |   |   |  |  |
| 2181-2182 |  |   |   |   |          |        |   |   |   |  |  |
| 2182-2183 |  |   |   |   |          |        |   |   |   |  |  |
| 2183-2184 |  |   |   |   |          |        |   |   |   |  |  |
| 2184-2185 |  |   |   |   |          |        |   |   |   |  |  |
| 2185-2186 |  |   |   |   |          |        |   |   |   |  |  |
| 2186-2187 |  |   |   |   |          |        |   |   |   |  |  |
| 2187-2188 |  |   |   |   |          |        |   |   |   |  |  |
| 2188-2189 |  |   |   |   |          |        |   |   |   |  |  |
| 2189-2190 |  |   |   |   |          |        |   |   |   |  |  |
| 2190-2191 |  |   |   |   |          |        |   |   |   |  |  |
| 2191-2192 |  |   |   |   |          |        |   |   |   |  |  |
| 2192-2193 |  |   |   |   |          |        |   |   |   |  |  |
| 2193-2194 |  |   |   |   |          |        |   |   |   |  |  |
| 2194-2195 |  |   |   |   |          |        |   |   |   |  |  |
| 2195-2196 |  |   |   |   |          |        |   |   |   |  |  |
| 2196-2197 |  |   |   |   |          |        |   |   |   |  |  |
| 2197-2198 |  |   |   |   |          |        |   |   |   |  |  |
| 2198-2199 |  |   |   |   |          |        |   |   |   |  |  |
| 2199-2200 |  |   |   |   |          |        |   |   |   |  |  |
| 2200-2201 |  |   |   |   |          |        |   |   |   |  |  |
| 2         |  |   |   |   |          |        |   |   |   |  |  |





**Duke Energy Carolinas**  
**Evans Exhibit 1**  
**Vintage 2020 Estimate - January 1, 2021 to December 31, 2021**  
**Docket Number E-7, Sub 1230**  
**Load Impacts and Estimated Revenue Requirements by Program**

[illegible]



Duke Energy Carolinas, LLC  
For the Period January 1, 2017 - December 31, 2021  
Docket Number E-7, Sub 1230  
North Carolina Net Lost Revenue Estimates for Vintages 2017 - 2021

| Line | Vintage 2017<br>Residential   |                     |               |               |              |      | Total      |
|------|---|---------------------|---------------|---------------|--------------|------|------------|
|      |   | 2017 <sup>(a)</sup> | 2018          | 2019          | 2020         | 2021 |            |
| 1    | Residential Energy Assessments  | \$ 198,264          | \$ 274,951    | \$ 178,148    | \$ 66,827    | \$   | 718,191    |
| 2    | My Home Energy Report   | 14,455,527          | -             | -             | -            |      | 14,455,527 |
| 3    | Energy Efficient Appliances and Devices                                 | 3,386,885           | 5,134,538     | 3,329,346     | 1,366,974    |      | 13,217,743 |
| 4    | Residential – Smart Saver Energy Efficiency Program                     | 197,134             | 264,823       | 171,558       | 62,120       |      | 695,635    |
| 5    | Appliance Recycle Program   | -                   | -             | -             | -            |      | -          |
| 6    | Income Qualified Energy Efficiency and Weatherization Assistance        | 141,450             | 210,612       | 136,514       | 55,631       |      | 544,208    |
| 7    | Multi-Family Energy Efficiency  | 535,154             | 743,597       | 478,801       | 177,645      |      | 1,935,197  |
| 8    | Energy Efficiency Education   | 165,283             | 221,302       | 143,362       | 49,313       |      | 579,260    |
| 9    | Total Lost Revenues   | 19,079,697          | 6,849,823     | 4,437,730     | 1,778,511    |      | 32,145,761 |
| 10   | Lost Revenue Decrement Pending Rate Case Implementation                 |                     |               |               | 289,930      |      | 289,930    |
| 11   | Found Residential Revenues *  | -                   | -             | -             | -            |      | -          |
| 12   | Net Lost Residential Revenues   | \$ 19,079,697       | \$ 6,849,823  | \$ 4,437,730  | \$ 1,488,581 | \$   | 31,855,831 |
|      |   |                     |               |               |              |      |            |
| Line | Non-Residential   |                     |               |               |              |      | Total      |
|      |   | 2017 <sup>(a)</sup> | 2018          | 2019          | 2020         | 2021 |            |
| 13   | Nonresidential Smart Saver Custom Energy Assessments                    | \$ 220,191          | \$ 358,289    | \$ 366,388    | \$ 143,464   | \$   | 1,088,332  |
| 14   | Non Residential Smart Saver Custom                                      | 435,407             | 871,334       | 901,545       | 368,351      |      | 2,576,637  |
| 15   | Energy Management Information Services                                  | -                   | -             | -             | -            |      | -          |
| 16   | Non Residential Smart Saver Energy Efficient Food Service Products      | 28,410              | 40,771        | 41,428        | 12,007       |      | 122,616    |
| 17   | Non Residential Smart Saver Energy Efficient HVAC Products              | 61,639              | 110,255       | 110,083       | 43,442       |      | 325,419    |
| 18   | Non Residential Smart Saver Energy Efficient Lighting Products          | 6,200,869           | 10,299,304    | 10,366,805    | 3,645,665    |      | 30,512,643 |
| 19   | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 58,808              | 127,509       | 132,526       | 61,892       |      | 380,734    |
| 20   | Non Residential Smart Saver Energy Efficient IT Products                | 82                  | 162           | 162           | 61           |      | 468        |
| 21   | Non Residential Smart Saver Energy Efficient Process Equipment Products | 8,160               | 12,172        | 12,410        | 3,804        |      | 36,547     |
| 22   | Non Residential Smart Saver Performance Incentive                       | 66                  | 774           | 759           | 442          |      | 2,041      |
| 23   | Small Business Energy Saver   | 2,203,337           | 3,774,927     | 3,785,763     | 1,381,942    |      | 11,145,969 |
| 24   | Smart Energy in Offices   | 209,310             | 149,382       | -             | -            |      | 358,692    |
| 25   | Business Energy Report  | -                   | -             | -             | -            |      | -          |
| 26   | EnergyWise for Business   | 85,268              | 158,514       | 158,671       | 65,096       |      | 467,549    |
| 27   | Total Lost Revenues   | 9,511,547           | 15,903,393    | 15,876,541    | 5,726,167    |      | 47,017,648 |
| 28   | Lost Revenue Decrement Pending Rate Case Implementation                 |                     |               |               | 926,185      |      | 926,185    |
| 29   | Found Non-Residential Revenues *  | -                   | -             | -             | -            |      | -          |
| 30   | Net Lost Non-Residential Revenues                                       | \$ 9,511,547        | \$ 15,903,393 | \$ 15,876,541 | \$ 4,799,982 | \$   | 46,091,463 |

\* Found Revenues - See Evans Exhibit 4  
(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

| Line | Vintage 2018   |  | 2017 <sup>(a)</sup> | 2018       | 2019 | 2020       | 2021 | Total      |    |           |    |            |    |            |
|------|--|--|---------------------|------------|------|------------|------|------------|----|-----------|----|------------|----|------------|
|      | Residential  |  |                     |            |      |            |      |            |    |           |    |            |    |            |
| 31   | Residential Energy Assessments                                   |  | \$                  | 204,097    | \$   | 359,848    | \$   | 210,787    | \$ | -         | \$ | 774,732    |    |            |
| 32   | My Home Energy Report  |  |                     | 15,751,701 |      | -          |      | -          |    | -         |    | 15,751,701 |    |            |
| 33   | Energy Efficient Appliances and Devices                          |  |                     | 4,299,434  |      | 9,243,154  |      | 5,414,309  |    | -         |    | 18,956,897 |    |            |
| 34   | Residential – Smart Saver Energy Efficiency Program              |  |                     | 161,443    |      | 324,295    |      | 189,962    |    | -         |    | 675,700    |    |            |
| 35   | Appliance Recycle Program  |  |                     | -          |      | -          |      | -          |    | -         |    | -          |    |            |
| 36   | Income Qualified Energy Efficiency and Weatherization Assistance |  |                     | 156,233    |      | 346,490    |      | 202,961    |    | -         |    | 705,685    |    |            |
| 37   | Multi-Family Energy Efficiency                                   |  |                     | 500,533    |      | 1,108,252  |      | 649,218    |    | -         |    | 2,258,002  |    |            |
| 38   | Energy Efficiency Education                                      |  |                     | 128,311    |      | 265,267    |      | 155,385    |    | -         |    | 548,962    |    |            |
| 39   | Total Lost Revenues  |  | -                   | 21,201,751 |      | 11,647,306 |      | 6,822,621  |    | -         |    | 39,671,679 |    |            |
| 40   | Lost Revenue Decrement Pending Rate Case Implementation          |  |                     |            |      |            |      | 1,608,585  |    |           |    | 1,608,585  |    |            |
| 41   | Found Residential Revenues *                                     |  |                     | -          |      | -          |      | -          |    | -         |    | -          |    |            |
| 42   | Net Lost Residential Revenues                                    |  | \$                  | -          | \$   | 21,201,751 | \$   | 11,647,306 | \$ | 5,214,036 | \$ | -          | \$ | 38,063,094 |

|    | Non-Residential   | 2017 <sup>(a)</sup> | 2018      | 2019 | 2020       | 2021 | Total      |    |           |    |            |    |            |
|----|---|---------------------|-----------|------|------------|------|------------|----|-----------|----|------------|----|------------|
| 43 | Nonresidential Smart Saver Custom Energy Assessments                    | \$                  | 212       | \$   | 866        | \$   | 671        | \$ | 300       | \$ | 2,049      |    |            |
| 44 | Non Residential Smart Saver Custom                                      |                     | 462,774   |      | 773,959    |      | 599,124    |    | 134,979   |    | 1,970,835  |    |            |
| 45 | Energy Management Information Services                                  |                     | -         |      | -          |      | -          |    | -         |    | -          |    |            |
| 46 | Non Residential Smart Saver Energy Efficient Food Service Products      |                     | 14,117    |      | 22,612     |      | 17,505     |    | 3,772     |    | 58,006     |    |            |
| 47 | Non Residential Smart Saver Energy Efficient HVAC Products              |                     | 50,245    |      | 116,447    |      | 90,192     |    | 30,218    |    | 287,102    |    |            |
| 48 | Non Residential Smart Saver Energy Efficient Lighting Products          |                     | 4,102,094 |      | 6,719,187  |      | 5,203,682  |    | 1,182,368 |    | 17,207,330 |    |            |
| 49 | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  |                     | 66,649    |      | 87,662     |      | 67,855     |    | 8,628     |    | 230,793    |    |            |
| 50 | Non Residential Smart Saver Energy Efficient IT Products                |                     | 185       |      | 876        |      | 678        |    | 317       |    | 2,056      |    |            |
| 51 | Non Residential Smart Saver Energy Efficient Process Equipment Products |                     | 6,501     |      | 10,498     |      | 8,128      |    | 1,776     |    | 26,903     |    |            |
| 52 | Non Residential Smart Saver Performance Incentive                       |                     | 20,243    |      | 84,759     |      | 65,573     |    | 29,373    |    | 199,948    |    |            |
| 53 | Small Business Energy Saver   |                     | 1,776,069 |      | 3,462,894  |      | 2,681,778  |    | 765,602   |    | 8,686,343  |    |            |
| 54 | Smart Energy in Offices   |                     | 39,733    |      | 3,847      |      | -          |    | -         |    | 43,580     |    |            |
| 55 | Business Energy Report  |                     | -         |      | -          |      | -          |    | -         |    | -          |    |            |
| 56 | EnergyWise for Business   |                     | 66,282    |      | 120,486    |      | 93,316     |    | 24,695    |    | 304,779    |    |            |
| 57 | Total Lost Revenues   | -                   | 6,605,105 |      | 11,404,093 |      | 8,828,500  |    | 2,182,027 |    | 29,019,725 |    |            |
| 58 | Lost Revenue Decrement Pending Rate Case Implementation                 |                     |           |      |            |      | 1,574,142  |    |           |    | 1,574,142  |    |            |
| 59 | Found Non-Residential Revenues *  |                     | -         |      | -          |      | -          |    | -         |    | -          |    |            |
| 60 | Net Lost Non-Residential Revenues                                       | \$                  | -         | \$   | 6,605,105  | \$   | 11,404,093 | \$ | 7,254,358 | \$ | 2,182,027  | \$ | 27,445,583 |

\* Found Revenues - See Evans Exhibit 4  
(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

| Line | Vintage 2019   |  | 2017 <sup>(a)</sup> | 2018 | 2019          | 2020         | 2021         | Total         |
|------|--|--|---------------------|------|---------------|--------------|--------------|---------------|
|      | Residential  |  |                     |      |               |              |              |               |
| 61   | Residential Energy Assessments                                   |  |                     |      | \$ 195,756    | \$ 277,275   | \$ 160,688   | \$ 633,719    |
| 62   | My Home Energy Report  |  |                     |      | 16,556,381    | -            | -            | 16,556,381    |
| 63   | Energy Efficient Appliances and Devices                          |  |                     |      | 4,884,189     | 6,969,929    | 4,117,409    | 15,971,527    |
| 64   | Residential – Smart Saver Energy Efficiency Program              |  |                     |      | 192,394       | 297,957      | 176,553      | 666,904       |
| 65   | Appliance Recycle Program  |  |                     |      | -             | -            | -            | -             |
| 66   | Income Qualified Energy Efficiency and Weatherization Assistance |  |                     |      | 225,833       | 321,143      | 183,651      | 730,627       |
| 67   | Multi-Family Energy Efficiency                                   |  |                     |      | 645,327       | 911,703      | 503,312      | 2,060,342     |
| 68   | Energy Efficiency Education                                      |  |                     |      | 148,216       | 260,619      | 155,168      | 564,003       |
| 69   | Total Lost Revenues  |  | -                   |      | 22,848,096    | 9,038,626    | 5,296,780    | 37,183,503    |
| 70   | Lost Revenue Decrement Pending Rate Case Implementation          |  |                     |      |               | 866,360      |              | 866,360       |
| 71   | Found Residential Revenues *                                     |  |                     |      | -             | -            | -            | -             |
| 72   | Net Lost Residential Revenues                                    |  | \$ -                |      | \$ 22,848,096 | \$ 8,172,266 | \$ 5,296,780 | \$ 36,317,143 |

|    | Non-Residential   | 2017 <sup>(a)</sup> | 2018 | 2019      | 2020         | 2021          | Total         |
|----|---|---------------------|------|-----------|--------------|---------------|---------------|
| 73 | Nonresidential Smart Saver Custom Energy Assessments                    |                     |      | \$ 83,809 | \$ 87,137    | \$ 87,137     | \$ 258,083    |
| 74 | Non Residential Smart Saver Custom                                      |                     |      | 872,916   | 1,892,292    | 1,892,292     | 4,657,500     |
| 75 | Energy Management Information Services                                  |                     |      | -         | -            | -             | -             |
| 76 | Non Residential Smart Saver Energy Efficient Food Service Products      |                     |      | 11,399    | 22,027       | 22,027        | 55,453        |
| 77 | Non Residential Smart Saver Energy Efficient HVAC Products              |                     |      | 156,513   | 369,527      | 369,527       | 895,568       |
| 78 | Non Residential Smart Saver Energy Efficient Lighting Products          |                     |      | 3,333,966 | 5,782,387    | 5,782,387     | 14,898,740    |
| 79 | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  |                     |      | 20,742    | 40,055       | 40,055        | 100,851       |
| 80 | Non Residential Smart Saver Energy Efficient IT Products                |                     |      | 250       | 448          | 448           | 1,145         |
| 81 | Non Residential Smart Saver Energy Efficient Process Equipment Products |                     |      | 15,405    | 20,738       | 20,738        | 56,882        |
| 82 | Non Residential Smart Saver Performance Incentive                       |                     |      | 24,374    | 119,631      | 119,631       | 263,637       |
| 83 | Small Business Energy Saver   |                     |      | 1,334,037 | 2,334,068    | 2,334,068     | 6,002,173     |
| 84 | Smart Energy in Offices   |                     |      | -         | -            | -             | -             |
| 85 | Business Energy Report  |                     |      | -         | -            | -             | -             |
| 86 | EnergyWise for Business   |                     |      | 62,574    | 126,345      | 126,345       | 315,263       |
| 87 | Total Lost Revenues   | -                   |      | 5,915,986 | 10,794,655   | 10,794,655    | 27,505,296    |
| 88 | Lost Revenue Decrement Pending Rate Case Implementation                 |                     |      |           | 1,448,109    |               | 1,448,109     |
| 89 | Found Non-Residential Revenues *  |                     |      | -         | -            | -             | -             |
| 90 | Net Lost Non-Residential Revenues                                       | \$ -                | \$   | 5,915,986 | \$ 9,346,546 | \$ 10,794,655 | \$ 26,057,187 |

\* Found Revenues - See Evans Exhibit 4  
(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

| Line | Vintage 2020   |                     |      |      |               |              |               |  |
|------|--|---------------------|------|------|---------------|--------------|---------------|--|
|      | Residential  | 2017 <sup>(a)</sup> | 2018 | 2019 | 2020          | 2021         | Total         |  |
| 91   | Residential Energy Assessments                                   |                     |      |      | 161,966       | 289,779      | \$ 451,745    |  |
| 92   | My Home Energy Report  |                     |      |      | 14,686,468    | -            | 14,686,468    |  |
| 93   | Energy Efficient Appliances and Devices                          |                     |      |      | 1,237,431     | 1,982,233    | 3,219,664     |  |
| 94   | Residential – Smart \$aver Energy Efficiency Program             |                     |      |      | 263,183       | 498,132      | 761,315       |  |
| 95   | Appliance Recycle Program  |                     |      |      | -             | -            | -             |  |
| 96   | Income Qualified Energy Efficiency and Weatherization Assistance |                     |      |      | 103,534       | 362,395      | 465,930       |  |
| 97   | Multi-Family Energy Efficiency                                   |                     |      |      | 496,249       | 939,264      | 1,435,513     |  |
| 98   | Energy Efficiency Education                                      |                     |      |      | 146,751       | 423,675      | 570,426       |  |
| 99   | Total Lost Revenues  | -                   |      | -    | 17,095,583    | 4,495,479    | 21,591,062    |  |
| 100  | Lost Revenue Decrement Pending Rate Case Implementation          |                     |      |      | 2,428,488     |              | 2,428,488     |  |
| 101  | Found Residential Revenues *                                     |                     |      |      | -             | -            | -             |  |
| 102  | Net Lost Residential Revenues                                    | \$ -                |      | \$ - | \$ 14,667,095 | \$ 4,495,479 | \$ 19,162,574 |  |

| Non-Residential |   | 2017 <sup>(a)</sup> | 2018 | 2019 | 2020         | 2021         | Total         |  |
|-----------------|---|---------------------|------|------|--------------|--------------|---------------|--|
| 103             | Nonresidential Smart Saver Custom Energy Assessments                    |                     |      |      | \$ 136,414   | \$ 250,432   | \$ 386,846    |  |
| 104             | Non Residential Smart Saver Custom                                      |                     |      |      | 1,201,984    | 2,299,277    | 3,501,261     |  |
| 105             | Energy Management Information Services                                  |                     |      |      | -            | -            | -             |  |
| 106             | Non Residential Smart Saver Energy Efficient Food Service Products      |                     |      |      | 93,624       | 138,074      | 231,698       |  |
| 107             | Non Residential Smart Saver Energy Efficient HVAC Products              |                     |      |      | 61,819       | 83,451       | 145,269       |  |
| 108             | Non Residential Smart Saver Energy Efficient Lighting Products          |                     |      |      | 3,029,908    | 4,219,711    | 7,249,619     |  |
| 109             | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  |                     |      |      | 94,651       | 147,632      | 242,283       |  |
| 110             | Non Residential Smart Saver Energy Efficient IT Products                |                     |      |      | 6,639        | 10,148       | 16,786        |  |
| 111             | Non Residential Smart Saver Energy Efficient Process Equipment Products |                     |      |      | 12,061       | 17,544       | 29,605        |  |
| 112             | Non Residential Smart Saver Performance Incentive                       |                     |      |      | 402,902      | 726,898      | 1,129,800     |  |
| 113             | Small Business Energy Saver   |                     |      |      | 955,245      | 1,413,098    | 2,368,343     |  |
| 114             | Smart Energy in Offices   |                     |      |      | -            | -            | -             |  |
| 115             | Business Energy Report  |                     |      |      | -            | -            | -             |  |
| 116             | EnergyWise for Business   |                     |      |      | 46,148       | 70,456       | 116,603       |  |
| 117             | Total Lost Revenues   | -                   |      | -    | 6,041,394    | 9,376,721    | 15,418,115    |  |
| 118             | Lost Revenue Decrement Pending Rate Case Implementation                 |                     |      |      | 858,201      |              | 858,201       |  |
| 119             | Found Non-Residential Revenues *  |                     |      |      | -            | -            | -             |  |
| 120             | Net Lost Non-Residential Revenues                                       | \$ -                |      | \$ - | \$ 5,183,193 | \$ 9,376,721 | \$ 14,559,914 |  |

\* Found Revenues - See Evans Exhibit 4  
(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

| Line | Vintage 2021  |                     |      |      |      |               | Total         |
|------|---|---------------------|------|------|------|---------------|---------------|
|      | Residential   | 2017 <sup>(a)</sup> | 2018 | 2019 | 2020 | 2021          |               |
| 121  | Residential Energy Assessments  |                     |      |      |      | 390,315       | \$ 390,315    |
| 122  | My Home Energy Report   |                     |      |      |      | 22,036,642    | 22,036,642    |
| 123  | Energy Efficient Appliances and Devices                                 |                     |      |      |      | 1,461,671     | 1,461,671     |
| 124  | Residential – Smart \$aver Energy Efficiency Program                    |                     |      |      |      | 141,218       | 141,218       |
| 125  | Appliance Recycle Program   |                     |      |      |      | -             | -             |
| 126  | Income Qualified Energy Efficiency and Weatherization Assistance        |                     |      |      |      | 216,311       | 216,311       |
| 127  | Multi-Family Energy Efficiency  |                     |      |      |      | 748,492       | 748,492       |
| 128  | Energy Efficiency Education   |                     |      |      |      | 215,041       | 215,041       |
| 129  | Total Lost Revenues   | -                   | -    | -    | -    | 25,209,690    | 25,209,690    |
| 130  | Found Residential Revenues *  | -                   | -    | -    | -    | -             | -             |
| 131  | Net Lost Residential Revenues   | \$ -                | \$ - | \$ - | \$ - | \$ 25,209,690 | \$ 25,209,690 |
|      |   |                     |      |      |      |               |               |
| Line | Non-Residential   |                     |      |      |      |               | Total         |
|      | Non-Residential   | 2017 <sup>(a)</sup> | 2018 | 2019 | 2020 | 2021          |               |
| 132  | Nonresidential Smart Saver Custom Energy Assessments                    |                     |      |      |      | \$ 93,807     | \$ 93,807     |
| 133  | Non Residential Smart Saver Custom                                      |                     |      |      |      | 986,152       | 986,152       |
| 134  | Energy Management Information Services                                  |                     |      |      |      |               | -             |
| 135  | Non Residential Smart Saver Energy Efficient Food Service Products      |                     |      |      |      | 107,100       | 107,100       |
| 136  | Non Residential Smart Saver Energy Efficient HVAC Products              |                     |      |      |      | 87,660        | 87,660        |
| 137  | Non Residential Smart Saver Energy Efficient Lighting Products          |                     |      |      |      | 3,741,050     | 3,741,050     |
| 138  | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  |                     |      |      |      | 56,674        | 56,674        |
| 139  | Non Residential Smart Saver Energy Efficient IT Products                |                     |      |      |      | 5,557         | 5,557         |
| 140  | Non Residential Smart Saver Energy Efficient Process Equipment Products |                     |      |      |      | 14,632        | 14,632        |
| 141  | Non Residential Smart Saver Performance Incentive                       |                     |      |      |      | 265,513       | 265,513       |
| 142  | Small Business Energy Saver   |                     |      |      |      | 953,671       | 953,671       |
| 143  | Smart Energy in Offices   |                     |      |      |      |               | -             |
| 144  | Business Energy Report  |                     |      |      |      |               | -             |
| 145  | EnergyWise for Business   |                     |      |      |      | 48,898        | 48,898        |
| 146  | Total Lost Revenues   | -                   | -    | -    | -    | 6,360,715     | 6,360,715     |
| 147  | Found Non-Residential Revenues *  | -                   | -    | -    | -    | -             | -             |
| 148  | Net Lost Non-Residential Revenues                                       | \$ -                | \$ - | \$ - | \$ - | \$ 6,360,715  | \$ 6,360,715  |

\* Found Revenues - See Evans Exhibit 4  
(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.



**Duke Energy Carolinas, LLC**  
**For the Period January 1, 2019 - December 31, 2019**  
**Docket Number E-7 Sub 1230**  
**Actual Program Costs for Vintage Years 2017, 2018 , 2019**

|    |  | <b>Carolinas System - 12<br/>months Ended<br/>12/31/2017</b> | <b>Carolinas System - 12<br/>months Ended<br/>12/31/2018</b> | <b>Carolinas System -<br/>12 months Ended<br/>12/31/2019</b> |
|----|--|--|--|--|
| 1  | Residential Energy Assessments                                   | 2,909,098  | 2,836,229  | 3,186,888  |
| 2  | My Home Energy Report  | 13,812,250   | 12,765,286   | 10,555,159   |
| 3  | Energy Efficient Appliances and Devices                          | 30,340,728   | 42,687,244   | 41,380,987   |
| 4  | Residential – Smart \$aver Energy Efficiency Program             | 7,403,327  | 6,955,146  | 7,400,669  |
| 5  | Appliance Recycle Program  | 5,307  | -  | -  |
| 6  | Income Qualified Energy Efficiency and Weatherization Assistance | 5,505,992  | 6,490,735  | 7,342,133  |
| 7  | Multi family Energy Efficiency                                   | 3,168,422  | 3,604,921  | 3,680,155  |
| 8  | Energy Efficiency Education                                      | 2,077,611  | 1,992,260  | 1,684,083  |
| 9  | Nonresidential Smart Saver Custom Energy Assessments             | 2,139,875  | 407,293  | 295,925  |
| 10 | Energy Management Information Systems                            | -  | -  | -  |
| 11 | Non-Residential Smart Saver Custom                               | 7,304,838  | 6,068,902  | 8,871,440  |
| 12 | Non-Residential Smart Saver Performance Incentive                | 320,559  | 479,610  | 784,949  |
| 13 | Non-Residential Energy Efficient Food Service Products           | 306,488  | 235,605  | 339,904  |
| 14 | Non-Residential Smart Saver Energy Efficient HVAC Products       | 1,560,769  | 1,620,748  | 2,207,760  |
| 15 | Non-Residential Smart Saver Energy Efficient Lighting Products   | 66,689,770   | 25,872,380   | 20,829,118   |
| 16 | Nonresidential Energy Efficient Pumps and Drives Products        | 528,937  | 277,785  | 189,123  |
| 17 | Nonresidential Energy Efficient ITEE                             | 61,215   | 36,875   | 44,323   |
| 18 | Nonresidential Energy Efficient Process Equipment Products       | 162,413  | 67,509   | 119,811  |
| 19 | Smart Energy In Offices  | 891,010  | 219,748  | -  |
| 20 | Small Business Energy Saver                                      | 17,350,972   | 15,977,993   | 11,418,264   |
| 21 | Business Energy Report   | 126,680  | -  | -  |
| 22 | Power Manager  | 14,021,500   | 14,423,610   | 13,383,639   |
| 23 | EnergyWise for Business  | 2,484,618  | 3,062,816  | 3,686,451  |
| 24 | Power Share  | 13,316,535   | 12,922,977   | 13,019,606   |
| 25 |  |  |  |  |
| 26 | <b>Total Energy Efficiency &amp; Demand Side Program Costs</b>   | <b>\$ 192,488,915</b>  | <b>\$ 159,005,671</b>  | <b>\$ 150,420,388</b>  |

|    |   |             |             |             |
|----|---|-------------|-------------|-------------|
| 27 | NC Allocation Factor for EE programs                  | 72.8087506% | 72.7130507% | 73.0903918% |
| 28 | NC Allocation Factor for DSM programs-Residential     | 33.8075104% | 32.1574721% | 34.1181040% |
| 29 | NC Allocation Factor for DSM programs-Non-Residential | 40.0747013% | 41.4712829% | 40.1233224% |

|    |  | <b>NC Allocated - 12<br/>Months Ended<br/>12/31/2017</b> | <b>NC Allocated - 12<br/>Months Ended<br/>12/31/2018</b> | <b>NC Allocated - 12<br/>Months Ended<br/>12/31/2019</b> |
|----|--|--|--|--|
| 30 | Residential Energy Assessments                                   | \$ 2,118,078   | \$ 2,065,023   | \$ 2,329,309   |
| 31 | My Home Energy Report  | \$ 10,056,526  | \$ 9,294,245   | \$ 7,714,807   |
| 32 | Energy Efficient Appliances and Devices                          | \$ 22,090,705  | \$ 31,080,049  | \$ 30,245,525  |
| 33 | Residential – Smart \$aver Energy Efficiency Program             | \$ 5,390,270   | \$ 5,063,955   | \$ 5,409,178   |
| 34 | Appliance Recycle Program  | \$ 3,864   | -  | -  |
| 35 | Income Qualified Energy Efficiency and Weatherization Assistance | \$ 4,008,844   | \$ 4,725,823   | \$ 5,366,394   |
| 36 | Multi family Energy Efficiency                                   | \$ 2,306,888   | \$ 2,624,698   | \$ 2,689,840   |
| 37 | Energy Efficiency Education                                      | \$ 1,512,683   | \$ 1,450,539   | \$ 1,230,903   |
| 38 | Nonresidential Smart Saver Custom Energy Assessments             | \$ 1,558,016   | \$ 296,545   | \$ 216,292   |
| 39 | Energy Management Information Systems                            | \$ -   | -  | -  |
| 40 | Non-Residential Smart Saver Custom                               | \$ 5,318,561   | \$ 4,418,691   | \$ 6,484,170   |
| 41 | Non-Residential Smart Saver Performance Incentive                | \$ -   | -  | \$ 573,723   |
| 42 | Non-Residential Energy Efficient Food Service Products           | \$ 223,150   | \$ 171,541   | \$ 248,437   |
| 43 | Non-Residential Smart Saver Energy Efficient HVAC Products       | \$ 1,136,376   | \$ 1,180,046   | \$ 1,613,660   |
| 44 | Non-Residential Smart Saver Energy Efficient Lighting Products   | \$ 48,555,988  | \$ 18,837,357  | \$ 15,224,084  |
| 45 | Nonresidential Energy Efficient Pumps and Drives Products        | \$ 385,112   | \$ 202,252   | \$ 138,231   |
| 46 | Nonresidential Energy Efficient ITEE                             | \$ 44,570  | \$ 26,848  | \$ 32,396  |
| 47 | Nonresidential Energy Efficient Process Equipment Products       | \$ 118,251   | \$ 49,153  | \$ 87,570  |
| 48 | Smart Energy In Offices  | \$ 648,734   | \$ 159,996   | -  |
| 49 | Small Business Energy Saver                                      | \$ 12,633,026  | \$ 11,633,377  | \$ 8,345,654   |
| 50 | Business Energy Report   | \$ 92,234  | -  | -  |
| 51 | Power Manager  | \$ 10,082,296  | \$ 9,778,895   | \$ 10,266,034  |
| 52 | EnergyWise for Business  | \$ 1,879,262   | \$ 2,416,251   | \$ 2,664,092   |
| 53 | Power Share  | \$ 10,072,077  | \$ 10,194,918  | \$ 9,408,894   |
| 54 |  |  |  |  |
| 55 | <b>Total Energy Efficiency &amp; Demand Side Program Costs</b>   | <b>\$ 140,235,514</b>                                    | <b>\$ 115,670,203</b>                                    | <b>\$ 110,289,194</b>                                    |

## Evans Exhibit 4

**Duke Energy Carolinas, LLC**  
**January 2018 - December 2019 Actuals**  
**January 2020 - December 2021 Estimates**  
**Docket Number E-7, Sub 1230**  
**North Carolina Found Revenues**

|  |             |              | Estimated KWH |              | Total        | Decision Tree Node |
|--|-------------|--------------|---------------|--------------|--------------|--------------------|
|  | 2018        | 2019         | 2020          | 2021         |              |                    |
| Economic Development                           | 507,965,880 | 285,918,000  | -             |              | 793,883,880  | Box 5 - exclude    |
| Plug-in Electric Charging Station Pilot        | -           | -            | -             |              | -            | Box 3 - exclude    |
| Lighting                                       |             |              |               |              | -            |                    |
| Residential                                    | 62,832      | 48,249       | 48,249        | 48,249       | 207,579      | Box 6 - include    |
| Non Residential (Regulated)                    | 67,443      | 105,681      | 105,681       | 105,681      | 384,486      | Box 6 - include    |
| MV to LED Credit - Residential (Regulated)     | (150,968)   | (113,648)    | (240,348)     | (305,768)    | (810,731)    | Box 6 - include    |
| MV to LED Credit - Non-Residential (Regulated) | (248,852)   | (232,984)    | (492,724)     | (626,839)    | (1,601,399)  | Box 6 - include    |
| Total KWH                                      | 507,696,335 | 285,725,298  | (579,142)     | (778,677)    | 792,063,814  |                    |
| Total KWH Included                             | (269,545)   | (192,702)    | (579,142)     | (778,677)    | (1,820,066)  |                    |
| Total KWH Included (net of Free Riders 15%)    | (229,113)   | (163,797)    | (492,271)     | (661,875)    | (1,547,056)  |                    |
| Annualized Found Revenue - Non Residential     | \$ (96,542) | \$ (209,678) | \$ (209,678)  | \$ (282,333) | \$ (798,230) |                    |
| Annualized Found Revenue - Residential         | \$ (59,309) | \$ (133,126) | \$ (133,126)  | \$ (178,463) | \$ (504,025) |                    |
|  | 2018        | 2019         | 2020          | 2021         | Total        |                    |
| Vintage 2014 - Non Res                         |             |              |               |              | -            |                    |
| Vintage 2015 - Non Res                         | (13,108)    |              |               |              | (13,108)     |                    |
| Vintage 2016 - Non Res                         | (30,720)    | (10,169)     |               |              | (40,889)     |                    |
| Vintage 2017 - Non Res                         | (47,791)    | (47,791)     | (21,240)      |              | (116,823)    |                    |
| Vintage 2018 - Non Res                         | (51,711)    | (96,542)     | (74,925)      | (20,662)     | (243,840)    |                    |
| Vintage 2019 - Non Res                         |             | (24,424)     | (69,401)      | (69,401)     | (163,225)    |                    |
| Vintage 2020 - Non Res                         |             |              | (113,575)     | (209,678)    | (323,253)    |                    |
| Vintage 2021 - Non Res                         |             |              |               | (152,931)    | (152,931)    |                    |
| Net Negative Found Revenues to Zero*           | 143,330     | 178,925      | 279,142       | 452,671      | 1,054,068    |                    |
| Subtotal - Non Res                             | \$ -        | \$ -         | \$ -          | \$ -         | \$ -         |                    |
| Vintage 2014 - Res                             |             |              |               |              | -            |                    |
| Vintage 2015 - Res                             | (17,981)    |              |               |              | (17,981)     |                    |
| Vintage 2016 - Res                             | (39,657)    | -            |               |              | (39,657)     |                    |
| Vintage 2017 - Res                             | (50,953)    | (32,706)     | (14,824)      |              | (98,484)     |                    |
| Vintage 2018 - Res                             | (28,325)    | (59,309)     | (34,597)      | -            | (122,230)    |                    |
| Vintage 2019 - Res                             |             | (29,926)     | (59,823)      | (34,705)     | (124,455)    |                    |
| Vintage 2020 - Res                             |             |              | (69,738)      | (127,434)    | (197,172)    |                    |
| Vintage 2021 - Res                             |             |              |               | (96,668)     | (96,668)     |                    |
| Net Negative Found Revenues to Zero*           | 136,917     | 121,941      | 178,982       | 258,806      | 696,646      |                    |
| Subtotal - Residential                         | \$ -        | \$ -         | \$ -          | \$ -         | \$ -         |                    |
| Total Found Revenues                           | \$ -        | \$ -         | \$ -          | \$ -         | \$ -         |                    |

\* Eliminates the inclusion of total negative found revenues at the Residential and Non-Residential level

## Evans Exhibit 5

**Duke Energy Carolinas**  
**System Event Based Demand Response January 1, 2019 - December 31, 2019**  
**Docket Number E-7, Sub 1230**

| Date      | State     | Program Name  | Event Trigger | High / Low System Temp<br>(F) | Customers Notified /Switches Dispatched               | MW Reduction |
|-----------|-----------|---------------|---------------|-------------------------------|---|--------------|
| 7/15/2019 | NC and SC | Power Manager | M&V Event     | 91 / 74                       | 226,600 / 272,600                                     | 275.0        |
| 7/19/2019 | NC and SC | Power Manager | M&V Event     | 94 / 74                       | 23,800 / 28,700                                       | n/a          |
| 8/9/2019  | NC and SC | Power Manager | M&V Event     | 93 / 70                       | 238,400 / 286,700                                     | 302.3        |
| 8/19/2019 | NC and SC | Power Manager | M&V Event     | 92 / 73                       | Tests across different hours with different subgroups | n/a          |
| 9/9/2019  | NC and SC | Power Manager | M&V Event     | 93 / 68                       | 226,800 / 272,700                                     | 182.9        |
| 9/12/2019 | NC and SC | Power Manager | M&V Event     | 96 / 71                       | 226,800 / 272,700                                     | 230.0        |
| 9/17/2019 | NC and SC | Power Manager | M&V Event     | 91 / 69                       | 226,600 / 272,500                                     | 200.0        |
| 9/26/2019 | NC and SC | Power Manager | M&V Event     | 92 / 65                       | 226,500 / 272,300                                     | 227.3        |

**Notes:**

- The 'High / Low System Temperature' is the average of the daily high & low temperatures from 3 weather stations (Charlotte, Greensboro, Greenville/Spartanburg)
- 'Customers Notified' is the number of participants notified to participate in the event
- 'Switches Dispatched' values represent the monthly active switch counts
- 'MW Reduction' values are based on the average across all hours of the event
- A loss adjustment of 1.0622 has been included in the 'MW Reduction' values.
- Customer and switch counts are estimated and rounded to nearest 100 due to not all customers being controlled in M&V events - some were left out as part of an uncontrolled control group.
- There were no PowerShare curtailment events in 2019



# Duke Energy Carolinas, LLC – Executive Summary

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## A. Description

During the first quarter 2019, Duke Energy Carolinas product managers prepared reports on each program describing the offerings and detailing each program's performance. This Executive Summary describes how the Company performed at an aggregate level during the full year of Vintage 2019 in comparison to as-filed information. Program-specific details are provided in the individual reports.

### Program reports include:

| Program  | Category | Customer        |
|--|----------|-----------------|
| Energy Assessments   | EE       | Residential     |
| Energy Efficient Appliances and Devices                          | EE       | Residential     |
| Energy Efficiency Education Programs                             | EE       | Residential     |
| Residential – Smart \$aver Energy Efficiency Program (HVAC EE)   | EE       | Residential     |
| Income Qualified Energy Efficiency and Weatherization Assistance | EE       | Residential     |
| My Home Energy Report  | EE       | Residential     |
| Multi-Family Energy Efficiency                                   | EE       | Residential     |
| Non-Residential Smart \$aver Prescriptive                        | EE       | Non-residential |
| Non-Residential Smart \$aver Custom                              | EE       | Non-residential |
| Non-Residential Smart \$aver Custom Assessment                   | EE       | Non-residential |
| Non-Residential Smart \$aver Performance Incentive               | EE       | Non-residential |
| Small Business Energy Saver                                      | EE       | Non-residential |
| EnergyWise for Business  | EE/DSM   | Non-residential |
| Power Manager  | DSM      | Residential     |
| PowerShare   | DSM      | Non-residential |

## Audience

All retail Duke Energy Carolinas customers who have not opted out.

## B & C. Impacts, Participants and Expenses

The tables below include actual results for the full year of Vintage 2019 in comparison to as-filed data for Vintage 2019.

The Company includes the number of units achieved and a percentage comparison to the as filed values. The unit of measure varies by measure as a participant, for example, may be a single LED bulb, a kW, a kWh, a household or a square foot. Due to the multiple measures in a given program or programs, units may appear skewed and are not easily comparable.

### Carolinas System Summary<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$356.3                  | \$437.7                               | 123%           |
| Program Cost                   | \$144.8                  | \$150.4                               | 104%           |
| MW <sup>2</sup>                | 1,039.9                  | 1,103.0                               | 106%           |
| MWH                            | 781,393.7                | 844,286.5                             | 108%           |
| Units                          | 106,419,427              | 72,688,882                            | 68%            |

1) Values are reflected at the system level.

2) As filed MW are annual maximum peak. Coincident peak is tracked for impacts.

## Duke Energy Carolinas, LLC – Executive Summary

### Carolinas Demand Response Summary<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$102.6</b>           | <b>\$114.6</b>                        | <b>112%</b>    |
| <b>Program Cost</b>            | <b>\$31.3</b>            | <b>\$30.1</b>                         | <b>96%</b>     |
| <b>MW<sup>2</sup></b>          | <b>888.9</b>             | <b>922.4</b>                          | <b>104%</b>    |
| <b>MWH</b>                     | <b>2,885.9</b>           | <b>2,704.1</b>                        | <b>94%</b>     |
| <b>Units<sup>3</sup></b>       | <b>840,237</b>           | <b>873,290</b>                        | <b>104%</b>    |

1) Values are reflected at the system level.

2) MW capability derived by taking the average over the PowerShare and PowerManager contract periods.

3) Units included in filing represented kW at meter, rather than number of participants. YTD value reflects average participation for 2019.

### Carolinas Energy Efficiency Summary<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$253.7</b>           | <b>\$323.1</b>                        | <b>127%</b>    |
| <b>Program Cost</b>            | <b>\$113.6</b>           | <b>\$120.3</b>                        | <b>106%</b>    |
| <b>MW<sup>2</sup></b>          | <b>150.9</b>             | <b>180.6</b>                          | <b>120%</b>    |
| <b>MWH</b>                     | <b>778,507.8</b>         | <b>841,582.4</b>                      | <b>108%</b>    |
| <b>Units</b>                   | <b>105,579,190</b>       | <b>71,815,592</b>                     | <b>68%</b>     |

1) Values are reflected at the system level.

2) As filed MW are annual maximum peak. Coincident peak is tracked for impacts.

## D. Qualitative Analysis

Energy efficiency impacts have primarily been driven by lighting measures for both residential and non-residential customers. This is a result of a higher take-rate for lighting offerings than originally projected.

### Highlights

#### Energy Efficiency

Customer participation continues to be largely driven by lighting and assessments programs. These measures provide customers with a relatively low-cost efficiency upgrade, with minimal effort, creating a positive initial energy efficiency experience.

#### Demand Side Management (DSM)

The DSM portfolio is comprised of PowerShare (non-residential), Power Manager (residential), and EnergyWise for Business (non-residential) programs. The impacts and participation were very close to the 2019 as-filed targets.

### Issues

A few of the Company's programs filed for program modifications at the close of the year. The Company faces a significant challenge with reductions in avoided costs, making programs and their measures potentially less impactful. As a result of this and other factors, the Company's continued assessment of its portfolio may result in the removal of or change in measures.

## Duke Energy Carolinas, LLC – Executive Summary

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### **Potential Changes**

Several programs are reviewing their current processes and are considering potential changes to increase customer adoption. Potential changes are discussed in individual program reports.

### **E. Marketing Strategy**

Located in individual reports.

### **F. Evaluation, Measurement and Verification**

Located in individual program reports.

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## Income-Qualified Energy Efficiency and Weatherization Assistance Program

### A. Description

The purpose of the Low Income Energy Efficiency and Weatherization Assistance Program ("Program") is to assist low income customers with installing energy efficiency measures in their homes. There are three offerings currently in the Program:

- Neighborhood Energy Saver ("NES")
- Weatherization and Equipment Replacement Program ("WERP")
- Refrigerator Replacement Program ("RRP").

WERP and RRP are available for income-qualified customers in Duke Energy Carolinas, LLC's (the "Company's") service territory for existing, individually metered single-family homes, condominiums, and mobile homes. Funds are available for (i.) weatherization measures and/or (ii.) heating system replacement with a 15 or greater SEER heat pump, and/or (iii.) refrigerator replacement with an Energy Star appliance. The measures eligible for funding will be determined by a full energy audit of the residence. Based on the results of the audit, customers are placed into a tier based on energy usage so that high energy users to receive more extensive weatherization measures. (Tier 1 provides up to \$600 for energy efficiency services; and Tier 2 provides up to \$4,000 for energy efficiency services, including insulation.) WERP and RRP are delivered in coordination with State agencies that administer the state's weatherization programs.

Customers participating in NES receive a walk-through energy assessment to identify energy efficiency opportunities in the customer's home and a one-on-one education on energy efficiency techniques and measures. Additionally, the customer receives a comprehensive package of energy efficient measures. NES participants may have the measures listed below installed in their homes based on the opportunities identified during the energy assessment.

1. Energy Efficient Bulbs - Up to 15 energy efficient bulbs (LEDs) to replace incandescent bulbs
2. Electric Water Heater Wrap and Insulation for Water Pipes
3. Electric Water Heater Temperature Check and Adjustment
4. Water Saving Faucet Aerators - Up to three faucet aerators
5. Water Saving Showerheads - Up to two showerheads
6. Wall Plate Thermometer
7. HVAC Winterization Kits – Up to three kits for wall/window air conditioning units will be provided along with education on the proper use, installation and value of the winterization kit as a method of stopping air infiltration.
8. HVAC Filters - A one-year supply of HVAC filters will be provided along with instructions on the proper method for installing a replacement filter.
9. Air Infiltration Reduction Measures - Weather stripping, door sweeps, caulk, foam sealant and clear patch tape will be installed to reduce or stop air infiltration around doors, windows, attic hatches and plumbing penetrations.

### Audience

WERP is available to qualified customers in existing individually metered, owner-occupied single-family residences, condominiums or manufactured homes.

RRP is available to qualified customers in individually metered residences irrespective of whether the property owner or the tenant owns the refrigerator.

NES is available to individually metered residential customers in selected neighborhoods where ~50% of the homeowners have income equal to or less than 200% of the Federal Poverty Guidelines, based on third party and census data.

# Income-Qualified Energy Efficiency and Weatherization Assistance Program

## B & C. Impacts, Participants and Expenses

Income Qualified Energy Efficiency and Weatherization Assistance<sup>1</sup>

| <u>\$ in millions, rounded</u> | Vintage 2019   | Vintage 2019          | % of Target |
|--------------------------------|----------------|-----------------------|-------------|
|                                | As Filed       | YTD December 31, 2019 |             |
| <b>NPV of Avoided Cost</b>     | <b>\$1.5</b>   | <b>\$3.6</b>          | <b>239%</b> |
| <b>Program Cost</b>            | <b>\$7.9</b>   | <b>\$7.3</b>          | <b>93%</b>  |
| <b>MW</b>                      | <b>0.6</b>     | <b>1.1</b>            | <b>173%</b> |
| <b>MWH</b>                     | <b>4,043.4</b> | <b>9,029.8</b>        | <b>223%</b> |
| <b>Units</b>                   | <b>10,114</b>  | <b>10,814</b>         | <b>107%</b> |

1) Values are reflected at the system level.

## D. Qualitative Analysis

### Highlights

**Neighborhood Energy Saver:** After receiving regulatory approval from both the North Carolina Utilities Commission and the South Carolina Public Service Commission in the fall of 2012, the Program was officially launched by the Company in March 2013. The yearly goal is to serve a minimum of 8,926 households. Honeywell Building Solutions was awarded the contract through a competitive bid process to administer the Program.

In 2019, NES offered free walk-through energy assessments to 8 qualifying neighborhoods in NC – Bessemer City, Burlington, Charlotte, Durham, Greensboro, Hickory, Kannapolis, Winston Salem and 3 qualifying neighborhoods in SC – Greenville, Kershaw and Spartanburg. Neighborhood events have included support from community groups and speakers such as elected officials, community leaders and community action agency representatives.

**Weatherization:** The Company launched WERP and RRP in February 2015 in North and South Carolina. The Company selected the program administrator, North Carolina Community Action Agency (NCCAA), in December 2014 via competitive bidding. The company is working with the NC and SC Weatherization Agencies to deliver this program.

In 2019, 736 homes received weatherization in conjunction with the DOE weatherization program, with 292 refrigerators replaced, 69 Tier 1 services provided, and 667 Tier 2 services provided.

## E. Marketing Strategy

**Neighborhood Energy Saver:** NES continues to target neighborhoods with a significant low-income customer base using a grassroots marketing approach to interact on an individual customer basis and gain trust. Participation is driven through a neighborhood kick-off event that includes trusted community leaders and local and state officials explaining the benefits of the Program. The purpose of the kick-off event is to rally the neighborhood around energy efficiency and to educate customers on methods to lower their energy bills. Customers have the option to make an appointment for an energy assessment at the time of the event.

In addition to the kick-off event, the Company plans to use the following avenues to inform eligible customers about the Program:

- Direct mail (letters and reminder post cards)
- Door hangers
- Press releases and/or neighborhood flyers

## Income-Qualified Energy Efficiency and Weatherization Assistance Program

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- Community presentations and partnerships
- Inclusion in community publications such as newsletters, etc.

**Weatherization:** WERP and RRP plan to piggy-back the marketing efforts of the current state Weatherization Assistance Programs administered by the state weatherization service providers. Additionally, agencies may utilize referrals generated from other Company energy efficiency programs as well as from their existing pool of weatherization applicants.

**Direct Weatherization Pilot:** In 2018-2019, a Direct Weatherization pilot was executed in a high-density area within DEC shown to have a significant low-income customer base. Through the use of internal customer data, high-energy use accounts with low-income indicators were targeted through direct mail and invited to apply for weatherization and refrigerator replacement programs. Through initial letters with follow-up postcards and a toll-free customer number, customers expressed their interests and follow-up appointments were set. Determination as to whether the program is to continue is pending.

### F. Evaluation, Measurement and Verification

The process and impact evaluation report for the Neighborhood Energy Saver portion of the Program was completed late in the fourth quarter of 2019. This was a combined evaluation with DEP. High level impacts for the engineering estimates include 676 kWh energy savings per participant, due to higher percentages of participants with electrically-heated homes and water heating. Since the program is focused on income-qualified participants, the net-to-gross is considered 1.0

The process evaluation assessed program operations and identified potential opportunity areas. Satisfaction for the program overall and the measures specifically was high – both reflected scores of 99% of participants satisfaction.

# Energy Efficiency Education Program

## A. Description

The Energy Efficiency Education Program ("Program") is available to students in grades K-12 enrolled in public and private schools in the Duke Energy Carolinas (the "Company" or "DEC") service territory. The current curriculum administered by The National Theatre for Children ("NTC") provides performances in elementary, middle and high schools.

The Program provides principals and teachers with an innovative curriculum to educate students about energy, resources, how energy and resources are related, ways energy is wasted, and how to be more energy efficient. The centerpiece of the curriculum is a live theatrical production focused on concepts such as energy, renewable fuels and energy efficiency and performed by two professional actors. Teachers receive supportive educational material for classroom and student take-home assignments. The workbooks, assignments and activities meet state curriculum requirements.

School principals are the main point of contact for scheduling their school's performance at their convenience. Two weeks prior to the performance, all materials are delivered to the principal's attention for classroom and student distribution. Materials include school posters, teacher guides, and classroom and family activity books.

Students are encouraged to complete a request form with their families (found in their classroom and family activity book, as well as online) to receive an Energy Efficiency Starter Kit. The kit contains specific energy efficiency measures to reduce home energy consumption. It is available at no cost to eligible Duke Energy customer households at participating schools.

## Audience

Eligible participants include the Company's residential customers who reside in households served by Duke Energy Carolinas with school-age children enrolled in public and private schools.

## B & C. Impacts, Participants and Expenses

Energy Efficiency Education<sup>1</sup>

| <u>\$ in millions, rounded</u> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$2.6</b>             | <b>\$2.5</b>                          | <b>98%</b>     |
| <b>Program Cost</b>            | <b>\$2.1</b>             | <b>\$1.7</b>                          | <b>80%</b>     |
| <b>MW</b>                      | <b>1.3</b>               | <b>0.8</b>                            | <b>63%</b>     |
| <b>MWH</b>                     | <b>5,701.5</b>           | <b>6,713.8</b>                        | <b>118%</b>    |
| <b>Units</b>                   | <b>26,705</b>            | <b>24,785</b>                         | <b>93%</b>     |

1) Values are reflected at the system level.

## D. Qualitative Analysis

### Highlights

The Company is supporting arts and theatre in schools while providing an important message about energy efficiency for students through an innovative delivery channel. Enhancing the message with a live theatrical production captivates the students' attention and reinforces the classroom curriculum materials provided.

For the 2018-2019 school year, elementary students enjoy watching *Kilowatt Kitchen* performed by two professional actors. Elementary schools will learn how to measure the energy we use and how we can reduce the energy we waste while watching Lorraine Quiche realize her dream of opening her own restaurant Kilowatt Kitchen. In this 25-minute educational play, Lorraine learns how to use energy wisely and saves the day for her Kilowatt Kitchen!

## Energy Efficiency Education Program

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The E-Team is a 35-minute, live show for grades six through nine. The program consists of two actors with two goals. The first goal is to highlight how we measure energy, the uses of energy, how energy is wasted and renewable resources. The second goal is to make the middle school students laugh so hard that they forget they are learning. The show is a series of improvised comedy sketches between characters in all sorts of hilarious situations. Before each scene, actors interact with the audience and get ideas that will be used during the sketch, such as their favorite band or a household pet. The ideas are incorporated into the show and may change the course of a scene.

High School students enjoyed the 45-minute live performance titled "What's your Goal". The performance consists of segments including student volunteers to take part in a sketch called "Moving Bodies" where the volunteer has complete control over the movement of the two actors as they explore ways to save energy at home and discuss the impact that energy saving items can have. The second segment is a game show called "The Carbon Footprint". Students are placed on teams and asked questions about what a carbon footprint is and ways they can reduce their own carbon footprint. The last segment takes the form of an interactive "TED Talk" style presentation where the actors explore topics relating to the effects of global climate change and how it relates to industries and economies. The students are offered information on what they can do and what careers they can explore to help do their part for the future of the planet.

From January through December 2019, a total of 587 schools hosted 919 performances in the Company's DEC service territory, reaching approximately 198,278 students and spurring the distribution of 24,785 kits.

Once an eligible customer submits a completed energy efficiency survey, the Energy Efficiency Starter Kit is shipped for delivery within two to four weeks. To ensure customer satisfaction with the Energy Efficiency Starter Kit and the installation of items, customers receive an email reminder monthly after the kit delivery to encourage families to return their Business Reply Card (BRC) verifying installation of measures. Qualified households that submit their energy efficiency survey and return the BRC are automatically entered into the household contest drawing, sponsored by NTC.

Additionally, school and classroom contests encourage sign-ups, and NTC awards checks to schools whose students, along with their families, completed home energy surveys and received energy efficiency kits. In the fall and spring of each year, a drawing is held selecting one school and one household contest winner. Principals, teachers and students may view their school's progress and compare the number of signups to other schools via the website, [www.trackmysignups.org](http://www.trackmysignups.org).

### Updates

The Company continues to enhance the Program by the following:

- Introducing new productions each school year to refresh and refocus the materials and scripts to keep participating schools engaged.
- Promoting the program through social media to encourage awareness, recognition and participation.
- Partnering with Duke Energy Account and District Managers to leverage existing relationships in the community to develop positive media stories while encouraging kit sign ups.
- Offering teacher satisfaction survey evaluations after the performances for both the elementary and middle school shows. Average survey data from January through December indicated 95% of the Elementary teachers surveyed and 94% of Middle School teachers surveyed had very high satisfaction ratings.
- Enhancing the offering by providing additional materials for all student households, but particularly those that have already received the current Energy Efficiency Starter Kit as well as non-Duke Energy customer student households. Including non-Duke customer households increases



## Energy Efficiency Education Program

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customer satisfaction and provides additional energy savings impacts for all customers, but particularly those customers that would otherwise have been excluded from the kit offering.

- Inclusion of the Kilowatt Krush mobile gaming application that will allow users to learn about smart energy use and conservation through an engaging arcade of action-packed, energy themed games. Students build and customize virtual houses in the neighborhood of their choice while learning about energy efficiency and safety education.

### **E. Marketing Strategy**

The National Theatre for Children is responsible for all marketing campaigns and outreach. The marketing channels may include but are not limited to the following:

- Direct mail (letters to school administrators)
- Email
- In-Person
- Program Website
- Events or assemblies
- Printed materials for classrooms
- Social media promotions

These marketing efforts engage students and their families in energy conservation behavior and provide energy saving opportunities through the Energy Efficiency Starter kits.

### **F. Evaluation, Measurement and Verification**

The evaluation report summary was presented at the Second Quarter 2019 Carolinas Collaborative. Results covered an evaluation period of August 2017 through July 2018. The evaluation methodology included verified impacts through engineering estimates. In addition, behavioral impacts were determined by surveying participants about actions taken as a result of the program and determining the engineering estimates of those actions. Participant surveys were also utilized to refine in-service rates, provide inputs into other algorithm variables, and help establish free ridership and spillover. Free ridership was estimated at 16% with spillover estimated at 9%, for an effective net-to-gross of 94%.

The process evaluation determined that teachers were satisfied with the performances and curriculum materials. Participating families were satisfied with the program overall and the measures included in the program, with lighting measures recording the highest satisfaction.

# My Home Energy Report

## A. Description

The My Home Energy Report ("MyHER" or the "Program") is a periodic usage report that compares a customer's energy use to similar residences in the same geographical area based upon the age, size and heating source of the home. The report includes recommendations to encourage energy saving behaviors. Customers with email addresses on file receive an electronic version of their reports monthly.

Customers receive reports up to 12 times per year via paper and electronic delivery. (Delivery may be interrupted during the off-peak energy usage months in the fall and spring.) The report delivers energy savings by encouraging customers to alter their energy use. Customer's usage is compared to the average homes (top 50 percent) in their area as well as the efficient homes (top 25 percent). It also suggests energy efficiency improvements, given the usage profile for that home. In addition, the report recommends measure-specific offers, rebates or audit follow-ups from the Company's other programs, based on the customer's energy profile. As of December 31, 2019, over 1.2 million single-family DEC customers and over 174 thousand multi-family DEC customers receive the MyHER report.

The MyHER interactive online portal allows customers to learn more about their energy use and about opportunities to reduce their usage. Customers can set goals, track their progress, and receive more targeted tips. As of December 31, 2019, over 68 thousand single-family customers and over 6 thousand multi-family customers were enrolled on the portal.

## Audience

Target customers reside in individually metered, single-family and multi-family residences with active accounts and 13 months of concurrent service from Duke Energy Carolinas, LLC (the "Company"). Single-family residences receive up to 8 printed reports and, if they have an email address on file, 12 electronic reports. Multi-family residences with registered email addresses with the Company receive up to 4 printed reports and 8 electronic reports. Multi-family residences without registered email addresses with the Company receive up to 6 printed reports a year with a strong call to action to provide their email addresses.

## B & C. Impacts, Participants and Expenses

My Home Energy Report<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019 |                       | % of Target |
|--------------------------------|--------------|-----------------------|-------------|
|                                | As Filed     | YTD December 31, 2019 |             |
| NPV of Avoided Cost            | \$20.9       | \$23.4                | 112%        |
| Program Cost                   | \$13.4       | \$10.6                | 79%         |
| MW <sup>2</sup>                | 79.4         | 91.4                  | 115%        |
| MWH <sup>2</sup>               | 312,934.1    | 328,439.1             | 105%        |
| Units <sup>3</sup>             | 1,364,000    | 1,339,152             | 98%         |

1) Values are reflected at the system level.

2) Values represent the annual MW and MWH savings associated with the December 2019 month end participation.

3) At month-end December 2019, single-family participation was 1,183,442, while multifamily participation was 155,710.

## D. Qualitative Analysis

As customers receive subsequent reports and learn more about their specific energy use and how they compare to their peer group, their engagement increases. The report then provides tools in the form of targeted energy efficiency tips with actionable ideas to become more efficient. Program participants are encouraged to contact the Company with their questions, comments and report corrections. Report corrections continue to generate the largest number of inquiries. Customers wishing to be removed from the Program represent 0.03% of single-family Program participants and .01% of multi-family Program participants.

## My Home Energy Report

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### Highlights

In 2019, the program launched into the Duke Energy Mobile App. Participants in the MyHER program are now able to see their usage comparison and disaggregation in the mobile app. With the deployment of AMI meters throughout DEC, the program began sending AMI data to Tendril. Customers with AMI meters can see their interval energy usage on the MyHER interactive experience. In 2019, the program also launched new AMI usage charts on the eHERs which show customers the difference in average weekly usage by hour from one month to the next.

### E. Marketing Strategy

The Program is marketed on the reports themselves by referring customers to the program website for additional information, Frequently Asked Questions ("FAQs") and contact resources. The MyHER Interactive portal is marketed by email campaigns as well as in the printed report.

In 2019, the program launched several email and on-report marketing campaigns to further awareness of the interactive portal. These campaigns resulted in an increase of over 56,900 customers enrolling in the interactive portal.

### F. Evaluation, Measurement and Verification

The process and impact evaluation report, combined with DEP, was completed and scheduled for completion in the third quarter of 2019 and presented to the Carolinas Collaborative in the Second Quarter 2019.

As is typical with MyHER evaluations, the impact evaluation consisted of a billing analysis to determine the consumption differences between the treatment group and the control group. A summary of results include verified impacts of 248 kWh per participant. Due to the nature of the evaluation methodology, these impacts are inherently net impacts.

For the process evaluation, recommendations and opportunity areas included continuing the practice of simultaneous control and treatment assignment, limited to once or twice per year; continuing to increase awareness of MyHER Interactive; keeping an eye on effective change management; and continue prioritizing the structuring of the program processes and schedules.

# Energy Assessments

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Feb 25 2020

## A. Description

The Home Energy House Call Program ("Program") is offered under the Energy Assessment Program. Duke Energy Carolinas, LLC (the "Company") partners with several key vendors to administer the Program.

The Program provides a free in-home assessment performed by a Building Performance Institute ("BPI") certified energy specialist and designed to help customers reduce energy usage and save money. The BPI-certified energy specialist completes a 60- to 90-minute walk through assessment of a customer's home and analyzes energy usage to identify energy savings opportunities. The energy specialist discusses behavioral and equipment modifications that can save energy and money with the customer. The customer also receives a customized report that identifies actions the customer can take to increase the home's efficiency. Examples of recommendations might include the following:

- Turning off vampire load equipment when not in use.
- Turning off lights when not in the room.
- Using energy efficient lighting.
- Using a programmable thermostat to better manage heating and cooling usage.
- Replacing older equipment.
- Adding insulation and sealing the home.

In addition to a customized report, customers receive an energy efficiency starter kit with a variety of measures that can be directly installed by the energy specialist. The kit includes measures such as energy efficiency lighting, a low-flow shower head, low flow faucet aerators, outlet/switch gaskets, weather stripping, and an energy saving tips booklet.

## Audience

Eligible Program participants are the Company's residential customers that own a single-family residence with at least four months of billing history and central air, electric heat or an electric water heater.

## B & C. Impacts, Participants and Expenses

Energy Assessments<sup>1</sup>

|                                | Vintage 2019   | Vintage 2019          | % of        |
|--------------------------------|----------------|-----------------------|-------------|
| <i>\$ in millions, rounded</i> | As Filed       | YTD December 31, 2019 | Target      |
| <b>NPV of Avoided Cost</b>     | <b>\$4.2</b>   | <b>\$4.4</b>          | <b>105%</b> |
| <b>Program Cost</b>            | <b>\$3.0</b>   | <b>\$3.2</b>          | <b>107%</b> |
| <b>MW</b>                      | <b>1.0</b>     | <b>0.9</b>            | <b>91%</b>  |
| <b>MWH</b>                     | <b>6,542.9</b> | <b>7,886.9</b>        | <b>121%</b> |
| <b>Units</b>                   | <b>34,304</b>  | <b>61,692</b>         | <b>180%</b> |

1) Values are reflected at the system level.

2) Units represent number of measures, and do include additional LEDs.

## D. Qualitative Analysis

### Highlights

The Company continues with a multi-channel approach which includes Duke Energy website pages, website banners, online services banner, paid search campaigns, Facebook, email, bill inserts, bill messages, direct mail, and customer segmentation to reach customers with a high propensity to participate. Examples of online, bill inserts and direct mail promotions are available in the appendix.

## Energy Assessments

Program staff explores other channels for marketing campaigns to reach the target audience and maximize both program performance as well as customer experience.

Vendors, partners and the team at Duke Energy collaborate regarding marketing initiatives, future scheduling, availability, routing, targeting, backlog, etc. to drive efficient operations as well as customer satisfaction.

Through December 2019, the program conducted 10,268 assessments and installed 45,710 additional LEDs. program continues to focus on maximizing the number of measures installed as well as cross-promoting other Duke Energy programs and offerings.

Enhancements to the program in 2019 include a continuing focus on cross promotion of other programs and integration of in-field referrals for FindItDuke, upgrading showerheads to chrome, implementing thermal imaging technology, testing handheld showerheads, removing the four-month usage eligibility requirement and performing route optimization updates.

### Potential Changes

Some program enhancements to increase the effectiveness of the Program being considered include the following:

- Continuing to optimize the online scheduling tool to enhance the customer experience
- Upgrading free measures to include pipewrap and additional bathroom aerators where relevant.
- Introducing upgradeable measures in field such as hand-held showerheads, smart thermostats, specialty bulbs, and blower door option
- Evaluating the incentive offerings to maximize savings and impacts as well as customer acceptance
- Including townhomes/condos for audit eligibility
- Implementing post audit follow up with reminders of recommendations/referrals.

### E. Marketing Strategy

Program participation continues to be driven through a multichannel approach including targeted mailings to pre-qualified residential customers, bill inserts, online promotions and online video. For those who elect to receive offers electronically, email marketing continues to be used to supplement direct mail. Information about the Program was included in the My Home Energy Report distributed in January and July. The Program management team continues to explore additional channels to drive awareness such as social, event marketing and other cross-promotional opportunities. The creative team continues to drive engagement and interest in the program based on online survey results and enrollment. Core messaging remains simple and focused on key benefits—a free energy assessment from Duke Energy can help save energy and money while also increasing comfort and it only takes three easy steps (You Call, We Come Over, You Save).

Home Energy House Call program information and an online assessment request form are available at [www.duke-energy.com](http://www.duke-energy.com).

### F. Evaluation, Measurement and Verification

The next evaluation for the program is tentatively scheduled for a late fourth quarter 2020 delivery date. It is anticipated that the evaluation will consist of a billing analysis that will compare the consumption of program participants to future program participants. Engineering estimates for the HEHC kit measures will also be conducted to provide insight into the behavioral impacts achieved through the program and to provide impacts for the Additional Bulbs provided to program participants. Participants surveys will be used to determine in-service rates and determine free ridership at the measure level.

The process evaluation will consist of participant surveys which will identify barriers to participation, improve program processes and assess overall participant satisfaction.

## Energy Efficient Appliances and Devices

### A. Description

The Energy Efficient Appliances and Devices program ("Program") offers a variety of measures to eligible Duke Energy Carolinas, LLC (the "Company") customers to facilitate a reduction in their energy consumption. The Program includes offers for lighting measures, pool pumps, heat pumps water heaters, and water measures.

#### Free LED Program

The Free LED (Light Emitting Diode) program is designed to increase the energy efficiency of residential customers by offering customers 9 watt A19 LEDs to install in high-use fixtures within their homes.

The LEDs are offered through multiple channels to eligible customers, including an on-demand ordering platform which enables eligible customers to request LEDs and have them shipped directly to their homes.

The program consists of two types of eligible customers:

1. Customers who have not yet met or exceeded the Duke Energy bulb (CFL or LED) limit of 15. These customers have the option to choose kits in quantities of 3, 6, 8, 12, and 15 bulbs. Available order quantities presented are dependent on past campaign participation (i.e., coupons, Business Reply Cards ("BRCs") and other Company programs offering lighting).
2. Customers who have met or exceeded the 15-bulb limit (CFL or LED) but 5 years have passed since their shipment dates. Depending upon past order quantities, these customers could have the option to order bulbs in quantities of 6 or 12.

Customers have the flexibility to order and track their shipments through four separate channels:

- 1) Telephone: Customers may call a toll-free number to access the Interactive Voice Response ("IVR") system, which provides prompts to facilitate the ordering process. The IVR is designed to handle requests for both English- and Spanish-speaking customers. Customers may easily validate their accounts, determine their eligibility and order their LEDs over the phone.
- 2) The Program's Web Site: Customers can go online to order LEDs, check their order status, see eligibility requirements and view frequently asked questions.
- 3) My Account: Once enrolled and authenticated in My Account, eligible customers will have the ability to order LEDs, check their order status and view frequently asked questions.
- 4) Duke Energy Mobile App: Once a customer downloads and authenticates their account on the mobile app, if eligible, the customer will see a "card" within the app offering the program. Like the other channels, customers have the ability to track order status and view FAQs.

#### Specialty Lighting

The Duke Energy Savings Store ("Store") is an extension of the on-demand ordering platform enabling eligible customers to purchase specialty bulbs and have them shipped directly to their homes. The Store launched on April 26, 2013, and offers a variety Light Emitting Diodes lamps ("LEDs") including reflectors, globes, candelabra, 3-way, dimmable and A-line type bulbs. The incentive levels vary by bulb type, and the customer pays the difference. Various shipping promotions are run throughout the year, ranging from free to a reduced flat rate price.

The maximum number of incented bulbs the Company provides is 36 per account. However, customers may choose to order additional bulbs without the Company's incentive.

## Energy Efficient Appliances and Devices

In 2018, the program added smart thermostats, smart strips, & water products. Customer purchase limits are as follows:

- Smart thermostats, 2 total
- Water measures, 3 total
- Smart Strips, 4 total

In 3Q of 2019, the program added the following additional energy efficient products:

- LED fixtures (direct wires, portable, & outdoor photocell), limit 8 total
- Small appliance, dehumidifiers & air purifiers, limit 2 each total

Customers can check eligibility and shop for specialty bulbs through four separate channels.

- 1) The Program Web Site: Customers can access the store via the program's public webpage on DukeEnergy.com. By clicking the "Shop Now" button, customers move to the store where they can purchase specialty bulbs. Frequently asked questions are available to help customers learn more about the program and the sustainability benefits of using LED lighting.
- 2) My Account (formerly OLS): Customers enrolled in the Company's OLS or My Account may visit the Store and purchase specialty bulbs. Upon login, eligible customers are intercepted with the Store offer. Customers can select "Shop Now" or "No Thanks." Additional links and promos within OLS also prompt customers to access the Store.
- 3) Phone Ordering: Customers can call a toll-free phone number provided on all promotional pieces for the program and place their orders over the phone directly with the programs third party vendor.
- 4) On occasion, Duke Energy provides customers with a mail-in option for placing an order. Direct mail campaigns offer specially priced bulb bundles with the option to order these bundles online, by phone or with a postage paid return mailer.

The Store is managed by a third-party vendor, Energy Federation Inc. ("EFI"). EFI is responsible for maintaining the Store website, fulfilling all customer purchases, supporting the program call center, and recommending products. The store's landing page provided information about the store, product offerings, highlights promotions, account information and order history. Support features include a toll-free number, chat, package tracking and frequently asked questions.

Educational information is available to help customers with their purchase decisions. This information includes videos and documents that speaks to how the customer can reduce their energy usage while maintaining comfortable atmosphere within their home.

Product pages include application photos, product images, product specifications, purchase limits, and program pricing. Customers may place items in their shopping carts to purchase later. Customers can pay for their purchases with a credit card or by check.

Benefits of the four distinct channels for the Savings Store include the following:

- Improved customer experience
- Advanced inventory management
- Simplified program coordination
- Enhanced reporting
- Increased program participation
- Reduced program costs
- Quick and convenient
- Discounted pricing



## Energy Efficient Appliances and Devices

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### Retail Lighting

The Retail Lighting Program's primary objective is the reduction of electric energy consumption and peak demand through increased awareness and adoption of energy-efficient lighting technologies. The program partners with retailers and manufacturers across North and South Carolina to provide price markdowns on customer purchases of efficient lighting. The product mix includes Energy Star-rated standard, reflector, and specialty LEDs and fixtures. Participating retailers include a variety of store types, including Big Box, DIY, and discount stores.

The program promotes customer awareness and the purchase of program-discounted products through a range of marketing and outreach strategies, including in-store collateral and events, bill inserts, direct mail and email marketing, mass media advertising, online advertising, and community events. The program also provides training to store staff to enable better customer education at the point of purchase. Ensuring customers are purchasing the right bulb for the application through proper customer education is imperative to obtain high satisfaction with lighting products and subsequent purchases.

### Water Measures

The Save Energy and Water Kit Program ("SEWK") launched in 2014. The Program is designed to increase the energy efficiency of residential customers by offering customers energy efficient water fixtures and insulating pipe tape for use within their homes.

The SEWK program is offered through a selective eligibility process, enabling eligible customers to request a kit and have it shipped directly to their homes. Customers owning and living in a single-family home with an electric water heater and who have not received similar measures through another Company-offered energy efficiency program are eligible for the program. Kits are available in two sizes for homes with one or more full bathrooms and contain varying quantities of shower heads, bathroom aerators, a kitchen aerator and insulating pipe tape. Program participants are eligible for one kit shipped free of charge to their homes. Also, customers are able to upgrade the showerhead(s) in the kit from a standard showerhead to either a wide pattern or wand showerhead at low cost.

Customers are pre-screened based on the eligibility requirements. Marketing channels include both a direct mail business reply card ("BRC") and direct email. Customers receiving the BRC may choose to return the BRC, navigate to a redemption website listed on the card, or call a toll-free number to take advantage of the offer. Customers receiving a direct email simply click on a redemption link to redeem the offer online. Upon receiving the order from the customer through one of the methods above, EFI ships the kit to the customer. Due to the unique eligibility requirements of this program, BRCs and direct email are the only two methods being used to solicit customers for participation.

### High Efficiency Pool Pumps

The High Efficiency Pool Pumps measure ("Pool Energy Efficiency Program") is designed to encourage the purchase and installation of energy efficient variable speed pool pumps for residential in-ground swimming pools. Eligible customers receive an incentive of \$300 for the replacement of an eligible single-speed pool pump with a new Energy Star-certified variable speed pump. New swimming pool construction is also eligible for the rebate. The program is marketed through a network of participating contractors ("Trade Allies") that interface directly with the customer, as well as through various marketing channels such as direct mail, email, company website, bill inserts and other customer communications. Eligible customers include single-family, owner-occupied residential customers with an in-ground pool in the Duke Energy Carolinas service territory. Builders of single-family residences are eligible for new residence construction that includes an in-ground swimming pool. In late 2017, this measure was moved to the Residential Smart Saver® Energy Efficiency Program (previously known as HVAC EE).



## Energy Efficient Appliances and Devices

### High Efficiency Heat Pump Water Heater

The high efficiency heat pump water heater measure is designed to encourage the installation and adoption of heat pump water heaters. Eligible customers receive an incentive of \$350 for the replacement of an existing electric water heater with an Energy Star-certified heat pump water heater having an Energy Factor ("EF") rating of 2.0 or higher. The program is marketed through a network of participating contractors ("Trade Allies") that interface directly with the customer, as well as through various marketing channels such as direct mail, email, company website, bill inserts and other customer communications. Eligible customers include single-family, owner-occupied residential customers with electric water heating in the Duke Energy Carolinas service territory. Builders of single-family residences that include an eligible heat pump water heater are also eligible for the rebate. In late 2017, this measure was moved to the Residential Smart Saver® Energy Efficiency Program (previously known as HVAC EE).

#### Audience

Customers who meet the Program eligibility requirements.

### B & C. Impacts, Participants and Expenses

Energy Efficient Appliances and Devices<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$52.1</b>            | <b>\$102.1</b>                        | <b>196%</b>    |
| <b>Program Cost</b>            | <b>\$21.7</b>            | <b>\$41.4</b>                         | <b>190%</b>    |
| <b>MW</b>                      | <b>16.7</b>              | <b>31.8</b>                           | <b>190%</b>    |
| <b>MWH</b>                     | <b>97,320.5</b>          | <b>187,351.7</b>                      | <b>193%</b>    |
| <b>Units</b>                   | <b>3,997,670</b>         | <b>9,893,466</b>                      | <b>247%</b>    |

1) Values are reflected at the system level.

### D. Qualitative Analysis

#### Free LED Program

##### Highlights

The program results were strong in 2019. Overall, over 451,000 orders were placed accounting for 5.6 million bulbs.

From an order channel perspective, the IVR intercept was the ordering channel that accounted for the most orders (45%). This was followed by the My Account authenticated portal accounting for 30% of orders in 2019 the Duke Energy public website with 24% of orders while the program's newest channel, the Duke Energy Mobile App rounded out the rest of the order channel splits accounting for 1% of orders.

##### Issues

Analyzing customer data and finding ways to effectively market to non-participating customers is the primary challenge of this program.

##### Potential Changes

The Free LED program is scheduled to discontinue in Duke Energy Carolinas in 2020 as a result of potential efficiency standards for general service bulbs that may be imposed as a part of the Energy Independence and Security Act (EISA). This standard change legislation will diminish both the impact of the program and its cost effectiveness, making it, therefore, no longer viable for the company to offer it. Although, at this time, there is still uncertainty as to how and when this legislation will be imposed, Duke Energy plans to move forward with its sunset strategy. The Company will work collaboratively with the implementation vendor to manage inventory and process pipeline orders efficiently during this time.

## Energy Efficient Appliances and Devices

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### Specialty Lighting

#### Highlights

The Online Savings Store, provides an ecommerce platform that allows customers to purchase a variety of energy efficient products, including LEDs, smart thermostats, smart strips and more, at any time. Over 43,578 orders were placed during 2019 resulting in the delivery of over 331,095 bulbs; 11,724 smart thermostats; 3,553 smart strips; 220 water products, 639 LED fixtures have been delivered to customers. Over 99 percent of customers accessed the online saving store via the public website, while 1 percent accessed by logging into their MyAccount.

#### Issues

Educating and bringing awareness to the variety of products in the Store to eligible customers is the program's primary issue.

#### Potential Changes

Upgrading the entire site to improve the overall customer shopping experience and enhance certain features is planned for 2020.

### Retail Lighting

#### Highlights

In 2019, the program moved a total of 3,476,442 measures, including 2,404,709 LEDs and 1,071,733 fixtures into customers' homes.

The DEC Energy Efficiency Program had 9 lighting retail channels actively participating in 2019. While the top three retail channels account for 70% of the program sales, all retail channels are important in that they allow access to the program for a widely diverse and geographically spread population of DEC customers. Locations are selected to ensure that the Program reaches 90% of customers within 30 miles of a participating retail location.

The Program operated efficiently with 86.77% of overall Program costs going directly to customers in the form of incentives. Most of the remaining Program costs (12.92%) were spent on implementation and administration of the Program. The remainder of costs, less than 1%, were spent on marketing and labor.

#### Issues

No issues are known at this time.

#### Potential Changes

The Program will continue to evaluate the market and adjust products and incentive levels as necessary, focusing on specialty applications and strategically targeting underserved customers through select channels and events.

### Save Energy and Water Kit Program

#### Highlights

In 2019, the program distributed over 409,000 measures. In 2Q 2019, the program enhanced the online ordering process to allow customers to upgrade the showerhead(s) in the kit from a standard showerhead to a wide format or wand showerhead. Online redemptions continue to grow and in 2019, accounted for 40% of all redemptions. Of customers that redeemed the offer online, 34% chose to upgrade their kit to either a wide format or wand showerhead.

## Energy Efficient Appliances and Devices

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### Issues

The Company continues to analyze data from non-respondents to the BRC offer to identify opportunities to increase the adoption rate. The Company also continues to review customer satisfaction surveys to identify opportunities for improvement in service rates and overall customer satisfaction.

### Potential Changes

The program continues to review the kit components to identify new measures that would provide customers with better product choices.

### High Efficiency Pool Pumps

#### Highlights

The Company partnered with several wholesale distributors across North and South Carolina to serve as distribution channels for program awareness and to develop the Trade Ally Network. Trade Allies are important to the program's success because they interface with the customer during the decision-making process. Several training classes were conducted throughout the jurisdiction to continue educating the trade allies on the advanced technology variable speed as well as on how to sell the technology to the end user.

#### Issues

Customer buy-in and the Trade Ally network are vital to the success of the program. Educating contractors on emerging technologies and the value the technologies provide customers is critical in growing the trade ally network and their willingness to promote the program. Additionally, many distributors are requesting point-of-sale rebates as they do not want to deal with submitting rebates or handling the additional paper work requirements for the Program. The Company is currently working to determine if a technology can be put in place to accommodate distributor needs and boost participation.

### High Efficiency Heat Pump Water Heater

#### Highlights

The Company has partnered with manufacturers and national retailers such as General Electric and Lowes to increase program awareness and maximize in store purchases. The program continued recruiting plumbing contractors and currently registered HVAC companies to increase coverage across the jurisdictions and maximize participation. The Program conducted training classes throughout the jurisdiction to educate the Trade Allies on the advanced technology offers for reducing energy consumption as well as on how to sell the technology to the end user.

#### Issues

Educating and bringing awareness of the program to both customers and potential contractors has been challenging. Educating contractors has been addressed through additional Trade Ally marketing, recruitment and training but remains slow due to the re-emerging technology of heat pump water heaters and their willingness to adopt more technical services. Customer awareness is being addressed through program design and marketing tactics but will be primarily targeted as a joint effort with manufactures and national retailers. Their willingness to co-brand and the frequency of campaigns will be critical in reaching our customer base.

### E. Marketing Strategy

#### Free LED Program

## Energy Efficient Appliances and Devices

The overall strategy of the program is to reach residential customers who have not adopted LED lighting. The Company educates customers on the benefits of LEDs while addressing barriers for customers who have not participated in the program. Additionally, the ease of Program participation will also be highlighted to encourage use of the on-demand ordering platform. The Free LED and Specialty Lighting offers utilize the same ordering platform so the Company can promote both lighting offers efficiently and bring awareness to non-adopters.

From an outreach standpoint, the program relies on our My Account intercept, a pop up that launches as a customer logs into the My Account authenticated portal to pay their bill or view account information, to generate interest in the program. A customer can click “continue” to move to the Free LED ordering page. In 2019, approximately 30% of orders came as a result of this intercept. In addition to the My Account intercept, the program leveraged it’s IVR Intercept that presents when a customer calls into the Duke Energy customer service line and goes through one of three flows—Billing Questions, Meter Read, Make a Payment. After authenticating, if eligible, a message will present that they are eligible for the offer and allowing them to place an order and then be placed back into the flow of their intended call. Overall, there were 123,563 IVR intercept orders out of 456,509 times the intercept presented, translating to a 27% take rate.

In addition to the intercepts, the program also solicited customers via emails and direct mail pieces. Such pieces usually targeted New Customers (typically yielding an 18% take rate) and customers who became re-eligible for the Free lighting program after 5 years passed since their Free CFL order (typically yielding a 16% take rate).

A sample of program collateral and emails (which cross promote Specialty Lighting) are available in the Appendix.

### Specialty Lighting

Since the launch of the Store, the marketing efforts include the following:

- bill messages
- bill inserts
- email campaigns
- direct mail
- and other digital media channels

Examples of the marketing pieces can be found in the Appendix. Awareness and education will continue to be a focus in collateral messages to eligible customers, as well as highlighting great pricing and other promotional offerings such as free shipping.

### Retail Lighting

The program’s marketing efforts for 2019 include the following:

- Point of Purchase materials at participating retailer locations
- Duke Energy and Program website
- General Awareness Campaigns
  - Bill Inserts
  - Email
  - Online Advertising
- Advertised events at key retailers including:
  - Direct mail
  - Email
  - In-Store materials (fliers, bag stuffers, posters, banners, etc.)
- Community outreach events (national night out, cultural events, etc.)

## Energy Efficient Appliances and Devices

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These marketing efforts are designed to create customer awareness of the Program, to educate customers on energy saving opportunities, and to emphasize the convenience of Program participation. Additionally, marketing efforts related to in-store events are designed to motivate customer participation.

### **Save Energy and Water Kit Program**

The overall strategy of the program is to reach residential customers who have not adopted low flow water devices. In 2020, the program is exploring the use of bilingual messaging to reach Spanish-speaking customers.

Both direct mail marketing in the form of BRCs and direct email are the current marketing channels being used by this program in the Carolinas. With the growth of online ordering and email as a marketing channel, the paper and cost associated with traditional mail solicitations continues to decline.

### **High Efficiency Pool Pumps**

The Company implemented several customer marketing campaigns in 2017 which leveraged channels such as email, paid search, display ads, direct mail and social media to build awareness of the program. Other channels such as co-branded retail displays with selected distributors created awareness of the program. The program's messaging was built around the benefits of the product including payback, annual savings and cleaner pools.

### **High Energy Efficiency Heat Pump Water Heater**

The Company implemented several customer marketing campaigns in 2017 which leveraged channels such as bill inserts, paid search, and display ads to build awareness of the program. Other channels such as co-branded retail displays with selected manufacturers and national retailers created awareness for the program.

## **F. Evaluation, Measurement and Verification**

### **Residential Lighting**

No additional EM&V activities are planned for the Free LED Program due to future sunseting of the program.

Future evaluations for the DEC Online Saving and Marketplace Program are tentatively scheduled for a final report date in the fourth quarter of 2021, subject to participation levels for the non-lighting retail and marketplace measures.

### **Heat Pump Water Heaters/Pool Pump**

The evaluation for Heat Pump Water Heater and Variable Speed Pool Pump measures are scheduled for tentative delivery in mid-year 2022 for Program Year 2021. The extended timeframe is to ensure sufficient participation in the referral component of the program.

### **Save Energy & Water**

Evaluation work commenced in 2019, with the final evaluation report tentatively scheduled for 2<sup>nd</sup> Quarter 2020.

## G. Appendix

**DUKE ENERGY**

• [Contact Us](#) • [Services](#)  
• [Shopping Information](#) • [FAQ](#)  
• [Helping Indiana Live Well](#)  
• [Employment](#) • [DukeCare](#)

## Welcome to Duke Energy!

As your energy provider, we're always looking for ways to help you save money and energy. Energy-efficient lighting is a great way to do that.

Let's take this step by step. On the right box and, as an incentive, after you a **FREE DUKE LED LIGHT BULB**, we'll get you general purpose (GU100) 15-watt (equivalent 60-watt) bulbs for your home.

- Live up to 25% less energy and save \$100 (vs. incandescent bulbs)
- Choose an incandescent
- Save a potential lifetime savings up to \$225 per bulb

**YOUR FREE DUKE LED LIGHT BULB**

Order your **FREE BULBS** now.

Visit [duke-energy.com/FreeLEDbulbs](#) or call 800.943.7585.

Order your bulbs today to meet Indiana's energy needs.

**DUKE ENERGY**

**SAVE MORE. SAVE BETTER.**

Choose from Incandescent or globe, but either offers after a wide variety of non-infrared, energy-efficient bulbs to choose from. The only spending bulbs for your home in your bulbs, and you have been awarded a bulb.

**Step 1: Go to [duke-energy.com/FreeLEDbulbs](#)**

After you've ordered your order of \$25 or more, we'll get you 100 of the most energy-efficient bulbs in the world.



# BRIGHT IDEA

Save energy *and* money.

There's never been a better time to switch out your old bulbs for LEDs.



Potential savings:  
up to **\$140**  
per bulb



Last up to  
**24x**  
longer\*



Uses up to  
**66%**  
less energy\*

\*When compared to traditional bulbs.

**Order today!**

**duke-energy.com/LEDs :: 800.943.7585**

# Energy Efficient Appliances and Devices

## Free LED Program – Email Campaign:

We're sending you LED bulbs & the new Energy Efficient Energy™ **DUKE ENERGY**

**ORDER MY LED BULBS NOW**

You'll take advantage of our new CFL offer, but now we want to offer you something smarter – **A BULB.** **LED!** Order yours today and we'll ship them directly to your door. You can enjoy better lighting and save on energy. (CFL's wait)

**LEDs work wonders on any home interior.**

Update a kitchen

Brighten a bathroom

Transform the look of a bedroom

**POINT, CLICK AND SAVE**

Order your freebies and you'll also get \$100 off a wide variety of energy-saving CFLs at a huge discount. Use promotion code **March31** for free shipping on orders of \$25 or more.

Offer valid through 3/31/16. See details at duke-energy.com/led

**APPLIANCE RECYCLING PROGRAM**

Free removal of your extra fridge. Easy. Convenient. Plus get \$50.

- Contact us to schedule your free home pickup
- We'll come get your fridge when it's good for you
- You'll get a \$50 check and save up to \$150 a year in energy costs

Schedule your free pickup today. Call 855.398.6200 or visit [duke-energy.com/save](http://duke-energy.com/save)

For more information and eligibility please visit [duke-energy.com/save](http://duke-energy.com/save)

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**ONLINE SAVINGS STORE**

Stop paying retail prices for your energy-saving light bulbs. Shop online.

- Enjoy up to **92 percent** off retail prices
- Huge selection of energy-saving CFL and LED bulbs delivered to your door
- Free shipping on orders over \$25 through May 31, 2016. Use promotion code **Duke315**

Visit [duke-energy.com/BigSavings](http://duke-energy.com/BigSavings) and start saving money today

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**It's March Savings Madness!**

4 ways we can help you score more than \$1,000.

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**Help the planet. Help your wallet.**

Water and energy are precious resources. And now we've made it possible for you to save water every time you turn on the faucet or take a shower.

**Our FREE showerhead kit** will save you water and energy. And it's free. (We'll even ship it to your door.)

Water the world with our Free Energy and Water Kit today.

To learn more about our programs, visit [duke-energy.com/SaveWater](http://duke-energy.com/SaveWater) or call 855.398.6200.

**Inside your FREE kit:**

- State-of-the-art showerheads** – Save up to 30% on water and energy. (We'll even ship it to your door.)
- Energy-efficient faucet aerators** – They'll save you water and energy every time you turn on the faucet. (We'll even ship it to your door.)
- Free insulation tape** – Insulate your water heater and pipes to save energy. (We'll even ship it to your door.)
- Installation guide and how-to video** – We'll even provide you with a video to help you install the kit. (We'll even ship it to your door.)

**Could save you nearly 37% on your energy bill.**

**YES, send me my FREE Save Energy and Water kit!**

**NOTICE:** You must have an electric water heater to receive this free kit.

☐ I confirm that the recipient has an electric water heater and that the recipient understands that they must install the kit and use it to receive the savings.

**Request your kit by 3/31/16**

**DUKE ENERGY**

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## Online Savings Store

11

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## Energy Efficient Appliances and Devices

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Feb 25 2020

**Trim your energy budget in 2019.**



Lighten the load with an  
extra **19% off** LED bulbs.

**16¢ LEDS ARE A SLAM DUNK!**



**Shop by April 8.**

**DUKE ENERGY.**

Online Savings More  
9729 | 400 S. Tryon Street  
Charlotte, NC 28202

PREPARED TO ORDER  
U.S. POSTAGE  
PAID  
CITY OF  
PERMIT NO. 4555

<<FirstName LastName>>  
<<Street address>>  
<<City, State ZIP>>

BUILDING A SMARTER ENERGY FUTURE®


**The bulb's in your court.**



**Dunk 16¢ bulbs in your basket and get FREE shipping!**  
See promo code inside.



## Energy Efficient Appliances and Devices

**Order online**  
duke-energy.com/LED16

Log in with your phone number or account number and the last four digits of the account holder's Social Security number.


Use promo code **LED16** to get free shipping!

Limit 8 bulbs per customer. While supplies last.


**Sale ends April 8**

Customer agrees to the Terms and Conditions when placing an order. Offer good while supplies last and while funds are available at the lowest price available. If you previously purchased these LED Savings items and are not sure how you are eligible to receive the discount, call 800-448-8888 or visit duke-energy.com/LED16. Products, prices, availability, and other details subject to change without notice. Customers must log in to their Duke Energy account within 30 days of purchase and the first four digits of their Social Security number to substantiate their eligibility. Duke Energy Savings items are available for eligible Duke Energy residential customers. Terms and Conditions: 1. Products may be located at the physical address associated with the account number containing the products. 2. Products cannot be used under any circumstances. 3. Duke Energy reserves the right to reserve products and/or equipment eligibility at any time. 4. Duke Energy will not pay for different models from agents' confidential agreements to purchase customer-owned equipment. 5. 1 year warranty, not transferable and subject to change. 6. Products may be subject to change without notice. 7. Products may be subject to change without notice. 8. Duke Energy is not affiliated with the manufacturer or vendor, does not represent or implicitly warrant the performance of installed or used products and is not liable for any damage caused by the installation of these products or for any damage caused by the installation of the installed product. Please direct all questions regarding products to the applicable manufacturer. See your Duke Energy agent or visit duke-energy.com for more information. All rights reserved. Duke Energy, 605 South Tryon Street, Charlotte, NC 28202. ©2019 Duke Energy Corporation. 000417 2/19


**Savings are a slam dunk with these deals**




◀ **Philips E12 Torpedo Candelabra R2030.201**  
Same as 40W, only uses 4.5W  
Soft White + Dimmable  
Your price: 16¢



◀ **NewLeaf BR30 Indoor Reflector R2200.201**  
Same as 60W, only uses 8W  
Soft White + Moderate Light  
Your price: 16¢



◀ **TCP G25 Globe R2020.101**  
Same as 40W, only uses 5W  
Soft White + Low Light  
Your price: 16¢



◀ **NewLeaf Par20 Outdoor Reflector R2300.203**  
Same as 60W, only uses 7W  
Damp Rated + Flood Light  
Your price: 16¢



**Dive into deep discounts this summer.**


**Save on a variety of energy-efficient products for your home.**

See promo code inside for FREE shipping.


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[illegible]




Online Savings Store  
5729 | 400 S. Tryon Street  
Charlotte, NC 28202



Google Nest Thermostat E is just \$79 + get a  
**FREE Google Home Mini!**

<<FirstName LastName>>  
<<Street address>>  
<<City, State ZIP>>



Shop the Wonderful Winter  
Smart Thermostat Sale

Get a Google Nest Thermostat E at the lowest price of  
the year + a **FREE Google Home Mini!**

Look inside for even more deals on smart thermostats

[illegible]

## Energy Efficient Appliances and Devices

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**Retail Lighting General Awareness Email:**

## Energy Efficient Appliances and Devices

Use our store locator to shop for deals on LEDs. [Trouble viewing? View on desktop](#)

**DUKE ENERGY**

**FIND A STORE NEAR YOU.**

**Get LED bulbs for up to 75% off.**

Saving energy and money for years to come is as simple as changing a lightbulb. Making the switch to energy-efficient LED bulbs is easier than ever with discounts of up to 75% off from Duke Energy at select retail locations.

[FIND A STORE](#)

Here are a few reasons to make the switch:

|   |  |
|---|--|
| <p><b>SAVE ENERGY</b><br/>They use up to 90% less energy than standard bulbs.</p> | <p><b>SAME BRIGHTNESS</b><br/>They're as bright as standard bulbs but use less energy.</p> |
| <p><b>LONG-LASTING</b><br/>They last up to 15x longer than standard bulbs.</p>    | <p><b>DEEP DISCOUNTS</b><br/>They're up to 75% off at a store near you.</p>                |

*BUILDING A SMARTER ENERGY FUTURE®*

[f](#) [t](#) [in](#) [v](#) [@](#)

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Duke Energy | 550 South Tryon Street | Charlotte, NC 28202

Retail Lighting In-Store event promotion:

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## Energy Efficient Appliances and Devices

Want to save on lighting?

# JUST SHOW UP.

Come to our event and save big on a variety of energy-efficient LEDs.




ONE DAY ONLY

SATURDAY, JUNE 22  
9 a.m. – 1 p.m.


**Ace Hardware**  
3986 E. Galbraith Road  
Cincinnati, OH 45236

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DISCOUNTED PRICES  
BROUGHT TO YOU BY

 **DUKE ENERGY.**  
BUILDING A SMARTER ENERGY FUTURE®


Did you know that each LED bulb can save you about \$80 in energy costs over its lifetime? Come to this **one-day-only event** to get a variety of energy-efficient LED bulbs for as low as \$1. Limit 12 bulbs per customer.\*



Get advice from lighting specialists on **how to lower energy use.**



Bring this postcard for **special giveaways.\***




Shop for a wide variety of **discounted LED bulbs.**

\*While supplies last.

☐

The barcode to the left is embedded with your address and account information. This system ensures your privacy and allows us to process your order quickly by scanning the barcode.



©2019 Duke Energy Corporation 191502-Cincinnati 5/19



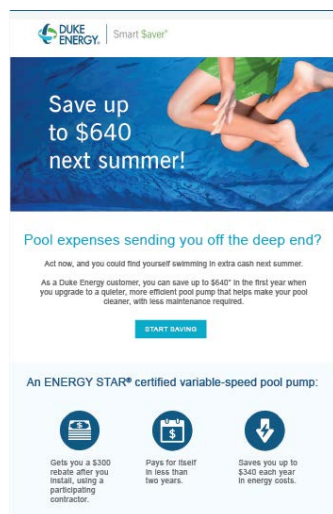
Retail LED Lighting Program  
ST29 | 400 S. Tryon Street  
Charlotte, NC 28202



<<Account Name>>  
<<Mailing Street>>  
<<Mailing City, Mailing State Zip/Postal Code>>



## Energy Efficient Appliances and Devices



**DUKE ENERGY | Smart Saver®**

Save up to \$640 next summer!

Pool expenses sending you off the deep end?

Act now, and you could find yourself swimming in extra cash next summer. As a Duke Energy customer, you can save up to \$640\* in the first year when you upgrade to a quieter, more efficient pool pump that helps make your pool cleaner, with less maintenance required.

**START SAVING**

An ENERGY STAR® certified variable-speed pool pump:

- Gets you a \$300 rebate after you install, using a participating contractor.
- Pays for itself in less than two years.
- Saves you up to \$340 each year in energy costs.

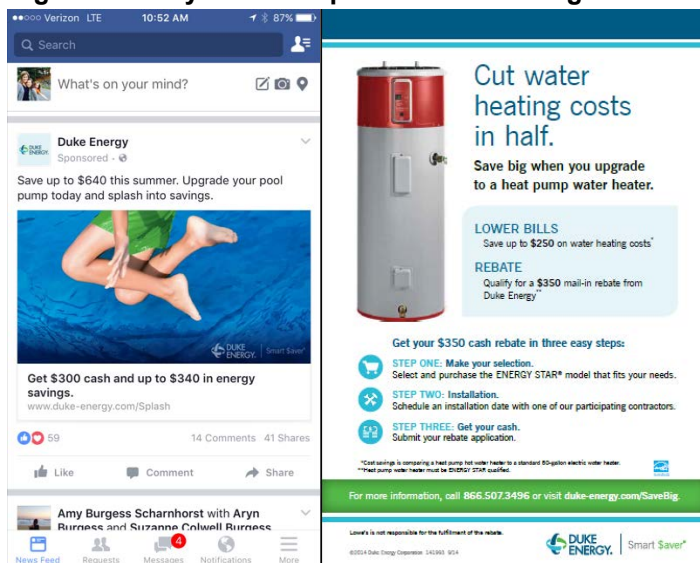
### High Efficiency Heat Pump Water Heater National Retailer Display



Enjoy easy summertime savings.

Want to save up to \$640 next summer? We can help.

### High Efficiency Pool Pump Facebook Posting



Verizon LTE 10:52 AM 87%

Search

What's on your mind?

**Duke Energy** Sponsored · 10

Save up to \$640 this summer. Upgrade your pool pump today and splash into savings.

**Get \$300 cash and up to \$340 in energy savings.**  
www.duke-energy.com/Splash

59 14 Comments 41 Shares

Like Comment Share

**Amy Burgess Scharnhorst with Aryn Buiness and Suzanne Colwell Buiness**

News Feed Requests Messages Notifications More

**Cut water heating costs in half.**

Save big when you upgrade to a heat pump water heater.

**LOWER BILLS**  
Save up to \$250 on water heating costs\*

**REBATE**  
Qualify for a \$350 mail-in rebate from Duke Energy\*\*

Get your \$350 cash rebate in three easy steps:

- STEP ONE:** Make your selection. Select and purchase the ENERGY STAR® model that fits your needs.
- STEP TWO:** Installation. Schedule an installation date with one of our participating contractors.
- STEP THREE:** Get your cash. Submit your rebate application.

\*Cost savings is comparing a heat pump hot water heater to a standard 50-gallon electric water heater.  
\*\*Heat pump water heater must be ENERGY STAR qualified.

For more information, call 866.507.3496 or visit duke-energy.com/SaveBig.

Lincoln is not responsible for the fulfillment of this rebate.  
©2014 Duke Energy Corporation 141363 9/14

**DUKE ENERGY | Smart Saver®**

### High Efficiency Heat Pump Water Heater Digital Media

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## Energy Efficient Appliances and Devices


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Water heater over  
10 years old?

**Don't wait until it fails.**

Get \$350 when you upgrade  
your water heater.

[Find a contractor >](#)



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## Residential –Smart \$aver® Energy Efficiency Program

### A. Description

The Residential – Smart \$aver® Energy Efficiency Program (“Program”) offers measures that allow eligible Duke Energy Carolinas, LLC (the “Company”) customers to reduce energy consumption in the home. The Program provides incentives for the purchase and installation of eligible central air conditioner or heat pump replacements in addition to Wi-Fi enabled Smart Thermostats when installed and programmed at the time the heating ventilation and air conditioning (HVAC) system is installed. Program participants may also receive an incentive for attic insulation, air sealing, duct sealing, variable speed pool pumps, and heat pump water heaters.

Program staff is responsible for establishing relationships with HVAC and home performance contractors (“Trade Allies”) who interface directly with residential customers. These Trade Allies market and leverage the Program to assist with selling these products and services to customers. Once the Trade Ally has sold the service/product, they complete and submit incentive applications on behalf of the customer. An incentive is disbursed to the customer after the application has been approved and processed.

Duke Energy contracts with a third-party vendor for application processing, incentive payment disbursement, and Trade Ally and customer call processing.

### Audience

The Company’s residential customers that meet the eligibility requirements of the Program may participate.

### B & C. Impacts, Participants and Expenses

Residential - Smart \$aver Energy Efficiency Program<sup>1</sup>

| <i><u>\$ in millions, rounded</u></i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|---------------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>            | <b>\$4.5</b>             | <b>\$7.1</b>                          | <b>157%</b>    |
| <b>Program Cost</b>                   | <b>\$4.8</b>             | <b>\$7.4</b>                          | <b>154%</b>    |
| <b>MW</b>                             | <b>1.3</b>               | <b>2.0</b>                            | <b>157%</b>    |
| <b>MWH</b>                            | <b>5,130.7</b>           | <b>7,329.1</b>                        | <b>143%</b>    |
| <b>Units</b>                          | <b>9,630</b>             | <b>25,852</b>                         | <b>268%</b>    |

1) Values are reflected at the system level.

### D. Qualitative Analysis

#### Highlights

The Company’s tiered incentive structure continues to receive a positive reaction from customers as well as Trade Allies. Reporting continued to show that the increased incentive amounts for higher SEER equipment has encouraged customers to install higher efficiency equipment as well as having it managed with newer thermostat technologies.

The program will continue to emphasize best practices and to build support by offering additional training to the Trade Allies and modifications to program requirements when needed. Program staff coordinated and assisted in 3 onsite field trainings and 2 webinars during 2019 as well as 2 contractor appreciation events.

Customer engagement continues to be a focus of the Program especially through the “Find It Duke” referral platform that positions Duke Energy as a trusted advisor by providing free home improvement referrals through a premier network of qualified contractors who deliver exceptional customer service.



## Residential –Smart \$aver® Energy Efficiency Program

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In September 2019, major enhancements to the Find it Duke website were completed that expanded the services offered and provided an improved customer experience. The Find it Duke referral channel successfully generated over 15,668 customer referrals during 2019. Customers whose referral generated a sale for the Trade Ally received a survey to rate their experience. The Referral Network maintained a contractor rating of 4.75 out of 5.0 stars during 2019.

### **Issues**

The buy-in and participation of the Trade Ally network is vital to the success of the Program. Trade Allies are important to the Program's success because they interface with the customer during the decision-making event.

### **E. Marketing Strategy**

Promotion of the rebate Program is targeted to HVAC and home performance contractors as well as pool and plumbing contractors that install variable speed pumps and heat pump water heater technology.

Program information to educate customers about the Program and encourage participation and Trade Ally enrollment links are available on the Program's website. Increasing the overall awareness of the Program and the participation of Trade Allies ensures more customers are considering the benefits of the Program at the time of purchase.

Various customer marketing campaigns during 2019 leveraged channels such as TV, radio, social media and email messaging in order to build awareness of the referral service. Other marketing efforts, such as a paid search and co-branded special offer campaigns with eligible referral contractors, manufacturers, and national retailers, also created awareness for the channel.


### **F. Evaluation, Measurement and Verification**


No evaluation activities were completed in 2019. The next evaluation for the program will commence in second quarter of 2021 with a completed report scheduled for Second Quarter 2022.


## Residential –Smart \$aver® Energy Efficiency Program


### G. Appendix

#### Residential HVAC and Heat Pump Water Heater– Referral Special Offer Campaigns






 Find cooling.

 Find savings.

Find It Duke.








Enjoy **\$300 off** heating and cooling system upgrade.



Find It Duke wants to help you enjoy a more comfortable home. Get **\$300 off** when you upgrade to a 16 SEER or greater HVAC system. Plus, qualify to earn up to **\$450 in rebates** to help offset the cost of your system.

[GET OFFER](#)


Enter promo code: HVAC16SEER  
Offer ends August 31, 2019


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Duke Energy | 550 South Tryon Street | Charlotte, NC 28202







It's Water Heater Savings Season.

Enjoy **\$100 off** a water heater upgrade.






Find comfort and savings. Get **\$100 off** any 50-gallon water heater replacement. Plus, get a **\$350 rebate** when you upgrade to an energy-efficient heat pump water heater.



Best of all, Find It Duke will provide a **FREE** referral to a qualified home improvement contractor in your area.

[GET OFFER](#)

Enter promo code: WHtrSAVE  
Offer ends August 31, 2019

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## Residential –Smart \$aver® Energy Efficiency Program

### Residential Pool Pump- Email Campaign

The graphic features the Duke Energy logo and 'Smart \$aver' branding at the top. The main headline 'SAVE MONEY' is displayed in large white letters on a blue background, with the letter 'O' replaced by a yellow pool ring. Below this, the text reads: 'End-of-season savings on a new pool pump up to \$640.' A paragraph explains the timing of the offer and the potential savings. A blue button labeled 'UPGRADE NOW' is positioned below the text. The section 'Why upgrade to a variable-speed pool pump?' is followed by three icons: a dollar sign, a speaker, and a pool pump, each with a corresponding benefit. The bottom section encourages visiting FindItDuke.com for a free referral and includes social media icons and app store links.

**DUKE ENERGY** | Smart \$aver®

# SAVE MONEY

End-of-season savings on a new pool pump up to \$640.

The time to upgrade to a variable-speed pool pump is now, before pool season ends. You'll save with a \$300 Duke Energy rebate, enjoy up to \$340 in annual energy savings and help keep your pool running at peak efficiency. Don't wait.

**UPGRADE NOW**

Why upgrade to a variable-speed pool pump?

- Saves up to \$340/year in energy costs.
- Uses less energy and makes less noise.
- Requires less overall maintenance.

Start saving now. Visit [FindItDuke.com](http://FindItDuke.com) for a FREE referral to a pool pump contractor.

**BUILDING A SMARTER ENERGY FUTURE\***

[Unsubscribe](#) | [Privacy Policy](#) | [View In Browser](#) | [duke-energy.com](http://duke-energy.com)

### HPWH Partnership - Email Campaign

The graphic has a green header with the text '350 reasons to upgrade.' and an illustration of a shower head with dollar signs. The main headline is 'Receive a \$350 instant rebate on a new heat pump water heater.' A paragraph explains the benefits of upgrading. A blue button labeled 'CLICK FOR REBATE' is shown. Below this are the Home Depot and Lowe's logos. The 'How does it work?' section is divided into three steps: downloading a coupon, visiting a store, and redeeming the coupon. A paragraph provides contact information for more details. The bottom section includes the ENERGY STAR logo and a disclaimer.

## 350 reasons to upgrade.

Receive a \$350 instant rebate on a new heat pump water heater.

It's the perfect time to upgrade to a high-efficiency heat pump water heater. Enjoy lower water heating costs, lower monthly electric bills and the lasting benefits of energy efficiency – a combined savings of up to \$600 within the first year.

Visit your nearest Lowe's or Home Depot to choose your qualifying model and redeem your \$350 instant rebate. Hurry, offer expires Dec. 31, 2019.

**CLICK FOR REBATE**

How does it work?

- STEP 1**  
[Download](#) your rebate coupon now.
- STEP 2**  
Visit your nearest Lowe's or Home Depot store.
- STEP 3**  
Redeem your digital coupon at checkout for an instant \$350 savings.

For additional details about this program, visit [dukeenergy.store](http://dukeenergy.store) or call [866.785.6209](tel:866.785.6209).

Per ENERGY STAR®, annual savings based on usage of a household of four. Duke Energy residential customers only.

Home Depot and Lowe's are not responsible for fulfillment of rebate and may not combine with all Home Depot and Lowe's offers. See terms & conditions at [duke-energy.com/homeproducts](http://duke-energy.com/homeproducts).

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## Residential –Smart \$aver® Energy Efficiency Program

### Social Ads

Duke Energy  
Sponsored · 🌟

Just say Find It Duke and find exclusive rebates & offers on home improvement upgrades.

SAVE UP TO \$1,450

FINDITDUKE.COM  
Find it Duke  
FREE contractor referrals

LEARN MORE

### Digital ads

AARP  
Join Renew Help Member Benefits AARP Rewards Register | Login

HOME & FAMILY  
**Your Home**

**7 Ways to Save When You Go Green**  
We bring you up to date on the best eco-friendly practices  
by Nissa Simon, AARP | Comments: 5

Also on AARP

Creative: HPWH

## Multi-Family Energy Efficiency Program

### A. Description

The Multi-Family Energy Efficiency program ("Program") provides energy efficient lighting and water measures to reduce energy usage in eligible multi-family properties. The Program allows Duke Energy Carolinas, LLC (the "Company") to utilize an alternative delivery channel which targets multi-family apartment complexes. The measures are installed in permanent fixtures by Franklin Energy, the program administrator. Franklin Energy oversees all aspects of the Program including outreach, direct installations, and customer care.

The Program helps property managers save energy by offering energy efficient lighting and water products. The Program offers LED lighting measures including A-lines, globes, candelabras, recessed, and track bulbs, and energy efficient water measures such as bath and kitchen faucet aerators, water saving showerheads, and pipe wrap. Water measures are available to eligible customers with electric water heating. These measures assist with reducing maintenance costs while improving tenant satisfaction through lower energy bills.

The Program offers a service where Franklin Energy installs the lighting and water measures during scheduled visits. Crews carry tablets to keep track of which measures are installed in each apartment.

After installations are completed, Quality Assurance ("QA") inspections are conducted on 20 percent of properties that completed installations in each month. The QA inspections are conducted by an independent third party. Any QA adjustments are provided to the Company to update participation records.

### Audience

The target audience is property managers who have properties served on individually metered residential rate schedules. To receive water measures, apartments must have electric water heating.

Properties that have already been served by the Property Manager CFL program are only eligible for water measures and specialty LED bulbs. However, properties with CFL installations over 5 years old are eligible for all the new LEDs and water measures. Lighting measures are only installed in permanent lighting fixtures such as ceiling lights, recessed lighting, track lighting, ceiling fan lights, and bathroom vanity lighting.

### B & C. Impacts, Participants and Expenses

Multi-Family Energy Efficiency<sup>1</sup>

| <i><u>\$ in millions, rounded</u></i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|---------------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>            | <b>\$9.6</b>             | <b>\$11.9</b>                         | <b>124%</b>    |
| <b>Program Cost</b>                   | <b>\$3.4</b>             | <b>\$3.7</b>                          | <b>109%</b>    |
| <b>MW</b>                             | <b>2.0</b>               | <b>2.6</b>                            | <b>132%</b>    |
| <b>MWH</b>                            | <b>19,846.4</b>          | <b>24,086.2</b>                       | <b>121%</b>    |
| <b>Units</b>                          | <b>342,660</b>           | <b>493,307</b>                        | <b>144%</b>    |

1) Values are reflected at the system level.

### D. Qualitative Analysis

#### Highlights

Through December 2019, the Program completed installations at 293 properties, accounting for over 46,422 units. The Program installed 493,307 measures with lighting representing 72% of the measures and water measures representing the remaining 33%. In 2019, the Program successfully added new 4,000 Kelvin LED bulb options to the offering for A-line fixtures, which have been requested by property

## Multi-Family Energy Efficiency Program

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managers. In 2019 the Program successfully added 0.5 GPM bath aerators at the request of property managers.

### Issues

There are no issues to report now.

### Potential Changes

In early 2020, the Program is planning to add 1.25 GPM showerheads and review additional 4,000 Kelvin bulb types for addition to the program. Program Management continues to evaluate new energy efficient measures for addition to the program.

New technology enhancements are being implemented to increase the accuracy of recording the measures installed and the bulb wattages removed, to increase efficiencies with scheduling units, and to improve the tracking of new opportunities from both the direct installers and energy advisors.

### E. Marketing Strategy

As program implementer, Franklin Energy is responsible for marketing and outreach to property managers in the Company's service territory. Marketing is primarily done through outbound appointment setting calls, industry trade events, and on-site visits to gauge initial interest in the program. The Program staff also utilizes local apartment association memberships to obtain access to contact information for local properties and attends association trade shows or events to promote the program. The Program was an exhibitor in the 2019 AANC Conference in Raleigh, NC and generated over 50 leads for the region.

A Multi-Family Energy Efficiency public website landing page is available for property managers to learn more about the Program. A program brochure and a frequently asked question sheet are available for download.

Other ways a property manager may learn more about this Program are through the MyDuke Portal, an online tool used to pay the utility bills of vacant units at their property. The MyDuke Portal presents a promo link that directs the user to the Program website for more information.

Once enrolled, Franklin Energy provides property managers with a variety of marketing tools to create awareness of the Program among their tenants. The tools include letters to each tenant informing them of energy efficient measures being installed and of when the installations are taking place. Tenants receive educational leave-behind brochures when the installation is complete. Feedback from both property managers and tenants is important for the Program's continued success. Property managers are provided with leave-behind materials about the program which also includes survey for them to complete and return. For tenants, the educational leave-behind brochure includes a satisfaction survey to return to Duke Energy. Online versions of both the Program Manager and Tenant surveys are also available.

After the installation, window clings are placed in strategic areas throughout the property, specifically in the common areas entry and on each residential building on site (to the extent applicable). Using the window cling ensures that the program and Duke Energy are recognized long after the installation has taken place.



## Multi-Family Energy Efficiency Program

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### **F. Evaluation, Measurement and Verification**

The combined DEC/DEP EM&V evaluation began in April of 2018. The evaluation will determine the net annual energy and demand associated with the program participants between January 1, 2017, and May 1, 2018. The evaluator will use a combination of surveys, on site data collection, a lighting logger study, and engineering analysis to determine the impacts for the program.

The evaluator ultimately determined that the initial logger deployment was not representative of the population during the sample period. As a result of the evaluators conclusions, loggers were redeployed to a new set of participants more representative of the population. Completion of updated impacts, which will include the new logger deployment results is scheduled for the first quarter of 2020.

## Multi-Family Energy Efficiency Program

### Appendix

#### Program Brochure-

*Updated to add Commercial Offerings partnership and new water measures*

Multifamily Energy  
Efficiency Program



### Thank You for Participating in the Duke Energy Multifamily Energy Efficiency Program!

Together with your neighbors, you helped Duke Energy provide and install energy-saving products in your home. Doing so is good for the environment AND your power bill!

As a result of your participation, the average unit could see energy savings of around [XXXX] every year.\*

Our community could save [XX] kilowatt-hours annually, which is the environmental equivalent to planting [XX] trees or taking [XX] cars off the road!



Please take Duke Energy's survey by scanning this QR code:



\*Actual savings will vary by floor plan and usage.  
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Feb 25 2020



# Multi-Family Energy Efficiency Program

## FAQ for Property Managers

### What does the install process look like?

On your scheduled installation day, our team will arrive at 8:45 a.m. to begin working by 9 a.m. A member of your staff will need to accompany our installers and handle keys throughout the installation process. The time spent in each unit varies depending on the layout and products being replaced. We will leave a flyer for each resident explaining what was installed and a survey providing an opportunity to give us feedback. It's that simple and that fast!

### How do we qualify?

Your property's electric utility must be Duke Energy to qualify. Additional qualifications depend on several factors such as metering, existing products, and method for water heating. To see which offerings your property qualifies for, you will need to schedule a complimentary energy assessment with one of our Energy Advisors by calling 888.297.1671 or emailing: [dukeenergymultifamilyep@franklinenergy.com](mailto:dukeenergymultifamilyep@franklinenergy.com)

### How much does it cost?

**NOTHING!** This program is part of many programs Duke Energy offers its customers from funds set aside to help reduce energy use. There are two parts to our program: residential (inside tenant units) and commercial (common areas). There are no limits on how many products we can install. Your Energy Advisor will go over your qualifications during the energy assessment.

### What safety precautions should we know before installation?

As we are going through the units, if there are any unsecured pets or unattended minors, we will not be able to enter to perform the installation. During product installation, we ask that all small children be kept at a safe distance from the installers. The installers will provide further direction once on-site.

### What is the next step?

Call 888.297.1671 or email [dukeenergymultifamilyep@franklinenergy.com](mailto:dukeenergymultifamilyep@franklinenergy.com) to schedule an appointment for an energy assessment.



Contact us today!

Phone: 888.297.1671 | Website: [duke-energy.com/multifamily](http://duke-energy.com/multifamily)  
Email: [dukeenergymultifamilyep@franklinenergy.com](mailto:dukeenergymultifamilyep@franklinenergy.com)

## Multifamily Energy Efficiency Program



It's what's on the inside that counts. Our FREE energy-saving lightbulbs and water-saving devices can help your tenants save money.

This program is administered by Franklin Energy, a contractor of Duke Energy with experience in the installation of home energy-saving products.  
©2019 Duke Energy Corporation

Note that this program is administered by Franklin Energy, a contractor of Duke Energy with experience in the installation of home energy-saving products.  
©2019 Duke Energy Corporation



## Start saving now with the latest FREE energy-saving products.

### Multifamily Energy Efficiency Program

If you are a Duke Energy customer, your tenants may receive the following energy-saving products – installed in each multifamily unit and qualifying common areas at no cost.

#### Standard, Globe, Candelabra, Recessed and Track LEDs



Use up to **90% less energy** and can save at least **\$80** over their lifetime in energy costs compared to traditional incandescent bulbs. A popular residential option, ENERGY STAR® light-emitting diodes, or LEDs, can be installed in bathrooms, track lights, ceiling fans, recessed lights and other high-usage permanent fixtures.

#### Exit Sign LEDs



Exit signs are necessary to keep us safe. We can help you save on operating and labor costs by replacing incandescent exit sign bulbs with LEDs.



## See what other property managers had to say.

### You guys got top marks

"I received the satisfaction survey and filled it out. You guys got top marks. I received a lot of compliments about how friendly and professional you all were. Thank you again for all that you did!"  
- Asheville Property Manager

### They were so polite and professional

"I just wanted to let you know that your team did a wonderful job installing the energy-saving products. They were so polite and professional, which made the residents feel more at ease with the installation. I really appreciate all the hard work that went into making this project run so smoothly. We are now officially energy efficient!"  
- Raleigh Property Manager

### The program has been a huge success and very much appreciated

"The thing that stood out most for me is your willingness to contact all property managers in my district. You took control of the program and scheduled each property efficiently and effectively, resulting in less work for each property. The program has been a huge success and very much appreciated by the management company, properties and our residents. Thank you for your hard work!"  
- Durham Property Management Company

### Bathroom and Kitchen Faucet Aerators



Use up to **55% less water** than traditional 2.2-gallons-per-minute (gpm) faucets, which can reduce water and sewer costs, as well as the amount of energy used to heat the water.\*

Outer ring allows for adjustable flow



\*If water is heated by electricity, savings are not guaranteed.

### Water-saving Showerheads



Use up to **40% less water** than traditional 2.5-gpm showerheads, which can reduce water and sewer costs, as well as the amount of energy used to heat the water.\*

Outer ring allows for adjustable flow



### Hot Water Pipe Wrap



Reduces water and energy use by preventing heat loss while hot water travels through your building's pipes.\*

This program is administered by Franklin Energy, a contractor of Duke Energy with experience in the installation of home energy-saving products.  
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## Multi-Family Energy Efficiency Program

**Sorry We Missed You**  
*Door post-it*



BUILDING A SMARTER ENERGY FUTURE®

# Sorry We Missed You!

Today we stopped  
by to install your  
**free energy-saving  
products**, but

\_\_\_\_\_  
\_\_\_\_\_



**Don't worry—you can still get your  
products! Simply contact your property  
manager to find out how.**

Learn more at [duke-energy.com/multifamily](https://duke-energy.com/multifamily). Note that this program is administered by Franklin Energy, a contractor of Duke Energy with experience in the installation of home energy-saving products.

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# Multi-Family Energy Efficiency Program

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Feb 25 2020

## Property Manager Direct Mail Piece



Start saving now with the latest  
**FREE** energy-saving products.

Sign up today!

Phone 888.297.1671 | Website [duke-energy.com/multifamily](http://duke-energy.com/multifamily)  
Email [dukeenergymultifamilyeep@franklinenergy.com](mailto:dukeenergymultifamilyeep@franklinenergy.com)



Our **FREE** energy-saving lightbulbs  
and water-saving devices can help  
your tenants save money!



Address  
City, ST ZIP XXXXX

Use less energy, help your tenants save money and receive **FREE** products throughout your property by signing up for the Duke Energy Multifamily Energy Efficiency program. Your multifamily property can receive a **FREE** energy assessment, plus **FREE** energy-saving products installed in each unit and qualifying common areas – at no cost:

- Standard, globe, candelabra, recessed and track LEDs
- Bathroom and kitchen faucet aerators
- Exit-sign LEDs
- Showerheads
- Hot-water pipe wrap
- Comparable assessments could cost \$1,000-\$3,000



Sign up today!

Phone 888.297.1671  
Website [duke-energy.com/multifamily](http://duke-energy.com/multifamily)  
Email [dukeenergymultifamilyeep@franklinenergy.com](mailto:dukeenergymultifamilyeep@franklinenergy.com)

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# Multi-Family Energy Efficiency Program

## Case Study

### MULTIFAMILY ENERGY EFFICIENCY PROGRAM CASE STUDY

## Here's What They're Saying About Us

"The Duke Energy Multifamily program has been instrumental in reducing the cost of living in Bell communities, enhancing our environmental stewardship and differentiating our NC/SC properties in the marketplace. We look forward to a continued partnership with Franklin Energy and Duke Energy."

– Wes Winterstein, Vice President, Ancillary Services, Bell Partners Inc.

### ESTIMATED SAVINGS FOR RESIDENTS

| Annual Electric Savings  |                                      | Annual Electric Bill Savings  |  |
|--|--------------------------------------|---|--|
| <b>1,015 kWh</b>   |                                      | <b>\$107</b>  |  |
| Value and Savings for Bell Partners and Its Residents Through 2018 |                                      | Going Green Makes a Difference  |  |
| Annual Electric Savings  | Value of Products and Energy Savings | So far Bell Partners and Duke Energy have delivered energy savings equivalent to: | Cars Taken Off the Road<br>Trees Planted |
| <b>2,771,664 kWh</b>   | <b>\$434,089</b>                     |   | <b>314 37,653</b>                        |

### DUKE ENERGY AND BELL PARTNERS ARE GOING GREEN!

To date, Bell Partners and Duke Energy have collaborated to make nine communities more energy efficient by replacing standard lighting with LED bulbs, replacing inefficient faucets and showerheads with water-saving products, and insulating hot water heater pipes. The cost to Bell Partners and its residents? Nothing!

In 2017 and 2018, Duke Energy provided and installed:

- \$152,000 worth of energy-saving products
- Over 26,000 LED lights
- Nearly 5,600 water-saving faucet aerators
- Over 1,800 energy-saving showerheads
- Nearly 14,000 feet of pipe insulation

Bell Partners residents can save an average of \$107 annually on their electric bill. The communities save ongoing O&M expenses. And with the help of Duke Energy, Bell Partners continues to be a leader in the green multifamily market.



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# Power Manager®

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Feb 25 2020

## A. Description

Power Manager® (“Program”) is a demand response program that cycles residential central air conditioning to ensure power reliability during high summer peak demand periods. Duke Energy Carolinas, LLC (the “Company”) installs a load cycling device near the outdoor unit of a qualifying air conditioner. This enables the customer’s air conditioner to be cycled off and on when the Company initiates a control event. During these events, the Company can perform cycling or full shed interruptions of participating customers’ air conditioning systems at any time to mitigate capacity constraints in the generation, transmission or distribution systems.

Program participants receive a financial incentive as a bill credit in the amount of \$8 per month from July through October (\$32 annually).

The customer’s air-conditioning system experiences no adverse impacts because the load control device has built-in safeguards to prevent the “short cycling” of the air-conditioning system. Cycling simply reduces the amount of time the air-conditioning system runs in a given period. Additionally, the indoor fan continues to run and circulate air during the cycling event.

## Audience

The Program is available to the Company’s residential customers residing in owner-occupied, single-family residences with a qualifying central air-conditioning unit.

## B & C. Impacts, Participants and Expenses

PowerManager<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$60.8                   | \$69.8                                | 115%           |
| Program Cost                   | \$14.1                   | \$13.4                                | 95%            |
| MW <sup>2</sup>                | 534.4                    | 568.2                                 | 106%           |
| MWH                            | 0.0                      | N/A                                   | -              |
| Units <sup>3</sup>             | 503,131                  | 535,704                               | 106%           |

### Notes on Tables:

- 1) Values are reflected at the system level.
- 2) MW capability at the generator derived from the average reduction during the May - September control season achieved by a full shed of participating air conditioners. At month-end December 2019, we had the ability to shed 568.2 MW (at the plant), representing 106% of the as filed capability.
- 3) Units included in filing represent average kW at the meter during the May - September control season. YTD value is based on 286,473 Power Manager devices at month-end December 2019.

## D. Qualitative Analysis

Working in collaboration with Nexant, the Program’s evaluator, Power Manager events were conducted on eight days during the summer of 2019. Prior to these events, the Company conducted several test events to ensure system readiness.

Nexant developed a variety of measurement and verification event scenarios based on: different start and end times, varying durations, cycling and emergency full shed control, and holding out different sub-groups during events to serve as control groups. These EM&V events were conducted on July 15 and 19, August 9 and 19, and September 9, 12, 17 and 26.

In 2019, the Company continued targeted load control device inspections based on analysis of interval usage data collected from smart meters on participating customers’ homes during Power Manager events. Homes whose energy use did not change as expected were identified for follow up. These targeted inspections continued to produce very successful results.

## Power Manager®

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In years past, the Company used a selected a sample of participating customers to conduct field investigations. The number of inspections that would have been conducted under the prior approach were reduced by over half using the new targeted inspections. In doing so, substantial savings and the following increases as a percentage of completed inspections were achieved:

- 3X as many disconnected Power Manager devices were reconnected.
- 2X as many missing devices were replaced.
- 2.5X as many nonfunctioning devices were replaced.

Continued use of targeted inspections will improve the overall program performance and effectiveness for years to come.

### **E. Marketing Strategy**

Outbound telephone calls were the Program's primary marketing channel with 15,619 customer enrollments for the year, resulting in 102% of goal. Power Manager was featured in the March MYHER home energy report.

At year-end, there were 238,057 customers (NC: 180,513 and SC: 57,544) and 286,473 air conditioners (NC: 216,490 and SC: 69,983) on the program; net increases of 8,682 customers (+3.8%) and 10,794 air conditioners (+3.9%).

At the start of the summer season, Power Manager customers were mailed postcards:

- Reminding them of their participation in the program
- Thanking them for making a difference
- Explaining how Power Manager works, its benefits, tips and other information

Program information and an enrollment form are available to customers on the Power Manager website located at <http://www.duke-energy.com/north-carolina/savings/power-manager.asp>.

### **F. Evaluation, Measurement and Verification**

Results for the Summer 2019 Power Manager program are tentatively scheduled for completion in the second quarter of 2020. The impact evaluation will measure the average and aggregate load reductions for each summer 2019 event and average 2019 event; determine the impacts for each cycling strategy; estimate the capability of the program under peak conditions; and compare the impacts of AMI versus data loggers.

The process evaluation will uncover opportunities to improve the program operations, assess satisfaction or dissatisfaction among program participants, and identify program strengths and weaknesses.

### **G. Appendix**

## Power Manager®

### Residential Home Energy Report

#### Paper Version



**Earn money. Help the environment.**

Get up to **\$32 off your summer bills** with **Power Manager**.

Power Manager helps:

- **Preserve natural resources**
- **Delay** the need for **more power plants and transmission lines**
- **Prevent** the use of older, **less efficient power plants**
- **Keep energy costs low** for everyone



Learn more at [duke-energy.com/GetReward](https://duke-energy.com/GetReward).

#### Email Version



**Earn money. Help the environment.**

Get up to **\$32 off your summer bills** with **Power Manager**.

Power Manager helps:

- **Preserve natural resources**
- **Delay** the need for **more power plants and transmission lines**
- **Prevent** the use of older, **less efficient power plants**
- **Keep energy costs low** for everyone

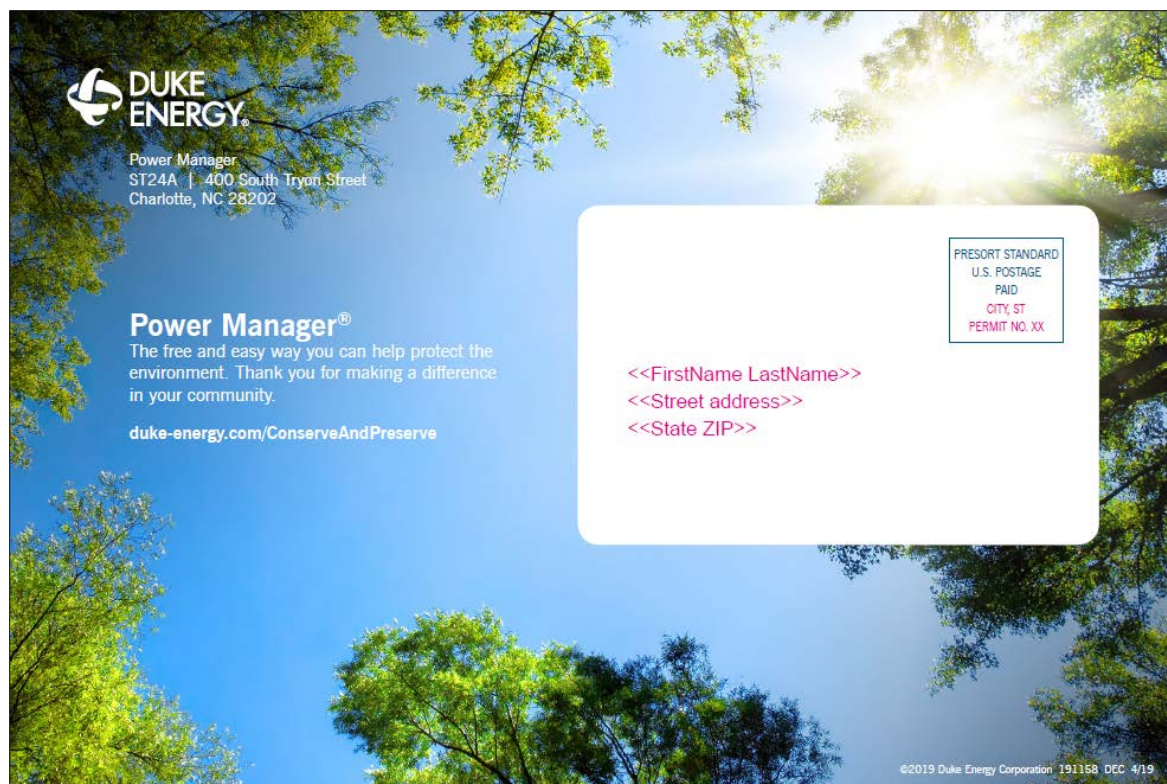
To learn more, click the button below.

[Learn More](#)

#### Reminder/Thank You Postcard



## Power Manager®



**Your participation in Power Manager is helping to:**

-  Use natural resources wisely
-  Delay the need for more power plants and transmission lines
-  Keep energy costs low for everyone

[duke-energy.com/ConserveAndPreserve](http://duke-energy.com/ConserveAndPreserve)



### Power Manager has been making a difference in the Carolinas for 40 years.

**Thank you for being a part of it.**

When outside temperatures are extreme, the demand for energy spikes and our systems must work extra hard to keep up. This can put a strain on the energy grid, requiring us to find sources to meet that increased demand. One option for meeting energy needs is starting up additional power plants where electricity is generated by fossil fuels.

By joining Power Manager, you've taken a meaningful step to reduce overall demand, keep energy prices low, and preserve natural resources by delaying the need (and greenhouse gas emissions) of additional power plants. Plus, you'll be rewarded with up to \$32 in bill credits.

Power Manager is a win-win-win for you, your community and the environment.

**For more information:**  
To find out if a Power Manager event is underway, call **800.832.3169**.  
For questions or if your device is damaged or disconnected, call us at **888.463.5022** to service it for free.



BUILDING A SMARTER ENERGY FUTURE®

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Feb 25 2020



**A. Description**

The purpose of Duke Energy Carolinas, LLC's (the "Company's" or "DEC") Small Business Energy Saver program (the "Program") is to reduce energy usage through the direct installation of energy efficiency measures within qualifying small non-residential customer facilities. All aspects of the Program are administered by a single Company-authorized vendor. Program measures address major end uses in lighting, refrigeration, and HVAC applications.

Program participants receive a free, no-obligation energy assessment of their facility and a recommendation of energy efficiency measures along with the projected energy savings, costs of all materials and installation, and up-front incentive amount from the Company. If the customer decides to move forward with the proposed project, the customer will make the final determination of which measures will be installed. The vendor then schedules the measure installation by electrical subcontractors at a time convenient for the customer.

The Program is designed as a pay-for-performance offering, meaning that the Company-authorized vendor administering the Program is compensated only for energy savings produced through the installation of energy efficiency measures.

**Audience**

The Program is available to existing non-residential customers that are not opted-out of the Company's Energy Efficiency Rider. Program participants must have an average annual demand of 180 kW or less per active account.

**B & C. Impacts, Participants and Expenses**

Small Business Energy Saver<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$37.9</b>            | <b>\$25.7</b>                         | <b>68%</b>     |
| <b>Program Cost</b>            | <b>\$14.6</b>            | <b>\$11.4</b>                         | <b>78%</b>     |
| <b>MW</b>                      | <b>14.5</b>              | <b>9.2</b>                            | <b>63%</b>     |
| <b>MWH</b>                     | <b>75,258.1</b>          | <b>53,674.2</b>                       | <b>71%</b>     |
| <b>Units<sup>2</sup></b>       | <b>61,700,000</b>        | <b>51,421,356</b>                     | <b>83%</b>     |

1) Values are reflected at the system level.

2) Units reflect gross kWh.

**D. Qualitative Analysis****Highlights**

Lime Energy is the Company-authorized vendor administering the Program in both DEC and DEP service areas.

In 2019, the Company implemented a modification to the Program incentive design to offer higher, tiered incentives for deep energy retrofit projects with multiple measure technologies, actively incentivizing customers to undertake efficiency upgrades beyond lighting. Ultimately, the Company would like for the Program to encourage customers to take on more comprehensive energy efficiency upgrades to maximize energy savings. The goal was to reduce projects that just completed lighting measures from previous program years. The tiering was successful reducing the lighting only projects from over 80% in previous years to 53% in 2019.

The Company has administered a customer satisfaction survey to Program participants since the Program's launch in DEC. The survey during 2019 was changed to be a net promoter score from just

measuring customer satisfaction. The new survey changes reported data from past program years. Overall the new survey results still show that program participants overwhelmingly view Duke Energy in a positive light after participation in the Program.

## Issues

While LED lighting measures are expected to remain the primary driver of kWh savings in the Program for the foreseeable future, the Company has been actively working with our vendor Lime Energy to implement initiatives focused on increasing refrigeration and HVAC measure adoption.

## Potential Changes

As the Program matures, the Company will continue to evaluate opportunities to add incentivized measures which fit the direct install program model and are suitable for the small business market. In addition, the Company is also looking at possible modifications that would allow customers to participate in an Efficiency as a Service payment model where the energy savings would be used to pay off the project cost reducing the financial impact to customers with limited available funds.

## E. Marketing Strategy

The Program is marketed primarily using the following channels:

- Lime Energy field representatives
- Direct mail (letters and postcards to qualifying customers)
- Duke Energy Carolinas website
- Social media and search engine marketing
- Email & Duke Energy Business E-Newsletters
- Direct marketing & outreach via Program administrator
- Outreach via Duke Energy Business Energy Advisors
- Community events

All marketing efforts are designed to create customer awareness of the Program, to educate customers on energy saving opportunities and to emphasize the convenience of Program participation for the target market.

## F. Evaluation, Measurement and Verification

No evaluation activities occurred in 2019. Future evaluation activities and timing will be determined at a later date.

# Non-Residential Smart \$aver Prescriptive

## A. Description

The Non-Residential Smart \$aver® Prescriptive Program ("Program") provides incentives to Duke Energy Carolinas, LLC's (the "Company's") commercial and industrial customers to install high efficiency equipment in applications involving new construction and retrofits and to replace failed equipment. The program also uses incentives to encourage maintenance of existing equipment in order to reduce its energy usage. Incentives are provided based on the Company's cost effectiveness modeling to ensure cost effectiveness over the life of the measure.

Commercial and industrial customers can have significant energy consumption but may lack an understanding of the benefits of high efficiency alternatives. The Program provides financial incentives to help reduce the cost differential between standard and high efficiency equipment, offer a quicker return on investment, save money on customers' utility bills so it can be reinvested in their businesses, and foster a cleaner environment. In addition, the Program encourages dealers and distributors (or market providers) to stock and provide these high efficiency alternatives to meet increased demand for the products.

The Program promotes prescriptive incentives for the following technologies – lighting, HVAC, pumps, variable frequency drives, food services, process and information technology equipment.

## Audience

All of the Company's non-residential opt-in customers billed on an eligible Duke Energy Carolinas rate schedule may participate.

## B & C. Impacts, Participants and Expenses<sup>1</sup>

### Non Residential Smart Saver Prescriptive<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$84.3</b>            | <b>\$103.6</b>                        | <b>123%</b>    |
| <b>Program Cost</b>            | <b>\$27.8</b>            | <b>\$23.7</b>                         | <b>85%</b>     |
| <b>MW</b>                      | <b>23.6</b>              | <b>30.0</b>                           | <b>127%</b>    |
| <b>MWH</b>                     | <b>160,730.5</b>         | <b>158,072.3</b>                      | <b>98%</b>     |
| <b>Units</b>                   | <b>14,784,792</b>        | <b>8,510,436</b>                      | <b>58%</b>     |

1) Values are reflected at the system level.

### Non Residential Smart Saver Energy Efficient Food Service Products<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$5.4</b>             | <b>\$0.4</b>                          | <b>7%</b>      |
| <b>Program Cost</b>            | <b>\$2.0</b>             | <b>\$0.3</b>                          | <b>17%</b>     |
| <b>MW</b>                      | <b>1.2</b>               | <b>0.1</b>                            | <b>7%</b>      |
| <b>MWH</b>                     | <b>10,601.9</b>          | <b>870.0</b>                          | <b>8%</b>      |
| <b>Units</b>                   | <b>11,695</b>            | <b>2,419</b>                          | <b>21%</b>     |

1) Values are reflected at the system level.

<sup>1</sup> The information reflects results for the Non-Residential Smart \$aver Prescriptive program in aggregate. Reference the Appendix for results by technology.

## Non-Residential Smart \$aver Prescriptive

### Non Residential Smart Saver Energy Efficient HVAC Products<sup>1</sup>

| <i><u>\$ in millions, rounded</u></i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|---------------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>            | <b>\$11.7</b>            | <b>\$4.5</b>                          | <b>38%</b>     |
| <b>Program Cost</b>                   | <b>\$5.8</b>             | <b>\$2.2</b>                          | <b>38%</b>     |
| <b>MW</b>                             | <b>5.0</b>               | <b>1.4</b>                            | <b>27%</b>     |
| <b>MWH</b>                            | <b>13,318.7</b>          | <b>5,951.0</b>                        | <b>45%</b>     |
| <b>Units</b>                          | <b>231,113</b>           | <b>3,038,732</b>                      | <b>1315%</b>   |

1) Values are reflected at the system level.

### Non Residential Smart Saver Energy Efficient Lighting Products<sup>1</sup>

| <i><u>\$ in millions, rounded</u></i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|---------------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>            | <b>\$62.0</b>            | <b>\$98.0</b>                         | <b>158%</b>    |
| <b>Program Cost</b>                   | <b>\$17.8</b>            | <b>\$20.8</b>                         | <b>117%</b>    |
| <b>MW</b>                             | <b>16.3</b>              | <b>28.3</b>                           | <b>173%</b>    |
| <b>MWH</b>                            | <b>122,943.3</b>         | <b>149,658.4</b>                      | <b>122%</b>    |
| <b>Units</b>                          | <b>14,523,270</b>        | <b>5,456,789</b>                      | <b>38%</b>     |

1) Values are reflected at the system level.

### Non Residential Energy Efficient Pumps and Drives Products<sup>1</sup>

| <i><u>\$ in millions, rounded</u></i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|---------------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>            | <b>\$3.0</b>             | <b>\$0.5</b>                          | <b>17%</b>     |
| <b>Program Cost</b>                   | <b>\$1.2</b>             | <b>\$0.2</b>                          | <b>16%</b>     |
| <b>MW</b>                             | <b>1.0</b>               | <b>0.2</b>                            | <b>17%</b>     |
| <b>MWH</b>                            | <b>6,310.6</b>           | <b>1,043.9</b>                        | <b>17%</b>     |
| <b>Units</b>                          | <b>8,662</b>             | <b>1,131</b>                          | <b>13%</b>     |

1) Values are reflected at the system level.

### Non Residential Energy Efficient ITEE<sup>1</sup>

| <i><u>\$ in millions, rounded</u></i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|---------------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>            | <b>\$1.8</b>             | <b>\$0.0</b>                          | <b>0%</b>      |
| <b>Program Cost</b>                   | <b>\$0.7</b>             | <b>\$0.0</b>                          | <b>6%</b>      |
| <b>MW</b>                             | <b>0.1</b>               | <b>0.0</b>                            | <b>0%</b>      |
| <b>MWH</b>                            | <b>6,503.2</b>           | <b>8.4</b>                            | <b>0%</b>      |
| <b>Units</b>                          | <b>5,382</b>             | <b>134</b>                            | <b>2%</b>      |

1) Values are reflected at the system level.

## Non-Residential Smart \$aver Prescriptive

### Non Residential Energy Efficient Process Equipment Products<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$0.5</b>             | <b>\$0.3</b>                          | <b>61%</b>     |
| <b>Program Cost</b>            | <b>\$0.2</b>             | <b>\$0.1</b>                          | <b>50%</b>     |
| <b>MW</b>                      | <b>0.1</b>               | <b>0.1</b>                            | <b>65%</b>     |
| <b>MWH</b>                     | <b>1,052.9</b>           | <b>540.5</b>                          | <b>51%</b>     |
| <b>Units</b>                   | <b>4,669</b>             | <b>11,232</b>                         | <b>241%</b>    |

1) Values are reflected at the system level.

### D. Qualitative Analysis

#### Highlights

The Program has developed multiple approaches, including paper and online options for incentive payment applications and instant incentives through the midstream marketing channel and the Online Energy Savings Store, for reaching a broad, diverse audience of business customers.

Several 2019 program trends are listed below.

- Customers continue to show high interest in energy efficiency and had significant funds to invest in efficiency when rebates offset a portion of the cost. The program activity in 2019 came in at 98% of target.
- More customers were drawn to the easy-to-use midstream marketing channel, which contributed nearly half of the 2019 impacts.
- More applicants used the online application.
- Outreach continued to support Trade Allies working with the program.
- Targeted marketing reached out to customers and Trade Allies.
- A dedicated team of representatives responded to customer questions via phone and email provided high levels of customer service.
- Large Account Management and Business Energy Advisors continue to leverage personal relationships with large and medium businesses to identify and support new EE projects.

Customers have several options for participating in the Program. The following chart summarizes 2019 participating customers by Program channel:

| Program Option                    | Participating Customers* | % 2018 YTD Repeat Customer |
|-----------------------------------|--------------------------|----------------------------|
| Paper and Online Application Form | 1,169                    | 61%                        |
| Midstream Marketing Channel       | 2,302                    | 61%                        |
| Online Energy Savings Store       | 1,414                    | 63%                        |
| Multifamily Free Channel          | 56                       | 79%                        |

\*May include multiple facilities/sites for one customer.

#### PAPER AND ONLINE APPLICATIONS

During 2019, the Company paid incentives for 2,414 applications, consisting of 5,388 measures. During 2019, 69% of applications were submitted via the online application portal, compared to 61% in 2018. The average payment per paid application was \$4,202.

Customers continue to take advantage of an optional process introduced in 2018 to pre-verify equipment eligibility to have certainty that their selected equipment qualifies for an incentive prior to purchase, which is designed to overcome another barrier that can delay investment in EE projects.

Many Trade Allies participating in the application process reduce the customer's invoice by the amount of the Smart \$aver® Prescriptive incentive and then receive reimbursement from Duke Energy. Customers

## Non-Residential Smart \$aver Prescriptive

often prefer this method rather than paying the full equipment cost upfront and receiving an incentive check from Duke Energy.

Duke Energy utilizes an internal database that allows the Program to self-administer Program applications and track program data.

### MIDSTREAM MARKETING CHANNEL

The midstream marketing channel provides instant incentives to eligible customers at a participating distributor's point of purchase. Approved midstream distributors validate eligible customers and selected lighting, HVAC, food service and IT products through an online portal and use that information to show customers the reduced price for high efficiency equipment. Upon purchase, the distributor reduces the customer's invoice for the eligible equipment by the amount of the Smart \$aver® Prescriptive incentive. Distributors then provide the sales information to Duke Energy electronically for reimbursement. The incentives offered through the midstream channel are consistent with current program incentive levels.

Energy Solutions provides the online portal for distributors to manage the paperless validation and incentive application. During 2019, approximately 44% of total Smart \$aver Prescriptive incentives were paid through the midstream marketing channel. Duke Energy currently has 272 distributors signed up for the midstream channel, an increase of 14% from 2018.

### ONLINE ENERGY SAVINGS STORE

Duke Energy also offers the Business Savings Store on the Duke Energy website, with orders fulfilled by the third-party EFI. The site provides customers the opportunity to take advantage of a limited number of incentivized measures by purchasing qualified products from an online store and receiving an instant incentive in the form of a reduced purchase price. The incentives offered in the online store are consistent with current program incentive levels. Through an emphasis on focused marketing and increased customer interest, the Business Savings Store experienced significant growth in participation in 2019, nearly doubling the number of participating customers versus 2018.

### MULTIFAMILY COMMON AREA FREE MEASURES

In order to grow the number of accounts participating in EE, particularly in market segments where knowledge of EE is limited, the Program is now collaborating with the Residential Multifamily Direct Install program to offer free low-cost measures to multifamily common areas as well as tenant spaces. Multifamily properties that are being approached by the Residential Multifamily program's vendor, Franklin Energy, are now eligible to add on limited quantities of common area measures. The common area must be on an eligible commercial rate to participate. Measures such as LED screw-in lamps, LED exit signs, low flow shower heads, faucet aerators and pipe insulation are now being installed where possible in multifamily common areas as well as in residential spaces. For those properties that accept the measures, Franklin Energy will directly install them in the common areas when they are on site for the residential installations. Franklin Energy tracks the measures installed by property, as well as total installations and reports this information to the Smart \$aver program team. This channel began earlier this year, additional channels may be developed in the future to distribute free measures.

### TRADE ALLY MANAGEMENT

Over the years, the Program has worked closely with Trade Allies to promote the program to our business customers at the critical point in time when customers are considering standard or high efficiency equipment options. The Smart \$aver® outreach team builds and maintains relationships with Trade Allies in and around Duke Energy's service territory. Existing relationships continue to be cultivated while recruitment of new Trade Allies also remains a focus. Duke Energy's efforts to engage Trade Allies include the following activities:

- Trade Ally Search tool located on the Smart \$aver® website
- Inspections of a sample of all projects to ensure quality control
- Trade Ally co-marketing including information about the Smart \$aver program in the TA's marketing efforts
- Online application portal training and support

## Non-Residential Smart \$aver Prescriptive

- Midstream channel support
- Trade Ally year-end awards
- Trade Ally quarterly newsletter
- Technology- and segment-specific marketing collateral
- Trade Ally discussion group (20 Trade Allies that give input on programs)
- Trade Ally training
- Sponsorship of trade ally events
- Online collateral toolkit for access to marketing materials

The Trade Ally outreach team educates Trade Allies on the program rules and the Smart \$aver Program expectations for Trade Ally conduct. The Company continues to look for ways to engage the Trade Allies in promotion of the Program and to target Trade Allies based on market opportunities.

### Issues

In the last few years, the combination of the Program's incentives and the falling prices for LED equipment has been very attractive for customers and many have taken advantage of the opportunity to invest in LED upgrades. While there is still significant opportunity for high efficiency lighting, the excitement around LEDs has taken customers' attention away from EE opportunities outside of lighting. The Program has continued to promote non-lighting EE and encourage customers to go beyond lighting for efficiency projects. The Company continues to work with outside consultants and internal resources to develop strategies to understand equipment supply/value chains and increase awareness of these measures going forward.

### Potential Changes

Standards continue to change and new, more efficient technologies continue to emerge in the market. Duke Energy periodically reviews major changes to baselines, standards, and the market for equipment that qualifies for existing measures and explores opportunities to add measures to the approved Program for a broader suite of options. This work is underway now, and there are expected to be changes announced for a limited number of new measures and measure updates later in 2020. These changes likely fall under the flexibility guidelines and not require regulatory approvals. When existing measures change, such as when a measure is removed or an incentive amount is reduced, customers have a 90-day grace period to apply for the past measure or incentive amount.

Duke Energy is also considering new and innovative ways to reach out to customer segments that have had a lower rate of prescriptive incentive applications and considering options to partner with other Duke Energy EE programs to cover gaps in the market and ultimately, make it easier for customers to participate in Smart \$aver incentives.

The Duke program team would like to drive deeper customer savings and increase participation in technologies beyond lighting. The Midstream distributor channel has proven to be efficient and customer friendly, influencing energy efficiency at the point of sale. Efforts are underway to build upon the success of the Midstream channel by evaluating a similar Upstream offer with manufacturers for existing food service and HVAC technologies only.

### E. Marketing Strategy

Nonresidential customers learn of programs via targeted marketing material and communications. The 2019 marketing plan included direct marketing such as email and direct mail, online marketing, print marketing and supporting partnerships. The marketing team has selected a highlighted topic for each month and promotes coordinated communication around that topic.

The internal marketing channel consists of assigned Large Business Account Managers, small and medium Business Energy Advisors, and Local Government and Community Relations, who all identify potential opportunities as well as distribute program informational material to customers and Trade Allies.



## Non-Residential Smart \$aver Prescriptive

Duke Energy has Business Energy Advisors in the Carolinas area to perform outreach to unassigned small and medium business customers. The Business Energy Advisors follow up on customer leads, assist with program questions, and steer customers who are not already working with a trade ally to the trade ally search tool. In addition, the Business Energy Advisors contact customers with revenue between \$60,000 and \$250,000 to promote the Smart \$aver® programs. The Economic and Business Development groups also provide a channel to customers who are new to the service territory.

The following chart summarizes the campaigns during 2019. Select example images are found on the following pages.



| Month     | Channel  | Audience                           | Incentives Highlighted  |
|-----------|--|------------------------------------|---|
| January   | Email  | All Business Customers             | Pre-Qualification (All Measures Categories)                                       |
| February  | Email  | SMB, BEA (DEC NC/SC)               | Non-Participating Customers (All Measures Categories)                             |
| February  | Email  | SMB, BEA (DEC/DEP)                 | Past Participants (HVAC, Commercial Equipment, Industrial Equipment, Agriculture) |
| May       | Email  | All Business Customers*            | New Rebate Measures (All Measures Categories)                                     |
| May       | Paid Advertising (digital, paid social, video) | All Business Customers             | All Measures Categories   |
| June      | Paid Advertising (digital, paid social, video) | All Business Customers             | All Measures Categories   |
| July      | Paid Advertising (digital, paid social, video) | All Business Customers             | All Measures Categories   |
| July      | Email  | All Business Customers             | Lighting & Lighting Controls  |
| July      | Email  | All Business Customers             | Wastewater  |
| August    | Paid Advertising (digital, paid social, video) | All Business Customers             | All Measures Categories   |
| August    | Email  | All Business Customers             | Lighting  |
| September | Paid Advertising (digital, paid social, video) | All Business Customers             | All Measures Categories   |
| October   | Email  | All Business Customers             | HVAC  |
| October   | Email  | All Business Customers             | All Measure Categories/<br>Cross-Sell Savings Store                               |
| November  | Paid Advertising (digital, paid social)        | All Business Customers (DEC NC/SC) | All Measures Categories   |
| December  | Paid Advertising (digital, paid social)        | All Business Customers (DEC NC/SC) | All Measures Categories   |




## Non-Residential Smart \$aver Prescriptive

### January Pre-Qualification – Email

Find out about rebates before the work starts. Trouble viewing? [View in browser](#)






Plan the next move  
for your business.

Is your project equipment  
eligible for rebates?


Before making major energy efficiency upgrades, wouldn't it be nice to be sure that your equipment is eligible for rebate? With the Smart \$aver prequalification option, now you can. Simply log in to the Online Application Portal and select "prequalification" when selecting each rebate.

GET PREQUALIFIED


Here's how it works:



**STEP 1: Submit your application.**  
Apply to get your equipment rebate eligibility prequalified. Rebate prequalification is voluntary but highly encouraged.








**STEP 2: Make upgrades.**  
When you receive your prequalification letter, your prequalified rebate amount for upgrades is valid for 90 days.



**STEP 3: Claim your rebate.**  
Once your project is complete, log in to the Online Application Portal to request your rebate payment.

BUILDING A SMARTER ENERGY FUTURE™



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Duke Energy | 550 South Tryon Street | Charlotte, NC 28202

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Feb 25 2020

## May New Rebate Measures – Email

Don't miss out on new savings opportunities! Trouble viewing? [View in browser.](#)

 **Smart \$aver**  
Business

# New rebates available



Don't miss these savings opportunities!

Our streamlined rebate options can help your business save energy and money. The previous year's rebate amount will apply to equipment purchased on or before June 26, 2019, if installation is completed and application received by Duke Energy on or before Sept. 26, 2019.

For all equipment that has a change to the rebate amount, it must be purchased on or before June 26, 2019, to be eligible for the 2018 rebate. View the new measures and application forms on our website and through our Online Application Portal.

[SEE REBATES](#)

*BUILDING A SMARTER ENERGY FUTURE™*

## Non-Residential Smart \$aver Prescriptive

### July Lighting & Controls Webinar – Email



#### Join us for the Lighting and Controls Webinar!

Do you want to learn how improving your lighting and adding controls can help reduce energy usage? By making a few updates and modifications, your business can save on energy costs.

Learn new ways to reduce electric usage through LED lighting and control upgrades. Plus, find out how to qualify for rebates and incentives.

If you are new to energy efficiency, or just need a refresher course, please join us!



#### WHEN

Tuesday, August 13, 2019  
10-11 a.m.

REGISTER

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## Non-Residential Smart \$aver Prescriptive

### December Paid Social – Facebook



A Facebook advertisement form for Duke Energy. The form has a background image of a person's hands holding a donut over a laptop. The text reads: "Have plans to make energy efficiency upgrades? We have Smart \$aver rebates and incentives for you." Below this is a section titled "Please provide your info and someone from our team will be in touch." with fields for "First name", "Last name", "Phone number" (with a dropdown for "US 41" and a "(000) 000-0000" placeholder), and "Work email" (with a placeholder "dus.energy@duke-energy.com"). At the bottom, there is a checkbox "Are you a Duke Energy customer?" with "Cancel" and "Next" buttons.

A Facebook advertisement form for Duke Energy. The form has a background image of a person's hands holding a donut over a laptop. The text reads: "Terms and Conditions for Duke Energy". Below this is a small paragraph of text: "By clicking Submit, you agree to send your info to Duke Energy who agrees to use it according to their privacy policy. Facebook will not use it based on our Data Policy. For more information, see www.duke-energy.com/privacy-policy." At the bottom, there are "Back", "Cancel", and "Submit" buttons.

A Facebook advertisement form for Duke Energy. The form has a background image of a person's hands holding a donut over a laptop. The text reads: "Thank you for your interest in Smart \$aver. Duke Energy will be in touch. Visit our main Smart \$aver page online to learn more about additional savings opportunities." At the bottom, there are "Cancel" and "Visit Website" buttons.

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Feb 25 2020

## Non-Residential Smart \$aver Prescriptive

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### **F. Evaluation, Measurement and Verification**

The combined DEC/DEP process and impact evaluation for the Non-Residential Smart \$aver® Prescriptive Incentive program for the period of March 2017 through December 2018 began the first quarter of 2019.

A process evaluation to determine free ridership and spillover will be conducted. The process evaluation will include interviews with program management. Main Channel Customer, Midstream Customer and Trade Ally surveys will be conducted to assess program awareness, satisfaction and installation decisions. Program materials will also be reviewed to fully understand the specifics of the program design.

The impact evaluation will mostly consist of engineering desk reviews as well as on site metering for a subset of lighting measures. An online survey with Midstream lighting customers will be performed to verify purchase and installation of lighting measures. Program supplied tracking databases, project documentation and Technical Reference Manuals from Ohio and neighboring states will also be used to estimate verified energy and demand savings for the Smart \$aver Prescriptive program.

The final report is scheduled for the first quarter of 2020.

## Non-Residential Smart \$aver® Custom

### A. Description

Duke Energy Carolinas, LLC's (the "Company's") Non-Residential Smart \$aver® Custom Incentives (the "Program") offers financial assistance to qualifying commercial, industrial and institutional customers (that have not opted-out) to enhance their ability to install cost-effective electrical energy efficiency projects.

The Program is designed to meet the needs of the Company's customers with electrical energy saving projects involving more complicated or alternative technologies, or with measures not covered by the Non-Residential Smart \$aver Prescriptive Program. The intent of the Program is to encourage energy efficiency projects that would not otherwise be completed without the Company's technical or financial assistance.

Unlike the Non-Residential Smart \$aver Prescriptive Program, the Program requires pre-approval prior to the project initiation. Proposed energy efficiency measures may be eligible for customer incentives if they clearly reduce electrical consumption and/or demand.

The two approaches for applying for incentives for this Program are Classic Custom and Smart \$aver Tools. Each approach has a method by which energy savings are calculated, but the documents required as part of the application process vary slightly between the two.

Currently the application forms listed below are located on the Company's website under the Smart \$aver® Incentives (Business and Large Business tabs).

- Custom Application, offered in word and pdf format.
- Energy savings calculation support:
  - Classic Custom excel spreadsheet approach (> 700,000 kWh or no applicable Smart \$aver Tool)
    - Lighting worksheet (excel)
    - Variable Speed Drive (VFD) worksheet (excel)
    - Compressed Air worksheet (excel)
    - Energy Management System (EMS) worksheet (excel)
    - General worksheet (excel), to be used for projects not addressed by or not easily submitted using one of the other worksheets
  - Smart \$aver Tools approach (< 700,000 kWh )
    - HVAC & Energy Management Systems
    - Lighting (no project size limit)
    - Process VFDs
    - Compressed Air

The Company contracts with AESC to perform technical review of applications. All other program implementation and analysis is performed by Duke Energy employees or direct contractors.

### Audience

All of the Company's non-residential electric accounts billed on eligible rate schedules, except those that choose to opt-out of the Program, are eligible.

## Non-Residential Smart Saver® Custom

### B & C. Impacts, Participants and Expenses

Non Residential Smart Saver Custom<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$24.1</b>            | <b>\$35.9</b>                         | <b>149%</b>    |
| <b>Program Cost</b>            | <b>\$10.1</b>            | <b>\$8.9</b>                          | <b>88%</b>     |
| <b>MW</b>                      | <b>6.9</b>               | <b>10.1</b>                           | <b>146%</b>    |
| <b>MWH</b>                     | <b>60,678.5</b>          | <b>52,522.6</b>                       | <b>87%</b>     |
| <b>Units</b>                   | <b>48,280</b>            | <b>34,709</b>                         | <b>72%</b>     |

1) Values are reflected at the system level.

### D. Qualitative Analysis

#### Highlights

Customers continue to identify energy efficiency opportunities eligible for incentives under this Program. In 2019, 203 new pre-approval applications were submitted. 103 from NC, 24 from SC and 76 new construction applications not yet defined by jurisdiction without a final account number.

Smart Saver Custom Incentives program uses a flat rate incentive for both energy and demand savings.

Efforts to educate trade allies and vendors who sell energy efficient equipment have been very successful. In many cases, vendors will submit the paperwork for the customer, eliminating a barrier for customers that do not have the resources to devote to completing the application.

The Program launched a fast track option for 2017 which gives customers the ability to pay a fee to speed up their application processing time to seven business days. This fee is passed through to the vendor for its cost to expedite the application.

As of the end of 2019, Custom-to-Go was retired and replaced with the Smart Saver Tool. For the lighting tool only, the customer can submit one file for both Prescriptive and Custom reducing some of the customer's administrative burden. To date DEC has received 22 combined lighting applications.

#### Issues

The Program application process is considered burdensome by some customers due to the individual and technically intensive review required for all projects applying for a custom incentive. Each year, Program staff explores ways to reduce the length of the application. By streamlining processes, the average processing time has dipped to 19 days for all states/jurisdictions.

The technical review often requires customers (or their vendors) to quantify the projected energy savings from the proposed project. This process can be lengthy and may require some level of engineering expertise. Where necessary, this requirement will continue, thus ensuring that incentives are being paid for cost-effective verifiable efficiency gains. Indications are that the Smart Saver Tools and online application portal have relieved some of this burden.

The custom program is subject to large fluctuations in performance due to the importance of a small number of large projects. Although the number of small projects is significant compared to the number of large projects, the large projects drive the majority of annual impacts.

The custom program is still limited by customers who are opted out of the EE Rider. Those customers who are opted out are not eligible to participate and any projects completed by those customers are lost opportunities. The custom program is actively working with internal resources (large account managers



## Non-Residential Smart Saver® Custom

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and Business Energy Advisors) to determine if opting in to the EE Rider for a potential project is the best option for customers currently opted out.

Finally, the custom program continues to see changes in available technologies as specific measures become eligible for Smart Saver Prescriptive.

### Potential Changes

The Custom program continues to evaluate additional improvements to enhance participation, processing speed and program efficiency.

### E. Marketing Strategy

The Company will continue the Program marketing efforts in 2020 through various marketing channels that include but are not limited to the following:

- Direct mail (letters and postcards to qualifying customers)
- Duke Energy website
- Community outreach events
- Small Business Group outreach events
- Paid advertising/mass media
- Social media promotions
- Trade ally outreach
- Account managers
- Business Energy Advisors

These marketing efforts are designed to create customer awareness of the Program, to educate customers on energy saving opportunities, and to emphasize the convenience of Program participation.

Non-residential customers learn of programs via targeted marketing material and communications. Information about incentives is also distributed to trade allies who sell equipment and services to all sizes of nonresidential customers. Large business or assigned accounts are targeted primarily through Company account managers. Unassigned small to medium business customers are supported by the Company's Business Energy Advisors. The Business Energy Advisors follow up on customer leads, assist with program questions, and steer customers who are not already working with a trade ally to the trade ally search tool. In addition, the Business Energy Advisors promote the program to customers with electrical costs between \$60,000 and \$250,000.

The internal marketing channel consists of Large Business Account Managers and Local Government and Community Relations who all identify potential opportunities as well as distribute program informational material to customers and trade allies. In addition, the Economic and Business Development groups also provide a channel to customers who are new to the service territory.

The Program launched a new marketing channel in 2017 called New Construction Energy Efficiency Design Assistance (NCEEDA) to identify energy efficiency projects for customers currently underserved in the SMB market. This channel will utilize the vendor Willdan Energy Solutions to help identify those opportunities, complete savings calculations, and submit applications for the customer. As of January 24, 2020, DEC has 233 active and completed enrolled projects in the NCEEDA offering, representing 32.3 million square feet of area. Of these, the 187 Smart Saver Custom project applications represent 64.8 million kWh of energy savings.



## Non-Residential Smart \$aver® Custom

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### **F. Evaluation, Measurement and Verification**

No evaluation activities occurred in 2019, however evaluation activities will commence in the first quarter of 2020. A final report, combined with DEP, is tentatively planned for the second quarter of 2021.

## Non-Residential Smart \$aver® Custom Assessment

### A. Description

Duke Energy Carolinas, LLC's (the "Company's") Non-Residential Smart \$aver® Custom Assessment (the "Program") offers financial assistance to qualifying commercial, industrial, and institutional customers to help fund an energy assessment and retro-commissioning design assistance in order to identify energy efficiency conservation measures of existing or new buildings or systems. The detailed study and subsequent list of suggested energy efficiency measures help customers to utilize the Non-Residential Smart \$aver® Custom. The Program delivers a detailed energy report that includes the technical data needed for the Non-Residential Smart \$aver® Custom Program and assistance with the Non-Residential Smart \$aver® Application. All kWh and kW savings identified from measures implemented as a result of the pre-qualified assessments are attributed to Smart \$aver Custom Program.

The intent of the Program is to encourage energy efficiency projects that would not otherwise be completed without the Company's technical and financial assistance. The Program's application requires pre-qualification for eligibility. Assessments are performed by professional engineering firms pre-selected and contracted by the Company. The current engineering firms are Willdan, APTIM and ThermalTech Engineering, Inc. All firms offer a diversified set of skills that support all qualifying commercial, industrial, and institutional customers.

The program was modified in 2017 to allow customers to choose one of the firms the Company contracted or to seek third party engineering assistance of their own selection and receive the same financial assistance. Pre-established criteria ensuring that the Program maintains high standards for engineering and work quality must be met for the funds to be released. This modification, which provided customers with more flexibility and choices, is expected to drive an increase in participation.

In 2019, the program again modified its approach again by utilizing a "virtual" approach to the assessment. Using energy modeling software called NEO from Willdan and collecting all building information remotely will allow the audit to be completed in 2-3 weeks for less cost. Each audit will have a fixed cost of \$5,000 of which the customer will be responsible for 50%. The virtual audit will not be applicable to buildings with process loads such as manufacturers. Audits of buildings with process loads will continue to be performed by Aptim and Thermaltech or the customer's vendor of choice. With the new methodology, the goal is to perform 30-50 assessments on an annual basis.

### Audience

Pre-qualified non-residential electric customers, except those that choose to opt out of the Program, are eligible.

### B & C. Impacts, Participants and Expenses

Non Residential Smart Saver Custom Technical Assessments<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$3.5</b>             | <b>\$0.7</b>                          | <b>20%</b>     |
| <b>Program Cost</b>            | <b>\$1.6</b>             | <b>\$0.3</b>                          | <b>18%</b>     |
| <b>MW</b>                      | <b>1.0</b>               | <b>0.1</b>                            | <b>15%</b>     |
| <b>MWH</b>                     | <b>8,831.6</b>           | <b>1,930.8</b>                        | <b>22%</b>     |
| <b>Units</b>                   | <b>6,125</b>             | <b>4</b>                              | <b>0%</b>      |

1) Values are reflected at the system level.

### D. Qualitative Analysis

#### Highlights

## Non-Residential Smart \$aver® Custom Assessment

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Participation in 2019 included 37 customers completing an application for an energy assessment. Of these, 20 chose to switch to the Small Business Energy Saver Program because that program fit the customer's needs better. Nine assessments were completed.

### **E. Marketing Strategy**

The marketing strategy for the Program is to work with those customers that need technical and financial assistance as a companion to their internal resources. Given the facility-wide approach, many of the energy savings opportunities are complex and interactive in nature which fits well with the end-to-end involvement utilized in the Program. Typical customer marketing activity involves direct marketing from Business Account Managers, electronic postcards, e-mails, and information attained through the Company's website and direct customer inquiries. Marketing in the future may shift as the virtual modeling software becomes more applicable. The opportunity to receive a quick readout of a building's efficiency level for a nominal cost will be a compelling message to Duke Energy customers.

### **F. Evaluation Measurement and Verification**

No evaluation activities occurred in 2019.

## Non-Residential Smart \$aver® Performance Incentive

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### A. Description

Duke Energy Carolinas, LLC's (the "Company's") Non-Residential Smart \$aver® Performance Incentives (the "Program") offers financial assistance to qualifying commercial, industrial and institutional customers (that have not opted-out) to enhance their ability to install cost-effective electrical energy efficiency projects.

The Program is designed to encourage the installation of high efficiency equipment in new and existing nonresidential establishments as well as the performance of efficiency-related repair activities designed to maintain or enhance efficiency levels in currently installed equipment. The Program provides incentive payments to offset a portion of the higher cost of energy efficient installations that are not eligible under either the Smart \$aver® Prescriptive or Custom programs. The types of measures covered by the Program include projects with some combination of unknown building conditions or system constraints or uncertain operating, occupancy, or production schedules. The specific type of measures are agreed upon with the Customer. The Program is delivered in close coordination with the existing Custom program team and shares resources for administrative review and payment processing. The Program requires pre-approval prior to project initiation.

The intent of the Program is to broaden participation in the Company's non-residential efficiency programs by providing incentives for projects that previously were deemed too unreliable to calculate an acceptably accurate savings amount predictively and, therefore, were not offered incentives. The program is also expected to provide a platform for gaining a better understanding of new technologies.

The key difference between the Performance Incentive Program and the Custom Program is that the customers in the Performance Incentive Program are paid incentives based on actual measured performance. For each project, a plan is developed to verify the actual performance of the project once completed and is the basis for the performance portion of the incentive.

The Program incentives will typically be paid out in the following manner, though payment installment quantities and timing may vary:

- Incentive #1: For the portion of savings that are expected to be achieved with a high degree of confidence, an initial incentive will be paid. This incentive is paid once installation is complete.
- Incentive #2: After performance is measured and verified, the performance-based part of the incentive will be paid out as follows:
  - If performance exceeds expectations, the incentive payout may be larger.
  - If performance does not meet expectations, the incentive payout may be smaller.

Application forms for applying for incentives are located on the Company's website.

The Company contracts with Alternative Energy Systems Consulting, Inc. (AESC) to perform technical review of applications. All other program implementation is performed by Duke Energy employees or direct contractors.

### Audience

All of the Company's non-residential electric accounts billed on eligible rate schedules, except those that choose to opt-out of the Program, are eligible.

## Non-Residential Smart \$aver® Performance Incentive

### B & C. Impacts, Participants and Expenses

Non Residential Smart Saver Performance Incentive<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$8.5                    | \$2.2                                 | 26%            |
| Program Cost                   | \$3.2                    | \$0.8                                 | 25%            |
| MW                             | 2.5                      | 0.4                                   | 16%            |
| MWH                            | 21,489.5                 | 4,546.0                               | 21%            |
| Units                          | 23,254,911               | 19                                    | 0%             |

1) Values are reflected at the system level.

### D. Qualitative Analysis

#### Highlights

As new technologies are introduced and changes occur in the energy efficiency marketplace, performance incentives are the perfect tool to influence and reward customers who invest in energy efficiency. The Smart \$aver Performance Incentives program was launched on January 1, 2017. Efforts to encourage internal resources, trade allies and vendors who sell energy efficient equipment to promote the Program and assist customers to participate are continuous and on-going. In addition, the Program is marketed closely with the Smart \$aver Custom Program.

In DEC, the program is beginning to reap the fruits of its marketing efforts as program participation increases slightly. In 2019 the program received 12 new applications, 2 of those were from SC.

The program experiences large fluctuations in performance due to long project lead times, long monitoring and verification times, and the timing and sizes of projects. With a compelling value proposition and internal resources and trade allies getting comfortable with this unique program offering, participation is expected to continue to be strong.

The program is now able to offer both top and bottom cycle CHP to customers.

#### Issues

Program management is monitoring a few areas.

- The preferred method for measurement and verification of performance is gathering, monitoring and analyzing customer billing history. However, energy savings are not significant enough at times to evaluate effectively through the review of billing information. If this is the case, sub-metering is required at the customer's expense and may be a hurdle due to the time and expense of monitoring and verifying savings.
- The Performance program cannot be offered to customers who are opted out of the EE Rider. Performance projects can easily carryover into multiple calendar years because of the monitoring and verification requirement, a situation which could make opting in more difficult to justify.
- Sometimes project M&V can span multiple years thus requiring a customer to be opted-in for multiple years. This is often not preferred and we are beginning to see customers forfeit a portion of their project incentive to opt-out of the rider.

## Non-Residential Smart \$aver® Performance Incentive

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- Customers may not participate because of the risk of measured energy savings being less than expected and resulting in a smaller incentive payout.
  - The program is having difficulty in finding cost effective projects. Typical Performance project with uncertainty in savings have been controls related, where savings are determined based on the part-load characteristics of the measure or system optimization. These types of projects typically have the following characteristics which makes costs-effectiveness challenging:
    - High first costs
    - Little demand savings – low avoided costs
    - Low measure life
- The program will continue to evaluate projects on a case by case basis to ensure cost effective projects are incentivized.

### Potential Changes

The Company continuously considers functional improvements to enhance participation, processing speed and program efficiency.

### E. Marketing Strategy

The 2020 marketing strategy for the Smart \$aver Performance Incentive Program closely aligns with the Custom Program. The goal is to educate the Company's non-residential customers about the technologies incentivized through both programs, as well as the benefits of installing energy-efficient equipment. These efforts encompass a multi-channel approach including but not limited to the following:

- Email (targeted customers)
- Direct Mail (letters to qualified/targeted customers)
- Duke Energy Carolinas website
- Community outreach events
- Print advertising/mass media
- Target customer outreach
- Industry Associations
- Large Account Managers
- Business Energy Advisors
- Trade Ally Outreach

Marketing efforts are designed to create customer awareness of the Program, to educate customers on opportunities to save energy, and to emphasize the convenience of Program participation.

Non-residential customers learn of programs via targeted marketing material and communications. Information about incentives is also distributed to trade allies who sell equipment and services to all sizes of nonresidential customers. Large business or assigned accounts are targeted primarily through Company account managers. Unassigned small to medium business customers are supported by the Company's Business Energy Advisors. The Business Energy Advisors follow up on customer leads, assist with program questions, and steer customers who are not already working with a trade ally to the trade ally search tool. In addition, the Business Energy Advisors contact customers with electrical costs between \$60,000 and \$250,000 to promote the program.

The internal marketing channel consists of Large Business Account Managers, Business Energy Advisors, and Local Government and Community Relations who all identify potential opportunities as well as distribute program informational material to customers and trade allies. In addition, the Economic and Business Development groups also provide a channel to customers who are new to the service territory.

## Non-Residential Smart \$aver® Performance Incentive

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### **F. Evaluation, Measurement and Verification**

No evaluation activities occurred in 2019. Future evaluation timing will depend upon sufficient participation.

**A. Description**

PowerShare® (“Program”) is a demand response program offered to commercial and industrial customers. The Program is comprised of Mandatory (“PS-M”), Generator (“PS-G”), and Voluntary (“PS-V”) options, and customers can choose from a variety of offers. Under PS-M and PS-G, customers receive capacity credits for their willingness to shed load during times of peak system usage. Energy credits are also available for participation (shedding load) during curtailment events. The notice to curtail under these offers can be rather short (15-30 minutes), although every effort is made to provide as much advance notification as possible. Failure to comply during an event could result in penalties.

**Audience**

The Program is offered to Duke Energy Carolinas, LLC’s (the “Company’s”) non-residential customers who have not opted-out and are able to meet the load shedding requirements.

**B & C. Impacts, Participants and Expenses**PowerShare<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$38.5                   | \$42.1                                | 109%           |
| Program Cost                   | \$13.3                   | \$13.0                                | 98%            |
| MW <sup>2</sup>                | 337.9                    | 342.6                                 | 101%           |
| MWH                            | 0.0                      | N/A                                   | -              |
| Units <sup>3</sup>             | 318,083                  | 322,533                               | 101%           |

**Notes on Tables:**

- 1) Values are reflected at the system level.
- 2) MW capability derived by taking average over specific PowerShare contract periods. At month-end December 2019, we had the ability to shed 342.6 MW (at the plant), representing 101% of the as filed capacity.
- 3) Units included in filing represented KW at meter, rather than number of participants.

**D. Qualitative Analysis****Highlights**

PS-M and PS-G continue to be well received by customers who have the flexibility to curtail load upon request in both North Carolina and South Carolina. Although several new participants joined the PowerShare program in 2019 adding more than 24MW of capacity, the gains were partially offset by the loss of existing participants, including the closure of a few major textile facilities. There were no PowerShare curtailment events in 2019.

**Issues**

No current issues.

**Potential Changes**

No changes anticipated at this time.

**E. Marketing Strategy**

To date, marketing efforts for the Program have focused on the relationship between the Company’s account executives and their assigned customers. As part of their normal contact with customers, the account executives introduce the Program, including any new options/offers, while explaining the value proposition to the customer. Account executives share in-house analytics that show the incentives for



each offer as applied to the customer's specific load profile and provide marketing collateral to explain the details of all the Program offers.

#### **F. Evaluation, Measurement and Verification**

The results of the 2018 PowerShare impact and process evaluation were shared with the Carolinas Collaborative in the Second Quarter of 2019. For the impact evaluation, Navigant audited the hourly kW DR event load shed for participating customers by replicating the Schneider Electric Energy Profiler Online™ (EPO) methods used to calculate the energy (kWh) and demand (kW) impacts used to determine settlement payments.

The process evaluation determined there was high satisfaction with the program. Participants preferred however, to get more advance notice for when to curtail and to gain a better understanding of how the incentive was calculated.

**A. Description**

Duke Energy Carolinas, LLC's (the "Company's" or "DEC") EnergyWise Business (the "Program") is an energy efficiency and demand response program for non-residential customers that allows the Company to reduce the operation of participants' air conditioning units to help manage the power grid. The Program provides customers with options for how they would like to participate. In exchange for participation, the Company applies an annual incentive directly to their bills.

For each air conditioning or heat pump unit that they have, Program participants can choose between a Wi-Fi thermostat or a load control switch professionally installed for free by the Program. In addition to choosing the equipment, participants also choose the cycling level at which they participate—30%, 50% or 75%. The levels represent the percentage of the normal on/off cycle of the unit that is reduced. During a conservation period, Company sends a signal to the thermostat or switch to reduce the amount of time a unit is on by the percentage the participant selected. For participating at the 30% level the customer receives a \$50 annual bill credit for each unit, \$85 for 50% cycling, and \$135 for 75% cycling. Finally, participants that have a heat pump unit with electric resistance emergency/back up heat and choose the thermostat can also participate in a winter option that allows the Company to control the emergency/back up heat. For 100% control of the emergency/back up heat, the Company provides an additional \$25 annual bill credit.

Participants choosing the thermostat are given access to a portal that allows them to control their units from anywhere they have internet access. They can set schedules, adjust the temperature set points and receive energy conservation tips and communications from the Company. In addition to the portal access, participants also receive conservation period notifications. Notifications allow participants to make adjustments to their schedules or notify their employees of the upcoming conservation period. Participants are allowed to override two conservation periods per year either before or during the conservation period.

**Audience**

The Program is available to existing non-residential customers that are not opted-out of the DSM portion of the Company's EE/DSM rider, Rider DSM; have at least one air conditioner or heat pump that operates to maintain a conditioned space on weekdays during the calendar months of May through September; and are not served under Schedules BC and HP, Riders NM, SCG, IS, PS or PSC. Also, customers must have an average minimum usage of 1,000 kWh during those same calendar months.

**B & C. Impacts, Participants and Expenses**

EnergyWise for Business<sup>1</sup>

| <i><u>\$ in millions, rounded</u></i> | Vintage 2019<br>As Filed <sup>3</sup> | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|---------------------------------------|---------------------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>            | <b>\$3.3</b>                          | <b>\$2.7</b>                          | <b>83%</b>     |
| <b>Program Cost</b>                   | <b>\$4.0</b>                          | <b>\$3.7</b>                          | <b>93%</b>     |
| <b>MW</b>                             | <b>16.7</b>                           | <b>11.6</b>                           | <b>70%</b>     |
| <b>MWH</b>                            | <b>2,885.9</b>                        | <b>2,704.1</b>                        | <b>94%</b>     |
| <b>Units<sup>2</sup></b>              | <b>19,023</b>                         | <b>15,053</b>                         | <b>79%</b>     |

1) Values are reflected at the system level.

2) Units represent average monthly kW at meter for demand response measures (10,071), plus individual participants for smart thermostat energy efficiency measures (4,982).

## **D. Qualitative Analysis**

### **Highlights**

During 2019, the Program continued to experience significant growth. The Program added 3,418 net new devices bringing the total installed devices in DEC to 12,885. The door-to-door marketing (canvassing) efforts have continued to be the most productive marketing efforts for producing enrollments, installations and positive customer interactions. In 2019, the Program canvassed in the Winston-Salem/Greensboro, Charlotte, the greater Charlotte region, Greenville/Spartanburg, and Hickory areas. Over 20,000 customers were reached during 2019 through the canvassing efforts.

### **Issues**

One factor that continues to impact the Program's overall performance is the high number of customers selecting to enroll in the 30% cycling option. Approximately 74% of customers are participating in this option. This is a slight improvement from the 80% participation in the 30% cycling option seen at the end of 2018. The original assumption when the Program was filed was that 50% of customers would select this option. Program staff worked with canvassers to improve their pitches to promote the higher cycling options, improving the current enrollment percentages and bringing them closer to the original assumptions. But, with the high percentage of customers participating in the 30% option in prior years, the overall percentage is slow to come down.

### **Potential Changes**

The Program is evaluating the possibility of adding additional thermostat options to offer customers during the install. The new thermostat will reduce the number of installs that are turned down due to the current version not having features used by the customer.

## **E. Marketing Strategy**

In 2019 the Program continued the efforts of door-to-door marketing using a dedicated canvassing vendor. In addition to canvassing, the Program targets slightly larger and multi-location customers through Duke Energy's Business Energy Advisors.

## **F. Evaluation, Measurement and Verification**

There were no evaluation activities for this program in 2019.

Duke Energy Carolinas, LLC  
Estimate - January 1, 2021 - December 31, 2021  
Docket Number E-7, Sub 1230  
Projected Program/Portfolio Cost Effectiveness - Vintage 2021

| Program  | UCT         | TRC         | RIM         | PCT         |
|--|-------------|-------------|-------------|-------------|
| <b>Residential Programs</b>                            |             |             |             |             |
| • Energy Education Program for Schools                 | 1.40        | 1.41        | 0.53        | 8.97        |
| • Energy Efficient Appliances & Devices                | 2.64        | 2.20        | 0.60        | 4.96        |
| • Residential – Smart \$aver Energy Efficiency Program | 0.81        | 0.67        | 0.49        | 1.68        |
| • Income-Qualified EE Products & Services              | 0.70        | 0.72        | 0.44        | 2.09        |
| • Multi-Family EE Products & Services                  | 3.14        | 3.16        | 0.66        | 20.52       |
| • My Home Energy Report                                | 1.89        | 1.89        | 0.66        |             |
| • Power Manager  | 4.33        | 9.80        | 4.33        |             |
| • Residential Energy Assessments                       | 1.33        | 1.28        | 0.48        | 19.95       |
| <b>Residential Total</b>                               | <b>2.50</b> | <b>2.82</b> | <b>1.04</b> | <b>6.18</b> |
| <b>Non-Residential Programs</b>                        |             |             |             |             |
| • Custom Assessment & Incentive                        | 3.03        | 1.13        | 0.86        | 1.92        |
| • EnergyWise for Business                              | 0.63        | 1.26        | 0.55        |             |
| • Food Service Products                                | 1.45        | 0.79        | 0.45        | 2.38        |
| • HVAC   | 1.47        | 1.12        | 0.64        | 2.05        |
| • Lighting   | 4.19        | 2.14        | 0.78        | 4.08        |
| • Motors, Pumps & VFDs                                 | 3.11        | 2.41        | 0.82        | 4.99        |
| • Non Res Information Technology                       | 0.65        | 0.47        | 0.31        | 2.26        |
| • Process Equipment                                    | 3.50        | 2.26        | 0.97        | 3.66        |
| • Performance Incentive                                | 3.22        | 1.06        | 0.86        | 1.79        |
| • Small Business Energy Saver                          | 2.32        | 1.43        | 0.76        | 2.60        |
| • PowerShare   | 3.37        | 137.02      | 3.37        |             |
| <b>Non-Residential Total</b>                           | <b>3.12</b> | <b>2.03</b> | <b>0.93</b> | <b>3.16</b> |
| <b>Overall Portfolio Total</b>                         | <b>2.81</b> | <b>2.32</b> | <b>0.98</b> | <b>3.83</b> |

Duke Energy Carolinas  
Docket Number E-7, Sub 1230  
Changes to DSM/EE Cost Recovery Vintage 2019 True Up January 1, 2019 - December 31, 2019  
Changes from Prior Filing Due to Application of M&V and Participation  
System kWh and kW Impacts Net Free Riders at the Plant

Residential Programs

| Program Name   | Filed in Docket E-7,<br>Sub 1164 |         | Filed in Docket E-7,<br>Sub 1230 |         | Overall Variance |        | E-7 Sub 1164         | E-7 Sub 1230 | Delta         | Variance attributable to Participation |         | Variance attributable to Mix of<br>Measures |       | Variance attributable to<br>EM&V |        | Sum of Variances |        |
|--|----------------------------------|---------|----------------------------------|---------|------------------|--------|----------------------|--------------|---------------|--|---------|---|-------|----------------------------------|--------|------------------|--------|
|  | kWh                              | kW      | kWh                              | kW      | kWh              | kW     | System Participation |              | Participation | kWh                                    | kW      | kWh   | kW    | kWh                              | kW     | kWh              | kW     |
| Energy Efficiency Education Program for Schools                  | 5,701,506                        | 1,339   | 6,713,787                        | 841     | 1,012,280        | (497)  | 26,705               | 24,785       | (1,920)       | (409,919)                              | (96)    | -   | -     | 1,422,200                        | (401)  | 1,012,280        | (497)  |
| Energy Efficient Appliances and Devices                          | 97,320,521                       | 16,726  | 187,351,705                      | 31,803  | 90,031,183       | 15,077 | 3,997,670            | 9,893,466    | 5,895,796     | 102,630,042                            | 13,446  | 5,166,789                                   | 389   | (17,765,648)                     | 1,242  | 90,031,183       | 15,077 |
| Residential – Smart Saver Energy Efficiency Program              | 5,130,696                        | 1,294   | 7,329,114                        | 2,029   | 2,198,418        | 735    | 9,630                | 25,852       | 16,222        | 3,814,398                              | 1,676   | (507,093)                                   | (179) | (1,108,887)                      | (761)  | 2,198,418        | 735    |
| Income Qualified Energy Efficiency and Weatherization Assistance | 4,043,435                        | 639     | 9,029,752                        | 1,105   | 4,986,316        | 467    | 10,114               | 10,814       | 700           | 967,344                                | 135     | -   | -     | 4,018,972                        | 332    | 4,986,316        | 467    |
| Multi-Family Energy Efficiency                                   | 19,846,385                       | 2,001   | 24,086,174                       | 2,649   | 4,239,789        | 648    | 342,660              | 493,307      | 150,647       | 1,757,319                              | 173     | 2,504,662                                   | 317   | (22,191)                         | 158    | 4,239,789        | 648    |
| Energy Assessments   | 6,542,935                        | 1,040   | 7,886,916                        | 946     | 1,343,981        | (94)   | 34,304               | 61,692       | 27,388        | 1,826,639                              | 273     | 169,564                                     | 19    | (652,222)                        | (386)  | 1,343,981        | (94)   |
| My Home Energy Report  | 312,934,099                      | 79,359  | 328,439,103                      | 91,387  | 15,505,004       | 12,027 | 1,364,000            | 1,339,152    | (24,848)      | (8,076,363)                            | (2,011) | -   | -     | 23,581,367                       | 14,038 | 15,505,004       | 12,027 |
| PowerManager   | -                                | 534,419 | -                                | 568,235 | -                | 33,816 | 503,131              | 534,967      | 31,836        | -                                      | 33,816  | -   | -     | -                                | -      | -                | 33,816 |
| Residential Programs Total                                       | 451,519,578                      | 636,816 | 570,836,550                      | 698,996 | 119,316,972      | 62,179 | 6,288,214            | 12,384,035   | 6,095,821     | 102,509,461                            | 47,412  | 7,333,923                                   | 545   | 9,473,589                        | 14,222 | 119,316,972      | 62,179 |

Non-Residential Programs

| Program Name   | Filed in Docket E-7,<br>Sub 1164 |           | Filed in Docket E-7,<br>Sub 1230 |           | Overall Variance |         | E-7 Sub 1164         | E-7 Sub 1230 | Delta         | Variance attributable to Participation |         | Variance attributable to Mix of<br>Measures |         | Variance attributable to<br>EM&V |        | Sum of Variances |         |
|--|----------------------------------|-----------|----------------------------------|-----------|------------------|---------|----------------------|--------------|---------------|--|---------|---|---------|----------------------------------|--------|------------------|---------|
|  | kWh                              | kW        | kWh                              | kW        | kWh              | kW      | System Participation |              | Participation | kWh                                    | kW      | kWh   | kW      | kWh                              | kW     | kWh              | kW      |
| Non Residential Smart Saver Custom Technical Assessments           | 8,831,594                        | 1,008     | 1,930,762                        | 148       | (6,900,831)      | (860)   | 6,125                | 4            | (6,121)       | -                                      | -       | (6,900,831)                                 | (860)   | -                                | -      | (6,900,831)      | (860)   |
| Non Residential Smart Saver Custom                                 | 60,678,525                       | 6,927     | 52,522,612                       | 10,109    | (8,155,912)      | 3,183   | 48,280               | 34,709       | (13,571)      | -                                      | -       | (8,155,912)                                 | 3,183   | -                                | -      | (8,155,912)      | 3,183   |
| Non Residential Smart Saver Energy Efficient Food Service Products | 10,601,930                       | 1,159     | 870,041                          | 76        | (9,731,890)      | (1,083) | 11,695               | 2,419        | (9,276)       | (4,662,804)                            | (459)   | (4,052,247)                                 | (474)   | (1,016,839)                      | (149)  | (9,731,890)      | (1,083) |
| Non Residential Smart Saver Energy Efficient HVAC Products         | 13,318,652                       | 5,012     | 5,950,986                        | 1,367     | (7,367,666)      | (3,645) | 231,113              | 3,038,732    | 2,807,618     | (1,001,440)                            | (934)   | (5,655,028)                                 | (2,500) | (711,198)                        | (211)  | (7,367,666)      | (3,645) |
| Non Residential Smart Saver Energy Efficient Lighting Products     | 122,943,286                      | 16,312    | 149,658,444                      | 28,280    | 26,715,157       | 11,968  | 14,523,270           | 5,456,789    | (9,066,481)   | (12,262,414)                           | (368)   | 15,890,028                                  | 5,915   | 23,087,543                       | 6,421  | 26,715,157       | 11,968  |
| Non Residential Energy Efficient Pumps and Drives Products         | 6,310,561                        | 978       | 1,043,899                        | 166       | (5,266,662)      | (812)   | 8,662                | 1,131        | (7,532)       | (5,550,813)                            | (856)   | (31,163)                                    | (6)     | 315,313                          | 50     | (5,266,662)      | (812)   |
| Non Residential Energy Efficient ITEE                              | 6,503,152                        | 50        | 8,442                            | -         | (6,494,710)      | (50)    | 5,382                | 134          | (5,248)       | (99,171)                               | -       | (6,394,065)                                 | (50)    | (1,474)                          | -      | (6,494,710)      | (50)    |
| Non Residential Energy Efficient Process Equipment Products        | 1,052,919                        | 129       | 540,487                          | 84        | (512,432)        | (45)    | 4,669                | 11,232       | 6,563         | (187,188)                              | (32)    | (423,895)                                   | (30)    | 98,652                           | 17     | (512,432)        | (45)    |
| Non Residential Smart Saver Performance Incentive                  | 21,489,480                       | 2,453     | 4,545,995                        | 391       | (16,943,485)     | (2,062) | 23,254,911           | 19           | (23,254,892)  | -                                      | -       | (16,943,485)                                | (2,062) | -                                | -      | (16,943,485)     | (2,062) |
| Smart Energy in Offices  | -                                | -         | -                                | -         | -                | -       | -                    | -            | -             | -                                      | -       | -   | -       | -                                | -      | -                | -       |
| Small Business Energy Saver  | 75,258,073                       | 14,501    | 53,674,194                       | 9,196     | (21,583,880)     | (5,306) | 61,700,000           | 51,421,356   | (10,278,644)  | (12,422,870)                           | (4,316) | 470   | 0       | (9,161,481)                      | (989)  | (21,583,880)     | (5,306) |
| Business Energy Report   | -                                | -         | -                                | -         | -                | -       | -                    | -            | -             | -                                      | -       | -   | -       | -                                | -      | -                | -       |
| EnergyWise for Business  | 2,885,926                        | 16,662    | 2,704,118                        | 11,598    | (181,808)        | (5,064) | 19,023               | 15,053       | (3,970)       | 504,397                                | (4,836) | -   | -       | (686,206)                        | (229)  | (181,808)        | (5,064) |
| PowerShare   | -                                | 337,864   | -                                | 342,590   | -                | 4,726   | 318,083              | 322,533      | 4,450         | -                                      | 4,726   | -   | -       | -                                | -      | -                | 4,726   |
| Non-Residential Programs Total                                     | 329,874,099                      | 403,056   | 273,449,978                      | 404,005   | (56,424,120)     | 950     | 100,131,213          | 60,304,110   | (39,827,103)  | (35,682,302)                           | (7,076) | (32,666,129)                                | 3,116   | 11,924,311                       | 4,910  | (56,424,120)     | 950     |
| Total Residential and Non-Residential Programs                     | 781,393,677                      | 1,039,872 | 844,286,529                      | 1,103,001 | 62,892,852       | 63,129  | 106,419,427          | 72,688,145   | (33,731,281)  | 66,827,159                             | 40,336  | (25,332,207)                                | 3,661   | 21,397,900                       | 19,132 | 62,892,852       | 63,129  |

NOTE - The actual per unit impacts are reflective of the following EM&V reports:

| Program Name As Filed  | Docket        | Report Reference  | Effective Date |
|--|---------------|---|----------------|
| Income Qualified Energy Efficiency and Weatherization Assistance | E-7, Sub 1230 | Duke Energy Carolinas and Duke Energy Progress 2017 Neighborhood Energy Saver Program Evaluation Report - Final | 11/30/2019     |
| My Home Energy Report Program                                    | E-7, Sub 1230 | My Home Energy Report Program Evaluation  | 7/10/2019      |
| PowerShare Program   | E-7, Sub 1192 | Duke Energy PowerShare Program 2018 Evaluation Report for Duke Energy Carolinas                                 | 5/2/2019       |
| Residential – Smart Saver Energy Efficiency Program              | E-7, Sub 1230 | Smart Saver Evaluation Report — May 1, 2016 – April 30, 2017 (Revised)  | 3/15/2019      |
| Energy Efficiency Education in Schools Program                   | E-7, Sub 1230 | Energy Efficiency Education in Schools Program Year 2017-2018 Evaluation Report                                 | 2/1/2019       |
| Smart Saver® Non-Residential Custom Program                      | E-7, Sub 1230 | Smart Saver® Non-Residential Custom Program Years 2016-2017 Evaluation Report                                   | 11/29/2018     |

**Duke Energy Carolinas, LLC**  
**List of Industrial and Commercial Customers Opted Out of Vintage 2018**  
**Docket E-7, Sub 1230**

|                                  | Number of Accounts |
|----------------------------------|--------------------|
| <b>DSM RIDER OPT OUT YR 2018</b> | <b>5,537</b>       |
| <b>EE RIDER OPT OUT YR 2018</b>  | <b>4,962</b>       |

| Customer Bill Name                    | DSM YR 18 (Jan 1-Dec 31) | EE YR 18 (Jan 1-Dec 31) | GRAND TOTAL |
|---------------------------------------|--------------------------|-------------------------|-------------|
|                                       | RIDER OPT OUT            | RIDER OPT OUT           |             |
| 101 NORTH CHERRY ST LLC               | 1                        | 1                       | 2           |
| 101 SOUTH TRYON LP                    | 2                        | 2                       | 4           |
| 1515 MOCKINGBIRD CHARLOTTE OFFICE LLC | 1                        | 1                       | 2           |
| 301 COLLEGE STREET CENTER LLC         | 1                        | 1                       | 2           |
| 4601 PARK CHARLOTTE OFFICE LLC        | 1                        | 1                       | 2           |
| 600 SOUTH TRYON DEVELOPMENT, LLC      | 1                        |                         | 1           |
| 638 BREWING CO, INC                   | 2                        | 2                       | 4           |
| 800 GREEN VALLEY ASSOCIATES LLC       | 1                        | 1                       | 2           |
| A & T STATE UNIV                      | 13                       | 10                      | 23          |
| A W NORTH CAROLINA INC                | 6                        | 6                       | 12          |
| ABB MOTORS AND MECHANICAL INC         | 7                        | 7                       | 14          |
| ABCO AUTOMATION INC                   | 1                        | 1                       | 2           |
| ABERCROMBIE TEXTILES LLC              |                          | 1                       | 1           |
| ABSS FACILITIES DEPT                  | 7                        | 4                       | 11          |
| ADVANCE STORES CO                     | 1                        | 1                       | 2           |
| ADVANCED DRAINAGE SYSTEMS             | 2                        | 2                       | 4           |
| ADVANCED MACHINE & FABRICATION, INC.  | 3                        | 3                       | 6           |
| ADVANCED TECHNOLOGY                   | 2                        | 1                       | 3           |
| AE & T COMPANY INC                    | 1                        | 1                       | 2           |
| AERO ACCESSORIES INC                  | 4                        | 4                       | 8           |
| AERODYN WIND TUNNEL LLC               | 1                        | 1                       | 2           |
| AFFILIATED COMPUTER SERVICE           | 2                        | 2                       | 4           |
| AFRO AMERICAN CULTUR                  | 1                        | 1                       | 2           |
| AIR PRODUCTS & CHEMICALS, INC         | 1                        | 1                       | 2           |
| AIRGAS USA LLC                        |                          | 1                       | 1           |
| AKZO NOBEL SURFACE CHEMISTRY LLC      | 9                        | 8                       | 17          |
| ALADDIN MANUFACTURING CORPORATION     |                          | 2                       | 2           |
| ALAMANCE REGIONAL MEDICAL CENTER      | 2                        | 5                       | 7           |
| ALAMANCE REGIONAL MEDICAL CENTER      |                          | 2                       | 2           |
| ALBEMARLE U. S., INC                  | 1                        | 1                       | 2           |
| ALBEMARLE U. S., INC                  | 1                        | 1                       | 2           |
| ALCAN PACKAGING FOOD AND TOBACCO, INC | 2                        | 2                       | 4           |
| ALDERSGATE                            | 11                       | 11                      | 22          |
| ALDI (NC ) LLC                        | 2                        | 2                       | 4           |
| ALEXANDER COUNTY SCHOOLS              | 2                        | 2                       | 4           |
| ALEXANDRIA REAL ESTATE EQUITIES INC   | 7                        | 6                       | 13          |
| ALL GRANITE INC                       | 3                        | 3                       | 6           |
| ALLIANCE ONE INTERNATIONAL            | 1                        |                         | 1           |
| ALLIED DIE CASTING CO OF NC           | 2                        | 2                       | 4           |
| ALLTEL MOBILE                         | 1                        | 1                       | 2           |
| ALTEC INDUSTRIES INC                  | 1                        | 1                       | 2           |

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| AMAZON FULFILLMENT SERVICES, INC                 | 1  | 1  | 2  |
| AMAZON.COM SERVICES, INC.                        | 8  | 8  | 16 |
| AMAZON.COMM.DEDC,LLC                             | 1  | 1  | 2  |
| AMERICAN & EFIRD LLC                             | 8  | 9  | 17 |
| AMERICAN AIRLINES                                | 5  | 2  | 7  |
| AMERICAN CAMPUS LLC                              | 1  | 1  | 2  |
| AMERICAN CAMPUS OPERATING CO LLC                 | 3  | 3  | 6  |
| AMERICAN CONVERTING, CO. LTD                     | 2  | 2  | 4  |
| AMERICAN EXPRESS TRAVEL RELATED SERVICES COMPANY | 1  | 1  | 2  |
| AMERICAN FIBER & FINISHING                       | 1  | 1  | 2  |
| AMERICAN HEBREW ACADEMY                          | 11 | 11 | 22 |
| AMERICAN MULTI CINEMA INC                        | 6  | 6  | 12 |
| AMERICAN ROLLER BEARING CO                       | 2  | 2  | 4  |
| AMERICAN TOBACCO HH LLC                          | 6  | 6  | 12 |
| AMERICAN TOBACCO POWER HOUSE LLC                 | 2  | 2  | 4  |
| AMERICAN YARNS LLC                               | 3  | 3  | 6  |
| AMERICAN ZINC PRODUCTS LLC                       | 1  | 1  | 2  |
| AMSTAR SUGAR CORP                                | 1  | 1  | 2  |
| ANDALE INC                                       | 1  | 1  | 2  |
| APPLE INC  | 2  | 1  | 3  |
| AQUA PLASTICS INC                                | 3  | 3  | 6  |
| ARCHER-DANIELS-MIDLAND CO                        | 3  | 3  | 6  |
| ARDAGH METAL BEVERAGE USA, INC                   | 2  | 2  | 4  |
| ARE-NC REGION NO 11, LLC                         | 3  | 3  | 6  |
| ARJOBEX AMERICA                                  | 2  | 2  | 4  |
| ARMACELL LLC                                     | 8  | 8  | 16 |
| ARROW INTERNATIONAL INC                          | 2  | 2  | 4  |
| ASHLEY FURNITURE INDUSTRIES INC                  | 13 | 13 | 26 |
| AT&T BELLSOUTH                                   | 3  | 3  | 6  |
| AT&T MOBILITY LLC                                | 4  | 4  | 8  |
| AT&T WIRELESS SERVICE                            | 1  | 1  | 2  |
| ATAPCO UEP, INC                                  | 2  | 2  | 4  |
| ATLANTIC SWEETNER CO                             | 2  | 2  | 4  |
| ATLAS WELDING                                    | 3  | 3  | 6  |
| ATOS IT OUTSOURCING SERVICES                     | 1  | 1  | 2  |
| ATOS IT SOLUTIONS AND SERVICES, INC              | 1  | 1  | 2  |
| ATRIUM WINDOWS & DOORS                           | 9  | 9  | 18 |
| AUTOMATED SOLUTIONS LLC                          | 2  | 2  | 4  |
| AVAGO TECHNOLOGIES WIRELESS(USA) MANUFACTURING   | 1  | 1  | 2  |
| B & E WOODTURNING INC                            | 1  | 1  | 2  |
| B & W FIBERGLASS                                 | 1  | 1  | 2  |
| B V HEDRICK GRAVEL & SAND COMPANY                | 10 | 10 | 20 |
| B&G FOODS SNACKS, INC                            | 1  | 1  | 2  |
| B/E AEROSPACE, INC                               | 12 | 16 | 28 |
| BAKER INTERIORS FURNITURE COMPANY                | 6  | 8  | 14 |
| BAKERY FEEDS INC                                 | 2  | 2  | 4  |
| BANK NOTE CORP                                   | 3  | 3  | 6  |
| BANK OF AMERICA                                  | 5  | 3  | 8  |
| BARNHARDT MANUFACTURING COMPANY INC              | 7  | 7  | 14 |
| BARRDAY CORP                                     | 3  | 3  | 6  |
| BARTIMAEUS BY DESIGN INC                         | 3  | 3  | 6  |
| BASF AGRICULTURAL SOLUTIONS SEED US LLC          | 10 | 10 | 20 |

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|--|----|----|----|
| BASF CORPORATION                       | 4  | 4  | 8  |
| BAY STATE MILLING                      | 5  | 5  | 10 |
| BB&T                                   | 12 | 11 | 23 |
| BEAL MANUFACTURING CORP                | 1  | 1  | 2  |
| BEASLEY FLOORING PRODUCTS INC          | 2  | 2  | 4  |
| BECO MANAGEMENT                        | 2  | 2  | 4  |
| BED,BATH & BEYOND                      | 1  | 1  | 2  |
| BEKAERT TEXTILES USA                   | 4  | 3  | 7  |
| BELK                                   | 6  | 6  | 12 |
| BELL SOUTH MOBILITY                    | 1  | 1  | 2  |
| BELLSOUTH                              | 10 | 10 | 20 |
| BELLSOUTH BSC                          | 14 | 14 | 28 |
| BELLSOUTH TELECOMMUNICATIONS, LLC      | 1  | 1  | 2  |
| BELMONT ABBEY COLLEGE                  | 19 | 19 | 38 |
| BEMIS MANUFACTURING CO                 | 2  | 2  | 4  |
| BENJAMIN THOMAS COOPER                 |    | 1  | 1  |
| BEOCARE INC                            | 2  | 3  | 5  |
| BERNHARDT FURNITURE COMPANY            | 8  | 8  | 16 |
| BERRY TRI PLASTICS                     |    | 1  | 1  |
| BESTCO                                 | 5  | 5  | 10 |
| BESTREADS INC                          | 2  | 2  | 4  |
| BEVERLY KNITS INC                      | 6  | 6  | 12 |
| BIC CORPORATION                        | 5  | 4  | 9  |
| BILLY GRAHAM EVANGELISTIC              | 7  | 7  | 14 |
| BI-LO, LLC                             | 15 | 15 | 30 |
| BIOMERIEUX, INC                        | 4  | 4  | 8  |
| BISHOP MCGUINNESS CATHOLIC HIGH SCHOOL | 3  | 3  | 6  |
| BISSELL COMPANIES                      | 22 | 2  | 24 |
| BJ'S WHOLESALE CLUB                    | 3  | 3  | 6  |
| BLACKSTONE CHARLOTTE, LLC              | 2  | 2  | 4  |
| BLUE RIDGE COMMUNITY COLLEGE           | 17 | 15 | 32 |
| BLUE RIDGE HEALTH CARE                 | 1  | 1  | 2  |
| BLUM, INC                              | 1  | 1  | 2  |
| BONSET AMERICA CORP                    | 1  | 1  | 2  |
| BORAL COMPOSITES INC.                  | 4  | 4  | 8  |
| BOSTON GEAR LLC                        | 1  | 1  | 2  |
| BOWMAN DAIRY                           | 1  | 1  | 2  |
| BOXBOARD PROD INC                      | 2  | 2  | 4  |
| BRASS CRAFT MFG CO                     | 1  | 1  | 2  |
| BRAXTON SAWMILL INC                    | 3  | 3  | 6  |
| BREVARD COLLEGE                        | 25 | 25 | 50 |
| BRF-A1,LLC                             | 1  | 1  | 2  |
| BRI 1875 MERIDIAN, LLC                 | 8  | 2  | 10 |
| BRIDGESTONE AIRCRAFT TIRE USA INC      | 3  | 3  | 6  |
| BRIGHT ENTERPRISES INC                 | 2  | 2  | 4  |
| BRIT CHARLOTTE LLC                     | 1  | 1  | 2  |
| BRIT-CHARLOTTE HOLDING LLC             | 3  | 3  | 6  |
| BROAD RIVER WATER AUTHORITY            | 1  |    | 1  |
| BSN MEDICAL INC                        | 1  |    | 1  |
| BUCKEYE FIRE EQUIPMENT COMPANY         | 4  | 3  | 7  |
| BUD ANTLE, INC                         | 1  | 1  | 2  |
| BURKE COUNTY SCHOOLS                   | 27 | 18 | 45 |



|                                      |    |    |     |
|--------------------------------------|----|----|-----|
| BURLINGTON COAT FACTORY              | 3  | 2  | 5   |
| BURLINGTON TECHNOLOGIES INC          | 3  | 3  | 6   |
| CABARRUS COUNTY SCHOOLS              | 63 | 63 | 126 |
| CALICO TECHNOLOGIES INC              | 3  | 3  | 6   |
| CAMBRIDGE ACQUISITIONS LLC           | 2  | 2  | 4   |
| CAMBRO MANUFACTURING CO              | 4  | 4  | 8   |
| CAMCO MANUFACTURING, INC             | 5  | 5  | 10  |
| CAMFIL USA INC                       | 2  | 2  | 4   |
| CANDLE CORPORATION OF AMERICA        | 2  | 2  | 4   |
| CAP YARNS LLC                        |    | 2  | 2   |
| CAPITOL BROADCASTING COMPANY INC     | 10 | 10 | 20  |
| CAPITOL TOWERS LLC                   | 5  | 5  | 10  |
| CARAUSTAR INC                        | 4  | 2  | 6   |
| CARAUSTAR INDUSTRIES                 | 3  | 2  | 5   |
| CARDINAL FLOAT GLASS                 | 1  | 1  | 2   |
| CARDINAL HEALTH                      | 1  | 1  | 2   |
| CARDINAL HEALTH 200, LLC             | 1  | 1  | 2   |
| CARDINAL HEALTH INC                  | 2  | 2  | 4   |
| CARGILL, INCORPORATED                | 9  | 9  | 18  |
| CARLISLE FOOD SERVIC                 | 3  | 3  | 6   |
| CARMEL COUNTRY CLUB                  | 27 | 27 | 54  |
| CARMEL CTRY CLUB                     | 1  | 1  | 2   |
| CAROLINA BEVERAGE GROUP, LLC         | 4  | 4  | 8   |
| CAROLINA CONTAINER                   | 5  | 5  | 10  |
| CAROLINA CUSTOM SURFACES LLC         | 2  | 2  | 4   |
| CAROLINA GLOVE COMPANY               | 6  | 6  | 12  |
| CAROLINA GRAPHIC SERVICES LLC        | 1  | 1  | 2   |
| CAROLINA INVESMENT PROPERTIES        | 1  | 1  | 2   |
| CAROLINA LASER CUTTING INC           | 1  | 1  | 2   |
| CAROLINA MEADOWS INC                 | 20 | 20 | 40  |
| CAROLINA NONWOVENS LLC               | 1  |    | 1   |
| CAROLINA PERLITE CO                  | 1  | 1  | 2   |
| CAROLINA PRECISION COMPONENTS, INC.  | 1  | 1  | 2   |
| CAROLINA PRECISION PLASTICS LLC      | 6  | 6  | 12  |
| CAROLINA STALITE CO                  | 11 | 11 | 22  |
| CAROLINA SUNROCK CORP                | 10 | 10 | 20  |
| CAROLINA TRACTOR & EQUIPMENT COMPANY | 4  | 4  | 8   |
| CAROLINA VILLAGE                     | 4  | 4  | 8   |
| CAROLINA YARN                        | 2  | 2  | 4   |
| CAROLINAS HEALTHCARE SYSTEM          | 31 | 22 | 53  |
| CARPENTER COMPANY                    | 4  | 4  | 8   |
| CARRIER CORPORATION                  | 2  | 1  | 3   |
| CASCADE DIE CASTING GRP INC          |    | 2  | 2   |
| CASE FARMS                           | 3  | 3  | 6   |
| CASTLE & COOKE NORTH CAROLINA LLC    | 4  | 4  | 8   |
| CATAWBA COLLEGE                      | 1  |    | 1   |
| CATAWBA COUNTY SCHOOLS               | 23 | 17 | 40  |
| CATAWBA VALLEY MEDICAL CENTER        | 1  | 1  | 2   |
| CATO CORP                            | 2  | 2  | 4   |
| CB RICHARD ELLI                      | 12 | 12 | 24  |
| CBL ASSOCIATES MANAGEMENT, INC       | 1  | 1  | 2   |
| CBP RESOURCES                        | 4  | 4  | 8   |

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| CCC DEVELOPMENT PARTNERS, LLC                    | 1   | 1   | 2   |
| CDP DURHAM CENTER INVESTORS LLC                  | 1   | 1   | 2   |
| CEDAR FAIR SOUTHWEST, INC                        | 3   | 3   | 6   |
| CELGARD, LLC                                     | 3   | 1   | 4   |
| CENTRAL CAROLINA PLASTICS INC                    | 2   | 2   | 4   |
| CENTRAL CAROLINA PRODUCTS                        | 1   | 1   | 2   |
| CENTRAL REGIONAL HOSPITAL                        |     | 5   | 5   |
| CENTRILOGIC, INC                                 | 1   | 1   | 2   |
| CENTURY FURNITURE, LLC                           | 7   | 13  | 20  |
| CERTAINTED CORP                                  | 1   | 4   | 5   |
| CHAPEL HILL/ CARRBORO SCHO                       | 51  |     | 51  |
| CHARLOTTE COLOCATION CENTER LLC                  | 1   | 1   | 2   |
| CHARLOTTE COUNTRY DAY SCHOOL                     | 10  |     | 10  |
| CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT          | 1   |     | 1   |
| CHARLOTTE GATEWAY VILLAGE                        | 2   | 2   | 4   |
| CHARLOTTE LATIN SCHOOLS, INC                     | 10  | 10  | 20  |
| CHARLOTTE OBSERVER PUBLISHING COMPANY            | 1   | 1   | 2   |
| CHARLOTTE PIPE & FOUNDRY                         | 13  | 13  | 26  |
| CHARTER COMMUNICATION                            | 1   | 1   | 2   |
| CHEMICAL SPECIALTIES                             | 5   | 5   | 10  |
| CHEROKEE BOYS CLUB                               | 3   | 3   | 6   |
| CHEROKEE INDIAN HOSPITAL                         | 1   | 1   | 2   |
| CHESAPEAKE TREATMENT COMPANY, LLC                | 1   | 1   | 2   |
| CINEBARRE, LLC                                   | 2   | 2   | 4   |
| CISCO SYSTEMS INC                                | 1   | 1   | 2   |
| CITY OF ASHEVILLE                                | 1   | 2   | 3   |
| CITY OF BELMONT                                  | 2   | 2   | 4   |
| CITY OF BURLINGTON                               | 5   | 5   | 10  |
| CITY OF CHARLOTTE                                | 92  | 107 | 199 |
| CITY OF CHARLOTTE REGIONAL VISITORS AUTHORITY    | 6   | 6   | 12  |
| CITY OF DURHAM                                   | 4   | 4   | 8   |
| CITY OF EDEN                                     |     | 2   | 2   |
| CITY OF GASTONIA                                 | 3   | 3   | 6   |
| CITY OF GRAHAM                                   | 2   | 2   | 4   |
| CITY OF GREENSBORO                               | 27  | 29  | 56  |
| CITY OF HENDERSONVILLE                           | 4   | 4   | 8   |
| CITY OF HICKORY                                  | 4   | 4   | 8   |
| CITY OF KANNAPOLIS                               |     | 1   | 1   |
| CITY OF MARION                                   | 2   | 2   | 4   |
| CITY OF MEBANE                                   | 1   | 1   | 2   |
| CITY OF REIDSVILLE                               | 2   | 2   | 4   |
| CITY OF SALISBURY                                | 10  | 9   | 19  |
| CITY OF WINSTON SALEM                            | 25  | 30  | 55  |
| CK THREE TOWER CENTER,LLC                        | 1   | 1   | 2   |
| CKS PACKAGING INC                                | 5   | 5   | 10  |
| CLAPPS NURSING HOME CENTER                       | 1   | 1   | 2   |
| CLARIANT CORPORATION                             | 19  | 19  | 38  |
| CLEARWATER PAPER CORPORATION                     | 5   | 5   | 10  |
| CLEMENT PAPPAS NC, INC                           | 4   | 3   | 7   |
| CLEVELAND COUNTY FAMILY YOUNG MENS CHRISTIAN ASS | 2   | 2   | 4   |
| CLEVELAND COUNTY SCHOOLS                         | 63  | 60  | 123 |
| CMBE   | 178 |     | 178 |

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|--|----|----|----|
| CMC-NORTHEAST INC                                      | 8  | 8  | 16 |
| CMHA   | 14 | 12 | 26 |
| COATS AMERICAN   | 2  | 2  | 4  |
| COCA COLA CONSOLIDATED INC                             | 5  | 5  | 10 |
| COLONIAL PIPELINE                                      |    | 5  | 5  |
| COLUMBIA PLYWOOD CORPORATION                           | 6  | 6  | 12 |
| COMMONWEALTH BRANDS                                    | 2  | 2  | 4  |
| COMMONWEALTH HOSIERY                                   | 3  | 3  | 6  |
| COMMSCOPE, INC.  | 9  | 9  | 18 |
| CONCRETE SUPPLY  | 3  | 3  | 6  |
| CONCRETE SUPPLY CO                                     | 7  | 7  | 14 |
| CONCRETE SUPPLY COMPANY LLC                            | 1  | 1  | 2  |
| CONOVER LUMBER CO                                      | 2  | 2  | 4  |
| CONRAD HILL FEED &                                     | 1  | 1  | 2  |
| CONSOLIDATED CONTAINER COMPANY                         | 6  | 6  | 12 |
| CONSOLIDATED METCO INC                                 |    | 1  | 1  |
| CONTINENTAL AUTOMOTIVE SYSTEMS, INC                    | 2  | 2  | 4  |
| CONTINENTAL STRUCTURAL PLASTICS                        | 4  | 4  | 8  |
| COPLAND FABRICS INC                                    |    | 1  | 1  |
| CORE SCIENTIFIC INC                                    |    | 1  | 1  |
| CORMETECH INC  | 1  | 1  | 2  |
| CORNERSTONE CHARTER ACADEMY INC                        | 2  | 2  | 4  |
| CORNING CABLE SYSTEMS                                  | 5  | 5  | 10 |
| CORNING INC  | 6  | 6  | 12 |
| COSTCO WHOLESALE INC                                   | 5  | 5  | 10 |
| COUSINS PROP INC                                       | 1  | 1  | 2  |
| COUSINS PROPERTIES LP                                  | 4  | 4  | 8  |
| COVERIS FLEXIBLES (THOMASVILLE) US LLC                 | 6  | 6  | 12 |
| CPCC   | 49 | 43 | 92 |
| CPP INTERNATIONAL LLC                                  | 1  | 1  | 2  |
| CRAFT REVOLUTION LLC                                   | 1  | 1  | 2  |
| CREDIT SUISSE SECURITIES (USA) LLC                     | 1  | 1  | 2  |
| CREDIT SUISSE SECURITIES(USA) LLC CENTER OF EXCELLENCE | 1  |    | 1  |
| CREE INC   | 10 | 10 | 20 |
| CRONLAND LUMBER CO                                     | 1  | 1  | 2  |
| CROWN CONVERTING                                       | 4  | 4  | 8  |
| CS CAROLINA INC  | 1  | 1  | 2  |
| CSHV 615 COLLEGE LLC                                   | 2  | 2  | 4  |
| CSHV SOUTHPARK 6100 FAIRVIEW, LLC                      | 1  | 1  | 2  |
| CSHV SOUTHPARK, LLC                                    | 1  | 1  | 2  |
| CULP HOME FASHIONS                                     | 1  | 1  | 2  |
| CULP INC   | 3  | 3  | 6  |
| CURTISS-WRIGHT CONTROLS INC                            | 4  | 4  | 8  |
| CV PRODUCTS CONSOLIDATED LLC                           | 2  | 2  | 4  |
| CYRUSONE-NC LLC  | 3  | 3  | 6  |
| DAIMLER TRUCKS NORTH AMERICA, LLC                      | 5  | 5  | 10 |
| DAIRY FRESH  | 6  | 6  | 12 |
| DALCO NONWOVENS, LLC                                   | 2  | 2  | 4  |
| DANNY TERRELL  | 2  | 2  | 4  |
| DART CONTAINER CORP                                    | 3  | 2  | 5  |
| DATACHAMBERS, LLC                                      | 2  | 2  | 4  |
| DAVIDSON COLLEGE                                       | 15 | 15 | 30 |

|   |     |    |     |
|---|-----|----|-----|
| DAVIDSON COUNTY COMMUNITY COLLEGE                 | 3   | 3  | 6   |
| DAVIDSON WATER INC                                |     | 1  | 1   |
| DAVIS AMBULATORY SURGICAL CENTER                  | 1   | 1  | 2   |
| DC74 LLC  | 3   | 3  | 6   |
| DE FEET INTERNATIONAL                             | 3   | 3  | 6   |
| DEBOTECH INC                                      | 1   | 1  | 2   |
| DEERE HITACHI CONST MACH                          | 11  | 11 | 22  |
| DELTA PHOENIX, INC.                               | 1   | 1  | 2   |
| DIAMOND VIEW I LLC                                | 2   | 2  | 4   |
| DIAMOND VIEW II                                   | 2   | 2  | 4   |
| DILLARDS DEPARTMENT STORE                         | 7   | 7  | 14  |
| DISCOVERY PLACE INC                               | 2   | 2  | 4   |
| DISNEY WORLDWIDE SERVICES INC                     | 1   | 1  | 2   |
| DIZE AWNING TENT CO                               | 1   | 1  | 2   |
| DIZE COMPANY                                      | 3   | 3  | 6   |
| DOOSAN INFRACORE PORTABLE POWER - A DIVISION OF C | 2   | 2  | 4   |
| DOUGHTON MFG CO                                   | 3   | 3  | 6   |
| DOW CORNING CORP                                  |     | 11 | 11  |
| DUKE UNIVERSITY                                   | 13  | 13 | 26  |
| DUPONT SPECIALTY PRODUCTS USA LLC                 | 1   | 1  | 2   |
| DURHAM ACADEMY                                    | 8   | 8  | 16  |
| DURHAM BULLS                                      | 2   | 2  | 4   |
| DURHAM COCA COLA                                  | 3   | 3  | 6   |
| DURHAM COUNTY HOSPITAL CORPORATION                | 1   | 1  | 2   |
| DURHAM ID PHASE 1 DEVELOPER LLC                   | 1   | 1  | 2   |
| DURHAM OB GYN                                     | 3   | 3  | 6   |
| DURHAM PUBLIC SCHLS                               | 107 |    | 107 |
| DURHAM TECH COMM COL                              | 2   |    | 2   |
| DURHAM TW ALEXANDER LLC                           | 1   | 1  | 2   |
| DYNAYARN USA, L.L.C.                              | 1   | 1  | 2   |
| DYSTAR LIMITED PARTNERSHIP                        | 1   | 1  | 2   |
| DYSTAR LP   | 6   | 6  | 12  |
| E J VICTOR INC                                    | 1   | 1  | 2   |
| EARTH FARE INC                                    | 3   | 3  | 6   |
| EAST COAST LUMBER CO                              | 1   | 1  | 2   |
| EAST DECK INC                                     | 1   | 1  | 2   |
| EAST WILKES HIGH SCHOOL                           | 5   | 5  | 10  |
| EASTERN BAND OF CHEROKEE INDIANS                  | 3   | 3  | 6   |
| EATON CORP  | 2   | 2  | 4   |
| ECMD INC  | 4   | 4  | 8   |
| ECOFLO INC  | 3   | 3  | 6   |
| EDS PALLETT WORLD INC                             | 4   | 4  | 8   |
| ELASTIC FABRICS OF AMERICA                        | 2   | 1  | 3   |
| ELECTRIC GLASS FIBER AMERICA,LLC                  | 3   | 4  | 7   |
| ELECTROLUX HOME PRODUCTS                          | 2   | 2  | 4   |
| ELECTROLUX HOME PRODUCTS, INC                     | 2   | 2  | 4   |
| ELEVATE TEXTILES, INC                             |     | 1  | 1   |
| ELITE COMFORT SOLUTIONS LLC                       | 1   | 1  | 2   |
| ELITE DISPLAYS & DESIGN INC                       | 3   | 3  | 6   |
| ELLIS LUMBER CO                                   | 3   | 3  | 6   |
| ELON UNIVERSITY                                   | 66  | 66 | 132 |
| EMC CORPORATION                                   | 2   | 2  | 4   |

|   |     |     |     |
|---|-----|-----|-----|
| EMERGEORTHO, P.A                                | 1   | 1   | 2   |
| ENDURA PRODUCTS INC                             | 5   | 5   | 10  |
| ENGINEERED CONTROLS INTERNATIONAL INC           | 4   | 4   | 8   |
| ENGINEERED RECYCLING COMPANY, LLC               | 4   | 4   | 8   |
| EPA   |     | 6   | 6   |
| ESSENTRA PACKAGING US, INC                      | 1   | 5   | 6   |
| ETHAN ALLEN OPERATIONS INC                      | 2   | 2   | 4   |
| EVANS,JAMES R                                   | 1   | 1   | 2   |
| EWE WAREHOUSE INVESTMENTS XXXIII LTD            | 4   | 4   | 8   |
| FAIRFIELD CHAIR CO                              | 6   | 3   | 9   |
| FAIRSTONE FABRICS                               | 4   | 4   | 8   |
| FAIST CHEMTEC INC                               | 2   | 2   | 4   |
| FAMILY DOLLAR STORES OF NORTH CAROLINA INC      | 4   | 4   | 8   |
| FEDERAL RES BANK                                | 1   |     | 1   |
| FERGUSON SUPPLY & BOX                           | 1   | 1   | 2   |
| FFNC INC  | 5   | 5   | 10  |
| FIBER & YARN PRODUCTS, INC                      | 1   | 2   | 3   |
| FIBER COMPOSITES CORPORATION                    | 2   | 4   | 6   |
| FIBRIX, LLC                                     | 2   | 2   | 4   |
| FIDDLIN FISH BREWING COMPANY LLC                | 1   | 1   | 2   |
| FIDELITY REAL ESTATE COMPANY, LLC               | 6   | 6   | 12  |
| FIDELITY REAL ESTATE LLC                        | 1   | 1   | 2   |
| FILTRONA GREENSBORO, INC                        | 5   | 5   | 10  |
| FIRESTONE FIBERS & TEXTILES COMPANY, LLC        | 2   | 2   | 4   |
| FIRST CITIZENS BANK & TRUST CO                  | 1   | 1   | 2   |
| FIRST PRESBY CHURCH                             | 4   | 4   | 8   |
| FISERV SOLUTIONS INC                            | 1   | 1   | 2   |
| FLEXENTIAL CORP                                 | 2   | 2   | 4   |
| FLOW PROPERTIES                                 | 1   |     | 0   |
| FLOWERS BAKERY OF WINSTON SALEM LLC             | 4   | 4   | 8   |
| FLOWERS BAKING COMPANY                          | 1   | 1   | 2   |
| FLYNT AMTEX INC                                 | 1   | 1   | 2   |
| FMC-LITHIUM CORP                                | 1   | 1   | 2   |
| FOCKE & CO, INC                                 | 1   |     | 1   |
| FOOD LION                                       | 224 | 179 | 403 |
| FORESTVIEW HIGH SCHOOL PTA                      | 1   |     | 1   |
| FORSYTH TECHNICAL COLLEGE                       | 10  | 7   | 17  |
| FOSS AUTO RECYCLING INC                         | 5   | 5   | 10  |
| FREUDENBERG PERFORMANCE MATERIALS LP            | 4   | 4   | 8   |
| FRIENDLIEST HOTEL, LLC                          | 1   |     | 1   |
| FRITO-LAY, INC                                  | 1   | 1   | 2   |
| FRONTIER COMMUNICATIONS CORPORATE SERVICES, INC | 7   | 7   | 14  |
| FRONTIER SPINNING MILLS, INC                    |     | 2   | 2   |
| FRYE REGIONAL MEDICAL CENTER                    | 6   | 5   | 11  |
| FUJITSU AMERICA INC                             | 1   | 1   | 2   |
| FULLSTEAM BREWERY, LLC                          | 1   |     | 1   |
| FUNDER AMERICA INC                              | 5   | 5   | 10  |
| FURNITURELAND SOUTH                             | 10  | 10  | 20  |
| GALENOR DESIGNS, LLC                            | 1   | 1   | 2   |
| GALVAN INDUSTRIES INC                           | 7   | 5   | 12  |
| GARDNER WEBB UNIV                               | 1   | 1   | 2   |
| GASTON CO SCHOOLS                               | 37  | 35  | 72  |

|                                       |     |     |     |
|---------------------------------------|-----|-----|-----|
| GASTON COLLEGE                        | 8   | 8   | 16  |
| GATEWAY RESEARCH PARK, INC            | 4   | 4   | 8   |
| GBORO NEWS & RECORD                   | 2   | 2   | 4   |
| GE LIGHTING SOLUTIONS LLC             | 6   | 6   | 12  |
| GENERAL ELECTRIC                      | 2   | 2   | 4   |
| GENPAK LLC                            | 5   | 6   | 11  |
| GENUINE PARTS COMPANY                 | 2   |     | 2   |
| GEORGIA-PACIFIC MT HOLLY LLC          | 1   | 1   | 2   |
| GERDAU AMERISTEEL US INC              | 2   | 2   | 4   |
| GETRAG GEARS OF NA                    | 2   | 2   | 4   |
| GF LINAMAR LLC                        | 2   | 2   | 4   |
| GIGA DATA CENTER - 1 LLC              | 2   | 2   | 4   |
| GIGA DATA CENTER CLT1                 | 1   | 1   | 2   |
| GILBARCO INC                          | 1   | 1   | 2   |
| GILDAN ACTIVEWEAR (EDEN) INC          | 4   | 2   | 6   |
| GILDAN YARNS, LLC                     |     | 1   | 1   |
| GILKEY LUMBER CO INC                  | 7   | 6   | 13  |
| GKN DRIVELINE NORTH AMERICA, INC      | 1   | 1   | 2   |
| GKN SINTER METALS                     | 1   | 1   | 2   |
| GLEN HIGH SCHOOL                      | 1   | 1   | 2   |
| GLEN RAVEN INC                        | 1   | 1   | 2   |
| GLOBAL TEXTILE ALLIANCE INC           | 5   | 5   | 10  |
| GOLDING FARMS FOODS                   | 2   | 2   | 4   |
| GOODWILL INDUSTRIES OF NW NC          |     | 1   | 1   |
| GRANDEUR MFG                          | 1   | 1   | 2   |
| GRANGES AMERICAS INC                  | 1   | 1   | 2   |
| GRASCHE USA                           | 1   |     | 1   |
| GRASS AMERICA INC                     | 4   | 4   | 8   |
| GRAY MANUFACTURING TECHNOLOGIES LLC   | 2   | 2   | 4   |
| GREENE STREET HOLDINGS                | 2   | 2   | 4   |
| GREENEST HOTEL LLC                    | 1   |     | 1   |
| GREENSBORO COLLEGE                    | 13  | 13  | 26  |
| GREER LABORATORIES INC                | 4   | 1   | 5   |
| GRIFFIN INDUSTRIES                    | 2   | 2   | 4   |
| GRIFOLS THERAPEUTICS INC              | 1   | 1   | 2   |
| GUILFORD COLLEGE                      | 42  | 30  | 72  |
| GUILFORD COUNTY                       | 8   | 8   | 16  |
| GUILFORD COUNTY SCHOOLS               | 236 | 234 | 470 |
| GUILFORD CTY SCH                      | 1   |     | 1   |
| GUILFORD TECH COMM COLL               | 16  | 15  | 31  |
| H ALVIS FAUST                         | 2   | 2   | 4   |
| H B D INC                             | 1   | 1   | 2   |
| HAECO CABIN SOLUTIONS                 | 9   | 9   | 18  |
| HAN FENG INC                          |     | 1   | 1   |
| HANES COMPANIES INC                   | 3   | 2   | 5   |
| HANES DYE & FINISHING                 | 1   | 1   | 2   |
| HANWHA ADVANCED MATERIALS AMERICA LLC | 1   | 1   | 2   |
| HARRIS TEETER INC                     | 91  | 87  | 178 |
| HASHMASTER TECH, LLC                  |     | 1   | 1   |
| HAYWARD INDUSTRIES, INC               | 3   | 3   | 6   |
| HENDERSON COUNTY GOVERNMENT           | 5   | 5   | 10  |
| HENDERSON COUNTY SCHOOLS              | 17  | 15  | 32  |

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| HENDERSONVILLE HEALTH & REHAB          | 1  | 1  | 2   |
| HENKEL CORPORATION                     | 6  | 6  | 12  |
| HERBALIFE INTERNATIONAL OF AMERICA INC | 1  | 1  | 2   |
| HERITAGE HOME GROUP LLC                | 2  | 4  | 6   |
| HERRON TEST LAB INC                    | 1  | 1  | 2   |
| HICKORY CITY SCHOOLS                   | 13 | 12 | 25  |
| HICKORY PRINTING SOLUTIONS, LLC        | 2  | 2  | 4   |
| HICKORY SPRINGS MANUFACTURING COMPANY  | 21 | 23 | 44  |
| HIGH ASSOCIATES, LTD                   | 2  | 2  | 4   |
| HIGH COUNTRY LUMBER AND MULCH LLC      |    | 2  | 2   |
| HIGH DEFINITION TOOL CORPORATION       | 1  | 1  | 2   |
| HIGHLAND INDUSTRIES INC                | 4  | 4  | 8   |
| HIGHWOODS PROPERTIES                   | 51 | 1  | 52  |
| HIGHWOODS REALTY LIMITED PARTNERSHIP   | 1  |    | 1   |
| HIGHWOODS REALTY LTP                   | 1  |    | 1   |
| HILL HOSIERY MILLS                     | 2  | 2  | 4   |
| HISTORIC REVOLUTION LLC                | 3  | 2  | 5   |
| HITACHI METALS NC LTD                  | 1  | 1  | 2   |
| HOME DEPOT                             | 18 | 2  | 20  |
| HONDA POWER EQUIPMENT MFG, INC         |    | 1  | 1   |
| HS MALLARD CREEK CENTER LLC            | 1  | 1  | 2   |
| HSRE-HOCK PLAZA LLC                    | 2  | 2  | 4   |
| HTA-MOREHEAD MOB, LLC                  | 1  | 1  | 2   |
| HUGH CHATHAM MEM HOSPITAL              | 37 | 37 | 74  |
| HUITT MILLS, INC                       | 2  | 2  | 4   |
| HUMACYTE INC                           | 2  | 2  | 4   |
| HUNTSMAN INTERNATIONAL LLC             | 2  | 2  | 4   |
| IAC OLD FORT II LLC                    | 1  | 2  | 3   |
| IAC OLD FORT, LLC                      | 2  |    | 2   |
| IBM CORPORATION                        | 5  | 4  | 9   |
| IGM RESINS USA INC                     |    | 1  | 1   |
| IMAGES OF AMERICA                      | 2  | 2  | 4   |
| IMC-METALSAMERICA, LLC                 | 1  | 1  | 2   |
| IMERYS MICA KINGS MOUNTAIN INC         | 7  | 7  | 14  |
| INDEPENDENT BEVERAGE CORPORATION       | 7  | 7  | 14  |
| INDUSTRIAL WOOD PROD                   | 3  | 3  | 6   |
| INDUSTRIAL WOOD PRODUCTS               | 3  | 3  | 6   |
| INFO-GEL, LLC                          | 3  | 3  | 6   |
| ING CLARION REALTY SERVICES LLC        | 5  | 5  | 10  |
| INGERSOLL-RAND COMPANY                 | 5  | 5  | 10  |
| INGLES MARKETS, INC.                   | 59 | 59 | 118 |
| INGREDION INCORPORATED                 | 1  | 1  | 2   |
| INSTEEL INDUSTRIES, INC                | 2  | 2  | 4   |
| INSTITUTION FOOD HOUSE, INC            | 7  | 7  | 14  |
| INTELLIGENT IMPLANT SYSTEMS            | 1  | 1  | 2   |
| INTERNATIONAL PAPER COMPANY            | 6  | 5  | 11  |
| INTERNATIONAL TEXTILE GROUP INC        |    | 1  | 1   |
| INTERTECH CORP                         | 1  | 1  | 2   |
| IPEX USA, INC                          | 2  | 1  | 3   |
| IQE INC                                | 3  | 3  | 6   |
| IRVING PARTNERS, LTD                   | 1  | 1  | 2   |
| ISOTHERMAL COMMUNITY COLLEGE           | 5  | 5  | 10  |

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|--|----|----|-----|
| ITG BRANDS LLC                                 | 2  | 2  | 4   |
| ITL LLC  | 2  | 2  | 4   |
| J C PENNEY CO                                  | 5  | 5  | 10  |
| J E HERNDON CO                                 | 1  | 1  | 2   |
| JACKSON BOE                                    | 7  | 7  | 14  |
| JACKSON CREEK MFG INC                          | 2  | 2  | 4   |
| JACKSON PAPER MFG CO                           | 1  | 1  | 2   |
| JAMES M PLEASANTS CO                           | 1  |    | 1   |
| JAMESTOWN YMCA                                 | 1  | 1  | 2   |
| JDL CASTLE CORP                                | 1  | 1  | 2   |
| JOHN JENKINS CO                                | 1  | 1  | 2   |
| JOHN UMSTEAD HOSPITAL                          |    | 5  | 5   |
| JOHNSON & WALES UNIVERSITY                     | 3  | 3  | 6   |
| JOHNSON CONTROLS BATTERY GROUP, INC            | 1  | 1  | 2   |
| JOHNSON CONTROLS INC                           | 3  |    | 3   |
| JOWAT CORPORATION                              | 8  | 8  | 16  |
| JPS COMPOSITE MATERIALS CORP                   |    | 1  | 1   |
| KAYSER ROTH CORPORATION                        | 2  | 2  | 4   |
| KBSIII CARILLON LLC                            | 1  | 1  | 2   |
| KEN SMITH YARN CO                              | 1  | 1  | 2   |
| KENDRION-SHELBY                                | 2  | 2  | 4   |
| KERRS HICKORY READY MIXED CONCRETE COMPANY INC | 2  | 2  | 4   |
| KEYSTONE FOODS LLC                             | 2  | 2  | 4   |
| KEYSTONE POWDERED ME                           | 1  | 1  | 2   |
| KIMBERLY CLARK                                 | 5  | 5  | 10  |
| KINCAID FURNITURE                              | 12 | 12 | 24  |
| KINDER MORGAN SOUTHEAST TERMINAL               | 2  | 2  | 4   |
| KINDER MORGAN TRANSMIX GROUP                   | 1  | 1  | 2   |
| KINDRED HOSPITALS EAST LLC                     | 2  | 2  | 4   |
| KINGS MOUNTAIN INTERNATIONAL INC               | 2  | 2  | 4   |
| KOHL'S DEPARTMENT STORES                       |    | 1  | 1   |
| KOOPMAN DAIRIES INC                            | 2  | 2  | 4   |
| KOURY CORPORATION                              | 58 | 58 | 116 |
| KOURY VENTURES                                 | 5  | 5  | 10  |
| KROGER CO                                      | 1  | 1  | 2   |
| KROGER LIMITED PARTNERSHIP I                   | 1  | 1  | 2   |
| KSM CASTINGS USA INC                           | 2  | 2  | 4   |
| KURZ TRANSFER PRODUCTS LP                      | 5  | 5  | 10  |
| KYOCERA INTERNATIONAL INC                      | 1  | 1  | 2   |
| L B PLASTICS INC                               | 8  | 8  | 16  |
| L S STARRETT CO                                | 2  | 4  | 6   |
| LAB CORP                                       | 8  | 8  | 16  |
| LABELTECH INCORPORATED                         | 2  | 2  | 4   |
| LABORATORY CORPORATION OF AMERICA              | 1  | 1  | 2   |
| LABORATORY CORPORATION OF AMERICA HOLDINGS     | 1  |    | 1   |
| LAKE HICKORY COUNTRY CLUB                      | 6  | 6  | 12  |
| LANXESS CORP                                   |    | 3  | 3   |
| LANXESS SOLUTIONS US INC                       | 1  | 1  | 2   |
| LEE INDUSTRIES                                 | 3  | 3  | 6   |
| LEESONA CORP                                   | 1  | 1  | 2   |
| LEGION BREWING COMPANY LLC                     | 2  | 2  | 4   |
| LELOUDIS LIONTIS, LLC                          | 1  | 1  | 2   |



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|--|----|----|-----|
| LEMCO MILLS INC                                  | 2  | 2  | 4   |
| LENNY BOY LLC                                    | 1  | 1  | 2   |
| LENOVO (UNITED STATES) INC                       | 1  | 1  | 2   |
| LEXINGTON FURNITURE IND                          | 2  | 3  | 5   |
| LIBERTY COMMONS NURSING AND REHABILITATION CENTI | 1  | 1  | 2   |
| LIBERTY HARDWARE                                 | 3  | 2  | 5   |
| LIBERTY HEALTHCARE PROPERTIES OF BALLANTYNE LLC  | 1  | 1  | 2   |
| LIBERTY HEALTHCARE PROPERTIES OF MECKLENBURG COU | 1  | 1  | 2   |
| LIDL US OPERATIONS LLC                           | 1  | 1  | 2   |
| LIDL US OPERATIONS, LLC                          | 4  | 4  | 8   |
| LIGGETT GROUP INC                                | 1  | 1  | 2   |
| LINCOLN COMM HEALTH                              | 1  | 1  | 2   |
| LINDE LLC  | 1  | 1  | 2   |
| LINDYS HOMEMADE, LLC                             | 1  | 1  | 2   |
| LOPAREX LLC                                      | 2  | 2  | 4   |
| LOTUS BAKERIES US MANUFACTURING, LLC             | 2  | 2  | 4   |
| LOUISIANA-PACIFIC CORPORATION                    | 1  | 1  | 2   |
| LOWES FOODS                                      | 42 | 42 | 84  |
| LOWE'S HOME CENTERS, INC                         | 90 | 89 | 179 |
| LOWES OF FRANKLIN #717                           | 2  | 2  | 4   |
| LOWE'S OF FRANKLIN #717                          | 1  | 1  | 2   |
| LTF CONSTRUCTION COMPANY LLC                     | 1  |    | 1   |
| LUBRIZOL ADVANCED MATERIALS INC                  | 3  | 2  | 5   |
| LUTHERAN RETIREMENT MINISTRIES OF ALAMANCE CO    | 10 | 10 | 20  |
| LYDALL THERMAL ACOUSTICAL INC                    | 4  | 1  | 5   |
| MACK CONSOLIDATED CENTER LLC                     | 3  | 3  | 6   |
| MAERSK INC                                       | 1  | 1  | 2   |
| MAGNOLIA CASTLE LLC                              | 1  | 1  | 2   |
| MANN+HUMMEL FILTRATION TECHNOLOGY US LLC         | 2  | 2  | 4   |
| MANNINGTON WOOD FLOORS                           | 1  |    | 1   |
| MANUAL WOODWORKERS & WEAVERS INC                 | 2  | 2  | 4   |
| MARKET AMERICA                                   | 3  | 3  | 6   |
| MARSH FURNITURE CO                               | 4  | 3  | 7   |
| MARTIN MARIETTA MATERIALS INC                    | 68 | 71 | 139 |
| MARVEL-SCHEBLER AIRCRAFT CARBORATORS             | 2  | 2  | 4   |
| MARVES INDUSTRIES, LLC                           | 1  | 1  | 2   |
| MASONIC & EASTERN STAR HOME                      | 3  | 3  | 6   |
| MATERIAL HANDLING INDUSTRY                       | 1  | 1  | 2   |
| MAUSER CORP                                      |    | 4  | 4   |
| MAY DEPT STORE                                   | 5  | 5  | 10  |
| MAYFLOWER VEHICLE SYSTEMS,LLC                    | 2  | 1  | 3   |
| MCCOMB INDUSTRIES LLLP                           | 2  | 2  | 4   |
| MCCREARY MODERN INC                              | 8  | 5  | 13  |
| MCDOWELL HOSPITAL INC                            | 1  |    | 1   |
| MCLEOD LEATHR & BELT                             | 1  | 1  | 2   |
| MCMICHAEL MILLS INC                              | 2  | 2  | 4   |
| MDI MANAGEMENT                                   | 1  |    | 1   |
| MEAT AND SEAFOOD SOLUTIONS LLC                   |    | 7  | 7   |
| MECK AREA CATH SCHLS                             |    | 3  | 3   |
| MECK CNTY JAIL CENTRAL                           | 1  |    | 1   |
| MECKLENBURG COUNTY                               | 21 | 10 | 31  |
| MEDI MFG INC                                     | 2  | 2  | 4   |

|                                    |    |    |    |
|------------------------------------|----|----|----|
| MERCHANTS DISTRIBUTORS , LLC       | 1  | 1  | 2  |
| MERCK SHARP & DOHME CORP           | 4  | 4  | 8  |
| MERCY HOSPITAL, INC                | 1  | 1  | 2  |
| MEREDITH WEBB PRINT                | 3  | 3  | 6  |
| MERIDIAN BRICK, LLC                | 1  | 1  | 2  |
| MERIDIAN HOSPITALITY HOLDINGS LLC  | 1  | 1  | 2  |
| MERIDIAN LABORATORY CORP           | 2  | 2  | 4  |
| MERITOR HEAVY VEHICLE SYSTEMS      | 1  | 1  | 2  |
| MERITOR HEAVY VEHICLE SYSTEMS LLC  | 1  | 1  | 2  |
| MESSER LLC                         | 1  | 1  | 2  |
| METALS USA CARBON FLAT ROLLED INC  | 2  | 1  | 3  |
| METROLINA GREENHOUSES INC          | 20 | 20 | 40 |
| MICHELIN AIRCRAFT TIRE CO          | 1  | 1  | 2  |
| MICHELIN NORTH AMERICA             | 7  | 7  | 14 |
| MILES TALBOTT                      | 2  | 2  | 4  |
| MILLERCOORS LLC                    | 1  | 1  | 2  |
| MILLIKEN & COMPANY                 | 2  | 2  | 4  |
| MINNESOTA MINING & MFG CO          | 2  | 2  | 4  |
| MINT MUSEUM OF CRAFT & DESIGN      | 1  | 1  | 2  |
| MITCHELL GOLD CO                   | 4  | 4  | 8  |
| MODERN DENSIFYING                  |    | 2  | 2  |
| MOM BRANDS COMPANY, LLC            | 1  | 1  | 2  |
| MOORE WALLACE NORTH AMERICA INC    | 1  | 1  | 2  |
| MOORESVILLE CITY SCHOOLS           | 8  | 8  | 16 |
| MOORESVILLE ICE CREAM COMPANY LLC  | 1  | 1  | 2  |
| MORINAGA AMERICA FOODS INC         |    | 1  | 1  |
| MORRISETTE PAPER COMPANY INC       | 2  |    | 2  |
| MORTON CUSTOM PLASTICS, LLC        | 2  | 2  | 4  |
| MOSES CONE HEALTH SYS              | 16 | 16 | 32 |
| MOUNT VERNON MILLS INC             | 1  | 1  | 2  |
| MULTI SHIFTER INC                  | 1  | 1  | 2  |
| N C FOAM IND INC                   | 1  |    | 1  |
| NATIONAL CONTAINER GROUP           | 1  | 1  | 2  |
| NATIONAL GENERAL MANAGMENT CORP.   | 5  | 5  | 10 |
| NATIONAL GYPSUM CO                 | 1  | 1  | 2  |
| NATIONAL PIPE & PLASTIC, INC       | 1  | 1  | 2  |
| NATIONAL PIPE & PLASTICS           | 2  | 2  | 4  |
| NC A&T UNIV FOUNDATION             | 1  | 1  | 2  |
| NC BAPTIST HOSPITAL                | 8  | 8  | 16 |
| NC BLUMENTHAL PAC                  | 2  | 2  | 4  |
| NC CENTER FOR PUBLIC TV            | 7  | 7  | 14 |
| NC CENTRAL UNIVERSITY              | 1  | 1  | 2  |
| NC DEPT OF HEALTH & HUMAN SERVICES | 29 | 29 | 58 |
| NC DEPT OF PUBLIC SAFETY           | 23 | 23 | 46 |
| NC OWNER LLC                       | 1  |    | 1  |
| NC STATE UNIVERSITY                | 1  | 1  | 2  |
| NCFLA II OWNER LLC                 | 3  |    | 3  |
| NEPTCO INC                         | 3  | 3  | 6  |
| NETAPP, INC                        | 2  | 2  | 4  |
| NEW EXCELSIOR, INC                 |    | 1  | 1  |
| NEW GENERATION YARNS               |    | 2  | 2  |
| NEW SOUTH LUMBER COMPANY INC       | 3  | 3  | 6  |

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|---|----|----|----|
| NFI INDUSTRIES INC                            | 1  |    | 1  |
| NGK CERAMICS USA                              | 2  | 2  | 4  |
| NIAGARA BOTTLING LLC                          | 1  | 1  | 2  |
| NORAFIN AMERICAS INC                          | 2  | 2  | 4  |
| NORDFAB                                       | 5  | 5  | 10 |
| NORDIC WAREHOUSE INC                          | 1  | 1  | 2  |
| NORDSTROM INC                                 | 2  | 1  | 3  |
| NORFOLK SOUTHERN                              | 2  | 2  | 4  |
| NORTH STATE FLEXIBLES, LLC                    | 3  | 3  | 6  |
| NORTHERN HOSP OF SURRY CO                     | 2  | 2  | 4  |
| NORTHROP GRUMMAN GUIDANCE & ELECTRONICS COMP, | 2  | 2  | 4  |
| NOVANT HEALTH INC                             | 26 | 26 | 52 |
| NOVOZYMES NORTH AMERICAN INC                  | 1  | 1  | 2  |
| NR CHARLOTTE LLC                              | 1  | 1  | 2  |
| NW BALLANTYNE ONE LP                          | 1  | 1  | 2  |
| NW BALLANTYNE THREE LP                        | 1  | 1  | 2  |
| NW BALLANTYNE TWO LP                          | 1  | 1  | 2  |
| NW BETSILL BUILDING LP                        | 1  | 1  | 2  |
| NW BOYLE BUILDINGS LP                         | 2  | 2  | 4  |
| NW BRIXHAM GREEN ONE LP                       | 1  | 1  | 2  |
| NW BRIXHAM GREEN THREE LP                     | 2  | 2  | 4  |
| NW BRIXHAM GREEN TWO LP                       | 1  | 1  | 2  |
| NW CALHOUN BUILDING LP                        | 1  | 1  | 2  |
| NW CHANDLER BUILDING LP                       | 1  | 1  | 2  |
| NW CRAWFORD BUILDING LP                       | 1  | 1  | 2  |
| NW CULLMAN PARK LP                            | 1  | 1  | 2  |
| NW EVERETT BUILDING LP                        | 1  | 1  | 2  |
| NW FRENETTE BUILDING LP                       | 1  | 1  | 2  |
| NW GIBSON BUILDING LP                         | 1  | 1  | 2  |
| NW GRAGG BUILDING LP                          | 1  | 1  | 2  |
| NW HALL BUILDING LP                           | 1  | 1  | 2  |
| NW HAYES BUILDING LP                          | 1  | 1  | 2  |
| NW HIXON BUILDING LP                          | 1  | 1  | 2  |
| NW IRBY BUILDING LP                           | 1  | 1  | 2  |
| NW JJH BUILDING LP                            | 2  | 2  | 4  |
| NW MEDICAL TWO LP                             | 1  | 1  | 2  |
| NW RICHARDSON BUILDING LP                     | 1  | 1  | 2  |
| NW SIMMONS BUILDING LP                        | 2  | 2  | 4  |
| NW WINSLOW BUILDING LP                        | 1  | 1  | 2  |
| NW WOODWARD BUILDING LP                       | 1  | 1  | 2  |
| NWBH 1 LP                                     | 2  | 2  | 4  |
| NYPRO CAROLINA                                | 3  | 2  | 5  |
| O T SPORTS IND INC                            | 1  | 1  | 2  |
| OAK FOREST HEALTH AND REHABILITATION CO       | 1  | 1  | 2  |
| O'MARA, INC.                                  | 1  | 1  | 2  |
| OMNISOURCE SOUTHEAST                          | 5  | 6  | 11 |
| OMNOVA SOLUTIONS                              |    | 1  | 1  |
| ONEAL STEEL INC                               | 4  | 4  | 8  |
| OPTICAL EXPERTS MANUFACTURING                 | 1  | 1  | 2  |
| ORACLE FLEXIBLE PACKAGING                     | 1  | 1  | 2  |
| OTTO INDUSTRIES                               | 2  | 2  | 4  |
| OWASA   | 9  | 8  | 17 |

|  |    |    |    |
|--|----|----|----|
| OWENS & MINOR DISTRIBUTION INC                 |    | 1  | 1  |
| OWENS & MINOR INC.                             |    | 1  | 1  |
| OWENS & MINOR MEDICA                           | 1  | 1  | 2  |
| OWENS ILLINOIS, INC                            | 2  | 2  | 4  |
| P G DRY KILN CO                                | 1  | 1  | 2  |
| P G MACHINE SHOP                               | 1  | 1  | 2  |
| PACKRITE LLC                                   | 5  | 5  | 10 |
| PACTIV LLC                                     |    | 3  | 3  |
| PALLETONE OF NC                                | 6  | 6  | 12 |
| PANTHERS STADIUM, LLC                          | 1  | 1  | 2  |
| PAPER STOCK DEALERS                            | 1  | 1  | 2  |
| PARDEE MEMORIAL HOSPITAL                       | 8  | 8  | 16 |
| PARK HUNTERSVILLE PARTNERS, LLC                | 3  | 3  | 6  |
| PARK RIDGE HOSPITAL                            | 8  | 9  | 17 |
| PARKDALE AMERICA LLC                           | 8  | 8  | 16 |
| PARKDALE MILLS, INC                            | 2  | 3  | 5  |
| PARKER HANNIFIN CORPORATION                    | 9  | 9  | 18 |
| PARMER RTP, LLC                                | 2  | 2  | 4  |
| PARTON LUMBER CO                               | 6  | 8  | 14 |
| PATRICK YARN MILL                              |    | 1  | 1  |
| PBM GRAPHICS INC                               | 5  | 5  | 10 |
| PENN ENG & MANF CORP                           | 2  | 2  | 4  |
| PEPSI BOTTLING VENTURES, LLC                   | 7  | 7  | 14 |
| PERFORMANCE LIVESTOCK & FEED CO, INC.          | 1  | 1  | 2  |
| PERMA TECH INC                                 | 1  | 1  | 2  |
| PHARR YARNS, LLC                               | 4  | 4  | 8  |
| PIEDMONT CHEMICAL                              | 2  | 2  | 4  |
| PIEDMONT PUBLISHING                            | 1  | 1  | 2  |
| PIEDMONT ROW DRIVE, LLC                        | 11 | 11 | 22 |
| PIEDMONT TRIAD REG WATER AUTH                  |    | 4  | 4  |
| PIERRE FOODS                                   | 7  | 7  | 14 |
| PILGRIM ASSOCIATES                             | 2  | 2  | 4  |
| PINE HALL BRICK COMPANY, INC                   | 2  | 2  | 4  |
| PINE NEEDLE LNG COMPANY                        | 1  | 1  | 2  |
| PIONEER COMMUNITY HOSPITAL OF STOKES           | 1  | 1  | 2  |
| PIONEER DIVERSITIES CO                         | 1  |    | 1  |
| PITTSBURGH GLASS WORKS LLC                     | 1  | 1  | 2  |
| PLANTATION PIPE LINE                           | 3  | 3  | 6  |
| PLASTIC REVOLUTIONS                            | 1  | 1  | 2  |
| PLYCEM USA, INC                                | 1  | 1  | 2  |
| PNEUMAFIL CORPORATION                          | 6  | 6  | 12 |
| POLK COUNTY SCHOOLS                            | 5  | 5  | 10 |
| POLY PLASTIC PRODUCTS OF NC INC                | 5  | 5  | 10 |
| POLYMER GROUP, INC                             | 1  | 1  | 2  |
| POPPELMANN PLASTICS USA LLC                    | 1  | 1  | 2  |
| PPG INDUSTRIES INC                             | 2  | 2  | 4  |
| PRECISION FABRICS GROUP INC                    | 2  | 2  | 4  |
| PRECOR MANUFACTURING LLC                       | 1  | 1  | 2  |
| PREFERRED APARTMENT COMMUNITIES OPERATING PART | 5  | 5  | 10 |
| PRESBYTERIAN HOMES, INC                        | 9  | 9  | 18 |
| PRESBYTERIAN HOSPITAL                          | 9  | 9  | 18 |
| PRESBYTERIAN MEDICAL CARE CORP                 | 1  | 1  | 2  |

|  |    |    |    |
|--|----|----|----|
| PRESTIGE FARMS                         | 1  | 1  | 2  |
| PRESTIGE FARMS INC                     | 1  | 1  | 2  |
| PRINCE MANUFACTURING CORP              | 1  | 1  | 2  |
| PRINTCRAFT CO INC                      | 1  | 1  | 2  |
| PRINTPACK INC                          | 1  | 1  | 2  |
| PROCTER & GAMBLE MANUFACTURING COMPANY | 5  | 5  | 10 |
| PRO-SYSTEM, INC                        | 1  | 1  | 2  |
| PRYSMIAN CABLE AND SYSTEMS USA, LLC    | 1  | 1  | 2  |
| PUBLIC LIBRARY MECK CO                 | 2  | 2  | 4  |
| PUBLIX NORTH CAROLINA LP               | 22 | 22 | 44 |
| PUROLATOR FACET INC                    | 4  | 3  | 7  |
| QG PRINTING II LLC                     | 4  | 4  | 8  |
| QORVO US , INC                         | 1  | 1  | 2  |
| QORVO US INC                           | 2  | 2  | 4  |
| QUALICAPS INC                          | 3  | 3  | 6  |
| R & R POWDER COATING INC               | 1  | 1  | 2  |
| RACK ROOM SHOES                        | 1  | 1  | 2  |
| RALEIGH RC GREEN LLC                   | 3  | 3  | 6  |
| RALPH LAUREN CORPORATION               | 4  | 4  | 8  |
| RANDOLPH CO BD OF ED                   | 36 | 36 | 72 |
| RANDY D MILLER                         | 7  | 7  | 14 |
| RAUMEDIC INCORPORATED                  | 1  | 1  | 2  |
| RD AMERICA LLC                         | 1  | 1  | 2  |
| REEP IND MCP IV NC LLC                 | 5  | 5  | 10 |
| REGAL CINEMAS INC                      | 5  | 5  | 10 |
| REMATTR, INC                           | 3  | 3  | 6  |
| RENWOOD MILLS LLC                      |    | 1  | 1  |
| REPLACEMENTS LTD                       | 7  | 7  | 14 |
| REVOLUTION TENANT, LLC                 | 2  |    | 2  |
| RESEARCH TRIANGLE INSTITUTE            |    | 1  | 1  |
| REYNOLDA MANUFACTURING SOLUTIONS, INC  | 4  | 4  | 8  |
| RH MANUFACTURING LLC                   | 2  | 2  | 4  |
| RICHA INC                              | 5  | 5  | 10 |
| RITZ CARLTON CHARLOTTE                 | 1  | 1  | 2  |
| RJ REYNOLDS TOBACCO CO                 | 5  | 5  | 10 |
| ROCHLING ENGINEERED PLASTICS           | 3  | 3  | 6  |
| ROCKINGHAM COMM COLLEGE                | 1  | 1  | 2  |
| ROCKINGHAM COUNTY GOVERNMENT           | 2  | 2  | 4  |
| ROCKINGHAM COUNTY SCHOOLS              | 4  | 3  | 7  |
| ROCK-TENN CONVERTING COMPANY           | 1  | 1  | 2  |
| ROGER MARK PENDLETON                   | 4  | 4  | 8  |
| RONNIE D MILES                         | 1  | 1  | 2  |
| ROUNDPOINT FINANCIAL GROUP             | 1  |    | 1  |
| ROUSH & YATES RACING ENGINES, LLC      | 4  | 4  | 8  |
| ROWAN COUNTY                           | 4  | 4  | 8  |
| ROWAN SALISBURY SCHOOLS                | 5  |    | 5  |
| RUTHERFORD COUNTY SCHOOLS              | 3  | 2  | 5  |
| RUTHERFORD HOSPITAL INC                | 5  | 5  | 10 |
| SAFT AMERICA                           | 4  | 4  | 8  |
| SALEM ACADEMY & COLLEGE                | 14 | 14 | 28 |
| SALEM BUSINESS PARK                    |    | 1  | 1  |
| SALISBURY MACHINERY                    | 1  | 1  | 2  |

|   |    |    |    |
|---|----|----|----|
| SAMS EAST INC                             | 19 | 19 | 38 |
| SANDVIK CORP                              | 2  | 2  | 4  |
| SANDY RDG GOLF CLUB                       | 2  | 2  | 4  |
| SANS TECHNICAL FIBERS, LLC                | 4  | 4  | 8  |
| SAP ACQUISITION,LLC                       | 5  | 5  | 10 |
| SAPA BURLINGTON LLC                       | 3  | 3  | 6  |
| SCA PACKAGING NORTH AMERICA               | 2  | 2  | 4  |
| SCHAEFER SYSTEMS                          | 7  |    | 7  |
| SCHERING-PLOUGH                           | 1  | 1  | 2  |
| SCHNEIDER MILLS, INC                      | 1  | 1  | 2  |
| SCM METAL PRODUCTS INC                    | 3  | 3  | 6  |
| SEALED AIR CORPORATION                    | 1  | 1  | 2  |
| SEALED AIR CORPORATION (US)               | 1  | 1  | 2  |
| SEALED AIR CORPORATION US                 | 1  | 1  | 2  |
| SECURITY NATIONAL PROPERTIES HOLDINGS LLC | 17 | 17 | 34 |
| SELEE CORP                                | 2  | 2  | 4  |
| SELF HELP VENTURES FUND                   | 1  | 1  | 2  |
| SGL CARBON, LLC                           | 1  | 1  | 2  |
| SHAMROCK CORPORATION                      | 4  |    | 4  |
| SHAW INDUSTRIES GROUP, INC                | 3  | 3  | 6  |
| SHEETZ DISTRIBUTION SERVICES LLC          | 1  | 1  | 2  |
| SHERATON IMPERIAL                         | 3  | 3  | 6  |
| SHERILL FURNITURE                         | 4  | 5  | 9  |
| SHERWIN WILLIAMS COMPANY                  | 5  | 5  | 10 |
| SHUFORD YARNS,LLC                         | 2  | 2  | 4  |
| SHURTAPE TECHNOLOGIES                     | 7  | 7  | 14 |
| SIEMENS ENERGY INC                        | 2  | 3  | 5  |
| SIEMENS ENERGY, INC                       | 2  | 2  | 4  |
| SIERRA NEVADA BREWING CO                  | 1  | 1  | 2  |
| S-L SNACKS NATIONAL , LLC                 | 1  | 1  | 2  |
| SLANE HOSIERY MILLS INC                   |    | 1  | 1  |
| SNIDER TIRE,INC                           | 2  | 2  | 4  |
| SOCIAL SECURITY ADMINISTRATION            | 1  | 1  | 2  |
| SONESTA INTERNATIONAL HOTELS CORPORATION  | 1  |    | 1  |
| SONOCO CORRFLEX D & P LLC                 | 2  | 2  | 4  |
| SONOCO CRELLIN INC                        | 2  | 2  | 4  |
| SONOCO PRODUCTS COMPANY                   | 2  | 2  | 4  |
| SOP 200 N COLLEGE OWNER GP LLC            | 1  | 1  | 2  |
| SOUTH COLLEGE STREET LLC                  | 1  | 1  | 2  |
| SOUTH FORK INDUSTRIES                     | 4  | 4  | 8  |
| SOUTH GRANVILLE WATER AND SEWER AUTHORITY | 3  | 3  | 6  |
| SOUTH PARK MALL                           | 12 | 6  | 18 |
| SOUTHCORR PACKAGING                       | 1  | 1  | 2  |
| SOUTHEASTERN CONTAINER INC                |    | 2  | 2  |
| SOUTHERN CAST                             | 3  | 3  | 6  |
| SOUTHERN FURNITURE                        | 4  | 2  | 6  |
| SOUTHERN METALS CO                        | 7  | 3  | 10 |
| SOUTHERN PIPE INC                         | 1  | 1  | 2  |
| SOUTHERN PRECISION SPRING CO INC          | 2  | 2  | 4  |
| SOUTHWESTERN COMMUNITY COLLEGE            | 9  | 9  | 18 |
| SPARTAN DYERS INC                         | 2  | 2  | 4  |
| SPECIALIZED PACKAGING FLEXO               | 1  | 1  | 2  |

|   |    |    |    |
|---|----|----|----|
| SPECIALTY MANUFACTURING INC             | 1  | 1  | 2  |
| SPECTRUM PROPERTIES MANAGEMENT COMPANY  | 7  | 7  | 14 |
| SPEED CHANNEL INC                       | 1  | 1  | 2  |
| SPENCERS INCORPORATED OF MOUNT AIRY, NC | 1  |    | 1  |
| SPORTS MENAGERIE                        | 2  | 2  | 4  |
| SPORTS SOLUTIONS INC                    | 2  | 2  | 4  |
| SPRINT                                  | 1  | 1  | 2  |
| SPX FLOW INC.                           | 1  | 1  | 2  |
| SRPF A/300 SOUTH BREVARD LLC            | 1  | 1  | 2  |
| ST LUKES HOSPITAL                       | 2  | 2  | 4  |
| STAMPSOURCE                             | 1  | 1  | 2  |
| STANDARD TOOLS AND EQUIPMENT            | 2  | 2  | 4  |
| STANLEY TOTAL LIVING CENTER             | 1  | 1  | 2  |
| STAPLES INC                             | 2  | 2  | 4  |
| STAR PAPER TUBE INC                     | 1  |    | 1  |
| STARPORT I,LLC                          | 1  | 1  | 2  |
| STARWOOD RETAIL PARTNERS                | 1  | 1  | 2  |
| STEEL SPECIALTIES                       | 2  | 2  | 4  |
| STEFANO FOODS                           | 3  | 3  | 6  |
| STEWART SUPERABSORBENTS, LLC            | 1  |    | 1  |
| STONEFIELD CELLARS WINERY LLC           | 1  | 1  | 2  |
| STONEVILLE LUMBER CO                    | 2  | 2  | 4  |
| STURM RUGER & CO INC                    | 2  | 2  | 4  |
| SUMITOMO ELECTRIC ESC, INC              | 1  | 1  | 2  |
| SUNCOM WIRELESS PCS, INC                |    | 3  | 3  |
| SUNSET HILL INVESTMENTS LLC             | 1  | 1  | 2  |
| SUNTERRACE CASUAL FURNITURE, INC        | 2  | 1  | 3  |
| SUNTRUST BANKS INC                      | 1  | 1  | 2  |
| SV CENTER LLC                           | 2  | 2  | 4  |
| SWAIN COUNTY SCHOOLS                    | 6  |    | 6  |
| SWIFT BEEF COMPANY                      | 1  | 1  | 2  |
| SYCAMORE BREWING LLC                    | 1  | 1  | 2  |
| SYNCOT PLASTICS, INC                    | 5  | 5  | 10 |
| SYNERGY RECYCLING LLC                   |    | 2  | 2  |
| SYNGENTA CROP PROTECTION, INC           | 9  | 9  | 18 |
| SYNGENTA CROP PROTECTION, LLC           | 1  |    | 1  |
| SYNTAX SYSTEMS USA, LP                  | 2  | 4  | 6  |
| SYNTEC SEATING SOLUTIONS LLC            | 1  | 1  | 2  |
| SYNTHETICS FINISHING                    | 9  | 9  | 18 |
| T5@KINGS MOUNTAIN II, LLC               | 1  | 1  | 2  |
| T5@KINGS MOUNTAIN VII LLC               | 2  | 2  | 4  |
| TALBERT BUILDING SUPPLY INC             | 1  | 1  | 2  |
| TARGET STORES                           | 23 | 6  | 29 |
| TAYLOR BROS                             | 6  | 6  | 12 |
| TAYLOR INVESTMENT PROPERTIES, LLC       | 3  | 3  | 6  |
| TAYLOR KING FURNITUR                    | 2  | 1  | 3  |
| TCG OF THE CAROLINAS                    | 1  | 1  | 2  |
| TDY INDUSTRIES LLC                      | 1  | 1  | 2  |
| TE CONNECTIVITY CORPORATION             | 15 | 15 | 30 |
| TEAM INDUSTRIES                         | 1  | 1  | 2  |
| TECHNIBILT LTD                          | 3  | 3  | 6  |
| TECHNICAL PRECISION PLASTICS            | 8  | 8  | 16 |

|  |    |    |    |
|--|----|----|----|
| TECHNIMARK LLC                                     | 11 | 11 | 22 |
| TELERX MARKETING INC                               | 1  | 1  | 2  |
| TERRA-MULCH PRODUCTS, LLC                          | 3  | 4  | 7  |
| TEX TECH COATINGS LLC                              | 4  | 4  | 8  |
| THE CHARLOTTE-MECKLENBURG HOSPITAL AUTHORITY       | 2  | 2  | 4  |
| THE CLEARING HOUSE PAYMENTS COMPANY LLC            | 1  | 1  | 2  |
| THE CYPRESS OF CHARLOTTE CLUB, INC                 | 11 | 11 | 22 |
| THE DAVID H MURDOCK CORE LABORATORY BUILDING OW    | 1  | 1  | 2  |
| THE EXCHANGE AT MEADOWMOUNT LLC                    | 1  | 1  | 2  |
| THE EXCHANGE EAST LLC                              | 1  | 1  | 2  |
| THE FRESH MARKET                                   | 1  | 1  | 2  |
| THE GC NET LEASE (CHARLOTTE) INVESTORS LLC         | 1  |    | 1  |
| THE INSPIRATIONAL NETWORK INC                      | 2  | 2  | 4  |
| THE LINCOLN NATIONAL LIFE INSURANCE COMPANY        | 2  | 2  | 4  |
| THE NC A&T UNIVERSITY                              | 1  | 1  | 2  |
| THE NC AT UNIVERSITY A&T FOUNDATION LLC            | 1  | 1  | 2  |
| THE NC OFFICE OF INFORMATION TECHNOLOGY SERVICES   | 3  | 3  | 6  |
| THE POLYMERS CENTER OF EXCELLENCE                  | 2  | 2  | 4  |
| THE TIMKEN COMPANY                                 | 3  | 3  | 6  |
| THERMOFORM PLASTICS                                | 1  |    | 1  |
| THIEMAN MANUFACTURING TECHNOLOGIES LLC             | 1  | 1  | 2  |
| THOMAS BUILT BUSES                                 | 3  | 3  | 6  |
| THOMASVILLE,CITY OF                                | 3  | 3  | 6  |
| TICONA POLYMERS, INC                               | 1  | 1  | 2  |
| TIERPOINT, LLC                                     | 8  | 7  | 15 |
| TIGHT LINES PARTNERS LLC                           | 1  | 1  | 2  |
| TIME WARNER CABLE SE LLC                           | 15 | 15 | 30 |
| TIME WARNER CABLE, INC.                            | 1  | 1  | 2  |
| TIMKENSTEEL CORPORATION                            | 1  | 1  | 2  |
| TJX COMPANIES                                      | 3  | 3  | 6  |
| TKC MANAGEMENT SERVICES                            | 2  | 2  | 4  |
| TORINGDON OFFICE OWNER LLC                         | 6  | 5  | 11 |
| TOSAF USA, INC                                     | 1  | 1  | 2  |
| TOSHIBA GLOBAL COMMERCE SOLUTIONS                  | 1  | 1  | 2  |
| TOWN OF CHAPEL HILL                                | 3  | 2  | 5  |
| TOWN OF HILLSBOROUGH                               | 2  | 2  | 4  |
| TOWN OF MOORESVILLE                                |    | 3  | 3  |
| TOWN OF VALDESE                                    | 3  | 3  | 6  |
| TR 121 W TRADE LLC                                 | 1  |    | 1  |
| TRANSCONTINENTAL GAS                               | 1  | 2  | 3  |
| TRANSCONTINENTAL HOLDING CORP                      | 5  | 5  | 10 |
| TRANSYLVANIA COMMUNITY HOSPITAL                    | 1  |    | 1  |
| TRANSYLVANIA COUNTY SCHOOLS                        | 11 | 11 | 22 |
| TRELLEBORG COATED SYSTEMS US, INC                  | 1  | 1  | 2  |
| TREND OFFSET PRINTING SERVICES INC                 | 4  | 5  | 9  |
| TRIAD CENTER GREENSBORO OFFICE, LLC                | 1  | 1  | 2  |
| TRIAD HOSPITALITY CORPORATION                      | 1  | 1  | 2  |
| TRIAD WINDOW DES & I                               | 1  | 1  | 2  |
| TRIBAL CASINO GAMING ENTERPRISES HARRAH'S CASINO { | 1  |    | 1  |
| TRIDENT GRAPHICS NA LLC                            | 1  | 1  | 2  |
| TRISTONE FLOWTECH USA INC                          | 1  | 1  | 2  |
| TROPICAL NUT & FRUIT CO                            | 1  | 1  | 2  |



|  |    |    |     |
|--|----|----|-----|
| TRUE TEXTILES, INC                     |    | 1  | 1   |
| TRYON PROPERTY OWNER LLC               | 2  | 2  | 4   |
| TUBULAR TEXTILE MACH                   | 1  | 1  | 2   |
| TURBOCOATING CORP                      | 1  | 1  | 2   |
| TYSON FARMS INC                        | 21 | 21 | 42  |
| U S POSTAL SERVICE                     | 5  | 5  | 10  |
| U.S. COTTON, LLC                       | 2  | 2  | 4   |
| ULTIMATE TEXTILE INC                   | 2  | 2  | 4   |
| UNC - CHAPEL HILL                      | 11 | 11 | 22  |
| UNC GREENSBORO                         | 25 | 25 | 50  |
| UNC ROCKINGHAM HEALTH CARE             | 3  | 3  | 6   |
| UNC SCHOOL OF THE ARTS                 | 34 | 34 | 68  |
| UNCC                                   | 16 | 16 | 32  |
| UNDERWRITERS LABORATORIES              | 1  | 1  | 2   |
| UNIFI INC                              | 1  | 1  | 2   |
| UNIFI MANUFACTURING, INC               | 3  | 5  | 8   |
| UNILIN FLOORING NC LLC                 | 3  | 3  | 6   |
| UNILIN NORTH AMERICA, LLC              | 1  | 1  | 2   |
| UNION COUNTY PUBLIC SCHOOLS            | 2  | 2  | 4   |
| UNIQUETEX                              | 1  | 1  | 2   |
| UNITED PARCEL SERV                     | 5  | 4  | 9   |
| UNITED STATES COLD STORAGE             | 1  | 1  | 2   |
| UNITED THERAPEUTICS CORPORATION        | 2  | 2  | 4   |
| UNIVERSAL FOREST PRODUCTS              | 2  | 2  | 4   |
| UNIVERSITY OF NC HOSPITALS             | 10 | 10 | 20  |
| UPM - RAFLATAC, INC                    | 1  | 1  | 2   |
| UPS LOGISTICS                          | 1  | 1  | 2   |
| US FOODS, INC                          | 1  | 1  | 2   |
| US NATIONAL WHITEWATER CENTER, INC     | 13 | 13 | 26  |
| V F CORPORATION                        | 2  |    | 2   |
| VALASSIS COMMUNICATIONS                | 1  | 1  | 2   |
| VALDESE WEAVERS                        | 6  | 6  | 12  |
| VALLEY HILLS MALL                      | 9  | 9  | 18  |
| VANGUARD FURNITURE INC                 | 8  | 8  | 16  |
| VECO PLAN, LLC                         |    | 1  | 1   |
| VERIZON WIRELESS                       | 5  | 5  | 10  |
| VF JEANSWEAR LIMITED PARTNERSHIP       | 1  | 1  | 2   |
| VF SERVICES INC                        | 1  | 1  | 2   |
| VIC INC                                | 1  | 1  | 2   |
| VULCAN CONSTRUCTION MATERIALS, L P     | 49 | 48 | 97  |
| W S FORSYTH COUNTY SCHOOLS             | 89 | 64 | 153 |
| W&G ASSOCIATES                         | 2  | 2  | 4   |
| WAGER,ROBERT CO,INC                    | 4  | 4  | 8   |
| WAKE FOREST UNIVERSITY                 | 4  | 4  | 8   |
| WAKE FOREST UNIVERSITY HEALTH SCIENCES | 11 | 11 | 22  |
| WAL-MART STORES EAST,LP                | 83 | 84 | 167 |
| WALNUT CIRCLE PRESS                    | 2  | 2  | 4   |
| WATTS REGULATOR COMPANY                | 8  | 8  | 16  |
| WAYNE FARMS LLC                        | 15 | 15 | 30  |
| WBTV LLC                               | 2  | 2  | 4   |
| WCCB TV INC                            | 2  | 2  | 4   |
| WEIL MCLAIN                            | 2  | 2  | 4   |

|   |              |              |               |
|---|--------------|--------------|---------------|
| WELDING UNLIMITED IN                      | 1            | 1            | 2             |
| WELL SPRING RET                           | 5            | 5            | 10            |
| WELLNESS CTR OF WRMC                      | 1            | 1            | 2             |
| WELLS FARGO BANK NA                       | 9            | 8            | 17            |
| WELLSPRING RETIREMNT COMM INC             | 5            | 5            | 10            |
| WESTERN CAROLINA UNIVERSITY               | 1            | 1            | 2             |
| WESTROCK COMPANY                          | 4            | 4            | 8             |
| WESTROCK CONVERTING COMPANY               | 28           | 28           | 56            |
| WEYERHAEUSER COMPANY                      | 1            | 1            | 2             |
| WFC PROPERTY, LLC                         | 1            | 1            | 2             |
| WFMY TV INC                               | 2            | 2            | 4             |
| WHOLE FOODS MARKET                        | 5            | 5            | 10            |
| WIELAND COPPER PRODUCTS LLC               | 1            | 1            | 2             |
| WILDERNESS N.C., INC.                     | 3            | 2            | 5             |
| WILKES COUNTY BOARD OF EDUCATION          | 18           | 18           | 36            |
| WILKES REGIONAL MED CTR                   | 10           | 9            | 19            |
| WILSON COOK MEDICAL                       | 7            | 7            | 14            |
| WINDWARD PRINT STAR INC                   | 1            | 1            | 2             |
| WINGATE UNIVERSITY                        | 18           | 18           | 36            |
| WINSTON SALEM STATE UNIVERSITY            | 21           | 21           | 42            |
| WINSTON TOWER MAIN LLC                    | 1            | 1            | 2             |
| WIPRO DATA CENTER AND CLOUD SERVICES, INC | 1            | 1            | 2             |
| WOODEN ROBOT BREWERY LLC                  | 4            | 4            | 8             |
| WOODGRAIN MILLWORK INC                    | 3            | 3            | 6             |
| WORLD MEDIA ENTERPRISES, INC              | 1            | 1            | 2             |
| WSOC TELEVISION INC                       | 4            | 4            | 8             |
| WXII TELEVISION                           | 1            | 1            | 2             |
| YESTERYEARS BREWERY LLC                   | 1            | 1            | 2             |
| YMCA GREENSBORO                           | 7            | 7            | 14            |
| YMCA OF NORTHWEST NORTH CAROLINA          | 4            | 4            | 8             |
| ZINK IMAGING INC                          | 1            | 1            | 2             |
| <b>Grand Total</b>                        | <b>5,537</b> | <b>4,962</b> | <b>10,498</b> |

**Duke Energy Carolinas, LLC**  
**List of Industrial and Commercial Customers Opted Into Vintage 2019**  
**Docket E-7, Sub 1230**

| Customer Bill Name                 | Number of Accounts       |                         |
|------------------------------------|--------------------------|-------------------------|
|                                    | DSM YR 19 (Jan 1-Dec 31) | EE YR 19 (Jan 1-Dec 31) |
| BAKERS INTERIORS FURNITURE COMPANY | 1                        | 3                       |
| BIC CORPORATION                    | 1                        |                         |
| CAROLINAS HEALTHCARE SYSTEM        | 1                        |                         |
| CITY OF SALISBURY                  | 1                        |                         |
| CORE SCIENTIFIC                    |                          | 1                       |
| FOOD LION                          | 2                        |                         |
| GENPAK LLC                         |                          | 1                       |
| HANES COMPANIES                    | 1                        |                         |
| HASHMASTER TECH, LLC               |                          | 1                       |
| HICKORY SPRINGS MANF. COMPANY      |                          | 1                       |
| HICKORY SPRINGS MANUFACTURING CO   |                          | 1                       |
| HIGH COUNTRY LUMBER AND MULCH, LLC |                          | 1                       |
| HOME DEPOT                         | 18                       |                         |
| MCCREARY MODERN INC                | 1                        |                         |
| MECKLENBURG COUNTY                 | 1                        |                         |
| STEWART SUPERABSORBENTS            | 1                        |                         |
| TREND OFFSET PRINTING              |                          | 2                       |
| <b>Grand Total</b>                 | <b>28</b>                | <b>11</b>               |

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Feb 25 2020

**Duke Energy Carolinas, LLC**  
**Shared Savings Incentive Calculation**  
**Docket Number E-7, Sub 1230**  
**Estimate January 1, 2021 - December 31, 2021**

|                                     |                  | <u>System</u>         |
|-------------------------------------|------------------|-----------------------|
| NPV of AC - Res EE <sup>1</sup>     |                  | \$ 78,209,012         |
| NPV of AC - Non Res EE              |                  | 163,026,017           |
| NPV of AC - DSM                     |                  | 129,908,853           |
| <b>Total NPV of Avoided Costs</b>   | <b>A</b>         | <b>\$ 371,143,881</b> |
| Program Costs - Res EE <sup>1</sup> |                  | \$ 42,757,938         |
| Program Costs - Non Res EE          |                  | 52,352,927            |
| Program Costs - DSM                 |                  | 40,153,124            |
| <b>Total Program Costs</b>          | <b>B</b>         | <b>\$ 135,263,988</b> |
| <b>Net Savings</b>                  | <b>C=A-B</b>     | <b>\$ 235,879,893</b> |
| <b>Sharing Percentage</b>           | <b>D</b>         | <b>11.50%</b>         |
| Shared Savings - Res EE             |                  | \$ 4,076,874          |
| Shared Savings - Non Res EE         |                  | 12,727,405            |
| Shared Savings - DSM                |                  | 10,321,909            |
| <b>Total Shared Savings</b>         | <b>E=(A-B)*D</b> | <b>\$ 27,126,188</b>  |

1) Excludes AC and Program Costs associated with Income Qualified Energy Efficiency and Weatherization Assistance, which is deemed to be cost recovery only.

## EM&V Activities

### Planned Evaluation, Measurement and Verification (EM&V) Activities through the rate period (Dec. 31, 2020)

Evaluation is a term adopted by Duke Energy Carolinas (DEC), and refers generally to the systematic process of gathering information on program activities, quantifying energy and demand impacts, and reporting overall effectiveness of program efforts. Within evaluation, the activity of measurement and verification (M&V) refers to the collection and analysis of data at a participating facility/project. Together this is referred to as "EM&V."

Refer to the accompanying Evans Exhibit 12 chart for a schedule of process and impact evaluation analysis and reports that are currently scheduled.

### Energy Efficiency Portfolio Evaluation

DEC has contracted with independent, third-party evaluation consultants to provide the appropriate EM&V support, including the development and implementation of an evaluation plan designed to measure the energy and demand impacts of the residential and non-residential energy efficiency programs.

Typical EM&V activities:

- Develop evaluation action plan
- Process evaluation interviews
- Collect program data
- Verify measure installation and performance through surveys and/or on-site visits
- Program database review
- Impact data analysis
- Reporting

The process evaluation provides unbiased information on past program performance, current implementation strategies and opportunities for future program improvements. Typically, the data collection for process evaluation consists of surveys with program management, implementation vendor(s), program partner(s), and participants; and, in some cases, non-participants. A statistically representative sample of participants will be selected for the analysis.

The impact evaluation provides energy and demand savings resulting from the program. Impact analysis may involve engineering analysis (formulas/algorithms), billing analysis, statistically adjusted engineering methods, and/or building simulation models, depending on the program and the nature of the impacts. Data collection may involve surveys and/or site visits. A statistically representative sample of participants is selected for the analysis. Duke Energy Carolinas intends to follow industry-accepted methodologies for all measurement and

verification activities, consistent with International Performance Measurement Verification Protocol (IPMVP) Options A, C or D depending on the measure.

The field of evaluation is constantly learning from ongoing data collection and analysis, and best practices for evaluation, measurement and verification continually evolve. As updated best practices are identified in the industry, DEC will consider these and revise evaluation plans as appropriate to provide accurate and cost-effective evaluation.

### **Demand Response Program Evaluation**

DEC has contracted with independent, third-party evaluation consultants to provide an independent review of the evaluation plan designed to measure the demand impacts of the residential and non-residential demand response programs and the final results of that evaluation.

Typical EM&V activities:

- Collect program data
- Process evaluation interviews
- Verify operability and performance through on-site visits
- Collect interval data
- Program database review
- Benchmarking research
- Dispatch optimization modeling
- Impact data analysis
- Reporting

The process evaluation provides unbiased information on past program performance, current implementation strategies and opportunities for future improvements. Typically, the data collection for process evaluation consists of surveys with program management, implementation vendor(s), program partner(s), and participants; and, in some cases, non-participants. A statistically representative sample of participants will be selected for the analysis.

The impact evaluation provides demand savings resulting from the program. Impact analysis for Power Manager involves a simulation model to calculate the duty cycle reduction, and then an overall load reduction. Impact analysis for PowerShare involves statistical modeling of an M&V baseline load shape for a customer, then modeling the event period baseline load shape and comparing to the actual load curve of the customer during the event period.

The field of evaluation is constantly learning from ongoing data collection and analysis, and best practices for evaluation, measurement and verification continually evolve. As updated best practices are identified in the industry, DEC will consider these and revise evaluation plans as appropriate to provide accurate and cost-effective evaluation.

EM&V EFFECTIVE DATE TIMELINE

This chart contains the expected timeline with end of customer data sample period for impact evaluation and when the impact evaluation report is expected to be completed.  
Unless otherwise noted, original impact estimates are replaced with the first impact evaluation results, after which time subsequent impact evaluation results are applied prospectively.

I / A

| Program   | Program/Measure                                     | 2015      |           |           |           | 2016      |           |           |           |
|---|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|   |   | Quarter 1 | Quarter 2 | Quarter 3 | Quarter 4 | Quarter 1 | Quarter 2 | Quarter 3 | Quarter 4 |
| Appliance Recycling   | Refrigerator, Freezer                               |           |           | 2nd EM&V  | Report    |           |           |           |           |
| Energy Efficiency Education (K12 Curriculum)                      | Energy Efficiency Education (K12 Curriculum)        |           |           | 3rd EM&V  | Report    |           |           |           |           |
| Energy Efficient Appliance and Devices                            | Lighting - Smart Saver RCFL                         |           |           | 3rd EM&V  | Report    |           |           |           |           |
|   | Lighting - Specialty Bulbs                          |           |           |           |           |           |           |           |           |
|   | SF Water EE Products                                |           |           | 1st EM&V  | Report    |           |           |           |           |
|   | HP Water Heater & Pool Pumps                        |           |           |           |           |           |           |           |           |
| HVAC Energy Efficiency  | Residential Smart Saver AC and HP                   |           |           |           |           |           |           |           |           |
| Income-Qualified Energy Efficiency                                | Tune & Seal Measures                                |           |           |           |           |           |           |           |           |
|   | Weatherization                                      |           |           |           |           |           |           |           |           |
|   | Refrigerator Replacement                            |           |           |           |           |           |           |           |           |
| Multi-Family Energy Efficiency                                    | Low Income Neighborhood                             |           |           |           |           |           |           | 2nd EM&V  | Report    |
|   | MF Water EE Products                                |           |           | 1st EM&V  | Report    |           |           | 2nd EM&V  | Report    |
|   | Lighting (CFL Property Manager)                     |           |           |           |           |           |           |           | 3rd EM&V  |
| My Home Energy Report   | MyHER   |           |           |           |           |           |           |           |           |
| Residential Energy Assessments                                    | Home Energy House Call                              |           |           |           |           |           |           |           |           |
| Non-Residential Smart Saver Energy Efficiency Custom              | Non-Res SmartSaver Custom Rebate                    |           |           |           |           |           |           |           |           |
| Non-Residential Smart Saver Energy Efficiency Food Service        | Non-Res Smart Saver Energy Efficiency Food Service  |           |           |           | 2nd EM&V  |           |           |           | 2nd EM&V  |
| Non-Residential Smart Saver Energy Efficiency HVAC Products       | Non-Res Smart Saver Energy Efficiency HVAC Products |           |           |           | 2nd EM&V  | Report    |           |           |           |
| Non-Residential Smart Saver Energy Efficiency Lighting            | Non Re Smart Saver Prescriptive Lighting            |           |           |           |           |           |           |           |           |
|   | Non Res Smart Saver Prescriptive Other              |           |           |           |           |           |           | 1st EM&V  | Report    |
| Non-Residential Smart Saver Energy Efficiency Motors Pumps Drives | Non-Res SmartSaver Prescriptive (VFDs or other)     |           |           |           | 2nd EM&V  |           |           |           |           |
| Non-Residential Smart Saver Energy Efficiency Process Equipment   | Non-Res Smart Saver Energy Efficiency Process Equip |           |           |           | 2nd EM&V  |           |           |           |           |
| Small Business Energy Saver                                       | SBES  |           |           |           |           |           |           |           |           |
| Smart Energy in Offices   | SEIO  |           |           |           |           |           |           |           |           |

Key

Original Estimate

1<sup>st</sup> EM&V

2<sup>nd</sup> EM&V

3<sup>rd</sup> EM&V

4<sup>th</sup> EM&V

5<sup>th</sup> EM&V

6<sup>th</sup> EM&V

| Program  | Program/Measure                              | 2017      |           |           |           | 2018                 |           |           |                      | 2019              |           |           |                      | 2020                 |                      |                      |                      |
|--|--|-----------|-----------|-----------|-----------|----------------------|-----------|-----------|----------------------|-------------------|-----------|-----------|----------------------|----------------------|----------------------|----------------------|----------------------|
|  |  | Quarter 1 | Quarter 2 | Quarter 3 | Quarter 4 | Quarter 1            | Quarter 2 | Quarter 3 | Quarter 4            | Quarter 1         | Quarter 2 | Quarter 3 | Quarter 4            | Quarter 1            | Quarter 2            | Quarter 3            | Quarter 4            |
| <del>Appliance Recycling</del>                       | <del>Refrigerator, Freezer</del>             |           |           |           |           |                      |           |           |                      |                   |           |           |                      |                      |                      |                      |                      |
| Energy Efficiency Education (K12 Curriculum)         | Energy Efficiency Education (K12 Curriculum) |           |           |           |           |                      |           |           | 4 <sup>th</sup> EM&V | Report            |           |           |                      |                      |                      |                      | 5 <sup>th</sup> EM&V |
| Energy Efficient Appliance and Devices               | Lighting - Smart Saver RLED (Free LED)       |           |           | 1st EM&V  | Report    |                      |           |           |                      |                   |           |           |                      |                      |                      |                      |                      |
|  | Lighting - Smart Saver Retail                |           |           |           |           | 1st EM&V             | Report    |           |                      |                   |           |           |                      |                      |                      |                      |                      |
|  | Lighting - Specialty Bulbs                   |           |           |           |           |                      |           | 2nd EM&V  | Report               |                   |           |           |                      |                      |                      |                      |                      |
|  | SF Water EE Products                         |           |           | 2nd EM&V  | Report    |                      |           |           |                      |                   |           |           | 3 <sup>rd</sup> EM&V | 3 <sup>rd</sup> EM&V | Report               |                      |                      |
| HVAC Energy Efficiency                               | HP Water Heater & Pool Pumps                 |           |           |           |           | 1 <sup>st</sup> EM&V | Report    |           |                      |                   |           |           |                      |                      |                      |                      |                      |
|  | Referral and Non-Referral HVAC Measures      |           |           |           |           | 2nd EM&V             | Report    |           |                      |                   |           |           |                      |                      |                      |                      |                      |
| Income-Qualified Energy Efficiency                   | Weatherization                               |           |           |           |           | 1st EM&V             | Report    |           |                      |                   |           |           |                      |                      | 2 <sup>nd</sup> EM&V | 2 <sup>nd</sup> EM&V | Report               |
|  | Refrigerator Replacement                     |           |           |           |           | 1st EM&V             | Report    |           |                      |                   |           |           |                      |                      | 2 <sup>nd</sup> EM&V | 2 <sup>nd</sup> EM&V | Report               |
|  | Low Income Neighborhood                      |           |           |           |           |                      |           |           |                      |                   |           | 3rd EM&V  | Report               |                      |                      |                      |                      |
| Multi-Family Energy Efficiency                       | Lighting & Water EE Products                 |           |           |           |           |                      |           |           |                      |                   |           | 3rd EM&V  | Report               |                      |                      |                      |                      |
| My Home Energy Report                                | MyHER  | Report    |           |           |           |                      |           |           |                      | 4th EM&V          | Report    |           |                      |                      |                      |                      | 5 <sup>th</sup> EM&V |
| Residential Energy Assessments                       | Home Energy House Call                       |           |           |           |           |                      |           | 3rd EM&V  | Report               |                   |           |           |                      |                      |                      | 4 <sup>th</sup> EM&V | Report               |
| <del>Business Energy Reports</del>                   | <del>BER</del>                               |           |           |           | 1st EM&V  | <del>Report</del>    |           |           |                      | <del>Report</del> |           |           |                      |                      |                      |                      |                      |
| EnergyWise Business                                  | EnergyWise Business (EE measure)             | 1st EM&V  | Report    |           |           |                      | 2nd EM&V  | Report    |                      |                   |           |           |                      |                      |                      |                      |                      |
| Non-Residential Smart Saver Energy Efficiency Custom | Custom Rebate & Custom Assessment            | Report    |           |           |           |                      |           | 3rd EM&V  | Report               |                   |           |           |                      |                      |                      | 4 <sup>th</sup> EM&V | Report               |
| Non-Residential Smart Saver Prescriptive             | All Prescriptive Technologies                |           |           |           |           | 3rd EM&V             | Report    |           |                      |                   |           |           | 4 <sup>th</sup> EM&V | Report               |                      |                      |                      |
| Non-Residential Energy Assessment                    |  |           | 1st EM&V  | Report    |           |                      |           |           |                      |                   |           |           |                      |                      |                      |                      |                      |
| Small Business Energy Saver                          | SBES   |           |           |           |           |                      | 2nd EM&V  | Report    |                      |                   |           |           |                      |                      |                      |                      | 3 <sup>rd</sup> EM&V |
| Smart Energy in Offices                              | SEIO   |           |           | 1st EM&V  | Report    |                      |           |           |                      |                   |           |           |                      |                      |                      |                      |                      |

Note: Residential Smart Saver AC and HP and Non-Residential Prescriptive lighting measures have completed a additional EM&V report in the past. Future reports combine measures for the respective programs.

| Program  | Program/Measure                                   | 2021                 |                      |                      |                      |
|--|---|----------------------|----------------------|----------------------|----------------------|
|  |   | Quarter 1            | Quarter 2            | Quarter 3            | Quarter 4            |
| <del>Appliance Recycling</del>                       | <del>Refrigerator, Freezer</del>                  |                      |                      |                      |                      |
| Energy Efficiency Education (K12 Curriculum)         | Energy Efficiency Education (K12 Curriculum)      |                      | 6 <sup>th</sup> EM&V | 6 <sup>th</sup> EM&V | Report               |
| Energy Efficient Appliance and Devices               | <del>Lighting - Smart Saver RLED (Free LED)</del> |                      |                      |                      |                      |
|  | <del>Lighting - Smart Saver Retail</del>          |                      |                      |                      |                      |
|  | Lighting - Specialty Bulbs/Retail Marketplace     |                      |                      | 3 <sup>rd</sup> EM&V | Report               |
|  | SF Water EE Products                              |                      |                      |                      | 4 <sup>th</sup> EM&V |
| HVAC Energy Efficiency                               | HP Water Heater & Pool Pumps                      |                      |                      | 2 <sup>nd</sup> EM&V | 2 <sup>nd</sup> EM&V |
|  | Referral and Non-Referral HVAC Measures           |                      |                      | 3 <sup>rd</sup> EM&V | 3 <sup>rd</sup> EM&V |
| Income-Qualified Energy Efficiency                   | Weatherization                                    |                      |                      |                      |                      |
|  | Refrigerator Replacement                          |                      |                      |                      |                      |
|  | Low Income Neighborhood                           |                      |                      |                      |                      |
| Multi-Family Energy Efficiency                       | Lighting & Water EE Products                      |                      |                      |                      |                      |
| My Home Energy Report                                | MyHER   |                      | 5 <sup>th</sup> EM&V | Report               |                      |
| Residential Energy Assessments                       | Home Energy House Call                            |                      |                      |                      |                      |
| <del>Business Energy Reports</del>                   | <del>BER</del>                                    |                      |                      |                      |                      |
| EnergyWise Business                                  | EnergyWise Business (EE measure)                  |                      |                      |                      |                      |
| Non-Residential Smart Saver Energy Efficiency Custom | Custom Rebate & Custom Assessment                 | 4 <sup>th</sup> EM&V | Report               |                      |                      |
| Non-Residential Smart Saver Prescriptive             | All Prescriptive Technologies                     |                      |                      |                      | 5 <sup>th</sup> EM&V |
| Non-Residential Energy Assessment                    |   |                      |                      |                      |                      |
| Small Business Energy Saver                          | SBES  | Report               |                      |                      |                      |
| Smart Energy in Offices                              | SEIO  |                      |                      |                      |                      |

Duke Energy Carolinas, LLC  
Docket Number E-7, Sub 1230  
Actual Program and Avoided Costs, January 1, 2014 - December 31, 2019

| Market          | Program   | 2014          |                | 2015           |                | 2016           |                | 2017           |                | 2018           |                | 2019           |                |
|-----------------|---|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                 |   | Program Costs | Avoided Costs  | Program Costs  | Avoided Costs  | Program Costs  | Avoided Costs  | Program Costs  | Avoided Costs  | Program Costs  | Avoided Costs  | Program Costs  | Avoided Costs  |
| Residential     | Appliance Recycling Program   | \$ 1,515,867  | \$ 1,763,411   | \$ 1,537,241   | \$ 1,901,321   | \$ (97,397)    | \$ 59,758      | \$ 5,307       | \$ -           | \$ -           | \$ -           | \$ -           | \$ -           |
| Residential     | Energy Assessments  | 3,605,737     | 12,827,575     | 3,086,173      | 10,115,222     | 2,678,893      | 6,822,806      | 2,909,098      | 6,602,773      | 2,836,229      | 5,756,902      | 3,186,888      | 4,413,585      |
| Residential     | Energy Efficiency Education   | 1,963,153     | 5,079,938      | 2,054,672      | 2,498,417      | 2,126,509      | 3,695,507      | 2,077,611      | 3,597,724      | 1,992,260      | 2,863,507      | 1,684,083      | 2,519,645      |
| Residential     | Energy Efficient Appliances and Devices                                 | 14,738,129    | 52,276,512     | 12,050,485     | 49,525,402     | 24,069,774     | 82,262,218     | 30,340,728     | 105,352,687    | 42,687,244     | 135,857,936    | 41,380,987     | 102,051,327    |
| Residential     | Income Qualified Energy Efficiency and Weatherization Assistance        | 1,917,192     | 1,675,463      | 2,238,776      | 1,854,068      | 4,792,436      | 2,984,760      | 5,505,992      | 3,185,867      | 6,490,735      | 4,315,688      | 7,342,133      | 3,648,597      |
| Residential     | Multi-Family Energy Efficiency  | 1,442,533     | 5,306,321      | 2,092,935      | 7,431,163      | 2,518,988      | 8,950,706      | 3,168,422      | 13,539,656     | 3,604,921      | 13,857,877     | 3,680,155      | 11,891,700     |
| Residential     | My Home Energy Report   | 8,285,066     | 12,166,183     | 9,845,895      | 16,583,325     | 10,822,444     | 20,423,954     | 13,812,250     | 21,728,369     | 12,765,286     | 22,684,688     | 10,555,159     | 23,361,954     |
| Residential     | Power Manager   | 15,662,693    | 57,744,666     | 14,634,279     | 52,718,688     | 13,644,970     | 54,179,776     | 14,021,500     | 61,074,105     | 14,423,610     | 61,924,152     | 13,383,639     | 69,783,157     |
| Residential     | Residential – Smart Saver Energy Efficiency Program                     | 4,786,807     | 7,061,500      | 5,416,833      | 6,816,479      | 7,839,566      | 7,476,100      | 7,403,327      | 7,287,263      | 6,955,146      | 7,088,531      | 7,400,669      | 7,079,940      |
| Non-Residential | Business Energy Report  | -             | -              | 126,404        | -              | 263,169        | 302,497        | 126,680        | 696            | -              | -              | -              | -              |
| Non-Residential | Energy Management Information Services                                  | 74,855        | -              | -              | -              | -              | -              | -              | -              | -              | -              | -              | -              |
| Non-Residential | EnergyWise for Business (Non-Residential)                               | -             | -              | 1,549,305      | 11,248         | 470,304        | 574,590        | 2,484,618      | 2,530,761      | 3,062,816      | 2,279,967      | 3,686,451      | 2,728,428      |
| Non-Residential | Non Residential Smart Saver Custom                                      | 8,136,712     | 49,908,871     | 9,932,877      | 53,882,448     | 7,356,509      | 39,025,086     | 7,304,838      | 34,693,083     | 6,068,902      | 23,322,046     | 8,871,440      | 35,884,367     |
| Non-Residential | Non Residential Smart Saver Energy Efficient IT Products                | 25,730        | 35,580         | 716,542        | 1,130,386      | 285,430        | 777,601        | 61,215         | 523            | 36,875         | 3,025          | 44,323         | 1,038          |
| Non-Residential | Non Residential Smart Saver Custom Energy Assessments                   | 1,458,195     | 6,858,644      | 660,420        | 321,686        | 2,034,308      | 9,572,687      | 2,139,875      | 10,272,302     | 407,293        | 67,306         | 295,925        | 691,285        |
| Non-Residential | Non Residential Smart Saver Energy Efficient Food Service Products      | 199,350       | 1,489,862      | 194,425        | 1,099,734      | 324,117        | 2,474,312      | 306,488        | 959,251        | 235,605        | 431,679        | 339,904        | 364,227        |
| Non-Residential | Non Residential Smart Saver Energy Efficient HVAC Products              | 815,339       | 5,224,765      | 1,142,522      | 6,221,217      | 1,473,991      | 3,344,669      | 1,560,769      | 2,958,336      | 1,620,748      | 2,810,168      | 2,207,760      | 4,481,911      |
| Non-Residential | Non Residential Smart Saver Energy Efficient Lighting Products          | 6,727,675     | 40,866,018     | 11,335,798     | 42,227,035     | 39,622,944     | 120,392,639    | 66,689,770     | 240,054,511    | 25,872,380     | 146,534,847    | 20,829,118     | 97,967,602     |
| Non-Residential | Non Residential Smart Saver Energy Efficient Process Equipment Products | 89,809        | 660,330        | 88,823         | 517,342        | 125,947        | 279,184        | 162,413        | 530,295        | 67,509         | 226,725        | 119,811        | 310,293        |
| Non-Residential | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 584,874       | 3,629,866      | 466,478        | 1,924,058      | 471,930        | 1,574,965      | 528,937        | 3,070,044      | 277,785        | 1,617,749      | 189,123        | 510,415        |
| Non-Residential | Non Residential Smart Saver Performance Incentive                       | -             | -              | -              | -              | 35,670         | -              | 320,559        | 8,958          | 479,610        | 1,671,793      | 784,949        | 2,238,186      |
| Non-Residential | Power Share (Non-Residential)   | 15,520,492    | 55,293,377     | 15,779,050     | 48,383,622     | 14,291,024     | 43,889,394     | 13,316,535     | 41,482,644     | 12,922,977     | 36,012,817     | 13,019,606     | 42,072,382     |
| Non-Residential | Small Business Energy Saver   | 1,026,607     | 3,221,137      | 13,968,790     | 47,989,975     | 15,360,852     | 55,685,830     | 17,350,972     | 63,169,894     | 15,977,993     | 46,832,942     | 11,418,264     | 25,661,729     |
| Non-Residential | Smart Energy in Offices   | 1,156,497     | 934,385        | 1,463,240      | 1,666,306      | 1,061,729      | 1,843,559      | 891,010        | 1,067,480      | 219,748        | 143,285        | -              | -              |
| Non-Residential | Disallowed Costs from 2015 Program Costs Audit (Order E-7 Sub 1105, da  | -             | -              | (3,851)        | -              | -              | -              | -              | -              | -              | -              | -              | -              |
|                 |   | \$ 89,733,313 | \$ 324,024,404 | \$ 110,378,109 | \$ 354,819,144 | \$ 151,574,107 | \$ 466,592,598 | \$ 192,488,915 | \$ 623,167,221 | \$ 159,005,671 | \$ 516,303,632 | \$ 150,420,388 | \$ 437,661,769 |

| Costs as Filed in | Docket Number |
|-------------------|---------------|
| 2014              | E-7, Sub 1164 |
| 2015              | E-7, Sub 1192 |
| 2016              | E-7, Sub 1192 |
| 2017              | E-7, Sub 1230 |
| 2018              | E-7, Sub 1230 |
| 2019              | E-7, Sub 1230 |





Opinion **Dynamics**

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Feb 25 2020



# Duke Energy Carolinas and Duke Energy Progress

## 2017 Neighborhood Energy Saver Program Evaluation Report – Final

November 30, 2019

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# 1. Evaluation Summary

## 1.1 Program Summary

The Duke Energy Carolinas' (DEC) and Duke Energy Progress' (DEP) Neighborhood Energy Saver Program (NES) provides one-on-one energy education, on-site energy assessments, and energy conservation measures to customers in selected low-income neighborhoods. These services are offered free of charge to all active DEC/DEP account holders who are individually metered homeowners and tenants living in predetermined income-qualified communities. Qualifying neighborhoods have at least 50% of households with incomes equal to or less than 200% of the federal poverty level<sup>1</sup>.

The program employs a neighborhood canvass approach to drive participation, while working with existing organizations in each community to maximize the number of customers benefitting from the program. Each year, program teams aim to reach approximately 4,500 customers in the DEP and 8,900 customers in the DEC service territory in several preselected communities throughout North and South Carolina.

The program period under evaluation is June 1st, 2017 through June 30th, 2018.

## 1.2 Evaluation Objectives

The objectives of the 2017-2018 NES Program evaluation are to:

- Review and update, as necessary, deemed savings estimates through a review of measure assumptions and calculations.
- Verify measure installation and persistence.
- Estimate program energy (kWh), summer and winter peak demand (kW) savings, and realization rates.
- If possible, discern the difference in energy savings between participating homes heated electrically from those heated with natural gas.
- Identify barriers to participation in the program and recommend strategies for addressing those barriers.
- Identify and characterize program strengths, which may include customer engagement and other non-energy benefits.
- Identify ways the DEP/DEC NES Program may be improved in the future.

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<sup>1</sup> As of January 1, 2017, qualifying neighborhoods in the DEP service territory must meet this threshold. Previously, qualifying neighborhoods were those where 50% of households had incomes equal to or less than 150% of the federal poverty level.

To achieve these objectives, Opinion Dynamics completed a number of data collection and analytic activities, including interviews with program staff, a participant survey, an analysis of survey results, an analysis of program-tracking data, a deemed savings review, and an engineering analysis.

## 1.3 High Level Findings

Overall, NES Program teams in DEP and DEC territories implemented the program effectively and have achieved a high penetration rate in target neighborhoods. The program team served 15,312 participants across both territories and had a 69% penetration rate. There were 11,079 participants in the DEC service territory, 124% of the DEC participant target, and 4,233 participants in the DEP service territory, 94% of the DEP participant target. In addition, the evaluation found high levels of program satisfaction; 96% of DEP and 99% of DEC participants reported they were somewhat or very satisfied with the program overall, and 99% of participants from both territories reported they were somewhat or very satisfied with the equipment they received through the program.

### Impact Evaluation

In previous NES evaluations, Opinion Dynamics used a billing analysis to determine program energy savings. However, due to differences in the usage patterns of the treatment and comparison groups and large differences in weather patterns between the pre- and post-treatment periods, a billing analysis was not feasible to evaluate this program cycle (see Section 4.3 for more details). As such, the team used an engineering analysis to determine both energy and demand savings. Table 1-1 and



Table 1-2 present the total gross energy and demand savings for each measure installed through the program and the estimated individual measure contribution to the overall energy (kWh) savings from the engineering analysis. The results are presented separately for each service territory.

**Table 1-1. Total Measure-Level Gross Energy Savings Results from Engineering Analysis**

| Measures                          | DEP          |                      | DEC          |                      |
|-----------------------------------|--------------|----------------------|--------------|----------------------|
|                                   | Energy (MWh) | Percent of total MWh | Energy (MWh) | Percent of total MWh |
| Lighting                          | 1,412        | 43%                  | 2,842        | 38%                  |
| Low Flow Showerhead               | 797          | 24%                  | 1,955        | 26%                  |
| Infiltration Reduction            | 436          | 13%                  | 955          | 13%                  |
| Efficient Aerator                 | 334          | 10%                  | 734          | 10%                  |
| HVAC Filters                      | 150          | 5%                   | 313          | 4%                   |
| Pipe Insulation (5 feet sections) | 97           | 3%                   | 423          | 6%                   |
| Water Heater Insulation Wrap      | 71           | 2%                   | 266          | 4%                   |
| <b>Total</b>                      | <b>3,298</b> | <b>100%</b>          | <b>7,449</b> | <b>100%</b>          |

**Table 1-2 Total Measure-Level Gross Demand Savings Results from Engineering Analysis**

| Measure                           | DEP                      |             |                          |             | DEC                      |             |                          |             |
|-----------------------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
|                                   | Summer Coincident Demand |             | Winter Coincident Demand |             | Summer Coincident Demand |             | Winter Coincident Demand |             |
|                                   | kW                       | %           | kW                       | %           | kW                       | %           | kW                       | %           |
| Lighting                          | 209                      | 48%         | 101                      | 24%         | 421                      | 42%         | 204                      | 22%         |
| Low Flow Showerhead               | 37                       | 9%          | 75                       | 17%         | 85                       | 9%          | 170                      | 19%         |
| Efficient Aerator                 | 18                       | 4%          | 36                       | 8%          | 42                       | 4%          | 84                       | 9%          |
| Infiltration Reduction            | 106                      | 24%         | 155                      | 36%         | 253                      | 25%         | 308                      | 34%         |
| HVAC Filters                      | 48                       | 11%         | 43                       | 10%         | 115                      | 12%         | 76                       | 8%          |
| Pipe Insulation (5 feet sections) | 11                       | 3%          | 11                       | 3%          | 48                       | 5%          | 48                       | 5%          |
| Water Heater Insulation Wrap      | 8                        | 2%          | 8                        | 2%          | 30                       | 3%          | 30                       | 3%          |
| <b>Total</b>                      | <b>437</b>               | <b>100%</b> | <b>428</b>               | <b>100%</b> | <b>994</b>               | <b>100%</b> | <b>921</b>               | <b>100%</b> |

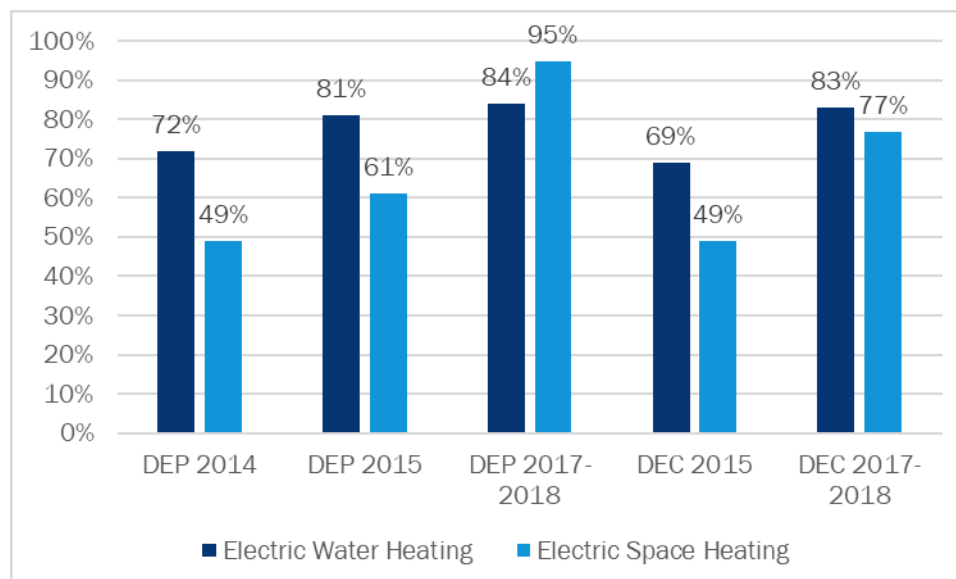
During the 2017-2018 evaluation period, DEP participants saved an average of 779 kWh and DEC participants saved an average of 676 kWh per household (see Table 1-3).

**Table 1-3. Per Household Energy and Demand Savings**

| Service Territory | Energy Savings (kWh) | Summer Peak Demand (kW) | Winter Peak Demand (kW) |
|-------------------|----------------------|-------------------------|-------------------------|
| DEP               | 779                  | 0.103                   | 0.101                   |
| DEC               | 676                  | 0.090                   | 0.083                   |

Per household energy savings for this evaluation period were substantially higher than engineering estimates from previous evaluations. Higher savings per household in the 2017-2018 evaluation period were driven, in part, by a larger share of participants with electric space and water heating (Figure 1-1). Given the mix of measures offered through the NES Program, energy savings from domestic hot water and infiltration measures represent a large portion of potential program savings. To realize electric savings from these measures at the household-level, participants need to heat their homes or hot water with electricity. As such, a higher share of participants that heat with electric fuel will yield more energy savings per household.

**Figure 1-1. Share of DEP and DEC Participants with Electric Space and Water Heating**



## Process Evaluation

The research team focused the process evaluation on several questions related to energy education, behavior change, additional savings opportunities, NES participant satisfaction, and the overall effectiveness of the program. The full results are available in Section 4.3; key findings are summarized below.

- Program participation was strong in both service territories. Between June 1<sup>st</sup>, 2017 and June 30<sup>th</sup>, 2018, 4,233 DEP and 11,079 DEC customers participated in the NES Program. This represented 69% of households within targeted neighborhoods.
- Customer satisfaction was high in both service territories overall (96% of DEP and 99% of DEC participants were somewhat or very satisfied). Both DEP and DEC participants were also satisfied with the equipment they received (99% in both territories) and the NES Program representatives (99% and 91%, respectively).
- The majority of NES participants (91%) received in-person education and 89% thought that information helped them save energy in their homes. Additionally, participants reported that they were more knowledgeable about ways to save energy in their homes after their NES participation than they were before. As such, NES participants reported taking a range of additional energy saving actions in their homes (e.g., turning off lights more frequently, keeping doors and windows closed, washing clothing in cold water, etc.).
- Participants reported experiencing a variety of non-energy benefits after participating in the NES Program. The majority of NES participants reported noticing a decrease in their electric bill after participating (54%-DEP, 55%-DEC). Additionally, 92% of DEP and 84% of DEC participants felt that their home was less drafty, and 86% and 73%, respectively, reported noticing a change in the comfort of their home.

## 1.4 Evaluation Recommendations

Opinion Dynamics has the following recommendations for maintaining and improving program performance and overall savings. More details on these recommendations are included in Section 6.1 and throughout this report.

- **NES program teams should consider including space and water heating fuel types as additional criteria for identifying and selecting neighborhoods for future program years.** As the NES offers a relatively limited set of easy-to-install measures by design, domestic hot water and air infiltration measures will continue to contribute a substantial portion to total program savings. However, energy savings only manifest from those measures in households that heat their homes or their hot water with electricity. To maximize savings per participating household, NES Program staff should consider targeting neighborhoods with higher rates of electric space and water heating.
- **NES Program staff should continue to emphasize air infiltration measures.** While infiltration measures make an important contribution to overall program energy savings (14% of DEP and DEC participants), NES participants that receive those measures also report other valuable non-energy benefits. Of those that received infiltration measures, 92% of DEP and 84% of DEC participants reported that their home was less drafty and 86% and 73%, respectively, reported noticing a change in the comfort of their home. Of those who noticed a difference in home comfort, 90% of DEP and 80% of DEC felt that keeping a comfortable temperature in their home was easier after their NES participation. Air infiltration measures may be important in driving participant non-energy benefits in the future.
- **NES Program staff should continue to emphasize the in-person educational component of the program.** The majority of DEC and DEP participants (91%) receive in-person education from implementation teams and 89% find the educational component of the program useful in helping save energy in their homes. This sort of in-person education can provide a valuable touch point between program representatives and Duke Energy customers, and also encourages various different types of energy-saving behavior change (see Section 5.3.4).

## 2. Program Description

### 2.1 Program Design

The DEC and DEP NES Program offers direct-install measures and employs a neighborhood canvassing approach to drive participation. The goal is to offer persistent energy savings to income-qualified customers through the direct installation of energy-saving measures. The program also provides participating customers with information on the measures that they received and additional suggestions on ways to lower energy use. Implementation teams provide measures and services at no cost to customers and collaborates with existing neighborhood organizations to promote the program and maximize the number of customers benefitting from the receipt of energy conservation measures.

Neighborhoods can be selected to participate in the program if at least 50% of households in the neighborhood have incomes equal to or less than 200% of the federal poverty level<sup>2</sup>. Implementation teams aim to reach approximately 8,900 customers in the DEC service territory and 4,500 customers in the DEP service territory in several preselected communities throughout North Carolina and South Carolina. Participating households are limited to a one-time receipt of energy efficiency measures through the program.

### 2.2 Program Implementation

Honeywell Building Solutions (Honeywell) implemented the 2017-2018 DEC-DEP NES Program in partnership with Duke Energy program staff. The implementer performs all assessments and installations. DEC and DEP program staff are heavily involved in selecting specific neighborhoods based on program eligibility criteria.

Prior to participating in the program, residents in selected neighborhoods receive targeted mailings that provide introductory information about how to participate; the benefits of participation; and a notice that additional information from program staff will be circulated throughout their community, including additional mailings and a community launch event. The implementation team organizes at least one community launch event in each targeted neighborhood, both to make residents aware of the program and to provide demonstrations of the measures that the NES Program offers.

The implementation team records measure installation information at each premise, which Duke Energy tracks in its program-tracking database. Program representatives also record the location in which they installed lighting measures and faucet aerators (i.e., kitchen or bathroom), along with household characteristics, such as primary heating fuel type and the type of heating and cooling equipment present in each participating household. Finally, implementation teams leave behind educational materials that explain the measures that they install in each home, additional recommendations for how participants could save energy through behavioral changes, and information about other Duke Energy programs that may be of interest.

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<sup>2</sup> As of January 1, 2017, qualifying neighborhoods in the DEP service territory must meet this threshold. Previously, qualifying neighborhoods were those where 50% of households had incomes equal to or less than 150% of the federal poverty level.

## 2.3 Program Performance

The program period under evaluation is June 1<sup>st</sup>, 2017 through June 30<sup>th</sup>, 2018. Over this period, the program teams served 15,312 households in 24 neighborhoods in North and South Carolina. Based on engineering estimates, participants save an average of 779 kWh per household per year in DEP territory and 676 kWh per household per year in the DEC territory. Energy and demand savings by service territory are displayed in Table 2-1.

**Table 2-1. Energy Savings per Household**

| Per Household Savings | kWh | Summer kW | Winter kW |
|-----------------------|-----|-----------|-----------|
| DEP                   | 779 | 0.103     | 0.101     |
| DEC                   | 676 | 0.090     | 0.083     |

### 3. Overview of Evaluation Activities

To answer the research objectives outlined in Section 1.2, Opinion Dynamics performed a range of data collection and analytic activities, including:

- Interviews with DEP and DEC program staff;
- A review of program materials and program tracking data;
- Participant telephone survey
- An engineering analysis of deemed savings.

In Sections 4 and 4.3, we provide more details on the methods and results of the impact and process analyses, respectively. Below, we summarize the scope and approach for the staff interviews, the program materials and data review, the engineering analysis, and the participant survey. Each of these components supported either the impact or the process evaluations.

#### 3.1 Program Staff Interviews

Opinion Dynamics conducted an in-depth interview with program staff responsible for program administration in 2017-2018. The in-depth interview allowed us to discuss implementation of the NES Program in DEP and DEC territories, including differences between the DEP/DEC program and program implementation in other Duke Energy territories. We also used this interview to identify program successes, to discuss any difficulties in administering the program, and to determine any risks for the program achieving its goals.

#### 3.1 Program Materials and Data Review

DEC and DEP program administration staff provided Opinion Dynamics with information on the program. These data included the program marketing materials, program tracking databases, and other program documents—such as NES implementation requirements, educational procedures, and contractors' on-site auditing and direct installation procedures. Review of these materials informed development of the participant survey instrument and the engineering analysis.

Each of these materials is further described below.

- **Marketing Materials.** Opinion Dynamics reviewed the leave-behind brochure, the customer survey booklet, the pre-participation program informational brochure, the leave-behind door hanger, the energy efficiency brochure about other Duke Energy programs, the introduction letter to the NES Program and the informational session, examples of the presentation shown at the informational sessions, and postcards sent to participants with information about how to participate.
- **Program Databases.** The program staff provided Opinion Dynamics with program-tracking data from June 1<sup>st</sup>, 2017 to June 30<sup>th</sup>, 2018. The databases provided us with information on the quantities, location (in some cases), and types of measures installed in each treated household.
- **Program Documents.** The program documents that we reviewed included statements of work between Duke Energy and Honeywell as well as the NES Program guide. The guide explained the program

implementation process, including homeowner eligibility, communication, scheduling, and assessment and installation, as well as a description of installed measures.

## 3.2 Participant Survey

The purpose of the participant survey was to collect information to support the process evaluation and development of in-service rates. Opinion Dynamics implemented the survey as a computer-assisted telephone interviewing (CATI) survey between July 11<sup>th</sup> - August 1<sup>st</sup>, 2019. We completed a total of 140 interviews and achieved a response rate of 20.5%; the average length of the interviews was 22 minutes.

The survey sample frame consisted of 14,442 NES participants that enrolled between June 1<sup>st</sup>, 2017 and June 6<sup>th</sup>, 2018.<sup>3</sup> Our team removed 3,300 records that were missing phone numbers, 2,298 records that were on Duke's "Do Not Call" list, and 393 records that were duplicates. We developed a simple random sample of the remaining 8,451 records. The survey final sample frame consisted of a preliminary extract of 550 DEP and 630 DEC measure-level participant records.

To meet precision targets for measure-level installation and persistence analyses, the evaluation team set quotas for each measure. Quotas were set at 68 to ensure that analyses met the industry-standard two-tail 90/10 criterion in terms of sampling error at a measure level. This means that we would be 90% confident that our results are within 10% of the true value in the population.

## 3.3 Engineering Analysis

Opinion Dynamics conducted an engineering analysis to estimate energy and demand savings for the 2017-2018 evaluation period.<sup>4</sup> We first adjusted the per-unit savings for each measure based on the deemed savings review described in this section using the in-service rates developed through the participant survey (see Section 4.1). We then estimated total program savings by applying the adjusted per unit savings to each participant based on the package of measures they received, their heating fuel, and the presence or absence of different types of heating and cooling equipment.<sup>5</sup>

In previous evaluations of the NES Program, Opinion Dynamics has conducted a billing analysis to determine the net savings attributable to the NES Program during the evaluation period. While this approach has been successful in previous evaluations, we were unable to apply this method to the 2017-2018 DEC-DEP evaluation due to lack of equivalency between the treatment and comparison groups and differences in weather patterns for pre- and post-treatment years. The combination of both factors did not allow for our team to control for potential exogeneous effects that biased results. For more detail, see Section 4.3.

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<sup>3</sup> Opinion Dynamics conducted a survey of participants from 11 months of the evaluation period to ensure that participants would be able to report feedback as close to their participation date as possible.

<sup>5</sup> For participants that did not have information related to heating/hot water fuel type or heating/cooling equipment in their homes tracked in the NES Program tracking data, Opinion Dynamics applied per-unit savings for specific measures weighted by the share of each population with the appropriate equipment and fuel type.



### 3.3.1 Deemed Savings Review

The primary goal of the deemed savings review is to develop updated savings algorithms and input assumptions that are consistent with standard industry practice and comparable with applicable Technical Reference Manuals (TRMs).

To conduct our deemed savings review, we performed the following steps:

- Reviewed the prior evaluation report, for the 2015–2016 NES Program years;
- Analyzed program tracking data to compile household characteristics (e.g., primary heating fuel type) to be used in estimating deemed savings for individual measures;
- Reviewed all other secondary information, including the program manual and the technical specifics of efficient equipment offered through the program; and
- Reviewed the latest Illinois, Indiana, and Mid-Atlantic TRMs, along with other recently published studies where relevant, to determine if there was a need for additional updates.

**Error! Reference source not found.** provides more detail on the methods used in the deemed savings review and engineering analysis.

## 3.4 Billing Analysis

In previous evaluations of the NES Program, Opinion Dynamics has conducted a billing analysis to determine the net savings attributable to the NES Program during the evaluation period. Opinion Dynamics attempted a billing analysis using a linear fixed effects regression (LFER) model; however, after testing several different model specifications, we determined that a billing analysis was not an effective method for evaluating NES Program impacts for the 2017-2018 evaluation period. Our team tested models that attempted to control for all household factors that do not vary over time by the individual constant terms in the equation. We used participants from the second half of 2018 and first half of 2019 as a comparison group. For more detail on our approach, see Section 4.3.

## 4. Gross Impact Evaluation

The gross impact evaluation for the 2017-2018 DEP/DEC NES Program consisted of two distinct steps: (1) verification of measure installation and continued operation; and (2) engineering analysis, including review of deemed savings values for incented measures. This section describes the methodologies and results of both steps.

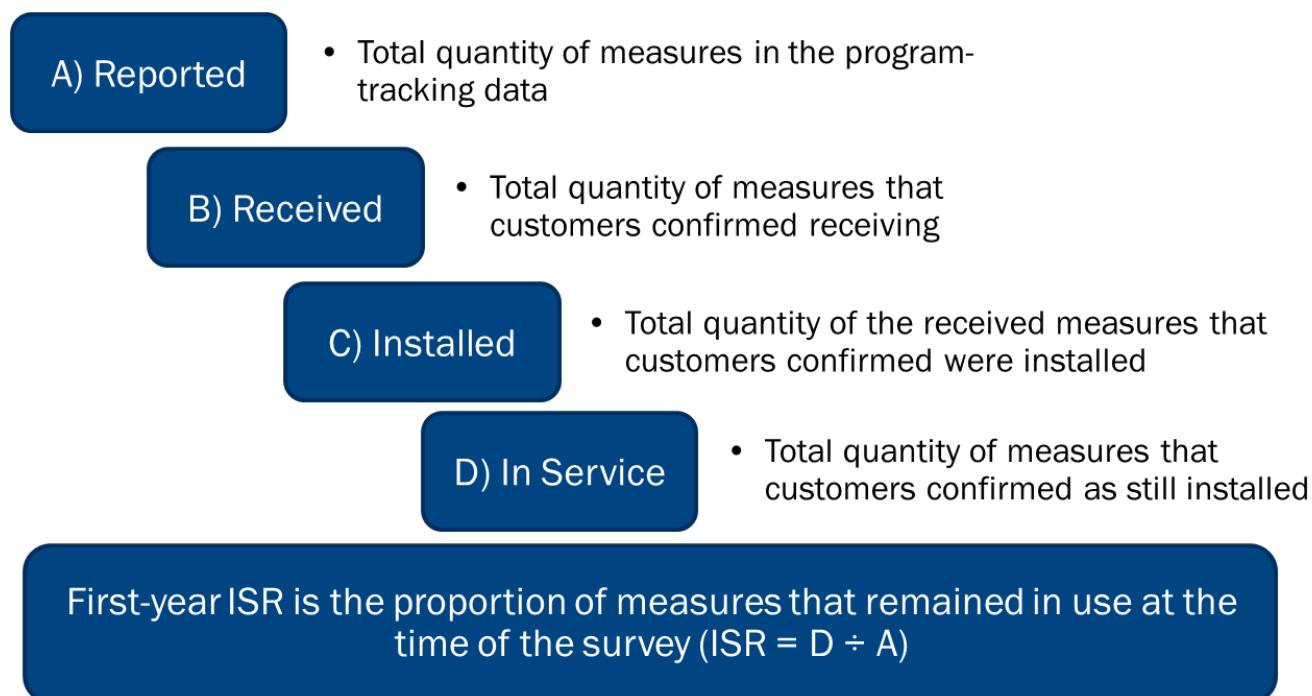
### 4.1 Measure Verification

#### 4.1.1 Measure Verification Methodology

The participant survey included questions designed to verify that participants received and installed program measures and that those measures remained in place and operational. The “in-service rate” (ISR) for each measure represents the share of measures in the program-tracking data that was still in service at the time of the survey, based on 140 completed telephone interviews (70-DEP, 70-DEC).

Figure 4-1 outlines the method for deriving the ISR for each measure. During the survey, we asked participants to confirm that they received the quantity of measures recorded in Duke Energy's program-tracking data and, when necessary, to provide the correct quantity. We also asked participants to confirm the quantity of measures that were installed and remained in service at the time of the survey.

**Figure 4-1 In Service Rate Components**



Based on the survey responses, we calculated the verification, installation, and persistence rates, as well as the resulting ISR – using the equations shown below – for each participant and each measure they received. We then developed jurisdiction-specific averages of all four rates for each measure group (see Table 4-1).

$$1) \text{ Verification Rate} = \frac{(B) \text{ Received Quantity}}{(A) \text{ Reported Quantity}}$$

$$2) \text{ Installation Rate} = \frac{(C) \text{ Installed Quantity}}{(B) \text{ Received Quantity}}$$

$$3) \text{ Persistence Rate} = \frac{(D) \text{ In Service Quantity}}{(C) \text{ Installed Quantity}}$$

$$\text{First Year ISR} = \text{In Service Measures (D)} \div \text{Reported Measures (A)}$$

In previous evaluations of the NES Program, Opinion Dynamics found that participants were unable to verify certain measures (e.g., water heater temperature setbacks, water heater tank and pipe wraps). For these measures, we assumed 100% for all four rates. Additionally, for some air infiltration measures, such as caulking or glass patch tape, participants are unable to verify installation and persistence of individual measures. As such, we asked participants to verify installation of the entire package of air infiltration measures and assume 100% of those treatments remain installed. As all NES measures are installed directly by program staff and these measures specifically are difficult to remove, we feel that these assumptions are reasonable.

for this type of program. Finally, ISRs for HVAC filters are based on verification that participants received the filters, and changed their filters at least once per year.

#### 4.1.2 Measure Verification Results

The results of this analysis showed high ISRs for measures in both DEC and DEP service territories, as shown in Table 4-1. Overall, both DEP and DEC participants reported that most measures were still in service at the time of the participant survey. All results are significant at the 90% confidence level with +/- 10% relative precision.

**Table 4-1. First Year Measure In-Service Rates**

| Measure Category      | DEP               |                   |                  |     | DEC               |                   |                  |     |
|-----------------------|-------------------|-------------------|------------------|-----|-------------------|-------------------|------------------|-----|
|                       | Verification Rate | Installation Rate | Persistence Rate | ISR | Verification Rate | Installation Rate | Persistence Rate | ISR |
| LEDs                  | 98%               | 100%              | 93%              | 92% | 98%               | 100%              | 96%              | 94% |
| Low Flow Showerheads  | 100%              | 100%              | 96%              | 96% | 99%               | 100%              | 98%              | 97% |
| Faucet Aerators       | 98%               | 100%              | 98%              | 97% | 96%               | 100%              | 99%              | 94% |
| Infiltration Measures | 94%               | N/A               | N/A              | 94% | 92%               | N/A               | N/A              | 92% |
| HVAC Filters          | 90%               | 92%               | N/A              | 83% | 89%               | 90%               | N/A              | 80% |

## 4.2 Engineering Analysis

### 4.2.1 Engineering Analysis Methodology

The engineering analysis for the 2017-2018 NES Program consisted of a deemed savings review of each incanted program measure and application of measure-specific ISRs to develop ex post program savings.

To develop per-unit savings, we used several resources. Since neither North Carolina nor South Carolina has a statewide TRM, we relied on the IL, IN, ARK, and Mid-Atlantic TRM and secondary sources, as necessary, for algorithms and assumptions. As NES implementation teams collect characteristics of participating households, our engineering team used inputs from the DEP and DEC program-tracking data wherever possible. For more information on the algorithms and inputs that our engineering team used to develop deemed savings estimates for each measure, see **Error! Reference source not found..**

When developing total program savings, Opinion Dynamics applied measure-specific per-unit savings estimates (excluding ISRs) to all participants who received each measure. Where savings for certain measures relied on households having specific heating/cooling equipment or fuel types, our engineering team only applied savings for those measures to participants who received them and had the appropriate

mix of fuel and equipment.<sup>6</sup> For example, NES implementation teams provide domestic hot water measures to all participants, regardless of the fuel they use to heat water in their homes. However, as Duke Energy only provides electricity to DEP and DEC customers, when developing total program savings, our team only applied savings for domestic hot water measures to participants that received them and heated their water with electricity. Once the engineering team applied savings appropriately to the participant population, we applied measure-level ISRs to develop total program savings. We then calculated per household savings by dividing total program savings by the total number of participants.

## 4.2.2 Engineering Analysis Results

This remainder of this section provides gross energy and demand savings estimates for each measure offered by the NES Program, along with total program savings and per household savings estimates for the 2017-2018 evaluation period.

### Ex-Post Deemed Savings Estimates

Table 4-2 provides the estimated gross per-unit energy and demand savings for all measures installed through the NES Program. As described in Section 3.3, we based the measure-level savings on secondary research and applied NES Program-specific assumptions on household characteristics, where applicable. The estimates shown below are for households with the appropriate mix of heating and cooling equipment, and electric heat or hot water. For example, savings from kitchen faucet aerators would only be realized by households with an electric water heater.

**Table 4-2. Ex Post Per-Unit Deemed Savings Estimates**

| Measure                                | Energy savings (kWh) |     | Summer Peak Demand (kW) |        | Winter Peak Demand (kW) |        |
|--|----------------------|-----|-------------------------|--------|-------------------------|--------|
|  | DEP                  | DEC | DEP                     | DEC    | DEP                     | DEC    |
| <b>Lighting</b>                        |                      |     |                         |        |                         |        |
| LEDs (75W equivalent)                  | 42                   | 42  | 0.0061                  | 0.0061 | 0.0030                  | 0.0030 |
| LEDs (60W equivalent)                  | 33                   | 33  | 0.0049                  | 0.0049 | 0.0024                  | 0.0024 |
| LEDs (40W equivalent)                  | 24                   | 24  | 0.0035                  | 0.0035 | 0.0017                  | 0.0017 |
| LEDs 5 W or similar - Candelabra Bulbs | 21                   | 21  | 0.0031                  | 0.0031 | 0.0015                  | 0.0015 |
| LED 5 W or similar - Globes            | 21                   | 21  | 0.0031                  | 0.0031 | 0.0015                  | 0.0015 |
| <b>Domestic Hot Water</b>              |                      |     |                         |        |                         |        |
| Low Flow Showerhead                    | 226                  | 255 | 0.0084                  | 0.0081 | 0.0168                  | 0.0162 |
| Water Heater Insulation Wrap           | 105                  | 96  | 0.0110                  | 0.0110 | 0.0110                  | 0.0110 |
| Pipe Insulation (5 feet sections)      | 83                   | 83  | 0.0094                  | 0.0094 | 0.0094                  | 0.0094 |
| Kitchen Faucet Aerator                 | 95                   | 67  | 0.0035                  | 0.0034 | 0.0070                  | 0.0068 |
| Bathroom Faucet Aerator                | 14                   | 10  | 0.0010                  | 0.0010 | 0.0020                  | 0.0020 |
| <b>Air Sealing</b>                     |                      |     |                         |        |                         |        |
| Infiltration Reduction                 | 120                  | 103 | 0.0295                  | 0.0275 | 0.0190                  | 0.0182 |
| <b>HVAC</b>                            |                      |     |                         |        |                         |        |

<sup>6</sup> For participants that did not have information related to heating/hot water fuel type or heating/cooling equipment in their homes tracked in the NES Program tracking data, Opinion Dynamics applied per-unit savings for specific measures weighted by the share of each population with the appropriate equipment and fuel type.

|              |    |    |        |        |        |        |
|--------------|----|----|--------|--------|--------|--------|
| HVAC Filters | 52 | 46 | 0.0147 | 0.0152 | 0.0112 | 0.0103 |
|--------------|----|----|--------|--------|--------|--------|

## Total Program Savings

Our team calculated total program savings by applying the per-unit estimates shown in Table 4-2 to each participant that received the corresponding measure.<sup>7</sup> We then applied the ISRs shown in Table 4-1 and, where applicable, multiplied the per-unit estimate by the measure quantity installed in each participating household. Table 4-3 below summarizes total gross program energy and demand savings, by jurisdiction and measure, for the 2017-2018 evaluation period.

**Table 4-3. Total Gross Program Savings**

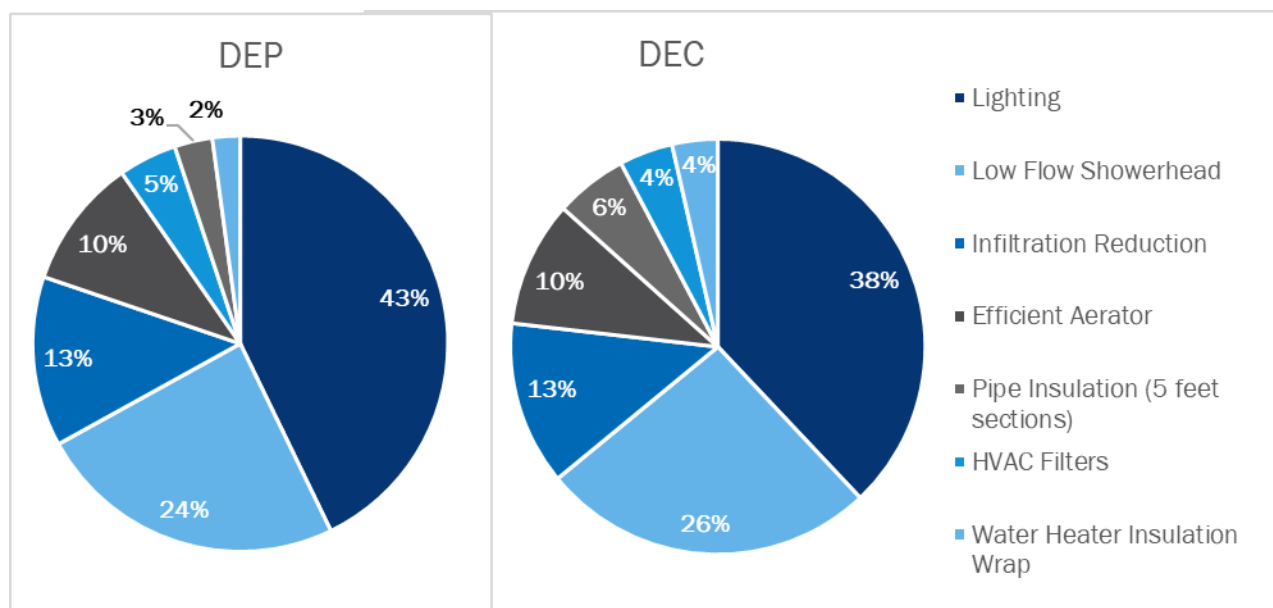
| Measure                                | Energy savings (kWh) |                  | Summer Peak Demand (kW) |              | Winter Peak Demand (kW) |              |
|--|----------------------|------------------|-------------------------|--------------|-------------------------|--------------|
|  | DEP                  | DEC              | DEP                     | DEC          | DEP                     | DEC          |
| <b>Lighting</b>                        |                      |                  |                         |              |                         |              |
| LEDs (60W equivalent)                  | 1,163,401            | 2,195,813        | 172                     | 325          | 83                      | 157          |
| LEDs 5 W or similar - Candelabra Bulbs | 140,116              | 354,045          | 20.7                    | 52.4         | 10                      | 25.3         |
| LEDs (75W equivalent)                  | 59,798               | 91,262           | 8.85                    | 13.5         | 4                       | 6.53         |
| LED 5 W or similar - Globes            | 44,762               | 164,478          | 6.62                    | 24.3         | 3                       | 11.8         |
| LEDs (40W equivalent)                  | 4,067                | 36,989           | 0.602                   | 5.47         | 0.3                     | 2.65         |
| <b>Domestic Hot Water</b>              |                      |                  |                         |              |                         |              |
| Low Flow Showerhead                    | 797,101              | 1,954,742        | 37.4                    | 85.0         | 75                      | 170          |
| Kitchen Faucet Aerator                 | 280,402              | 622,664          | 12.9                    | 31.3         | 26                      | 62.5         |
| Pipe Insulation (5 feet sections)      | 97,387               | 423,152          | 11.1                    | 48.3         | 11                      | 48.3         |
| Water Heater Insulation Wrap           | 71,352               | 266,243          | 8.14                    | 30.4         | 8                       | 30.4         |
| Bathroom Faucet Aerator                | 53,622               | 110,904          | 4.85                    | 10.9         | 10                      | 21.7         |
| <b>Air Sealing</b>                     |                      |                  |                         |              |                         |              |
| Infiltration Reduction                 | 436,437              | 955,256          | 106                     | 253          | 155                     | 308          |
| <b>HVAC</b>                            |                      |                  |                         |              |                         |              |
| HVAC Filters                           | 149,881              | 313,208          | 47.9                    | 115          | 43                      | 76.0         |
| <b>Total Program Savings</b>           | <b>3,298,328</b>     | <b>7,488,755</b> | <b>437</b>              | <b>994</b>   | <b>428</b>              | <b>920</b>   |
| <b>Savings per Household</b>           | <b>779</b>           | <b>676</b>       | <b>0.103</b>            | <b>0.090</b> | <b>0.101</b>            | <b>0.083</b> |

Using the total gross savings values from Table 4-3 and the total number of participants, we calculated per household energy savings of 779 kWh for DEP and 676 kWh for DEC neighborhoods. The majority of these savings are attributable to lighting and low-flow showerhead installations. As shown in Figure 4-2 lighting

<sup>7</sup> Certain measures only generate electric savings in households with electric space or water heating, or central cooling (i.e., domestic hot water, infiltration reduction, and HVAC filters). For these measures, we only applied savings to those households with the appropriate mix of electric heating, hot water, or cooling equipment. In cases where individual participants did not have space or water heating fuel type information in the program tracking data, we weighted per-unit savings by the share of participating households with the appropriate fuel type.

accounted for 1,427 MWh (43%) of overall savings in DEP territory and 2,892 MWh (38%) of savings in DEC territory. Low-flow showerhead installations accounted for 797 MWh (24%) and 1,975 MWh (26%) of savings in DEP and DEC territories, respectively.

**Figure 4-2 Measure Contribution to Total Energy (kWh) Savings**



### Comparison to Previous Impact Analyses

As noted earlier, due to drastically different weather patterns and an inequivalent comparison group, Opinion Dynamics was unable to rely on a billing analysis and determined that an engineering analysis was a more reasonable approach to estimating ex post program impacts for this evaluation period. To ensure that engineering analysis results can be a reliable proxy for billing analysis results for the NES Program, we compared impact results from the two methods derived for previous DEP and DEC evaluations. Table 4-4 below provides per household energy savings estimates for both methods, based on DEP and DEC evaluations for the 2014 and 2015 program years, along with the ratio of the billing-to-engineering estimates. The results show generally good agreement of the two methods.

**Table 4-4. Historical Per Household Billing-to-Engineering Savings Comparisons**

| Service Territory and Evaluation Year | Per Household Savings Estimates (kWh) |             | Ratio of Billing/Engineering |
|---------------------------------------|---------------------------------------|-------------|------------------------------|
|                                       | Billing Analysis                      | Engineering |                              |
| DEP 2014                              | 367                                   | 379         | 97%                          |
| DEP 2015                              | 430                                   | 478         | 90%                          |
| DEC 2015                              | 347                                   | 333         | 104%                         |

When compared with per household savings estimates from previous years, results from the 2017-2018 evaluation period are higher (see Table 4-5). There are two main factors that may contribute to this. First, as seen in Table 4-5, participants in the 2017-2018 evaluation period had higher rates of electric water, space heating, and central air conditioning, so energy savings from domestic hot water, air infiltration, and HVAC measures applied to a larger share of participants. Also, Opinion Dynamics made updates to certain

parameters used in estimating per-unit savings during the deemed savings review based on more recent editions of technical resources (see **Error! Reference source not found.**).

**Table 4-5. Comparison of Per Household Savings Estimates and Characteristics**

|  | DEP  |      |           | DEC  |           |
|--|------|------|-----------|------|-----------|
|  | 2014 | 2015 | 2017-2018 | 2015 | 2017-2018 |
| <i>Per Household kWh Estimates (Engineering)</i> | 379  | 478  | 779       | 333  | 676       |
| Share of Participants with Electric Hot Water    | 72%  | 81%  | 84%       | 69%  | 83%       |
| Share of Participants with Electric Heat         | 49%  | 61%  | 95%       | 49%  | 77%       |
| Share of Participants with Central AC            | 50%  | 66%  | 77%       | 64%  | 72%       |

## Measure Installation

To evaluate the success of the program in providing energy-saving measures to participants, and to determine if there were missed savings opportunities or measures that were being provided less frequently than in past years, Opinion Dynamics examined the number of measures provided to each home. Table 4-6 shows the share of homes that received at least one of each measure and the average quantity installed per home. DEP and DEC territories had similar measure mixes overall, although homes in DEC territory had a fewer LEDs installed on average than homes in DEP territory (12.2 compared to 9).

**Table 4-6. Measure Installation Rates from Program-Tracking Data**

| Measure Category       | Measure                                | DEP                              |                    | DEC                              |                    |
|------------------------|--|----------------------------------|--------------------|----------------------------------|--------------------|
|                        |  | Percent of Projects with Measure | Average Qty Per HH | Percent of Projects with Measure | Average Qty Per HH |
| Lighting               | LEDs (60W equivalent)                  | 93%                              | 9.3                | 85%                              | 6.3                |
|                        | LEDs 5 W or similar - Candelabra Bulbs | 38%                              | 1.8                | 33%                              | 1.6                |
|                        | LED 5 W or similar - Globes            | 14%                              | 0.6                | 18%                              | 0.8                |
|                        | LEDs (75W equivalent)                  | 5%                               | 0.5                | 3%                               | 0.2                |
|                        | LEDs (40W equivalent)                  | 1%                               | <0.1               | 2%                               | 0.1                |
| Hot Water              | Kitchen Faucet Aerator                 | 85%                              | 0.9                | 78%                              | 0.8                |
|                        | Low Flow Showerhead                    | 82%                              | 1.1                | 71%                              | 0.9                |
|                        | Bathroom Faucet Aerator                | 78%                              | 1.1                | 71%                              | 0.9                |
|                        | Pipe Insulation (5 feet sections)      | 19%                              | 0.3                | 29%                              | 0.5                |
|                        | Water Heater Insulation Wrap           | 18%                              | 0.2                | 25%                              | 0.3                |
| Infiltration Reduction | Caulking                               | 77%                              | 0.8                | 78%                              | 0.8                |
|                        | Weather-stripping per door             | 70%                              | 1.1                | 73%                              | 1.1                |
|                        | Foam Insulation                        | 53%                              | 0.6                | 57%                              | 0.6                |
|                        | Door Sweep                             | 51%                              | 0.8                | 40%                              | 0.5                |
|                        | Cover for A/C                          | 24%                              | 0.4                | 26%                              | 0.5                |
|                        | Poly Tape                              | 0.3%                             | <0.1               | 3%                               | <0.1               |
| HVAC                   | HVAC Filters                           | 74%                              | 9.2                | 68%                              | 8.1                |
| Education/Other        | Water Heater Temp Check                | 94%                              | 1                  | 95%                              | 1                  |



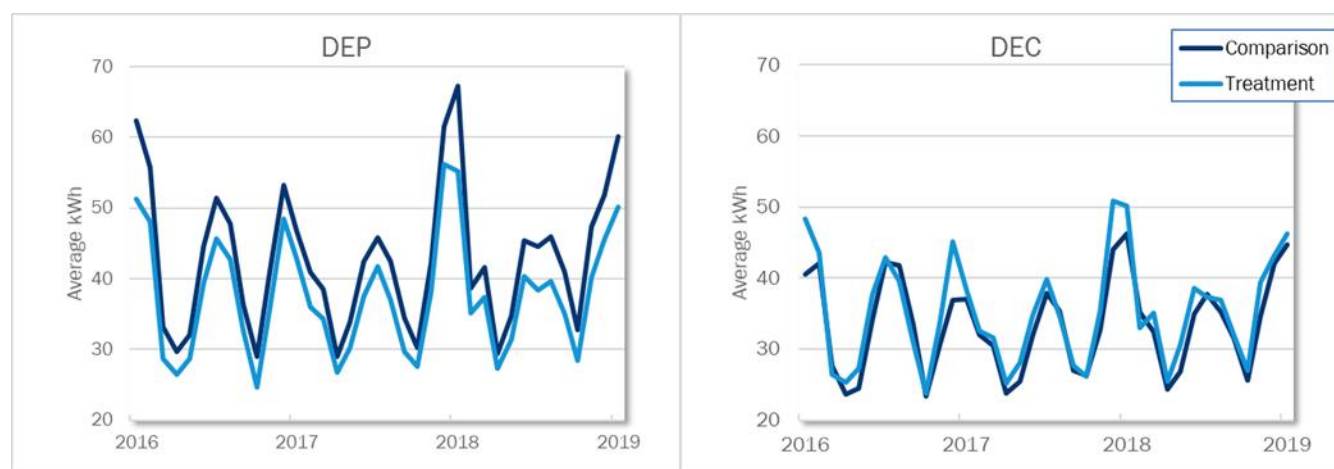
|  |                         |     |     |      |      |
|--|-------------------------|-----|-----|------|------|
|  | Thermometer             | 97% | 1.0 | 94%  | 0.9  |
|  | Refrigerator coil brush | --  | --  | 0.1% | <0.1 |

### 4.3 Billing Analysis

In previous Duke NES evaluations, Opinion Dynamics conducted a billing analysis to determine the overall evaluated net savings of the NES Program. Billing analyses capture savings attributable to the program, including installed measures, behavioral changes, and participant spillover. In past DEP and DEC evaluations, we have compared the energy usage of the treatment group, those that participated in the NES Program during the evaluation period, with the usage of a comparison group. Comparison groups must have similar usage patterns to those in the treatment group prior to their enrollment in the program. To avoid self-selection bias, i.e. the correlation between the propensity to participate in a program and energy use, in previous DEP and DEC evaluations, we used future NES participants as the comparison group.

As billing analyses require a comparison between energy usage between pre- and post-treatment periods, successful analyses control for differences in weather patterns between the two periods. In cases of large weather differences between the two periods, the use of an equivalent comparison group is critical to control for other changes in behavior that may coincide with major weather differences. Figure 4-3 shows how the energy consumption differed between the treatment and comparison group from the early 2016 to early 2019. While usage patterns varied between the two groups in both service territories, DEP treatment and comparison groups were particularly incompatible in terms of energy consumption.

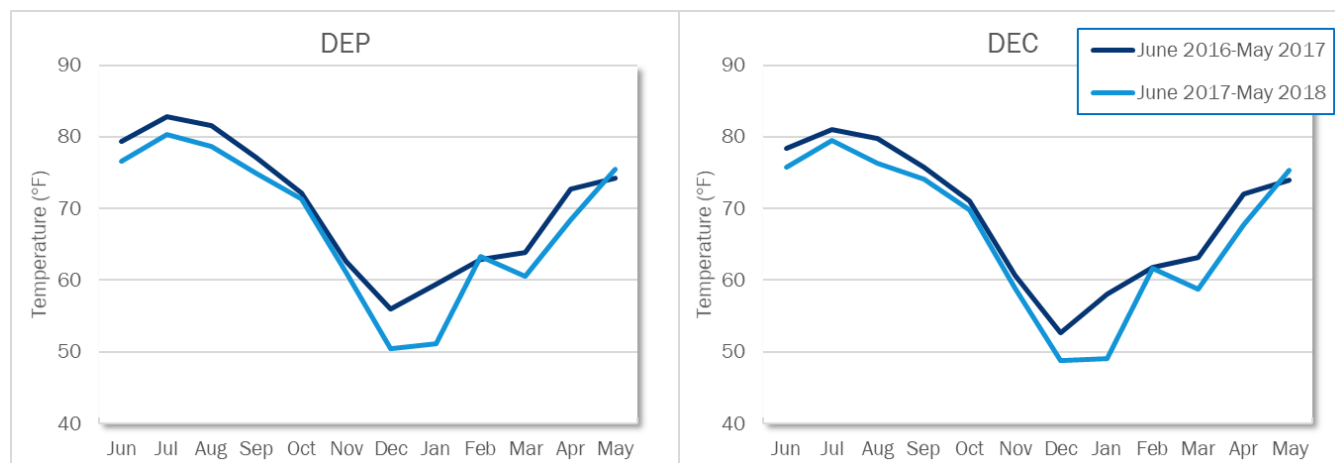
**Figure 4-3. Treatment and Comparison Group Energy Usage**



Across both service territories, the evaluation period was substantially colder than the pre-treatment period. Figure 4-4, shows the differences in average monthly temperatures between the two time periods. With inequivalent comparison groups, and substantially different weather patterns from year-to-year, models were unable to control for exogenous factors that may have influenced energy usage in NES participant households.



**Figure 4-4. Average Monthly Temperature**



### 4.3.1 Model Results

Opinion Dynamics tested several different model specifications and determined that, due to the wide variation in modeled results largely driven by the 2 factors discussed in this section, a billing analysis was not an appropriate method for evaluating the impacts for the 2017-2018 NES evaluation period. Table 4-7 below shows the parameter estimates from the final model.

**Table 4-7. Results of Billing Analysis Model Parameter Estimates**

| Variable  | DEP      |         | DEC      |         |
|---|----------|---------|----------|---------|
|   | NC       | SC      | NC       | SC      |
| NES Participation (i.e., treatment effect)                | 7.624**  | -0.650  | -1.910** | 1.775   |
| Cooling Degree Days (CDD)                                 | 2.084**  | 1.946** | 1.862**  | 1.513** |
| Heating Degree Days (HDD)                                 | 1.533**  | 1.893** | 0.995**  | 1.193** |
| Post-Participation Period CDD                             | -0.336** | 1.432** | -0.654** | 0.528** |
| Post-Participation Period HDD                             | -0.392** | 0.117   | 0.162**  | -0.122* |
| Constant  | 0.0      | 0.0     | 0.0      | 0.0     |
| Observations  | 83,418   | 75,451  | 260,123  | 89,027  |
| R-squared   | 0.321    | 0.327   | 0.221    | 0.230   |
| Monthly Effects Included                                  | YES      |         |          |         |
| Post-Participation Period Interacted with Months Included | YES      |         |          |         |
| Treatment Group Interacted with Months Included           | YES      |         |          |         |

\* p<0.05, \*\* p<0.01.

## 5. Process Evaluation

### 5.1 Researchable Questions

Based on experience evaluating this program in previous years and discussions with DEC and DEP program staff, Opinion Dynamics developed the following process-related research questions:

- What are the major strengths of the program? Are there specific ways that the program could be improved to be more effective in the future?
- What are the barriers to implementing this program—that is, are there limiting factors to achieving greater participation and realizing additional program attributable savings?
- Do NES participants realize other non-energy benefits as a result of their participation, and, if so, what are the most common?
- Would NES participants benefit from, or like, additional follow-up communication from the program after their participation? What communication methods would be effective?

### 5.2 Methodology

The process evaluation relied on the following tasks (see Section 3 for additional detail):

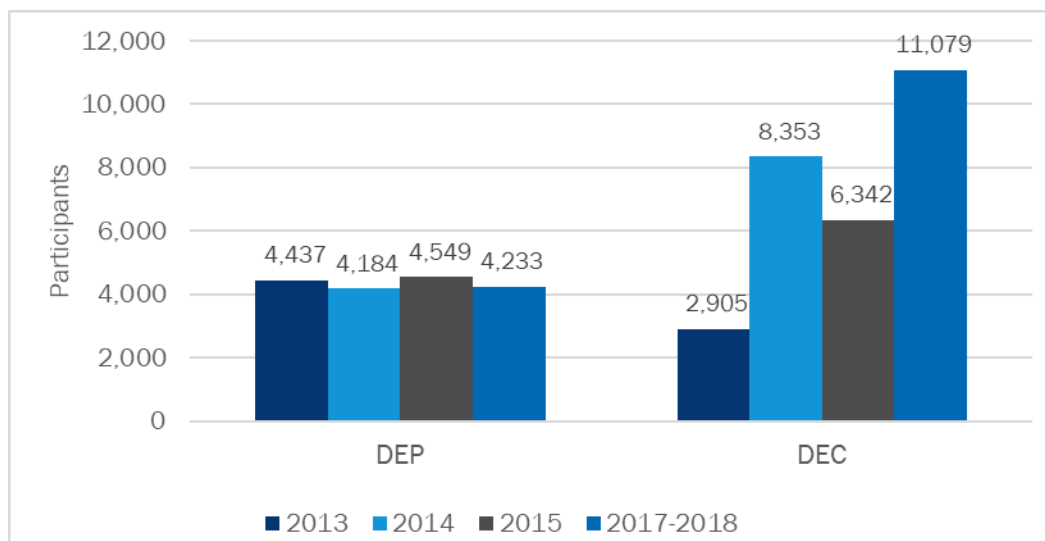
- in-depth interview with program staff at DEC and DEP;
- A review of secondary materials (i.e., Honeywell Scope of Work, NES marketing materials, NES Program guide, and program evaluations from previous years);
- Telephone survey of program participants
- An analysis of program tracking data.

### 5.3 Key Findings

#### 5.3.1 Program Participation

The program years 2017 and 2018 were the eighth and ninth years of the NES Program in Duke Energy's North and South Carolina territories. Between June 1<sup>st</sup>, 2017 and June 30<sup>th</sup>, 2018, the NES Program teams served 24 neighborhoods in total, 17 in DEC territory and 7 in DEP territory. The NES Program team treated 11,079 DEC and 4,233 DEP customers, 15,312 in total. Figure 5-1 below provides a comparison of program participation over the past 4 years. Overall, staff reached 69% of customers across all neighborhoods served during the 2017-2018 evaluation period.

**Figure 5-1 NES Program Participation 2013-2018**



### Cross Participation

There were high levels of cross participation in other Duke Energy programs among NES participants from June 1<sup>st</sup>, 2017 and June 30<sup>th</sup>, 2018. As shown in Table 5-2 below, 79% of DEP and 83% of DEC participants also participated in another Duke Energy program, most of them prior to having NES measures installed in their homes (67% and 71%, respectively).

**Figure 5-2. Cross Participation Before and After NES Participation**

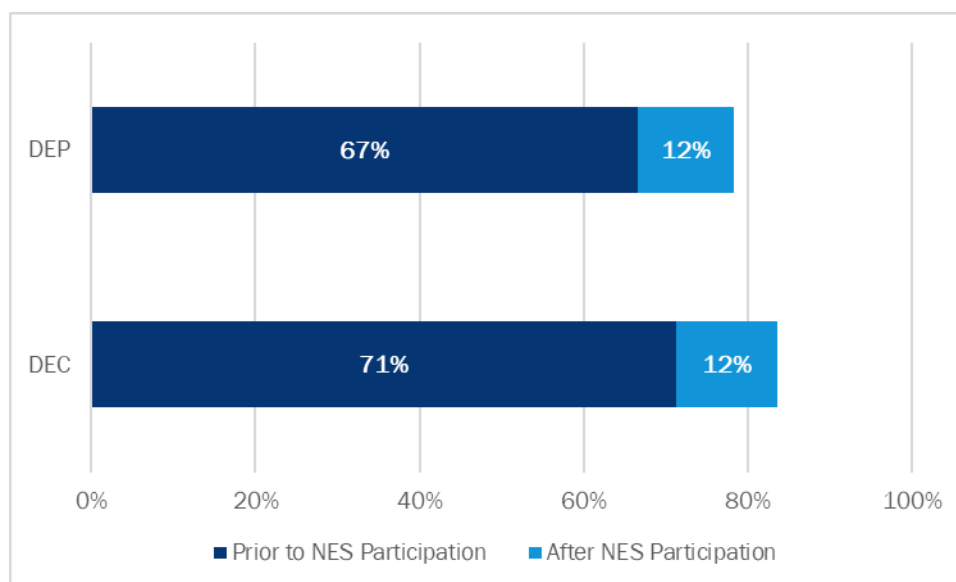


Table 5-1 shows the number of cross participants in other Duke Energy programs. The largest number of DEP cross participants also enrolled in the My Home Energy Report Program, while the largest number of DEC participants also enrolled in the Smart \$aver Residential program.

**Table 5-1. Count of NES Cross Participants by Program**

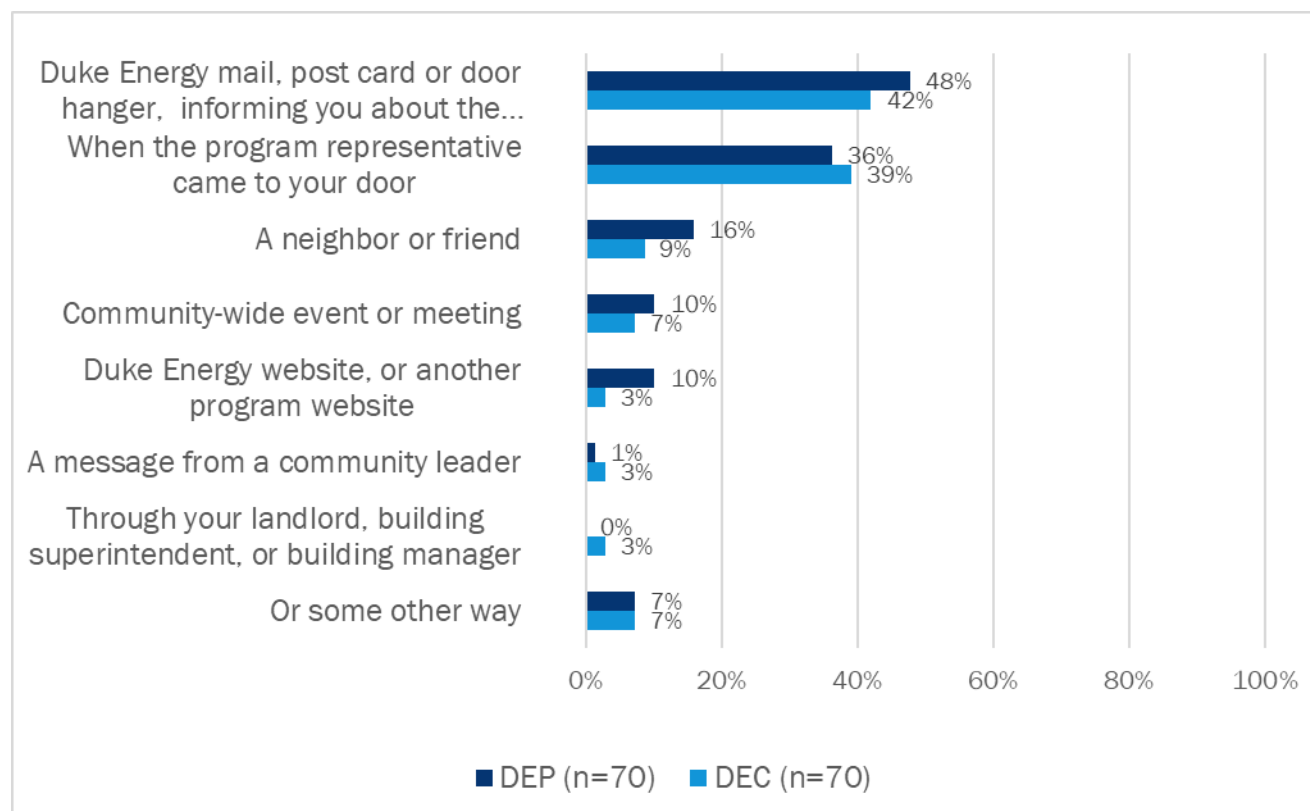
| Program                                | DEP          | DEC          |
|--|--------------|--------------|
| My Home Energy Report                  | 3,164        | 1,450        |
| EnergyWise Home                        | 556          | 0            |
| Single Family Water Measures           | 320          | 0            |
| Smart \$aver Residential               | 118          | 8,546        |
| Home Energy Improvement                | 92           | 0            |
| Residential Energy Assessment          | 64           | 108          |
| Energy Efficiency Behavior             | 54           | 0            |
| Appliance Recycling Program            | 25           | 64           |
| Residential EE Products & Services     | 6            | 767          |
| Residential Demand Response            | 0            | 727          |
| <b>Total Unique Cross Participants</b> | <b>3,315</b> | <b>9,265</b> |

### 5.3.2 Marketing and Outreach

For each neighborhood, Duke program staff and implementation teams conduct both broad and targeted outreach aimed at encouraging program participation and educating communities about energy efficiency. Program teams first send customized introductory letters to neighborhood residents that provide information on the measures that the program offers, the monetary savings that participants can achieve by enrolling, and information about how to participate. The introductory letter also notes any local community organizations that program teams have partnered with and provides information about the community launch event for their neighborhood. In coordination with the implementation teams, program staff conduct a community launch event for each neighborhood, introducing the NES Program, the implementation teams, and showing residents, the types of energy efficiency measures offered through the NES Program. Program teams also send follow up postcards reminding residents about the NES Program and, for those not home when an implementation team knocks on their door, crews leave behind door hangers that provide an option to schedule an appointment to have measures installed.

Figure 5-3 shows participant responses about how they first heard about the NES Program. In both service territories, the most common way that participants heard about the program was through a direct mail or door hanger (DEP-48%, DEC-42%). The second most common method was from a program representative who visited the home (DEP-36%, DEC-39%). These responses indicate that the initial contacts made by program teams are an effective form of outreach.

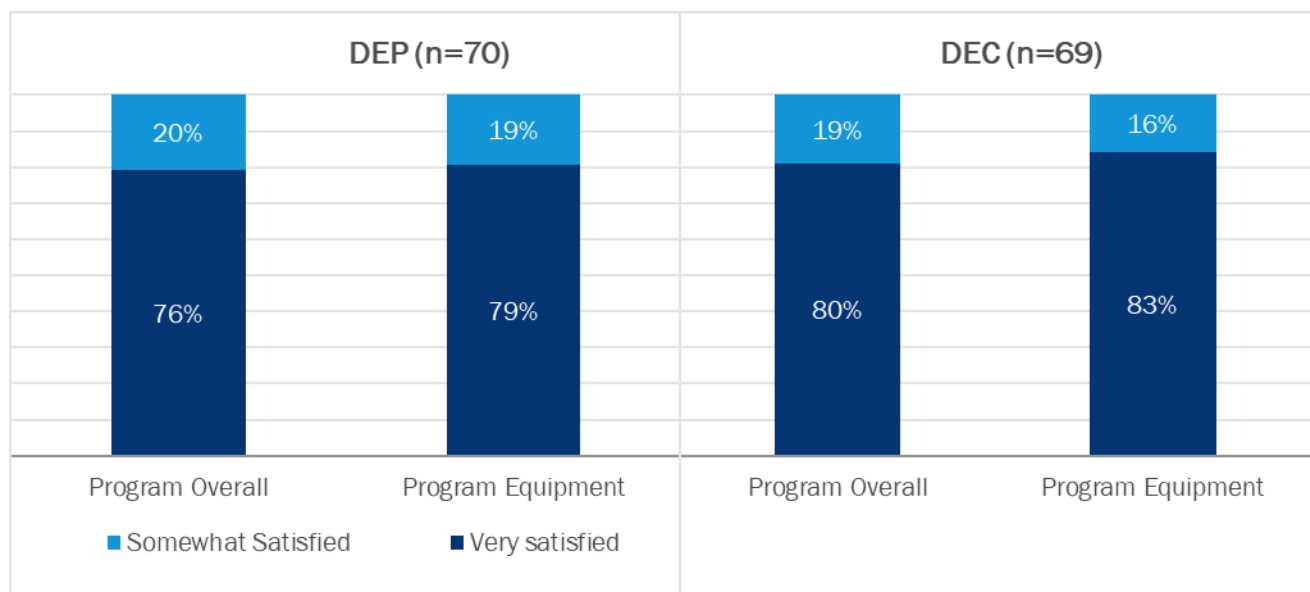
Figure 5-3. How Participants First Heard About the NES Program



### 5.3.3 Program Satisfaction

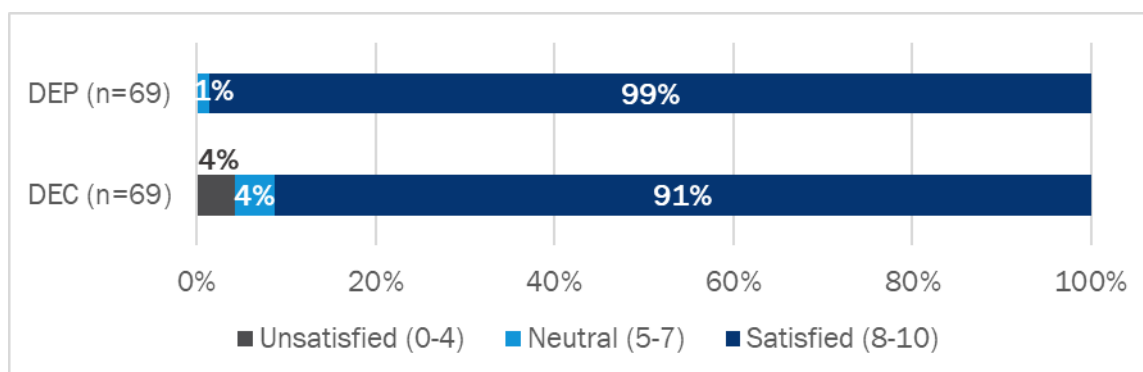
Both DEP and DEC participants are satisfied with all components of the program. As shown in Figure 5-4, 96% of DEP and 98% of DEC participants reported that they were somewhat or very satisfied with the program overall, and 99% of participants from both territories reported that they were somewhat or very satisfied with the equipment they received through the program.

Figure 5-4 Satisfaction with NES Program and Equipment



In addition, participants are very satisfied with program representatives, including implementation teams (Figure 5-5). Ninety-nine percent of DEP and 91% of DEC participants reported they were satisfied with their NES Program representatives.

Figure 5-5 Participant Satisfaction with NES Program Representatives



### 5.3.4 Additional Benefits

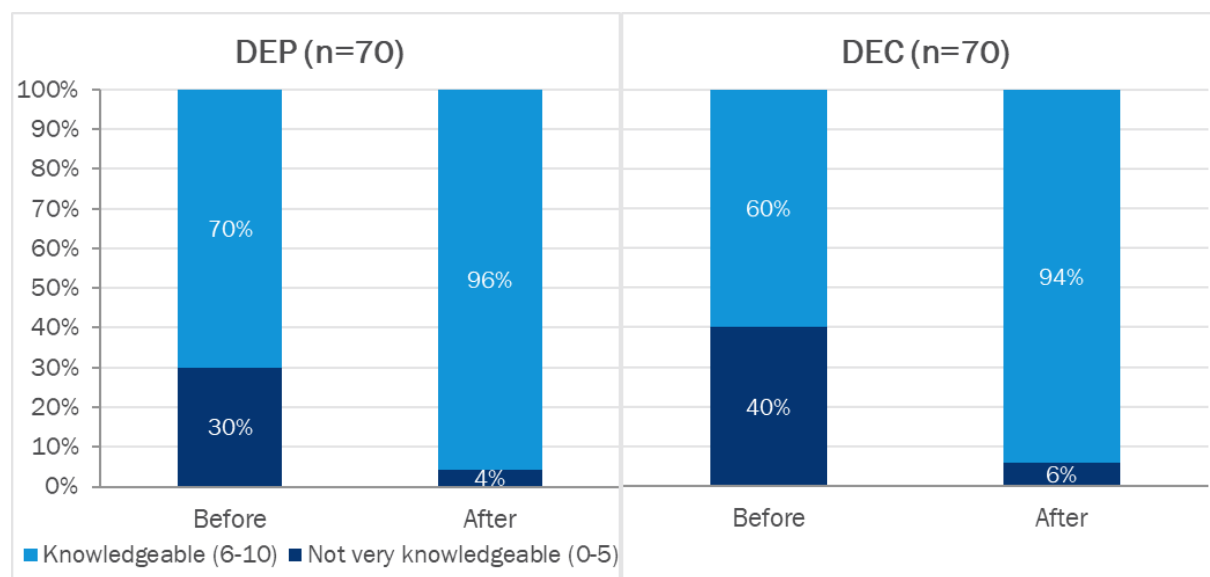
An important customer benefit of the NES Program is the energy education that customers receive at the time of home visits. Prior to participation, customers received some information about ways to save energy through mailings and flyers either left at their home or provided at the community launch event. Additionally, at the neighborhood launch event, program staff discuss the energy-saving measures that Duke Energy offers through the NES Program and how each measure saves energy in participants' homes. Implementation teams also provide important education to participants while on site. During measure installation, implementation teams provide more detail on energy saving measures, discuss other ways that participants might change their behavior to save more energy, and answer participant questions. Implementation teams then leave

behind information to reinforce the energy education, provide other tips for saving energy in their home, and information about other Duke Energy programs that participants may be eligible for.

Eighty-nine percent of DEP and all of DEC participants reported receiving in-person recommendations or energy saving tips from implementation teams. The vast majority of those participants found that information useful in helping them save energy (DEP-94%, DEC-87%). In addition, 99% of DEP participants and 87% of DEC participants said that they received educational materials during their home visit. Of those that received these materials, most found them useful in helping save energy in their homes (DEP-88%, DEC-75%).

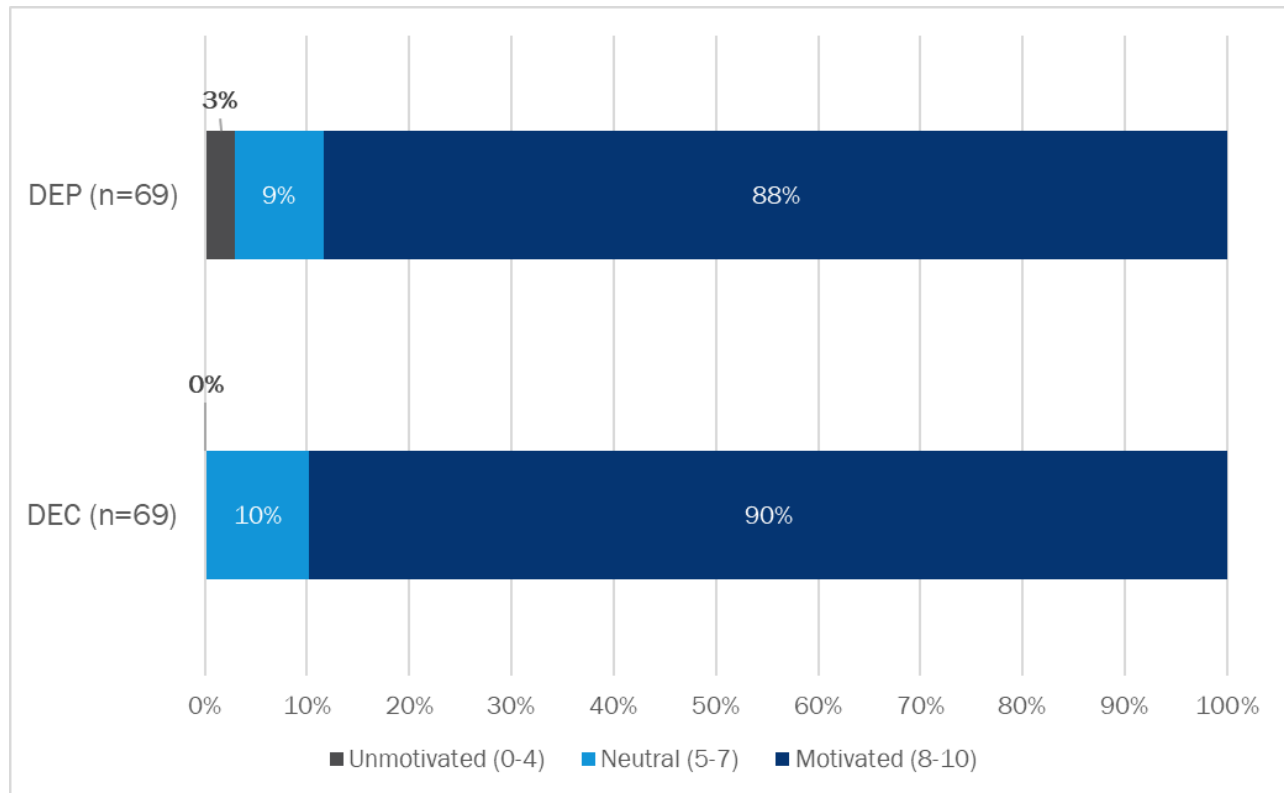
Participants across both service territories reported that their knowledge increased after their enrollment in the NES Program. Prior to participation, 70% of DEP participants and 60% of DEC participants reported that they were knowledgeable about ways to save energy in their homes, providing a mean rating of 6.6 (DEP) and 6.5 (DEC) on a scale of 0 to 10, where 0 means “not at all knowledgeable” and 10 means “very knowledgeable.” After participation, 96% of DEP participants and 94% of DEC participants reported that they were knowledgeable, providing a mean rating of 9.0 and 8.4, respectively (Figure 5-6).

**Figure 5-6 Participant Knowledge of Ways to Save Energy**



Both DEP and DEC participants are motivated to reduce their energy use. Eighty-eight percent of DEP and 90% of DEC participants were motivated to reduce their energy use after participating in the NES Program (Figure 5-7).

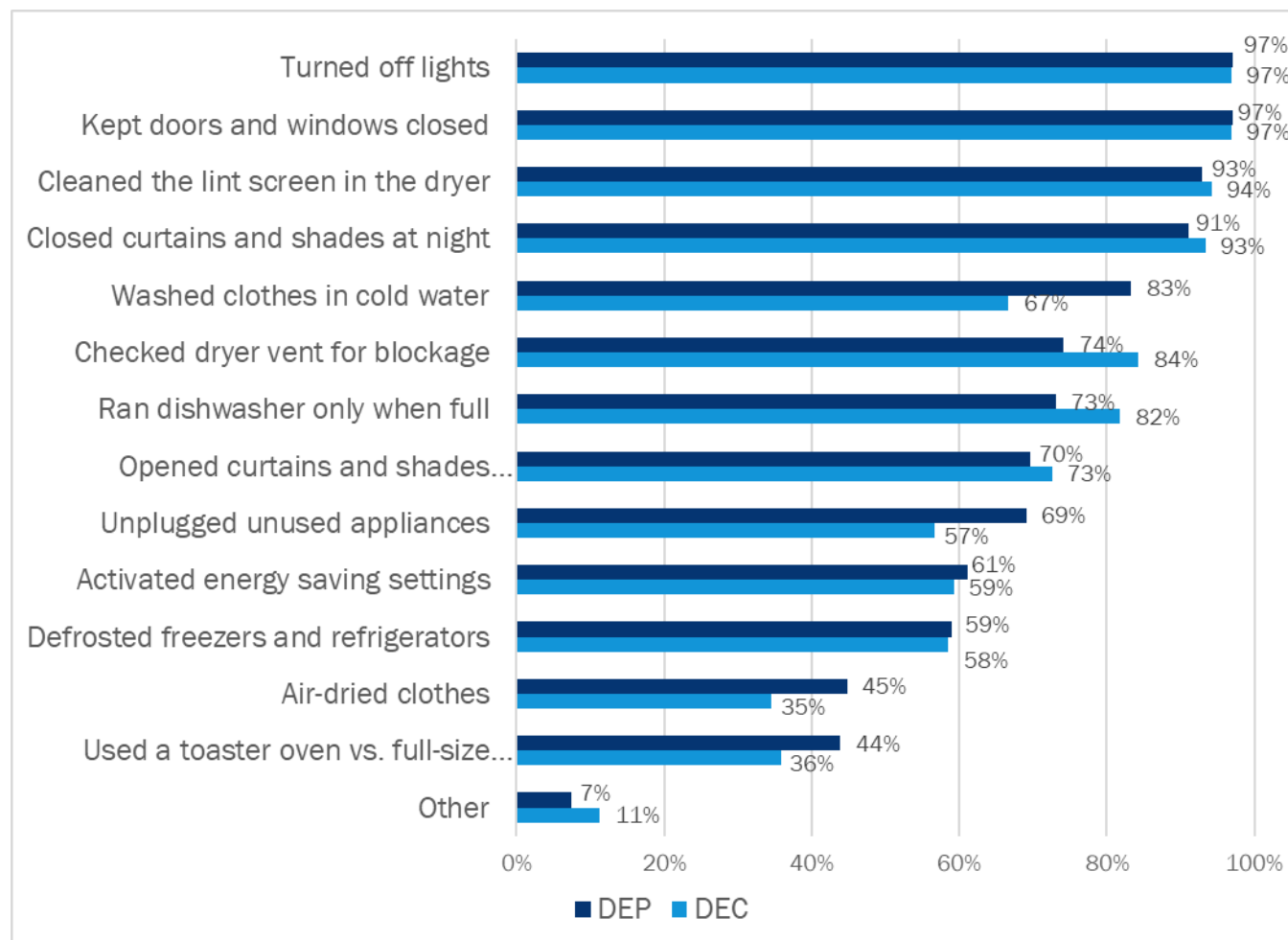
**Figure 5-7 Motivation to Reduce Energy Use after NES Program Participation**



Participants that received the leave behind materials take other actions to save energy in their home. Most frequently, participants reported turning lights off more frequently, keeping doors and windows closed, cleaning their dryer's lint screen, and closing curtains and shades at night (Figure 5-8).



**Figure 5-8 Energy Saving Actions Taken (multiple responses)**



Over half of participants in both service territories reported noticing a decrease in their electric bill since participating in the NES Program (DEP-58%, DEC-57%). Additionally, participants report several non-energy benefits. Notably, 92% of DEP and 84% of DEC participants felt that their home was less drafty, and 86% and 73%, respectively, reported noticing a change in the comfort of their home. Of those who noticed a difference in home comfort, 90% and 80% of DEP and DEC participants, respectively, felt that keeping a comfortable temperature in their home was easier after their NES participation. Table 5-2 lists additional non-energy benefits, and the share of DEP and DEC participants that experienced each.

**Table 5-2 Non-Energy Benefits Reported by Participants**

| Non-Energy Benefit                                       | DEP                     |    | DEC                     |    |
|--|-------------------------|----|-------------------------|----|
|  | Percent of Participants | n  | Percent of Participants | n  |
| I like the light level better in my home                 | 90%                     | 69 | 86%                     | 64 |
| I feel like I'm doing something good for the environment | 95%                     | 65 | 93%                     | 68 |
| My home is less drafty                                   | 92%                     | 64 | 84%                     | 64 |
| My home is quieter; I hear less noise from the outside   | 61%                     | 67 | 51%                     | 63 |
| I have fewer maintenance costs                           | 81%                     | 62 | 68%                     | 57 |

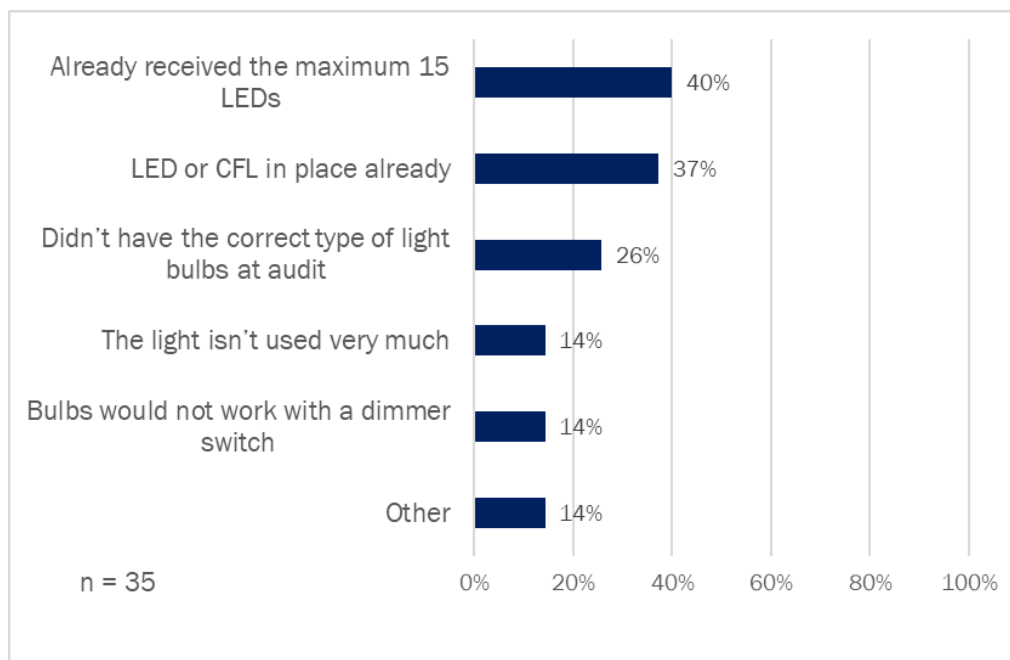
### 5.3.5 Additional Opportunities for Program Savings

One objective of the process evaluation was to determine if there are opportunities for increasing program savings. For example, some income-qualified programs provide energy-efficient replacements for older, inefficient appliances. Further, with the increasing efficiency of existing standard lighting, some programs are offering LEDs and other specialty lighting options.

#### Lighting

There is limited opportunity for additional savings from lighting measures beyond the LEDs already offered through the NES Program. Twenty-five percent of participants reported that some bulbs were not replaced during their NES installation visit. Figure 5-9 several reasons that participants gave for not having all of their bulbs replaced with program LEDs. Most commonly, participants reported that they had already received the maximum number of LEDs (40%) or that an efficient bulb was already in place (37%). This suggests that, while lighting remains an important component of the NES Program, the potential for additional savings from lighting in the future may be limited as LEDs become more common in the residential market.

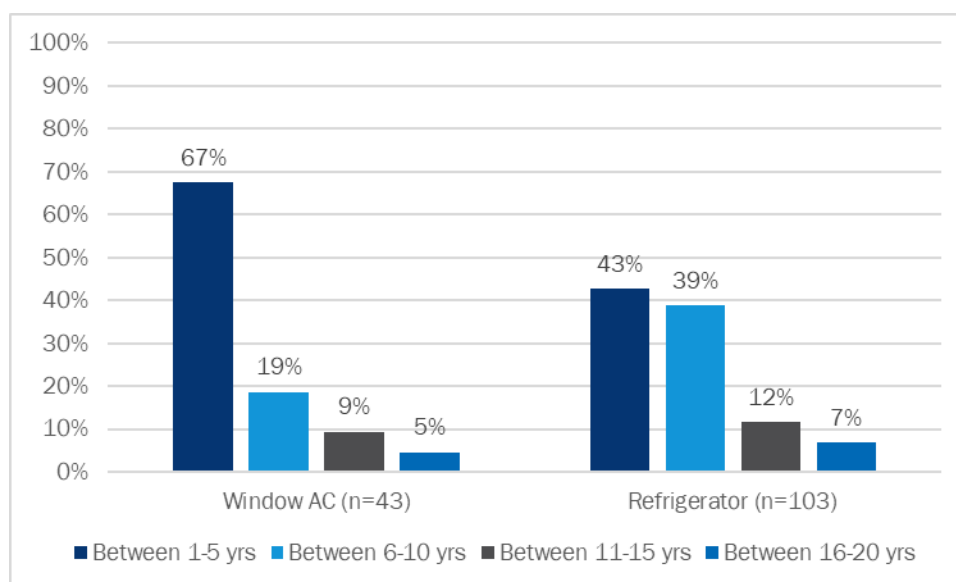
**Figure 5-9. Reasons for Not Replacing Bulbs with Program LEDs**



## Air Conditioning and Refrigeration

There is also limited opportunity for additional savings from replacing old window air conditioner units and refrigerators. Forty-one percent of participants reported having window air conditioning units in their home, and the majority (67%) were between 1 and 5 years old. Additionally, 43% of participants reported their refrigerator was between 1 and 5 years old. Figure 5-10 shows the age distribution of both appliances in participating households.

**Figure 5-10. Window AC and Refrigerator Age Distribution**



## 6. Conclusions and Recommendations

Opinion Dynamics conducted an engineering analysis to estimate gross energy and demand savings for the DEP and DEC NES Programs from June 1<sup>st</sup>, 2017 through June 30<sup>th</sup>, 2018. Table 6-1 presents both per household ex post impacts and total program savings.

**Table 6-1 Comparison of 2017 Engineering Savings Estimates**

| Service Territory | Gross Annual Savings per Household |                               |                               | Gross Program Savings |                               |                               |
|-------------------|------------------------------------|-------------------------------|-------------------------------|-----------------------|-------------------------------|-------------------------------|
|                   | Energy (kWh)                       | Summer Coincident Demand (kW) | Winter Coincident Demand (kW) | Energy (MWh)          | Summer Coincident Demand (MW) | Winter Coincident Demand (MW) |
| DEP               | 779                                | 0.103                         | 0.101                         | 3,298                 | 0.437                         | 0.428                         |
| DEC               | 676                                | 0.090                         | 0.083                         | 7,449                 | 0.994                         | 0.921                         |

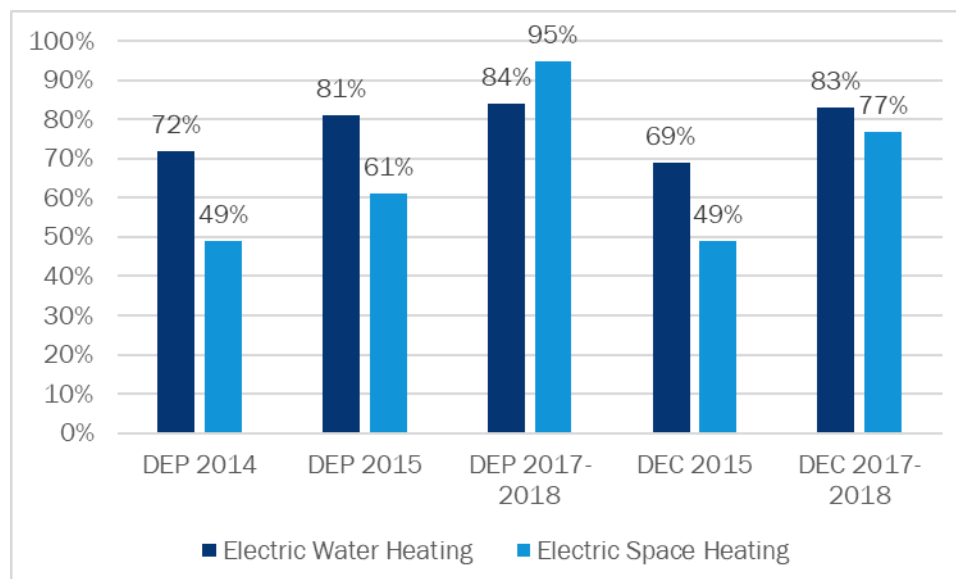
Key findings, which we discuss below, include:

- Per household savings increased for both service territories when compared to engineering estimates in past DEP and DEC evaluations;
- NES participation was strong for this evaluation period and participants are highly satisfied with the program;
- The educational component of the NES Program is effective, and the majority of participants are engaged with the implementation teams during the measure installation visit; and
- NES participants experienced additional non-energy benefits, such as lower energy bills and increased comfort.

### Per Household Savings

During this evaluation period, DEP participants saved 779 kWh and DEC participants saved 676 kWh per household, as determined by our engineering analysis. Per household energy savings for this evaluation period were substantially higher than engineering estimates from previous DEP and DEC impact evaluations. Higher savings per household in the 2017-2018 evaluation period were driven, in part, by a larger share of participants with electric space and water heating (Figure 6-1). Given the mix of measures offered through the NES Program, energy savings from domestic hot water and infiltration measures represent a large portion of potential program savings. To realize electric savings from these measures at the household-level, participants need to heat their homes or hot water with electricity. As such, a higher share of participants that heat with electric fuel will yield more energy savings per household.

**Figure 6-1. Share of DEP and DEC Participants with Electric Space and Water Heating**



## Program Participation and Satisfaction

The program teams achieved strong participation during the 2017-2018 evaluation period. DEP program teams reached 4,233 households (94% of the annual target) and 11,079 DEC households (124% of the annual target). Additionally, across both service territories, program teams reached 69% of households within targeted neighborhoods.

Satisfaction with the NES Program is also very high amongst participants. Seventy-six percent of DEP and 79% of DEC participants were very satisfied with the NES Program, and 80% of DEP and 83% of DEC participants were very satisfied with the equipment they received.

## Energy Education

The vast majority (91%) of participants received in-person education and 89% thought that information helped them save energy in their homes. Additionally, participants reported that they were more knowledgeable about ways to save energy in their homes after their NES participation than they were before (70%-DEP and 60% DEC before compared with 96%-DEP and 94% DEC after). As such, NES participants reported taking a range of additional energy saving actions in their homes (e.g., turning off lights more frequently, keeping doors and windows closed, washing clothing in cold water, etc.). See section 5.3.4 for additional details.

## Non-Energy Benefits

NES participants reported several non-energy benefits; including less drafty homes (92%-DEP, 84%-DEC), increased comfort (86%-DEP, 73% DEC), and the ability to more easily keep their homes at a comfortable temperature (90%-DEP, 80%-DEC). Additionally, 54% of DEP and 55% of DEC participants reported that their electric bill had gone down after participating in the NES Program.

## 6.1 Recommendations

- **NES program teams should consider including space and water heating fuel types as additional criteria for identifying and selecting neighborhoods for future program years.** As the NES offers a relatively limited set of easy-to-install measures by design, domestic hot water and air infiltration measures will continue to contribute a substantial portion to total program savings. However, energy savings only manifest from those measures in households that heat their homes or their hot water with electricity. To maximize savings per participating household, NES Program staff should consider targeting neighborhoods with higher rates of electric space and water heating.
- **NES Program staff should continue to emphasize air infiltration measures.** While infiltration measures make an important contribution to overall program energy savings (14% of DEP and DEC participants), NES participants that receive those measures also report other valuable non-energy benefits. Of those that received infiltration measures, 92% of DEP and 84% of DEC participants reported that their home was less drafty and 86% and 73%, respectively, reported noticing a change in the comfort of their home. Of those who noticed a difference in home comfort, 90% of DEP and 80% of DEC felt that keeping a comfortable temperature in their home was easier after their NES participation. Air infiltration measures may be important in driving participant non-energy benefits in the future.
- **NES Program staff should continue to emphasize the in-person educational component of the program.** The majority of DEC and DEP participants (91%) receive in-person education from implementation teams and 89% find the educational component of the program useful in helping save energy in their homes.. This sort of in-person education can provide a valuable touch point between program representatives and Duke Energy customers, and also encourages various different types of energy-saving behavior change (see Section 5.3.4).

## 7. DEP Summary Form

### Neighborhood Energy Saver Program

Completed EMV Fact Sheet

The Neighborhood Energy Saver (NES) program provides a home energy assessment free of cost and installs energy-saving measures in the homes of income-qualified customers living in DEP service territory. During the assessment, program representatives discuss what was installed and provide additional recommendations on ways participants can save energy in their homes.

|                             |  |
|-----------------------------|--|
| Date                        | December 6 <sup>th</sup> , 2019                              |
| Region(s)                   | Duke Energy Progress, North Carolina and South Carolina      |
| Evaluation Period           | June 1 <sup>st</sup> , 2017-<br>June 30 <sup>th</sup> , 2018 |
| MWh Savings                 | 3,298  |
| Coincident MW Impact        | 0.437 (Summer)<br>0.428 (Winter)                             |
| Per Participant kWh Savings | 779  |
| Measure Life                | Not evaluated, so remains unchanged at 7 years               |
| Net-to-Gross Ratio          | N/A  |
| Process Evaluation          | Yes  |
| Previous Evaluation(s)      | January 2017, January 2016                                   |

### Evaluation Methodology

The evaluation team performed an engineering analysis to estimate ex-pot energy and demand savings. The consisted of (1) a review of deemed savings estimates using an engineering analysis of savings assumptions and calculations and (2) verification of measure installation and persistence through a participant survey. To determine total program savings, the evaluation team applied (1) measure-specific per-unit savings estimates to participants who both received each measure and had the appropriate mix of fuel and equipment and (2) measure-specific ISRs.

### Impact Evaluation Details

- Neighborhoods in DEP service territory where at least 50% of residential customers are at or below 200% of the federal poverty guidelines are eligible to participate in the NES Program.
- The engineering team developed updated deemed savings values for individual measures.
- The evaluation team developed measure-specific in-service rates and made adjustments to per-unit savings based on the share of measure in operation at the time of the survey.
- Applied adjusted per-unit savings to each participant and multiplied by the quantity received. The team only applied savings for measure dependent on certain fuel types or other parameters (i.e., domestic hot water, air infiltration, and HVAC filters) to the applicable households.

## 8. DEC Summary Form

### Neighborhood Energy Saver Program

Completed EMV Fact Sheet

The Neighborhood Energy Saver (NES) program provides a home energy assessment free of cost and installs energy-saving measures in the homes of income-qualified customers living in DEC service territory. During the assessment, program representatives discuss what was installed and provide additional recommendations on ways participants can save energy in their homes.

|                             |   |
|-----------------------------|---|
| Date                        | December 6 <sup>th</sup> , 2019                           |
| Region(s)                   | Duke Energy Carolinas, North Carolina and South Carolina  |
| Evaluation Period           | June 1 <sup>st</sup> , 2017- June 30 <sup>th</sup> , 2018 |
| MWh Savings                 | 7,489   |
| Coincident MW Impact        | 0.994 (Summer)<br>0.921 (Winter)                          |
| Per Participant kWh Savings | 676   |
| Measure Life                | Not evaluated, so remains unchanged at 7 years            |
| Net-to-Gross Ratio          | N/A   |
| Process Evaluation          | Yes   |
| Previous Evaluation(s)      | December 2016   |

### Evaluation Methodology

The evaluation team performed an engineering analysis to estimate ex-pot energy and demand savings. The consisted of (1) a review of deemed savings estimates using an engineering analysis of savings assumptions and calculations and (2) verification of measure installation and persistence through a participant survey. To determine total program savings, the evaluation team applied (1) measure-specific per-unit savings estimates to participants who both received each measure and had the appropriate mix of fuel and equipment and (2) measure-specific ISRs.

### Impact Evaluation Details

- Neighborhoods in DEC service territory where at least 50% of residential customers are at or below 200% of the federal poverty guidelines are eligible to participate in the NES Program.
- The engineering team developed updated deemed savings values for individual measures.
- The evaluation team developed measure-specific in-service rates and made adjustments to per-unit savings based on the share of measure in operation at the time of the survey.

Applied adjusted per-unit savings to each participant and multiplied by the quantity received. The team only applied savings for measure dependent on certain fuel types or other parameters (i.e., domestic hot water, air infiltration, and HVAC filters) to the applicable households.



DSMore Table

## 9. DSMore Table

The embedded Excel spreadsheet below contains inputs for Duke Energy Analytics. Per-household savings values in the spreadsheet are based on the engineering estimates reported above.



DSMore\_DEP-DEC  
NES Program.xlsx

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DSMore Table

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## REPORT



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# My Home Energy Report Program Evaluation

Submitted to Duke Energy

July 10, 2019

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# 1 Executive Summary

## 1.1 Program Summary

This report describes process and impact findings for the Duke Energy Carolinas and Duke Energy Progress My Home Energy Report (MyHER) offered to residential customers who live in single-metered, single family homes with thirteen months of usage history. MyHER relies on principles of behavioral science to encourage customer engagement with home energy management and energy efficiency. The program accomplishes this primarily by delivering a personalized report comparing each customer's energy use to that of a peer group of similar homes.<sup>1</sup> MyHER motivates customers to reduce their energy consumption by:

- Showing customers a comparison of their household electricity consumption to that of similar homes;
- Presenting a month-ahead forecast of electricity consumption disaggregated by end-use category;
- Suggesting tips for reducing energy use by changing customers' behavior or installing energy efficient equipment;
- Educating them about the energy savings benefits of Duke Energy's demand side management (DSM) programs; and
- Encouraging active management of their home's energy consumption.

## 1.2 Evaluation Objectives and High Level Findings

Nexant estimated the energy impacts associated with MyHER delivery for the period June 2017 to May 2018. This report also presents measurements of customer satisfaction and engagement for MyHER participants. The MyHER program is implemented as a randomized controlled trial (RCT). Customers are randomly assigned to either "treatment" or "control" groups for the purpose of measuring energy savings. Treatment customers are MyHER recipients (participants). The control group is a set of customers from whom the MyHER is intentionally withheld. The control group serves as the baseline against which MyHER impacts are measured. As Duke Energy customers become eligible for the MyHER program, Duke Energy randomly assigns them to one of these two groups.

The energy savings generated by the DEC MyHER program are presented in Table 1-1, showing that the evaluated impacts of the program are 248 kWh per household. The energy savings generated by the DEP MyHER program are presented in Table 1-2, showing that the evaluated impacts of the program are 201 kWh per household. These evaluated energy savings for the MyHER program are net of additional energy savings achieved through increased

---

<sup>1</sup> Homes are grouped by characteristics such as location, size, vintage, and heating fuel. Energy use is compared on groups of similar homes.

participation by the MyHER treatment group in other Duke Energy programs. Additional information concerning the evaluation period is shown in Table 1-3.

**Table 1-1: DEC Deemed and Evaluated Energy Impacts per Participating Household**

|                   | Energy (kWh) | Confidence/Precision |
|-------------------|--------------|----------------------|
| Evaluated Impacts | 248          | 90/6                 |
| Deemed Impacts    | 230          | N/A                  |

\*MyHER is an opt-out program. As such, all impacts are considered net impacts; Nexant also calculated the impacts of the MyHER program by removing savings achieved by MyHER participants via other Duke Energy Programs.

**Table 1-2: DEP Deemed and Evaluated Energy Impacts per Participating Household**

|                   | Energy (kWh) | Confidence/Precision |
|-------------------|--------------|----------------------|
| Evaluated Impacts | 201          | 90/9                 |
| Deemed Impacts    | 148          | N/A                  |

\*MyHER is an opt-out program. As such, all impacts are considered net impacts; Nexant also calculated the impacts of the MyHER program by removing savings achieved by MyHER participants via other Duke Energy Programs.

**Table 1-3: Sample Period Start and End Dates**

| Evaluation Component     | Start        | End        |
|--------------------------|--------------|------------|
| Impact Evaluation Period | June 2017    | May 2018   |
| Customer Survey Period   | January 2019 | March 2019 |

## 1.3 Evaluation Recommendations

This evaluation finds the DEC MyHER program realized 137% of its claimed impacts and the DEP MyHER program realized 108% of its claimed impacts. The MyHER program remains fully deployed at these two Duke Energy jurisdictions, due to semiannual introductions of newly eligible customers to the treatment and control program populations. The continual addition of new customers to the program means that there will always be a mix of participants with respect to the duration of the customers' exposure to the treatment. Impacts delivered by behavioral programs such as MyHER have been shown in many evaluations of behavioral programs to vary depending on the length of that exposure, reaching maturity after 1-2 years of exposure to the program. As such, Duke Energy should generally expect that the newest cohorts of MyHER treatment customers will deliver lower energy savings than the established cohorts. In the case of DEC, some cohorts are attaining an age of 8 years.

Duke Energy undertakes substantial work in partnership with their implementation contractor, Tendril, Inc., in planning and coordinating the delivery of MyHER reports to more than 1.1 million customers in the Carolinas and more than 680,000 customers at Duke Energy Progress. Duke Energy has developed a production process that allows for the customization of MyHER messages, tips, and promotions on the basis of customer information and exposure to Duke Energy's demand-side management programs. Since the prior MyHER evaluation<sup>2</sup>, Tendril has implemented a number of improvements that have resulted in increased product quality, as evidenced by improved performance in Duke Energy's quality checks that take place before each batch of reports is sent to participants. The process evaluation finds that MyHER is successful in achieving its goal of enhancing customer motivation, awareness, and attention to saving energy in most areas probed by customer surveys.

Nexant has the following specific recommendations for enhancing Duke Energy's MyHER program:

- **Continue the commitment to simultaneous control and treatment assignment.** New assignments to treatment and control groups must be simultaneous and Tendril and Duke Energy should work to add all newly assigned treatment and control groups to their respective status in a single billing month, to the extent that is technically feasible.
- **Continue the practice of making assignments of new accounts to MyHER treatment and control groups once a year, or at most, twice a year.** The numbers of Duke Energy customers becoming eligible for the program each year do not facilitate more frequent assignments. This is due to the fact that sufficient numbers of customers must be set aside for the control group each time a group of customers is assigned to treatment in order for the evaluator to be able to measure the energy savings delivered by the new cohort.
- **Increase MyHER participant awareness of Interactive.** The process evaluation finds that current awareness of Interactive among DEP and DEC MyHER participants is very low; another program objective above increasing aware customers' engagement with Interactive is to more effectively get the word out about its existence and increase the number of aware customers.
- **Continue to drive engagement with the Interactive Portal.** MyHER Interactive's ability to deliver measurable energy savings is on the rise, as shown by this evaluation in comparison to the prior DEC evaluation, as well as the MyHER evaluations for other Duke Energy jurisdictions completed in the past year. We recommend that Duke Energy continue to drive more MyHER participants to the portal.
- **Continue to operate MyHER with an eye towards change management.** MyHER's implementer Tendril has made great strides in improving quality control performance since the prior DEC and DEP evaluations in the automation of quality control processes. Effective change management and stable staffing have been notable contributors to these improvements and they should continue to be emphasized in MyHER program

<sup>2</sup> DEC was previously evaluated in February 2016. DEP was previously evaluated in July 2017.

operations, especially as Tendril's new HER production platform, HOMERS (the Home Energy Reporting Service), is rolled out and its implementation is optimized.

- **Continue to prioritize the structuring of the processes and schedules for program elements.** Improved organization of tasks for elements such as the FFT report module has been a significant success in the operations of the MyHER program and has made reactive responses to impending deadlines and emergent challenges that characterized these operations in the past much less common. Program staff should seek out additional opportunities for the optimization of program schedules, tasks, and long term goals in this manner.

## 2 Introduction and Program Description

This section presents a brief description of the My Home Energy Report (MyHER) program as it is operated in the DEC and DEP service territories during the evaluation timeframe. This description is informed by document review, in-depth interviews with staff, and Nexant's understanding of program nuance developed through regular communication during the evaluation process.

### 2.1 Program Description

The MyHER program is a Duke Energy Carolinas and Duke Energy Progress behavioral product for demand-side management (DSM) of energy consumption and generation capacity requirements. The MyHER presents a comparison of participants' energy use to a peer group of similar homes. It is sent by direct mail eight times a year, and 12 times a year by email to customers that have provided Duke Energy with their email address.<sup>3</sup> The MyHER provides customer-specific information that allows customers to compare their energy use for the month and over the past year to the consumption of similar homes as well as homes considered to be energy-efficient. Reports include seasonal and household-appropriate energy savings tips and information on energy efficiency programs offered by Duke Energy. Many tips include low cost suggestions such as behavioral changes. An additional feature presents a month-ahead forecast of energy usage disaggregated by end-use type. Duke Energy contracts with Tendril Inc. for the management and delivery of its MyHER product.

Duke Energy also launched the MyHER Interactive Portal<sup>4</sup> in March 2015. MyHER Interactive seeks to engage customers in a responsive energy information and education dialogue. When customers enroll in the online portal they are given the opportunity to update and expand on information known to Duke Energy about their home and electricity consumption. Customers who have registered to use MyHER Interactive are also sent weekly energy management tips and conservation challenges via email. The general strategy of MyHER Interactive is to open communications between customers and the utility, as well as to explore new ways of engaging households in electricity consumption management.

Customers occupying single-family homes with an individual electric meter and at least thirteen months of electricity consumption history are eligible for MyHER in Duke Energy Carolinas and Duke Energy Progress territories in North Carolina and South Carolina. The program is an opt-out program: customers can notify Duke Energy if they no longer wish to receive a MyHER and will be subsequently removed from the program. Customers who receive both paper and email

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<sup>3</sup> For clarity: MyHERs are only sent to customers randomly assigned to the treatment group. All of the customers in the treatment group receive paper MyHERs 8 times a year. Duke Energy has email contact information for some of the treatment customers – those email customers also receive email MyHERs 12 times a year. Therefore, the email customers receive both an email and paper MyHER 8 months of the year and only an email report 4 months of the year.

<sup>4</sup> We refer to the MyHER Interactive Portal simply as "Interactive" in the remainder of this report.

MyHERs may also opt out of the report format of their choice (i.e., elect to only receive MyHERs by email, or only receive them by U.S. Mail).

Duke Energy placed a portion of eligible customers into a control group to satisfy evaluation, measurement, and verification (EM&V) requirements. These control group customers are not eligible to participate in the MyHER program.

Duke Energy has several objectives for the MyHER program, including:

1. Generating cost effective energy savings;
2. Increasing customer awareness of household energy use, engagement with Duke Energy, and overall customer satisfaction with services provided by Duke Energy; and
3. Promoting other energy efficiency and demand response program options to residential customers.

## 2.2 Implementation

MyHER is implemented by Tendril Inc., a behavioral science and analytics contractor that prepares and distributes the MyHER reports according to a pre-determined annual calendar. Tendril also generates and disseminates the MyHER Interactive Portal content and email reports, energy savings tips, and energy savings challenges. Tendril and Duke Energy coordinate closely on the data transfer and preparation required to successfully manage the MyHER program, and they make adjustments as needed to provide custom tips and messages expected to reflect the characteristics of specific homes. A more detailed discussion of the roles and responsibilities of both organizations is provided in [Section 4](#).

### **Eligibility**

The single-family MyHER program targets residential customers living in single-family, single meter, non-commercial homes with at least thirteen months of electricity consumption history. Approximately 1,174,000 DEC and 695,000 DEP residential customers met those requirements as of May 2018 and are assigned to the MyHER treatment groups. Accounts could still be excluded from the program for reasons such as the following: different mailing and service addresses and enrollment in payment plans based on income (although Equal Payment Plan customers are eligible). Eligibility criteria for the MyHER program have changed over time, and in some cases, customers were assigned to either treatment or control but later determined to be ineligible for the program. Nexant estimates that approximately 2% of assigned DEC customers and 1% of assigned DEP customers have been deemed ineligible for the program after having been assigned. Nexant addresses this topic by applying an intention-to-treat analysis (ITT); refer to [Section 3.1.2](#).

## 2.3 Key Research Objectives

The section describes our key research objectives and associated evaluation activities.



### 2.3.1 Impact Evaluation Objectives

The primary objective of the impact evaluation is to describe the impact of the program on energy consumption (kWh). Savings attributable to the program are measured across an average annual and monthly time period. The following research questions guided impact evaluation activities:

1. Is the process used to select customers into treatment and control groups unbiased?
2. What is the impact of MyHER on the uptake of other Duke Energy programs (downstream and upstream) in the market?
3. What net energy savings are attributable solely to MyHER reports after removing savings already claimed by Duke Energy's other energy efficiency programs?
4. What incremental savings are achieved by customers participating in the MyHER Interactive portal?

### 2.3.2 Process Evaluation Objectives

The program evaluation also seeks to identify improvements to the business processes of program delivery. Process evaluation activities focused on how the program is working and opportunities to make MyHER more effective. The following questions guided process data collection and evaluation activities:

1. Are there opportunities to make the program more efficient, more effective, or to increase participant engagement?
2. What components of the program are most effective and should be replicated or expanded?
3. What additional information, services, tips or other capabilities should MyHER consider?
4. Does MyHER participation increase customer awareness of their energy use and interest in saving energy?
5. What elements of the reports are useful to recipients?
6. How satisfied are recipients with MyHER reports?
7. To what extent does receiving MyHER increase customer engagement in energy saving behaviors and upgrades?
8. Do participants hold more favorable opinions of Duke Energy as a result of receiving the reports?
9. What encourages or prevents households from acting upon information or tips provided by MyHER?
10. To what degree are recipients aware of, and making use of, MyHER Interactive?
11. How can the program encourage additional action?



## 2.4 Organization of This Report

The remainder of this report contains the results of the impact analysis ([Section 3](#)); the results of the process evaluation activities, including the customer surveys ([Section 4](#)); and Nexant's conclusions and recommendations ([Section 5](#)).

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## 3 Impact Evaluation

### 3.1 Methods

A key objective of the MyHER impact evaluation is to measure the change in electricity consumption (kWh) resulting from exposure to the normative comparisons and conservation messages presented in Duke Energy's My Home Energy Reports. The approach for estimating MyHER impacts is built into the program delivery strategy. Eligible accounts are randomly assigned to either a treatment (participant) group or a control group. The control group accounts are not exposed to MyHER in order to provide the baseline for estimating savings attributable to the Home Energy Reports. In this randomized controlled trial (RCT) design, the only explanation for the observed differences in energy consumption between the treatment and control group is exposure to MyHER.

The impact estimate is based on monthly billing data and program participation data provided by Duke Energy. The RCT delivery method of the program removes the need for a net-to-gross analysis as the billing analysis directly estimates the net impact of the program. After estimating the total change in energy consumption in treatment group homes, Nexant performed an "overlap analysis", which quantifies the savings associated with increased participation by treatment homes in other DEC or DEP energy efficiency offerings. These savings were claimed by other programs; therefore, they are subtracted from the MyHER impact estimates to eliminate double-counting.

#### 3.1.1 Data Sources and Management

The MyHER impact evaluation relied on a large volume of participation and billing data from Duke Energy's data warehouse. Nexant provided a data request for the necessary information in July 2018. Key data elements include the following:

- **Participant List** – a table listing each of the homes assigned to the MyHER program since its 2010 inception in DEC and its 2014 inception in DEP. This table also indicated whether the account was in the treatment or control group and the date the home was assigned to either group. Duke Energy also provided a supplemental table of Acxiom demographic data for program participants.
- **Billing History** – a monthly consumption (kWh) history for each account in the treatment and control group. Records included all months since assignment as well as the pre-assignment usage history required for eligibility. This file also included the meter read date and the number of days in each billing cycle.
- **MyHER Report History** – a record of the approximate 'drop date' of each MyHER report sent to the treatment group accounts, the messaging included, and the recommended actions. This dataset also contained a supplemental table of treatment group accounts omitted from each MyHER mailing during the evaluation period, and the associated reason for omission.

- **Participation Tracking Data for Other Energy Efficiency Programs offered by Duke Energy** – a table of the Duke DSM program participation of MyHER control and treatment group accounts. Key fields for analysis include the measure name, quantity, participation date, and net annual kWh and peak demand impacts per unit for each MyHER recipient and control group account participating in other DSM programs offered by Duke Energy.

In preparation for the impact analysis, Nexant combined and cleaned the participation and billing data provided by the MyHER program staff and then combined with the cleaned dataset from Nexant's prior MyHER impact evaluation for that jurisdiction.<sup>5</sup> The combined billing dataset includes 1,652,515 distinct DEC accounts and 1,011,440 distinct DEP accounts (the actual number varies by month). A number of treatment and control accounts in this dataset have closed prior to the start of this evaluation period (May 2016) and they have been dropped from the analysis dataset. For DEC, there were 306,131 such treatment customers and 126,142 such control customers. For DEP, there were 86,346 such treatment customers and 12,722 such control customers.

Nexant also removed the following accounts or data points from the analysis (total for DEC and DEP):

- 7,459 accounts that had a negative value for billed kWh;
- 710 records with unrealistically high usage: any month with greater than six times the 99<sup>th</sup> percentile value for daily kWh usage, or approximately 900 kWh per day.

Like most electric utilities, Duke Energy does not bill its customers for usage within a standard calendar month interval. Instead, billing cycles are a function of meter read dates that vary across accounts. Since the interval between meter reads vary by customer and by month, the evaluation team "calendarized" the usage data to reflect each calendar month, so that all accounts represent usage on a uniform basis. The calendarization process includes expanding usage data to daily usage, splitting the billing month's usage uniformly among the days between reads. The average daily usage for each calendar month is then calculated by taking the average of daily usage within the calendar month.

### 3.1.2 Intention to Treat

Duke Energy maintains a number of eligibility requirements for continued receipt of MyHER. Not all accounts assigned to treatment remained eligible and received MyHER over the study horizon. Several programmatic considerations can prevent a treatment group home from receiving MyHER in a given month. Common reasons for an account not being mailed include the following:

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<sup>5</sup> Rather than re-requesting all of the data necessary for this evaluation (pre-treatment and posttreatment usage data for all treatment and control customers), Nexant omitted any data that we already had from the first evaluation – the pre-treatment data for cohorts included in our prior evaluation is still necessary for this current evaluation.

- **Mailing Address Issues** – mailing addresses are subjected to deliverability verification by the printer. If an account fails this check due to an invalid street name or PO Box or has another issue, the home will not receive the MyHER.
- **Implausible Bill** – if a home's billed usage for the previous month is less than 150 kWh or greater than 10,000 kWh, Tendril does not mail the MyHER.
- **Insufficient Matching Households** – this filter is referred to as “Small Neighborhood” by Tendril and is a function of the clustering algorithm Tendril uses to produce the usage comparison. If a home can't be clustered with a sufficient number of other homes, it will not receive the MyHER.
- **No Bill Received** – if Tendril does not receive usage data for an account from Duke within the necessary time frame to print and mail, the home will not receive MyHER for the month.

The Nexant data cleaning steps listed in [Section 3.1.1](#) do not impose these filters on the impact evaluation analysis dataset. This is necessary to preserve the RCT design because eligibility filters are not applied to the control group in the same manner as the treatment group. Instead, Nexant employed an “intention-to-treat” (ITT) analysis. In the ITT framework, the average energy savings per home *assigned* to the treatment is calculated via billing analysis. This impact estimate is then divided by the proportion of the treatment group homes analyzed that were active MyHER participants. The underlying assumption of this approach is all of the observed energy savings are being generated by the participating accounts.

Nexant relied on Duke Energy's monthly participation counts for the numerator of the proportion treated calculation. MyHER program staff calculates participation monthly according to the business rules and eligibility criteria in place at the time. The denominator of the proportion treated is the number of treatment group homes with billed kWh usage for the bill month. This calculation is presented by month in Table 3-1 and Table 3-2 for the study period. The average proportion of assigned accounts that were treated during the period of June 2017 to May 2018 was 98% for both DEC and DEP.

Table 3-1: DEC Calculation of Treatment Percentage by Bill Month

| Month                       | Treatment Homes Analyzed | DEC Participant Count | % Treated |
|-----------------------------|--------------------------|-----------------------|-----------|
| 06/2017                     | 1,231,705                | 1,197,462             | 97%       |
| 07/2017                     | 1,218,640                | 1,198,133             | 98%       |
| 08/2017                     | 1,207,107                | 1,171,813             | 97%       |
| 09/2017                     | 1,195,242                | 1,172,053             | 98%       |
| 10/2017                     | 1,185,902                | 1,172,053             | 99%       |
| 11/2017                     | 1,225,916                | 1,195,285             | 98%       |
| 12/2017                     | 1,216,916                | 1,191,881             | 98%       |
| 01/2018                     | 1,208,915                | 1,193,353             | 99%       |
| 02/2018                     | 1,200,827                | 1,178,403             | 98%       |
| 03/2018                     | 1,192,681                | 1,177,960             | 99%       |
| 04/2018                     | 1,183,803                | 1,157,514             | 98%       |
| 05/2018                     | 1,173,821                | 1,151,896             | 98%       |
| 12-month Average Proportion |                          |                       | 98%       |

Table 3-2: DEP Calculation of Treatment Percentage by Bill Month

| Month                       | Treatment Homes Analyzed | DEP Participant Count | % Treated |
|-----------------------------|--------------------------|-----------------------|-----------|
| 06/2017                     | 727,455                  | 682,040               | 94%       |
| 07/2017                     | 719,693                  | 713,994               | 99%       |
| 08/2017                     | 712,653                  | 701,172               | 98%       |
| 09/2017                     | 705,487                  | 700,125               | 99%       |
| 10/2017                     | 699,920                  | 700,125               | 100%      |
| 11/2017                     | 726,344                  | 710,313               | 98%       |
| 12/2017                     | 720,920                  | 707,899               | 98%       |
| 01/2018                     | 715,954                  | 708,355               | 99%       |
| 02/2018                     | 711,221                  | 697,726               | 98%       |
| 03/2018                     | 706,614                  | 698,443               | 99%       |
| 04/2018                     | 701,195                  | 693,815               | 99%       |
| 05/2018                     | 695,352                  | 689,886               | 99%       |
| 12-month Average Proportion |                          |                       | 98%       |

The monthly participation counts shown in Table 3-1 and Table 3-2 were also used by Nexant to estimate the aggregate impacts of the MyHER. Per-home kWh savings estimates for each bill month are multiplied by the number of participating homes to arrive at the aggregate MWh impact achieved by the program.

### 3.1.3 Sampling Plan and Precision of Findings

The MyHER program was implemented as an RCT in which individuals were randomly assigned to a treatment (participant) group or a control group for the purpose of estimating changes in energy use because of the program. Nexant's analysis methodology relies on a census analysis of the homes in both groups so the resulting impact estimates are free of sampling error. However, there is inherent uncertainty associated with the impact estimates because random assignment produces a statistical chance that the control group consumption would not vary in perfect harmony with the treatment group, even in the absence of MyHER exposure. The uncertainty associated with random assignment is a function of the size of the treatment and control groups. As group size increases, the uncertainty introduced by randomization decreases, and the precision of the estimates improves.

Nexant's MyHER impact estimates are presented with both an absolute precision and relative precision. Absolute precision estimates are expressed in units of annual energy consumption (kWh) or as a percentage of annual consumption.

The two following statements about the MyHER impact analysis reflect absolute precision:

- DEC MyHER saved an average of 247.7 kWh per home during the 12-month period June 2017 to May 2018,  $\pm 16.0$  kWh. Homes in the treatment group reduced electric consumption by an average of 1.69%,  $\pm 0.11$ %.
- DEP MyHER saved an average of 201.2 kWh per home during the 12-month period June 2017 to May 2018,  $\pm 18.9$  kWh. Homes in the treatment group reduced electric consumption by an average of 1.25%,  $\pm 0.12$ %.

In these examples, the uncertainty of the estimate, or margin of error (denoted by " $\pm$ "), is presented in the same absolute terms as the impact estimate—that is, in terms of annual electricity consumption. Nexant also includes the relative precision of the findings. Relative precision expresses the margin of error as a percentage of the impact estimate itself. Consider the following examples:

- The average treatment effect of DEC MyHER during the 12-month period June 2017 to May 2018 is 247.7 kWh with a relative precision of  $\pm 6.4$ %. In this case,  $\pm 6.4$ % is determined by dividing the absolute margin of error by the impact estimate:  $16.0 \div 247.7 = 0.064 = 6.4$ %.
- The average treatment effect of DEP MyHER during the 12-month period June 2017 to May 2018 is 201.2 kWh with a relative precision of  $\pm 9.4$ %. In this case,  $\pm 9.4$ % is determined by dividing the absolute margin of error by the impact estimate:  $18.9 \div 201.2 = 0.094 = 9.4$ %.

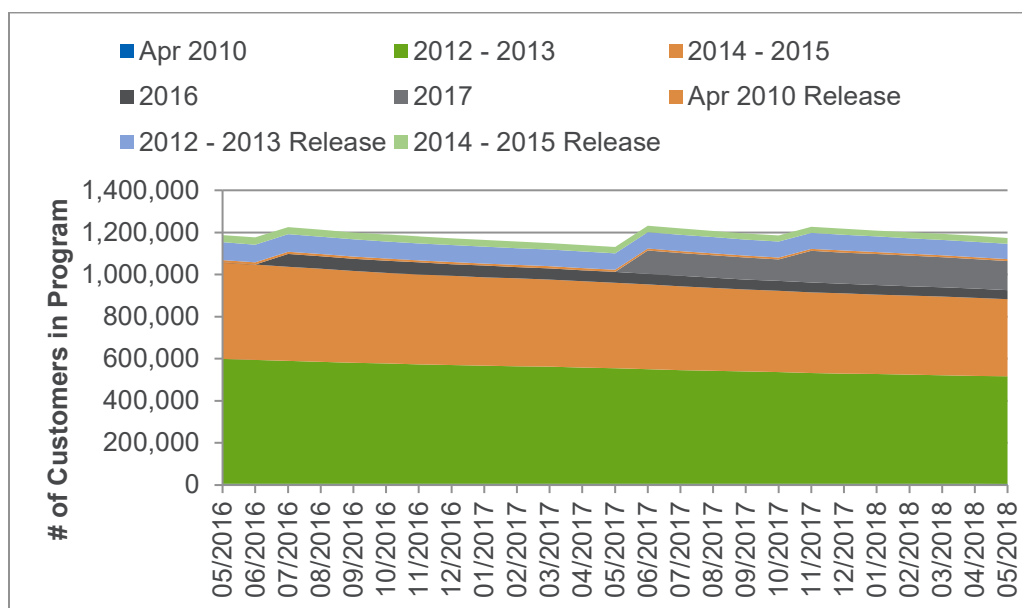
All of the precision estimates in this report are presented at the 90% confidence level and assume a two-tailed distribution.

### 3.1.4 Assignment Cohorts and Equivalence Testing

The DEC and DEP MyHER program has been growing over time since its DEC launch in 2010 and DEP launch in 2014. Nexant mapped the DEC MyHER population into eight cohorts and DEP MyHER population into six cohorts. The cohort groupings are defined on a temporal basis, generally following the major periods when customers were assigned to treatment and control groups. Cohorts that had been defined in prior evaluations of the DEC and DEP programs were maintained for consistency.

Figure 3-1 shows the timeline of DEC program expansion by cohort since May 2016. The original pilot cohort started the program in April 2010 which was followed by a large expansion of customers who were added in 2012 and 2013, mainly in September 2012. A second large cohort was added in 2014 and 2015, mainly in December 2014. The program has continued to expand since 2015, in more modest increments relative to the 2012 - 2013 and 2014 - 2015 expansions, as newer customers met the program's eligibility criteria. In October 2015, Duke Energy also released a small number of DEC customers originally assigned to the control group into treatment from the April 2010, 2012 - 2013, and 2014 - 2015 cohorts. These cohorts are denoted with "Release" in Figure 3-1.<sup>6</sup> These customers were released into treatment starting in October 2015, and began producing impacts in November 2015.

**Figure 3-1: History of Cohort Assignments for DEC MyHER Program**

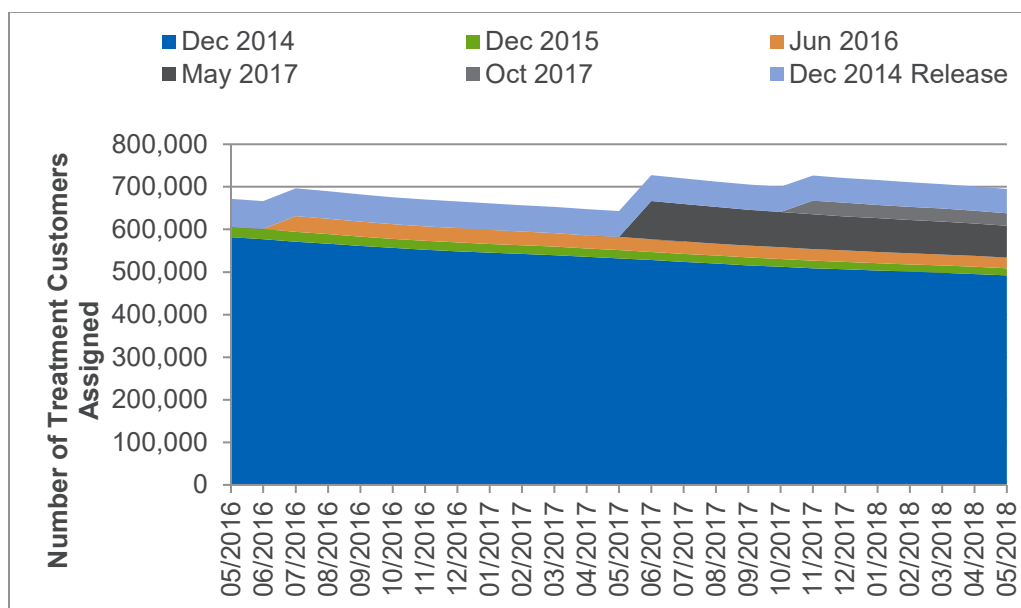


<sup>6</sup> Duke Energy commissioned a review of the MyHER control groups in 2015 to assess whether or not there were any control groups that were larger than necessary for the purpose of EM&V. Four relatively small releases (approximately 110,000 customers total) from the DEC jurisdiction was recommended by that review. Consequently, about 110,000 control group customers from the April 2010, September 2012, December 2014, and January 2015 cohorts were randomly selected for release into treatment.

Approximately 26% of DEC MyHER treatment customers were not assigned to the program simultaneously with a control group, and were bundled into cohorts with treatment customers assigned around the same time, consistent with the prior DEC evaluations. Nexant has advised Duke Energy to continue a simultaneous assignment protocol and to make assignments on an annual or biennial basis. Doing so will minimize any potential sources of bias that could occur due to a lack of simultaneous assignment to treatment and control.

Figure 3-2 shows the timeline of DEP program expansion by cohort since May 2016. A large original cohort started the program in December 2014. The program has continued to expand since 2014, in more modest increments relative to the original cohort, as newer customers met the program's eligibility criteria. In October 2015, Duke Energy also released a small number of DEP customers originally assigned to the control group into treatment from the December 2014 cohort. This cohort is denoted with "Release" in Figure 3-2.<sup>7</sup> These customers were released into treatment starting in October 2015, and began producing impacts in November 2015.

**Figure 3-2: History of Cohort Assignments for DEP MyHER Program**



Approximately 8% of DEP MyHER treatment customers were not assigned to the program simultaneously with a control group, and were bundled into cohorts with treatment customers assigned around the same time. These cohort definitions are consistent with those used in the previous evaluation. Simultaneous assignment will minimize any potential sources of bias that could occur due to a lack of simultaneous assignment to treatment and control.

Straightforward impact estimates are a fundamental property of the RCT design. Random assignment to treatment and control produces a situation in which the treatment and control

<sup>7</sup> Duke Energy commissioned a review of the MyHER control groups in 2015 to assess whether or not there were any control groups that were larger than necessary for the purpose of EM&V. A release of 60,000 customers from the DEP jurisdiction was recommended by that review. Consequently, about 60,000 control group customers from the December 2014 cohort were randomly selected for release into treatment.



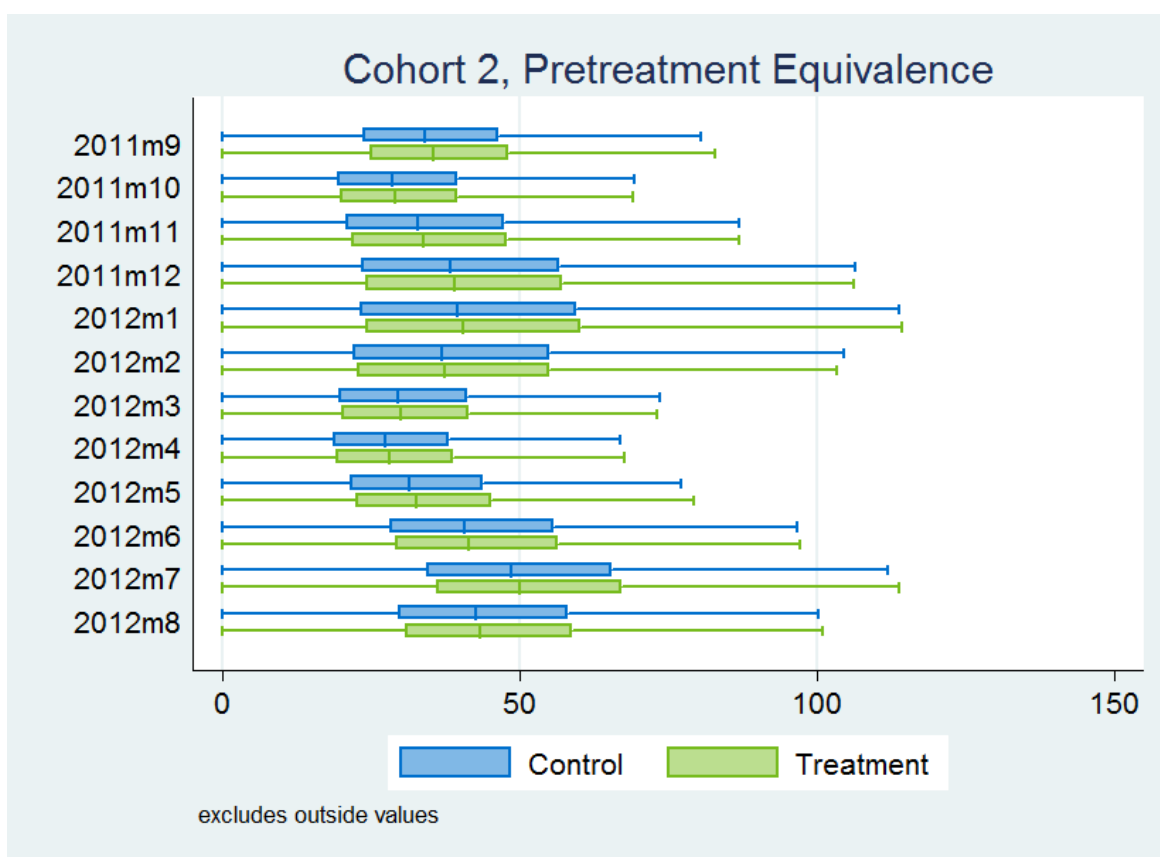
groups are statistically identical on all dimensions prior to the onset of treatment; the only difference between the treatment and control groups is exposure to MyHER. The impact is therefore simply the difference in average electricity consumption between the two groups. The first step to assessing the impact of an experiment involving a RCT is to determine whether or not the randomization worked as planned.

Table 3-3 presents summary information for each of the eight cohorts included in Nexant's DEC analysis, comparing the average annual kWh usage of each cohort's treatment and control group for the 12 months prior to the beginning of assignment. On an annual basis, the pre-assignment usage is relatively balanced between groups for each of these cohorts, where the largest difference occurs in Cohort 5 ("2017").

**Table 3-3: DEC MyHER Cohort Summary Statistics**

| Cohort |                     | Pretreatment Period |         | # Homes |           | Annual kWh in Pretreatment Period |           |
|--------|---------------------|---------------------|---------|---------|-----------|-----------------------------------|-----------|
|        |                     | Start               | End     | Control | Treatment | Control                           | Treatment |
| 1      | Apr 2010            | 04/2009             | 03/2010 | 9,535   | 6,173     | 17,871                            | 17,893    |
| 2      | 2012 - 2013         | 09/2011             | 08/2012 | 30,566  | 527,684   | 14,392                            | 14,528    |
| 3      | 2014 - 2015         | 12/2013             | 11/2014 | 26,376  | 383,024   | 14,782                            | 14,684    |
| 4      | 2016                | 06/2015             | 05/2016 | 19,848  | 61,332    | 13,324                            | 13,402    |
| 5      | 2017                | 05/2016             | 04/2017 | 27,388  | 161,317   | 13,204                            | 13,554    |
| 6      | Apr 2010 Release    | 04/2009             | 03/2010 | 9,535   | 10,689    | 17,871                            | 17,732    |
| 7      | 2012 - 2013 Release | 09/2011             | 08/2012 | 30,566  | 85,505    | 14,392                            | 14,486    |
| 8      | 2014 - 2015 Release | 12/2013             | 11/2014 | 26,376  | 35,809    | 14,782                            | 14,660    |

Since MyHER is evaluated on a month basis, the more important equivalency check is on month-to-month comparability between treatment and control groups. Figure 3-3 is a box-and-whisker plot of the average pre-treatment consumption for the treatment and control groups of DEC Cohort 2 ("2012 - 2013"), the largest treatment cohort of the DEC MyHER program. The figure depicts the distribution of monthly average consumption from September 2011 to August 2012, the time period prior to the launch of the cohort. This figure represents usage of all accounts assigned to treatment and control in this cohort. The plot illustrates that usage patterns of the treatment and control customers are grossly similar, however t-tests on the mean consumption for treatment and control groups reveals statistically significant differences between treatment and control customers during much of the pretreatment period. For example, the cohort shown in Figure 3-3 has statistically significant differences between treatment and control groups in 11 of 12 months in the year immediately prior to the onset of treatment. Across all eight DEC cohorts, the number of pretreatment months that show statistically different differences between treatment and control customers ranges from 0 to 12. These differences will need to be addressed by the estimation procedure, as we describe later in this section.

**Figure 3-3: DEC Difference in Average Pre-treatment Billed Consumption (kWh)**

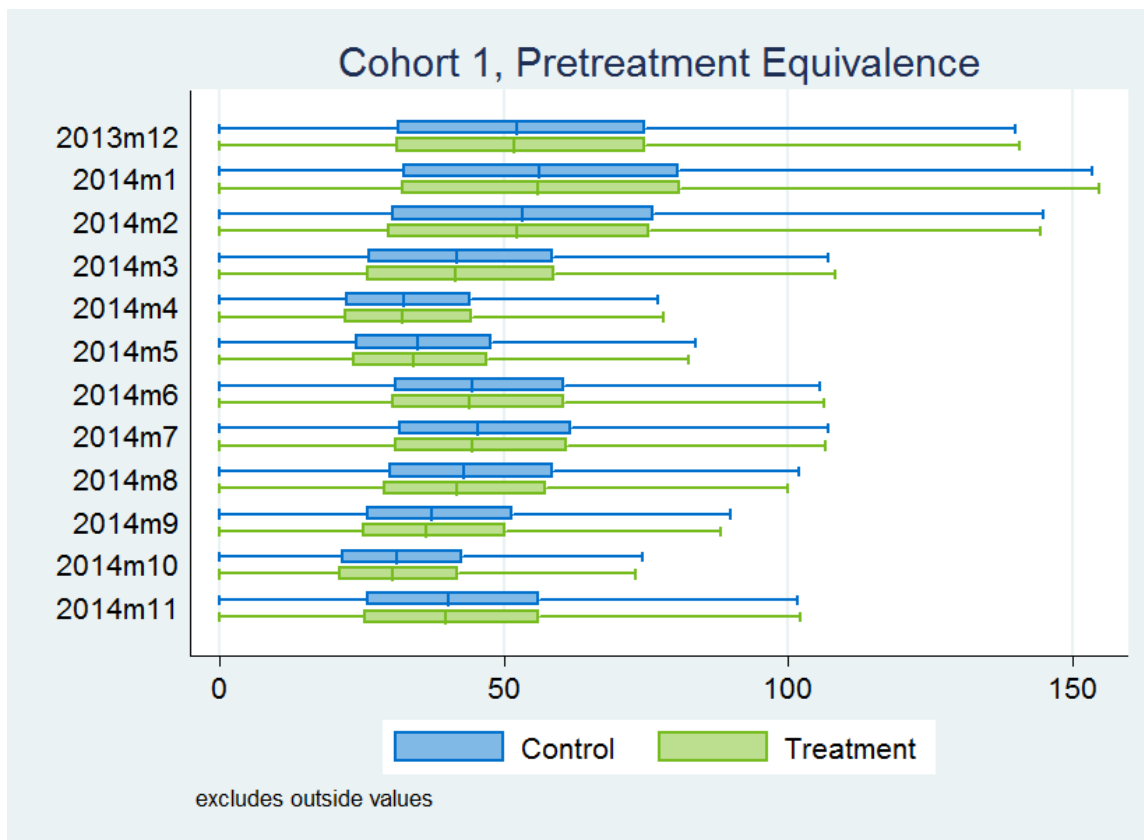
Considering the DEP program, Table 3-4 presents summary information for each of the six cohorts included in Nexant's analysis, comparing the average annual kWh usage of each cohort's treatment and control group for the 12 months prior to the beginning of assignment. Here as in DEC, on an annual basis, the pre-assignment usage is relatively balanced between groups for each of these cohorts, where the largest difference occurs in Cohort 5 ("October 2017") which is the smallest cohort in terms of the number of both treatment and control customers.

**Table 3-4: DEP MyHER Cohort Summary Statistics**

| Cohort |                  | Pre-Period |         | # Homes |           | Annual kWh in Pre-Period |           |
|--------|------------------|------------|---------|---------|-----------|--------------------------|-----------|
|        |                  | Start      | End     | Control | Treatment | Control                  | Treatment |
| 1      | Dec 2014         | 12/2013    | 11/2014 | 72,590  | 565,291   | 16,852                   | 16,773    |
| 2      | Dec 2015         | 12/2014    | 11/2015 | 8,086   | 24,482    | 14,826                   | 14,628    |
| 3      | Jun 2016         | 06/2015    | 05/2016 | 16,579  | 37,011    | 13,765                   | 13,860    |
| 4      | May 2017         | 05/2016    | 04/2017 | 7,102   | 94,947    | 15,121                   | 15,060    |
| 5      | Oct 2017         | 10/2016    | 09/2017 | 12,401  | 33,879    | 13,636                   | 13,838    |
| 6      | Dec 2014 Release | 12/2013    | 11/2014 | 72,590  | 65,869    | 16,852                   | 16,847    |

On a month-to-month basis, DEP's cohorts perform similarly to DEC's cohorts in terms of equivalence in treatment and control group usage. Figure 3-4 is a box-and-whisker plot of the average pre-treatment consumption for the treatment and control groups of DEP Cohort 1 ("December 2014"), the largest treatment cohort of the DEP MyHER program. The figure depicts the distribution of monthly average consumption from December 2013 to November 2014, the time period prior to the launch of the cohort. This figure represents usage of all accounts assigned to treatment and control in this cohort. As was the case for DEC, this largest of DEP cohorts grossly demonstrates monthly equivalence of treatment and control group usage, but the differences in mean monthly consumption are actually statistically significant for all 12 months of the year immediately preceding the onset of treatment. Across the six DEP cohorts, the number of months of the year immediately prior to the onset of treatment that treatment and control group usage is statistically different ranges from 0 to 12. These differences will need to be taken into account during estimation.

**Figure 3-4: DEP Difference in Average Pre-treatment Billed Consumption (kWh)**



### 3.1.5 Regression Analysis

Separating the MyHER population into cohorts accounts for cohort maturation effects and improves statistical precision relative to differences among the cohorts. Nevertheless, as discussed above, there are still small, but significant, underlying differences between the cohort treatment and control groups that need to be netted out via a difference-in-differences approach. Nexant applied a linear fixed effects regression (LFER) model to account for the month-to-month differences in electricity usage observed in the pre-treatment period between the treatment and control groups. The basic form of the LFER model is shown in [Equation 3-1](#). Average daily electricity consumption for treatment and control group customers is modeled using an indicator variable for the billing period of the study, a treatment indicator variable, and a customer-specific intercept term:

#### Equation 3-1: Fixed Effects Model Specification

$$\text{kWh}_{ity} = \text{customer}_i * \beta_i + \sum_{t=1}^{12} \sum_{y=2009}^{2018} I_{ty} * \beta_{ty} + \sum_{t=1}^{12} \sum_{y=2009}^{2018} I_{ty} * \tau_{ty} * \text{treatment}_{ity} + \varepsilon_{ity}$$

Table 3-5 provides additional information about the terms and coefficients in [Equation 3-1](#).

**Table 3-5: Fixed Effects Regression Model Definition of Terms**

| Variable                 | Definition  |
|--------------------------|---|
| $\text{kWh}_{ity}$       | Customer i's average daily energy usage in billing month t of year y  |
| $\text{customer}_i$      | An indicator variable that equals one for customer i and zero otherwise. This variable models each customer's average energy use separately.  |
| $\beta_i$                | The coefficient on the customer indicator variable. Equal to the mean daily energy use for each customer.   |
| $I_{ty}$                 | An indicator variable equal to one for each monthly billing period t, year y and zero otherwise. This variable captures the effect of each billing period's deviation from the customers' average energy use over the entire time series under investigation. |
| $\beta_{ty}$             | The coefficient on the billing period t, year y indicator variable.   |
| $\text{treatment}_{ity}$ | The treatment variable. Equal to one when the treatment is in effect for the treatment group. Zero otherwise. Always zero for the control group.  |
| $\tau_{ty}$              | The estimated treatment effect in kWh per day per customer in billing month t of year y; the main parameter of interest.  |
| $\varepsilon_{ity}$      | The error term.   |

Nexant estimated the LFER model separately for each of the randomized cohorts included in the analysis for each jurisdiction. Detailed regression outputs can be found in [Appendix A](#). The model specification includes an interaction term between the treatment indicator variable and the indicator variable for the bill month term. This specification generates a separate estimate of the MyHER daily impact for each month.

Table 3-6 illustrates the calculation of monthly impact estimates from the regression model coefficients for homes in the DEC 2012 - 2013 cohort (DEC Cohort 2). The monthly savings shown in Table 3-6 are the unweighted point estimates for that cohort. Each month's average

treatment effect is multiplied by an assumed number of days in the month equal to  $365.25/12 = 30.4375$ .

**Table 3-6: Impact Calculation Example – DEC Cohort 2**

| Month                 | Daily Treatment Coefficient ( $\tau$ ) | Monthly Impact (kWh) |
|-----------------------|--|----------------------|
| 06/2017               | -0.2310                                | -7.0                 |
| 07/2017               | 0.1645                                 | 5.0                  |
| 08/2017               | 0.1487                                 | 4.5                  |
| 09/2017               | -0.5932                                | -18.1                |
| 10/2017               | -0.4416                                | -13.4                |
| 11/2017               | -1.1360                                | -34.6                |
| 12/2017               | -1.9676                                | -59.9                |
| 01/2018               | -1.0220                                | -31.1                |
| 02/2018               | -1.2419                                | -37.8                |
| 03/2018               | -1.2941                                | -39.4                |
| 04/2018               | -1.0254                                | -31.2                |
| 05/2018               | -0.6825                                | -20.8                |
| <b>12-month Total</b> |  | <b>-283.7</b>        |

Impact estimates by cohort were combined for each month using a weighted average where the weighting factor is the number of homes with billing data that had been assigned to the treatment group during a prior month (e.g., were in the post-treatment period). These estimates of the average MyHER impact per assigned home were then divided by the proportion of customers treated, as shown in Table 3-1 and Table 3-2, to estimate the average treatment effect per participating home.

### 3.1.6 Dual Participation Analysis

The regression model outputs and subsequent intention-to-treat adjustments discussed in [Section 3.1.5](#) produce estimates of the total change in electricity consumption in homes exposed to MyHER. Some portion of the savings estimated by the regression is attributable to the propensity of MyHER treatment group homes to participate in other energy efficiency offerings at Duke Energy at a greater rate than control group homes. The primary purpose of the dual participation analysis is to quantify annual electricity savings attributable to this incremental DSM participation and subtract it from the MyHER impact estimates. This downward adjustment prevents savings from being double-counted by both the MyHER program and the program where savings were originally claimed.

A secondary objective of the dual participation analysis is to better understand the increased DSM participation, or “uplift” triggered by inclusion of marketing messages within MyHER. The ability to serve as a marketing tool for other DSM initiatives is an important part of what makes MyHER attractive as Duke Energy assumes the role of a trusted energy advisor with its customer base.

Duke Energy EM&V staff provided Nexant with a dataset of non-MyHER program participation records for the MyHER treatment and control group homes dating back to January 2015. This dataset included nearly 439,000 records of efficient measure installations by the MyHER treatment and control group and formed the basis of Nexant’s dual participation analysis.

Table 3-7 and Table 3-8 shows the distribution of participation and savings during the 12-month period June 2017 to May 2018 across DEC and DEP’s residential portfolio, respectively.

**Table 3-7: DEC Total EE Program Participation among MyHER Customers**

| Program Name                          | Number of Records | Net MWh/year   | Net kW/year   |
|---------------------------------------|-------------------|----------------|---------------|
| DE Residential EE Products & Services | 181,353           | 36,612         | 12,092        |
| DE Smart Saver Residential            | 243,630           | 152,553        | 31,754        |
| Residential Energy Assessments        | 13,584            | 15,457         | 2,530         |
| <b>Total</b>                          | <b>438,567</b>    | <b>204,622</b> | <b>46,376</b> |

**Table 3-8: DEP Total EE Program Participation among MyHER Customers**

| Program Name                      | Number of Records | Net MWh/year  | Net kW/year   |
|-----------------------------------|-------------------|---------------|---------------|
| DEP Home Energy Improvement       | 17,585            | 5,435         | 1,429         |
| DEP Neighborhood Energy Saver     | 2,534             | 1,144         | 174           |
| DEP New Construction Program      | 30                | 1             | 1             |
| DEP ResEE Multi-Family            | 4,739             | 1,172         | 118           |
| DEP Residential Energy Assessment | 10,494            | 11,758        | 1,955         |
| DEP Single Family Water Measures  | 115,504           | 30,605        | 10,199        |
| DEP Smart Saver Residential       | 8,672             | 11,021        | 4,297         |
| <b>Total</b>                      | <b>159,558</b>    | <b>61,137</b> | <b>18,173</b> |

The MyHER dual participation analysis included the following steps:

- Match the data to the treatment and control homes by Account ID
- Assign each transaction to a bill month based on the participation date field in the tracking data
- Exclude any installations that occurred prior to the home being assigned to the treatment or control group

- Calculate the daily net energy savings for each efficiency measure
- Sum the daily net energy impact by Account ID for measures installed prior to each bill month
- Calculate the average savings per day for the treatment and control groups by bill month. This calculation is performed separately for each cohort
- Calculate the incremental daily energy saved from energy efficiency (treatment – control) and multiply by the average number of days per bill month (30.4375)
- Take a weighted average across cohorts of the incremental energy savings observed in the treatment group
- Subtract this value from the LFER estimates of treatment effect for each bill month

Table 3-9 shows the dual participation calculations, by bill month, for homes in the DEC 2012 – 2013 Cohort (DEC Cohort 2). Savings from energy efficiency measures climb steadily over time in both groups as additional efficient technologies are installed through Duke Energy's residential energy efficiency portfolio. The treatment group's impacts increase at a slightly greater rate, so the incremental energy savings subtracted from the MyHER treatment effect generally grows as a cohort's duration of exposure lengthens.

**Table 3-9: Incremental Energy Efficiency Savings Calculation Example – DEC Cohort 2**

| Month                 | Mean Daily EE kWh Impact (Control) | Mean Daily EE kWh Impact (Treatment) | Incremental Daily kWh from EE (Treatment – Control) | Uplift % | Incremental kWh Savings |
|-----------------------|------------------------------------|--------------------------------------|---|----------|-------------------------|
| 06/2017               | 0.354                              | 0.381                                | 0.027   | 7.6%     | 0.82                    |
| 07/2017               | 0.369                              | 0.395                                | 0.026   | 7.2%     | 0.80                    |
| 08/2017               | 0.384                              | 0.412                                | 0.028   | 7.3%     | 0.85                    |
| 09/2017               | 0.406                              | 0.435                                | 0.029   | 7.1%     | 0.88                    |
| 10/2017               | 0.428                              | 0.459                                | 0.031   | 7.2%     | 0.94                    |
| 11/2017               | 0.445                              | 0.476                                | 0.031   | 7.0%     | 0.95                    |
| 12/2017               | 0.459                              | 0.492                                | 0.033   | 7.2%     | 1.01                    |
| 01/2018               | 0.477                              | 0.511                                | 0.034   | 7.2%     | 1.04                    |
| 02/2018               | 0.488                              | 0.523                                | 0.035   | 7.1%     | 1.06                    |
| 03/2018               | 0.506                              | 0.540                                | 0.034   | 6.7%     | 1.04                    |
| 04/2018               | 0.527                              | 0.561                                | 0.034   | 6.5%     | 1.05                    |
| 05/2018               | 0.541                              | 0.576                                | 0.035   | 6.5%     | 1.06                    |
| <b>12-month Total</b> |                                    |                                      |   |          | <b>11.51</b>            |

While the incremental participation rate of the treatment group in other EE programs is modest when considered in total, increased uptake of measures immediately following promotional messaging within MyHER mailers could be much more dramatic. Each MyHER issued has space for one product promotion message that is used to market other Duke Energy programs



or initiatives. Duke Energy provided Nexant with records of the exact messages received by each home. Table 3-10 and Table 3-11 show the number of homes that received each combination of messages for the DEC and DEP MyHER cycles from this evaluation period.

**Table 3-10: DEC MyHER Promotional Messaging by Month**

| Source Month | Message 1 - Details                       | Message 2 - Details  | Number of Homes |
|--------------|---|----------------------|-----------------|
| 06/2017      | Fire Up The Grill                         | Think Thermostat     | 207,609         |
| 06/2017      | HEHC                                      | Think Thermostat     | 291,650         |
| 06/2017      | NC Greenpower                             | Think Thermostat     | 674,093         |
| 07/2017      | Discover Ways To Save                     | Full Not Too Full    | 87              |
| 07/2017      | Duke Energy Delivers                      | Full Not Too Full    | 1,153,123       |
| 07/2017      | Safety First                              | Full Not Too Full    | 6,172           |
| 08/2017      | Laundry Savings                           | Automate Energy Use  | 1,148,835       |
| 10/2017      | Share The Warmth                          | To Preheat Or Not    | 1,171,806       |
| 11/2017      | Great Escape                              | Unblock The Heat     | 96,953          |
| 11/2017      | Weatherstrip                              | Unblock The Heat     | 447,864         |
| 12/2017      | Share The Warmth                          | Think At The Sink    | 1,116,808       |
| 01/2018      | Great Escape                              | Safety And Savings   | 273,800         |
| 01/2018      | Let The Sun Shine                         | Safety And Savings   | 856,846         |
| 02/2018      | Insulate And Seal                         | Caulk                | 428,407         |
| 02/2018      | Johns Manville Ad (Intelligent)           | None                 | 44,173          |
| 02/2018      | Johns Manville Ad (Traditional)           | None                 | 38,854          |
| 02/2018      | Johns Manville eHER only Ad (Intelligent) | None                 | 20,459          |
| 02/2018      | Johns Manville eHER only Ad (Traditional) | None                 | 20,267          |
| 03/2018      | Equal Payment Plan                        | Interactive          | 446,161         |
| 03/2018      | Power Manager 32                          | Interactive          | 443,381         |
| 03/2018      | Ecobee Ad (Intelligent)                   | None                 | 87,843          |
| 03/2018      | Ecobee Ad (Traditional)                   | None                 | 78,410          |
| 03/2018      | Ecobee eHER only Ad (Intelligent)         | None                 | 20,442          |
| 03/2018      | Ecobee eHER only Ad (Traditional)         | None                 | 20,329          |
| 04/2018      | Find It Duke                              | Cool Off On Counter  | 425,744         |
| 04/2018      | Lighting DEC Ad (Intelligent)             | None                 | 60,356          |
| 04/2018      | Lighting DEC Ad (Traditional)             | None                 | 60,395          |
| 05/2018      | Find It Duke                              | Let LEDs Lower Bills | 952,111         |
| 05/2018      | Online Store - May Lighting Ad A          | None                 | 99,426          |
| 05/2018      | Online Store - May Lighting Ad B          | None                 | 99,070          |



**Table 3-11: DEP MyHER Promotional Messaging by Month**

| Source Month | Message 1 - Details                       | Message 2 - Details  | Number of Homes |
|--------------|---|----------------------|-----------------|
| 06/2017      | Fire Up The Grill                         | Think Thermostat     | 16,901          |
| 06/2017      | HEHC                                      | Think Thermostat     | 527,037         |
| 06/2017      | NC Greenpower                             | Think Thermostat     | 145,351         |
| 07/2017      | Discover Ways To Save                     | Full Not Too Full    | 38              |
| 07/2017      | Don't Forget The Bulbs                    | Full Not Too Full    | 678,448         |
| 07/2017      | Safety First                              | Full Not Too Full    | 15              |
| 08/2017      | Laundry Savings                           | Automate Energy Use  | 680,829         |
| 10/2017      | It Takes More DEP                         | To Preheat Or Not    | 691,761         |
| 11/2017      | Great Escape                              | Unblock The Heat     | 233,084         |
| 11/2017      | Weatherstrip                              | Unblock The Heat     | 72,702          |
| 11/2017      | Weatherstrip MF                           | Unblock The Heat MF  | 1,559           |
| 12/2017      | It Takes More DEP                         | Think At The Sink    | 626,155         |
| 01/2018      | Great Escape                              | Safety And Savings   | 494,476         |
| 01/2018      | Let The Sun Shine                         | Safety And Savings   | 171,651         |
| 02/2018      | Insulate And Seal                         | Caulk                | 196,546         |
| 02/2018      | Johns Manville Ad (Intelligent)           | None                 | 23,627          |
| 02/2018      | Johns Manville Ad (Traditional)           | None                 | 20,684          |
| 02/2018      | Johns Manville eHER only Ad (Intelligent) | None                 | 39,638          |
| 02/2018      | Johns Manville eHER only Ad (Traditional) | None                 | 39,871          |
| 03/2018      | Energy Wise DEP                           | Interactive          | 269,480         |
| 03/2018      | Equal Payment Plan                        | Interactive          | 2,417           |
| 03/2018      | Equal Payment Plan DEP                    | Interactive          | 220,991         |
| 03/2018      | Ecobee Ad (Intelligent)                   | None                 | 39,307          |
| 03/2018      | Ecobee Ad (Traditional)                   | None                 | 35,126          |
| 03/2018      | Ecobee eHER only Ad (Intelligent)         | None                 | 40,113          |
| 03/2018      | Ecobee eHER only Ad (Traditional)         | None                 | 40,239          |
| 04/2018      | Find It Duke                              | Cool Off On Counter  | 184,896         |
| 04/2018      | Lighting DEP Ad (Intelligent)             | None                 | 62,604          |
| 04/2018      | Lighting DEP Ad (Traditional)             | None                 | 54,374          |
| 05/2018      | Find It Duke                              | Let LEDs Lower Bills | 532,453         |
| 05/2018      | Retail Lighting - May Lighting DEP Ad A   | None                 | 70,712          |
| 05/2018      | Retail Lighting - May Lighting DEP Ad B   | None                 | 79,863          |

## 3.2 Impact Findings

### 3.2.1 Per-home kWh and Percent Impacts

Nexant estimates the average participating DEC MyHER home saved 247.7 kWh of electricity from June 2017 to May 2018. This represents a 1.69% reduction in total electricity consumption compared to the control group over the same period. The average DEP MyHER home saved 201.2 kWh of electricity from June 2017 to May 2018, which represents a 1.25% reduction in electricity consumption. These estimates reflect an upward adjustment to account for the intention-to-treat methodology and a downward adjustment to prevent double-counting of savings attributable to incremental participation of treatment groups in Duke Energy's energy efficiency programs.

Table 3-12 and Table 3-13 show the impact estimates in each bill month for the average home assigned to treatment in DEC and DEP, respectively. The table also shows the subsequent adjustment to account for the fact that only a subset of homes assigned to treatment was actively participating in MyHER during the study period.

**Table 3-12: DEC MyHER Impact Estimates with ITT Adjustment, before EE Overlap Adjustment**

| Month                 | Treatment Homes Analyzed | DEC Participant Count | kWh impact in Assigned Homes | % Treated  | kWh Impact in Treated Homes |
|-----------------------|--------------------------|-----------------------|------------------------------|------------|-----------------------------|
| 06/2017               | 1,231,705                | 1,197,462             | 8.7                          | 97%        | 9.0                         |
| 07/2017               | 1,218,640                | 1,198,133             | 3.6                          | 98%        | 3.7                         |
| 08/2017               | 1,207,107                | 1,171,813             | 4.0                          | 97%        | 4.1                         |
| 09/2017               | 1,195,242                | 1,172,053             | 14.5                         | 98%        | 14.7                        |
| 10/2017               | 1,185,902                | 1,172,053             | 15.3                         | 99%        | 15.5                        |
| 11/2017               | 1,225,916                | 1,195,285             | 27.0                         | 98%        | 27.6                        |
| 12/2017               | 1,216,916                | 1,191,881             | 36.8                         | 98%        | 37.6                        |
| 01/2018               | 1,208,915                | 1,193,353             | 30.4                         | 99%        | 30.7                        |
| 02/2018               | 1,200,827                | 1,178,403             | 30.1                         | 98%        | 30.7                        |
| 03/2018               | 1,192,681                | 1,177,960             | 31.9                         | 99%        | 32.3                        |
| 04/2018               | 1,183,803                | 1,157,514             | 26.1                         | 98%        | 26.7                        |
| 05/2018               | 1,173,821                | 1,151,896             | 20.5                         | 98%        | 20.9                        |
| <b>12-month Total</b> |                          |                       | <b>248.9</b>                 | <b>98%</b> | <b>253.6</b>                |

**Table 3-13: DEP MyHER Impact Estimates with ITT Adjustment, before EE Overlap Adjustment**

| Month                 | Treatment Homes Analyzed | DEP Participant Count | kWh impact in Assigned Homes | % Treated  | kWh Impact in Treated Homes |
|-----------------------|--------------------------|-----------------------|------------------------------|------------|-----------------------------|
| 06/2017               | 727,455                  | 682,040               | 18.3                         | 94%        | 19.5                        |
| 07/2017               | 719,693                  | 713,994               | 17.2                         | 99%        | 17.4                        |
| 08/2017               | 712,653                  | 701,172               | 19.5                         | 98%        | 19.8                        |
| 09/2017               | 705,487                  | 700,125               | 4.1                          | 99%        | 4.1                         |
| 10/2017               | 699,920                  | 700,125               | -6.1                         | 100%       | -6.1                        |
| 11/2017               | 726,344                  | 710,313               | 19.3                         | 98%        | 19.7                        |
| 12/2017               | 720,920                  | 707,899               | 31.2                         | 98%        | 31.8                        |
| 01/2018               | 715,954                  | 708,355               | 29.2                         | 99%        | 29.5                        |
| 02/2018               | 711,221                  | 697,726               | 21.4                         | 98%        | 21.8                        |
| 03/2018               | 706,614                  | 698,443               | 15.5                         | 99%        | 15.6                        |
| 04/2018               | 701,195                  | 693,815               | 16.3                         | 99%        | 16.5                        |
| 05/2018               | 695,352                  | 689,886               | 17.4                         | 99%        | 17.6                        |
| <b>12-month Total</b> |                          |                       | <b>203.3</b>                 | <b>98%</b> | <b>207.2</b>                |

An adjustment factor of 5.95 kWh per home for DEC and 6.02 kWh per home for DEP is applied to MyHER impact estimates in Table 3-14 to arrive at the final net verified program impact per home. [Section 3.2.6](#) provides additional detail on the calculation of the adjustment for overlapping participation in other Duke EE programs.

**Table 3-14: MyHER Impact Estimates Net of EE Overlap**

| Jurisdiction | Time Period          | kWh Savings in Treated Homes | Incremental kWh from EE Programs | Net MyHER Impact Estimate | Control Group Usage (kWh) | Percent Reduction |
|--------------|----------------------|------------------------------|----------------------------------|---------------------------|---------------------------|-------------------|
| DEC          | June 2017 - May 2018 | 253.6                        | 5.95                             | 247.7                     | 14,658                    | 1.69%             |
| DEP          | June 2017 - May 2018 | 207.2                        | 6.02                             | 201.2                     | 16,137                    | 1.25%             |

### 3.2.2 Aggregate Impacts

The total impact of the MyHER program in each service territory is calculated by multiplying the per-home impacts (adjusted for ITT and incremental EE participation) for each bill month by the number of participating homes. Over the 12-month period June 2017 to May 2018, DEC MyHER participants conserved 292.2 GWh of electricity, while DEP MyHER participants conserved 141.1 GWh. The aggregate impacts presented in Table 3-15 and Table 3-16 are at the meter

level so they do not reflect line losses which occur during transmission and distribution between the generator and end-use customer.

**Table 3-15: DEC MyHER Aggregate Impacts**

| Month                 | DEC Participant Count | kWh Net Impact | GWh Net Impact |
|-----------------------|-----------------------|----------------|----------------|
| 06/2017               | 1,197,462             | 8.5            | 10.2           |
| 07/2017               | 1,198,133             | 3.2            | 3.8            |
| 08/2017               | 1,171,813             | 3.6            | 4.2            |
| 09/2017               | 1,172,053             | 14.1           | 16.6           |
| 10/2017               | 1,172,053             | 14.8           | 17.4           |
| 11/2017               | 1,195,285             | 27.3           | 32.6           |
| 12/2017               | 1,191,881             | 37.2           | 44.3           |
| 01/2018               | 1,193,353             | 30.3           | 36.2           |
| 02/2018               | 1,178,403             | 30.2           | 35.6           |
| 03/2018               | 1,177,960             | 31.9           | 37.6           |
| 04/2018               | 1,157,514             | 26.2           | 30.3           |
| 05/2018               | 1,151,896             | 20.4           | 23.5           |
| <b>12-month Total</b> |                       | <b>247.7</b>   | <b>292.2</b>   |

**Table 3-16: DEP MyHER Aggregate Impacts**

| Month                 | DEP Participant Count | kWh Net Impact | GWh Net Impact |
|-----------------------|-----------------------|----------------|----------------|
| 06/2017               | 682,040               | 19.1           | 13.0           |
| 07/2017               | 713,994               | 16.9           | 12.1           |
| 08/2017               | 701,172               | 19.3           | 13.6           |
| 09/2017               | 700,125               | 3.6            | 2.5            |
| 10/2017               | 700,125               | -6.6           | -4.6           |
| 11/2017               | 710,313               | 19.2           | 13.6           |
| 12/2017               | 707,899               | 31.3           | 22.1           |
| 01/2018               | 708,355               | 29.0           | 20.5           |
| 02/2018               | 697,726               | 21.3           | 14.9           |
| 03/2018               | 698,443               | 15.1           | 10.6           |
| 04/2018               | 693,815               | 16.0           | 11.1           |
| 05/2018               | 689,886               | 17.1           | 11.8           |
| <b>12-month Total</b> |                       | <b>201.2</b>   | <b>141.1</b>   |

### 3.2.3 Precision of Findings

The margin of error of the per-home impact estimate is  $\pm 16.0$  kWh for DEC and  $\pm 18.9$  kWh for DEP at the 90% confidence interval. Nexant clustered the variation of the LFER model by

Account ID to produce a robust estimate of the standard error associated with treatment coefficients. The standard normal z-statistic for the 90% confidence level of 1.645 was then used to estimate the uncertainty associated with each cohort estimate. This uncertainty was then aggregated across cohorts to quantify the precision of the program-level impacts estimates (Table 3-17 and Table 3-18).

**Table 3-17: 90% Confidence Intervals Associated with DEC MyHER Impact Estimates**

| Parameter                                | Lower Bound (90%) | Point Estimate | Upper Bound (90%) |
|--|-------------------|----------------|-------------------|
| Evaluation Period Savings per Home (kWh) | 231.7             | 247.7          | 263.6             |
| Percent Reduction                        | 1.58%             | 1.69%          | 1.80%             |
| Aggregate Impact (GWh)                   | 273.4             | 292.2          | 311.0             |

**Table 3-18: 90% Confidence Intervals Associated with DEP MyHER Impact Estimates**

| Parameter                                | Lower Bound (90%) | Point Estimate | Upper Bound (90%) |
|--|-------------------|----------------|-------------------|
| Evaluation Period Savings per Home (kWh) | 182.3             | 201.2          | 220.1             |
| Percent Reduction                        | 1.13%             | 1.25%          | 1.36%             |
| Aggregate Impact (GWh)                   | 127.9             | 141.1          | 154.3             |

For DEC, the absolute precision of the result is  $\pm 0.11\%$  and the relative precision of  $\pm 6.4\%$  at the 90% confidence level. For DEP, the absolute precision of the result is  $\pm 0.12\%$  and the relative precision of  $\pm 9.4\%$  at the 90% confidence level.

### 3.2.4 Impact Estimates by Cohort

The per-home impact estimates shown in Table 3-15 and Table 3-16 reflect a weighted average impact across the eight cohorts of DEC MyHER customers analyzed and the six cohorts of DEP MyHER customers analyzed. The impact estimates for the individual cohorts varied across the study period. Table 3-19 and Table 3-20 show point estimates for each cohort during the period June 2017 to May 2018 for DEC and DEP, respectively. Three released cohorts for DEC and one release cohort for DEP were added to treatment in October 2015 and began producing impacts in November 2015.

Table 3-19: DEC Annual kWh Impact Estimates by Cohort

| Month                 | Monthly Average Impact |               |               |               |               |                  |                     |                     |
|-----------------------|------------------------|---------------|---------------|---------------|---------------|------------------|---------------------|---------------------|
|                       | Apr 2010               | 2012 - 2013   | 2014 - 2015   | 2016          | 2017          | Apr 2010 Release | 2012 - 2013 Release | 2014 - 2015 Release |
| 06/2017               | -22.6                  | -7.0          | -8.7          | -7.0          | -15.7         | -6.4             | -11.1               | -10.1               |
| 07/2017               | -22.0                  | 5.0           | -7.4          | -5.0          | -21.3         | -9.6             | -15.3               | -8.8                |
| 08/2017               | -23.5                  | 4.5           | -9.8          | -3.9          | -15.4         | -12.6            | -12.4               | -13.8               |
| 09/2017               | -29.4                  | -18.1         | -11.4         | -3.7          | -14.6         | -12.4            | -10.1               | -15.5               |
| 10/2017               | -22.1                  | -13.4         | -22.1         | -8.5          | -8.6          | -10.7            | -6.9                | -15.6               |
| 11/2017               | -19.8                  | -34.6         | -28.3         | -18.2         | -12.2         | -17.0            | -8.4                | -13.7               |
| 12/2017               | -19.6                  | -59.9         | -27.4         | -23.9         | -1.2          | -19.0            | -12.3               | -18.3               |
| 01/2018               | -24.9                  | -31.1         | -45.7         | -21.2         | 0.0           | -26.9            | -15.8               | -23.4               |
| 02/2018               | -23.5                  | -37.8         | -33.5         | -19.8         | -10.3         | -15.9            | -11.5               | -17.6               |
| 03/2018               | -24.1                  | -39.4         | -36.7         | -19.5         | -12.1         | -20.9            | -9.5                | -16.4               |
| 04/2018               | -20.2                  | -31.2         | -26.7         | -14.6         | -21.7         | -13.5            | -8.3                | -15.0               |
| 05/2018               | -23.1                  | -20.8         | -17.4         | -11.9         | -36.9         | -15.2            | -8.8                | -19.0               |
| <b>12 Month Total</b> | <b>-274.8</b>          | <b>-283.7</b> | <b>-275.0</b> | <b>-157.1</b> | <b>-169.9</b> | <b>-180.1</b>    | <b>-130.3</b>       | <b>-187.2</b>       |

Table 3-20: DEP Annual kWh Impact Estimates by Cohort

| Month                 | Monthly Average Impact |               |               |              |             |                  |
|-----------------------|------------------------|---------------|---------------|--------------|-------------|------------------|
|                       | Dec 2014               | Dec 2015      | Jun 2016      | May 2017     | Oct 2017    | Dec 2014 Release |
| 06/2017               | -22.3                  | -5.7          | -15.3         | -8.6         | 0.0         | -3.0             |
| 07/2017               | -21.0                  | -10.5         | -19.2         | -5.5         | 0.0         | -2.6             |
| 08/2017               | -24.3                  | -11.0         | -16.2         | -4.0         | 0.0         | -4.0             |
| 09/2017               | -2.8                   | -10.9         | -16.8         | -5.1         | 0.0         | -5.8             |
| 10/2017               | 10.6                   | -5.8          | -17.4         | -2.7         | 0.0         | -6.6             |
| 11/2017               | -24.4                  | -9.1          | -10.8         | -8.6         | 10.0        | -12.6            |
| 12/2017               | -40.8                  | -18.9         | -2.0          | -14.8        | 30.2        | -21.3            |
| 01/2018               | -38.1                  | -24.4         | -2.2          | -13.4        | 32.6        | -19.8            |
| 02/2018               | -26.6                  | -8.4          | -15.3         | -13.0        | 14.9        | -13.2            |
| 03/2018               | -18.7                  | -5.4          | -14.5         | -9.0         | 11.1        | -14.0            |
| 04/2018               | -19.2                  | -1.1          | -20.0         | -6.4         | -5.9        | -12.2            |
| 05/2018               | -21.1                  | -6.8          | -22.1         | -0.9         | -17.9       | -8.3             |
| <b>12 Month Total</b> | <b>-248.8</b>          | <b>-118.1</b> | <b>-171.8</b> | <b>-92.1</b> | <b>74.9</b> | <b>-123.4</b>    |

For DEC, cohorts 1, 2, and 3 (April 2010, 2012 - 2013, and 2014 - 2015) show the greatest impacts and are also the oldest cohorts. Cohort 2 is the largest cohort and contains roughly 44% of analyzed treatment customers. For DEP, cohorts 1 and 3 (December 2014 and June 2016) show the greatest impacts. Cohort 1 is the largest cohort in DEP and contains about 71% of analyzed treatment customers.

Table 3-21 and Table 3-22 show the margin of error at the 90% confidence level for each cohort's annual impact estimate for DEC and DEP, respectively. The combined margin of error for the entire program is lower than the error for any single cohort because the combined program impact estimate is based on a larger pool of customers. Individual cohort margins of error are high for the small cohorts due to the sizes of these groups relative to the underlying variation in consumption among the treatment and control groups constituting each cohort.

**Table 3-21: DEC 90% Confidence Intervals Associated with Cohort Savings Estimates**

| Cohort              | Margin of Error in kWh at 90% Confidence Level | Lower Bound (kWh) | Point Estimate (kWh) | Upper Bound (kWh) |
|---------------------|--|-------------------|----------------------|-------------------|
| Apr 2010            | ± 194  | -468              | -275                 | -81               |
| 2012 - 2013         | ± 72   | -356              | -284                 | -212              |
| 2014 - 2015         | ± 65   | -340              | -275                 | -210              |
| 2016                | ± 86   | -243              | -157                 | -71               |
| 2017                | ± 67   | -237              | -170                 | -102              |
| Apr 2010 Release    | ± 166  | -346              | -180                 | -15               |
| 2012 - 2013 Release | ± 83   | -213              | -130                 | -48               |
| 2014 - 2015 Release | ± 94   | -281              | -187                 | -93               |

**Table 3-22: DEP 90% Confidence Intervals Associated with Cohort Savings Estimates**

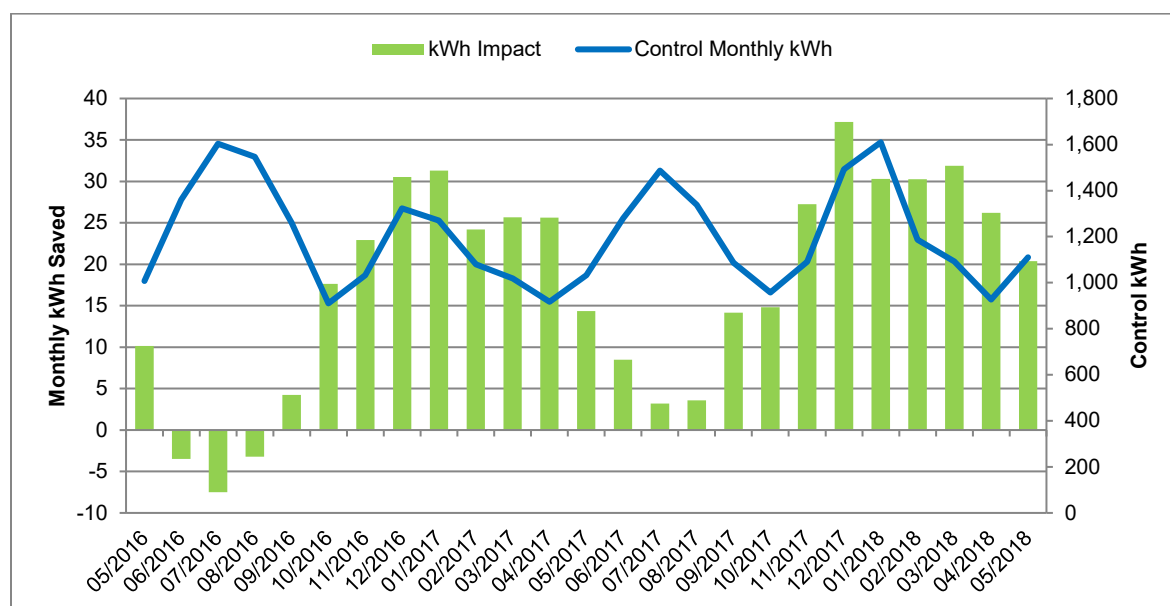
| Cohort           | Margin of Error in kWh at 90% Confidence Level | Lower Bound (kWh) | Point Estimate (kWh) | Upper Bound (kWh) |
|------------------|--|-------------------|----------------------|-------------------|
| Dec 2014         | ± 49   | -298              | -249                 | -199              |
| Dec 2015         | ± 148  | -266              | -118                 | 30                |
| Jun 2016         | ± 105  | -277              | -172                 | -67               |
| May 2017         | ± 144  | -236              | -92                  | 52                |
| Oct 2017         | ± 70   | 5                 | 75                   | 145               |
| Dec 2014 Release | ± 67   | -191              | -123                 | -56               |

### 3.2.5 Seasonal Trends

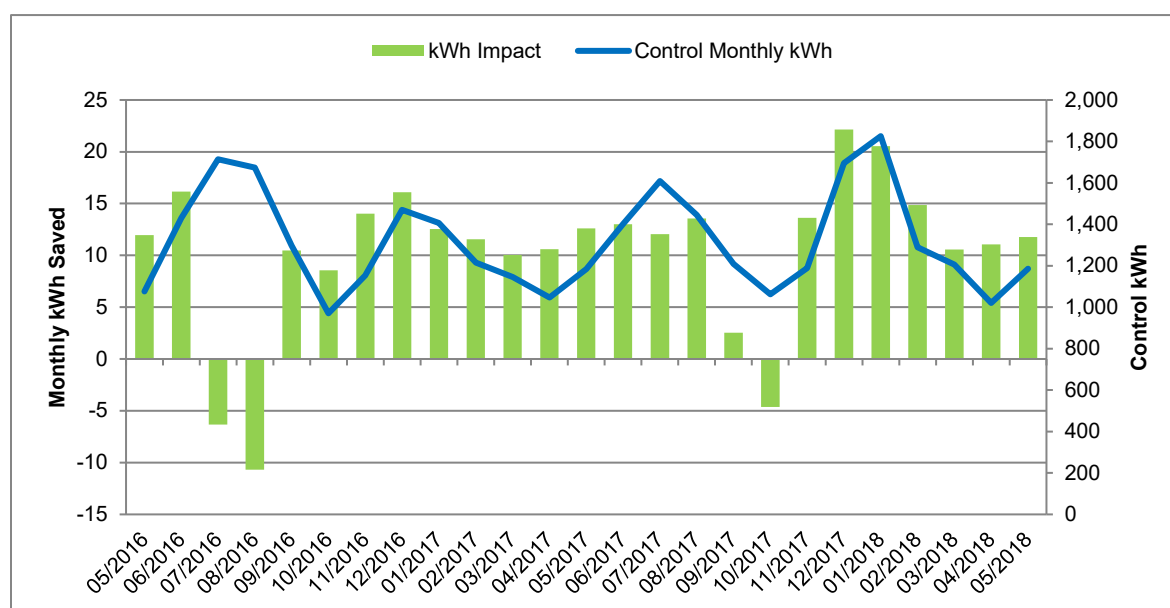
There is a clear seasonal pattern to the DEC and DEP MyHER savings profiles. DEC and DEP customers both consistently experience the greatest reductions in winter and the smallest,

sometimes negative, reductions in summer. The green series in Figure 3-5 and Figure 3-6 show the average estimated monthly treatment effect for the program in each bill month from May 2016 to May 2018. The blue series in Figure 3-5 and Figure 3-6 show the average control customer's load during the same period of time. Even though annual electricity consumption for customers in both service territories is clearly bimodal (with peaks in both the summer and winter), MyHER impacts are not.

**Figure 3-5: DEC Average kWh Savings by Month**



**Figure 3-6: DEP Average kWh Savings by Month**



Based on the observed savings trends, MyHER is realizing the greatest impacts in the winter and shoulder months, with the lowest impacts in the summer months. Seasonal trends in



MyHER average treatment effects likely reflect customers' differing abilities to respond by season. For example, winter heating demand can be mitigated by dressing more warmly, using more blankets in the home, or shutting off lights more often (there are fewer hours of daylight in the winter than the summer). The summer impacts still occur but the conservation options, and potentially willingness to conserve on cooling, options available to customers are fewer.

### 3.2.6 Uplift in Other Duke Energy Programs

Section 3.1.6 outlined the methodology Nexant used to calculate the annual kWh savings attributable to increased participation in other Duke Energy programs. Table 3-23 presents the downward adjustment per home that was applied to impacts in order to avoid double-counting savings from June 2017 to May 2018. For DEC, the uplift was determined to be 5.95 kWh per home, or 7.0 GWh in aggregate. For DEP, the uplift was determined to be 6.02 kWh per home, or 4.2 GWh in aggregate.

**Table 3-23: Monthly Adjustment for Overlapping Participation in Other EE Programs**

| Month                 | DEC Incremental<br>kWh from Other EE<br>Programs | DEP Incremental<br>kWh from Other EE<br>Programs |
|-----------------------|--|--|
| 06/2017               | 0.52   | 0.46   |
| 07/2017               | 0.52   | 0.48   |
| 08/2017               | 0.56   | 0.49   |
| 09/2017               | 0.60   | 0.53   |
| 10/2017               | 0.64   | 0.56   |
| 11/2017               | 0.40   | 0.52   |
| 12/2017               | 0.43   | 0.49   |
| 01/2018               | 0.45   | 0.49   |
| 02/2018               | 0.45   | 0.50   |
| 03/2018               | 0.45   | 0.50   |
| 04/2018               | 0.46   | 0.50   |
| 05/2018               | 0.46   | 0.50   |
| <b>12 Month Total</b> | <b>5.95</b>                                      | <b>6.02</b>                                      |

Although these additional savings must be subtracted from the MyHER effect to prevent double-counting, the MyHERs clearly played an important role in harvesting these savings.

Table 3-24 and Table 3-25 show the average daily energy savings attributable to tracked energy efficiency measures as of May 2018 by cohort and calculates an uplift percentage. In nearly every case the treatment group showed a higher propensity to adopt measures through Duke Energy programs than the control group.

**Table 3-24: DEC Uplift Percentage by Cohort**

|   | Cohort              | Monthly Net kWh Savings from EE (Treatment Group) | Monthly Net kWh Savings from EE (Control Group) | Uplift Percentage |
|---|---------------------|---|---|-------------------|
| 1 | Apr 2010            | 18.7  | 17.7  | 6.2%              |
| 2 | 2012 - 2013         | 14.6  | 13.7  | 7.0%              |
| 3 | 2014 - 2015         | 15.2  | 14.6  | 3.9%              |
| 4 | 2016                | 28.1  | 27.3  | 2.9%              |
| 5 | 2017                | 18.1  | 19.4  | -6.4%             |
| 6 | Apr 2010 Release    | 17.9  | 17.7  | 1.6%              |
| 7 | 2012 - 2013 Release | 14.0  | 13.7  | 2.3%              |
| 8 | 2014 - 2015 Release | 13.8  | 14.6  | -5.3%             |

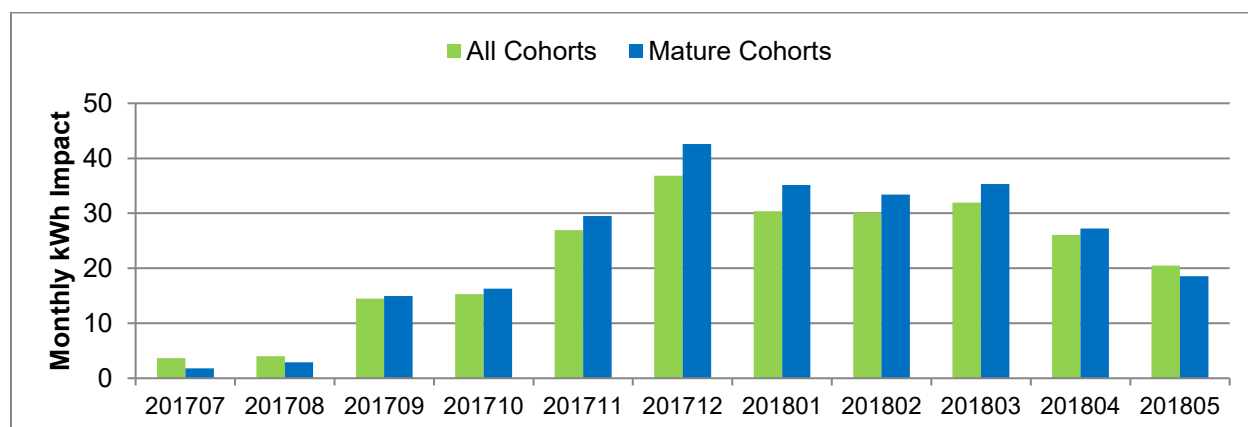
**Table 3-25: DEP Uplift Percentage by Cohort**

|   | Cohort           | Monthly Net kWh Savings from EE (Treatment Group) | Monthly Net kWh Savings from EE (Control Group) | Uplift Percentage |
|---|------------------|---|---|-------------------|
| 1 | Dec 2014         | 9.3   | 8.7   | 6.76%             |
| 2 | Dec 2015         | 9.2   | 8.0   | 13.98%            |
| 3 | Jun 2016         | 9.8   | 9.1   | 7.64%             |
| 4 | May 2017         | 7.8   | 7.8   | 0.14%             |
| 5 | Oct 2017         | 6.9   | 7.2   | -4.90%            |
| 6 | Dec 2014 Release | 9.1   | 8.7   | 4.93%             |

### 3.2.7 Duration of Exposure

Home energy report evaluations in North America consistently find a trend of increasing savings with length of treatment. Since the prior evaluation, Nexant has estimated impacts for three new cohorts in both service territories. The bulk of the cohorts were added to the DEC and DEP programs in June 2016, May 2017, and October 2017. In DEC, the newest cohorts (Cohorts 4 and 5) make up 15% of the treatment population by May 2018. In DEP, the newest cohorts (3, 4, and 5) make up 19% of the treatment population by May 2018. Figure 3-7 and Figure 3-8 compare the overall results with the results of the average customer who is not in one of the three newest cohorts for DEC and DEP, respectively. The older cohorts consistently realize higher impacts than their newer counterparts.

**Figure 3-7: DEC Comparison of Average Customer Savings to the Savings of the Older Program Participants**



**Figure 3-8: DEP Comparison of Average Customer Savings to the Savings of the Older Program Participants**

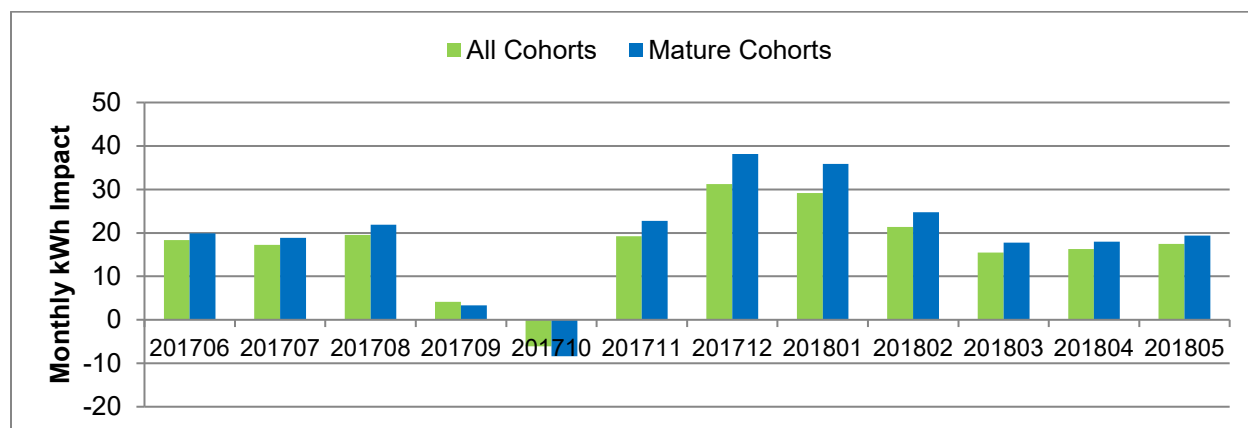
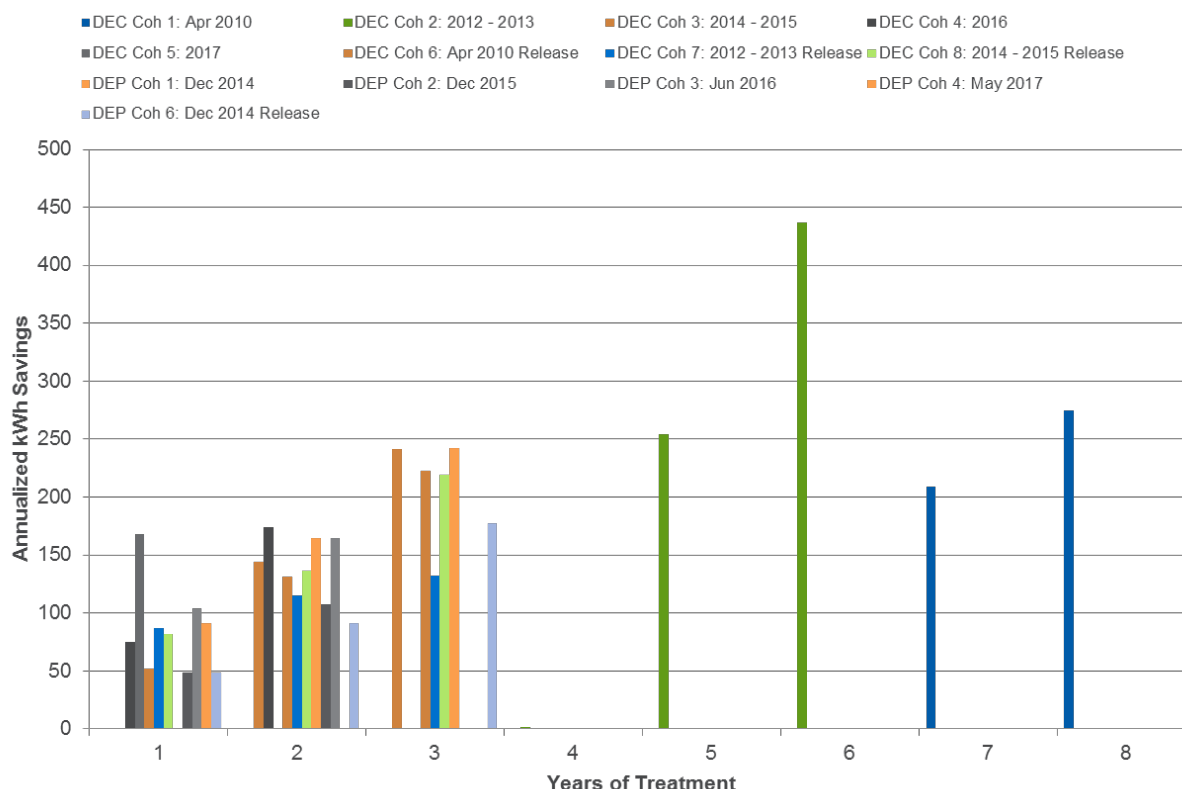


Figure 3-9 displays the annual savings by the number of years a cohort has been in the program. A general upward trend of savings occurs with longer exposure to treatment, however some exceptions are visible. The oldest cohort, which has been in treatment since 2010, shows lower impacts than those in earlier years of treatment. It should be noted that there are few program implementations of home energy report programs with durations in excess of five years and there is less information about what should be expected from implementations of that vintage. Additionally, with less than 6,000 treatment customers in this cohort, it is now one of the smallest cohorts in DEC. It is reasonable to expect the newer cohorts' impacts to increase with maturation of the cohorts, however the 2010 cohort's performance may be indicative of the existence of a point peak maturation after which mature impacts cannot be sustained. A literature review of home energy report programs in North America with participants exposed to treatment for eight years or more would be valuable to benchmark the performance of Duke Energy's oldest MyHER cohorts.

**Figure 3-9: Annual Savings by Duration of Exposure**



### 3.3 MyHER Interactive Portal

Nexant also evaluated the incremental energy savings generated by Duke Energy's enhancement to the standard MyHER report. Duke Energy launched the MyHER Interactive Portal in March 2015. The portal offers additional means for customers to customize or update Duke Energy's data on their premises, demographics, and other characteristics that affect consumption and MyHER's classification of each customer.

The portal provides additional custom tips based on updated data provided by the customer. MyHER Interactive also sends weekly email challenges that seek to engage customers in active energy management, additional efficiency upgrades, and conservation behaviors. Nexant evaluated the impacts of the MyHER Interactive Portal using a matched comparison group because MyHER Interactive is not deployed as a randomized controlled trial (RCT).

#### 3.3.1 Estimation Procedures for MyHER Interactive

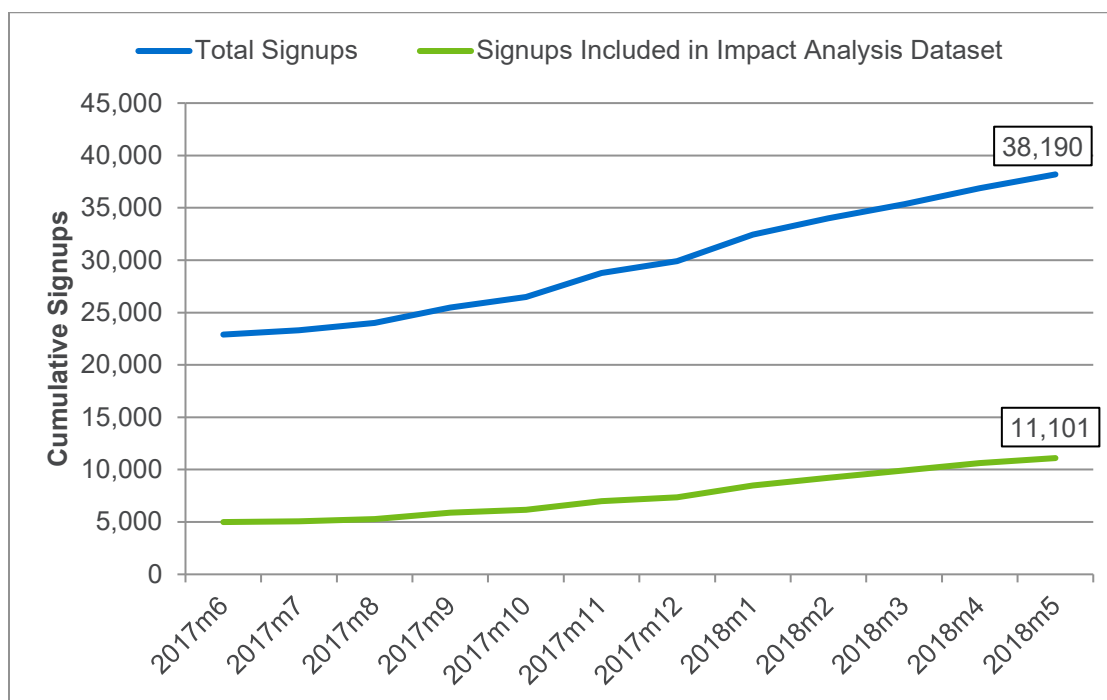
A matched comparison group is a standard approach for establishing a counterfactual baseline when there is no random assignment to treatment and control. The goal of matching estimators is to estimate impacts by matching treatment customers to similar customers that did not participate in the program. The key assumption to matched comparison approaches is that MyHER Interactive participants closely resemble non-participants, except for the fact that one of these two groups participated in the program while the other did not. When a strong comparison

group is established, evaluators can reliably conclude that any differences observed after enrollment are due to program's stimulus. In using a matched comparison group to estimate energy savings due to exposure to MyHER Interactive, the same statistical modeling approach is used to estimate energy savings impacts as was used for estimating energy savings for the program overall (i.e., with linear fixed effects regression (LFER) estimation).

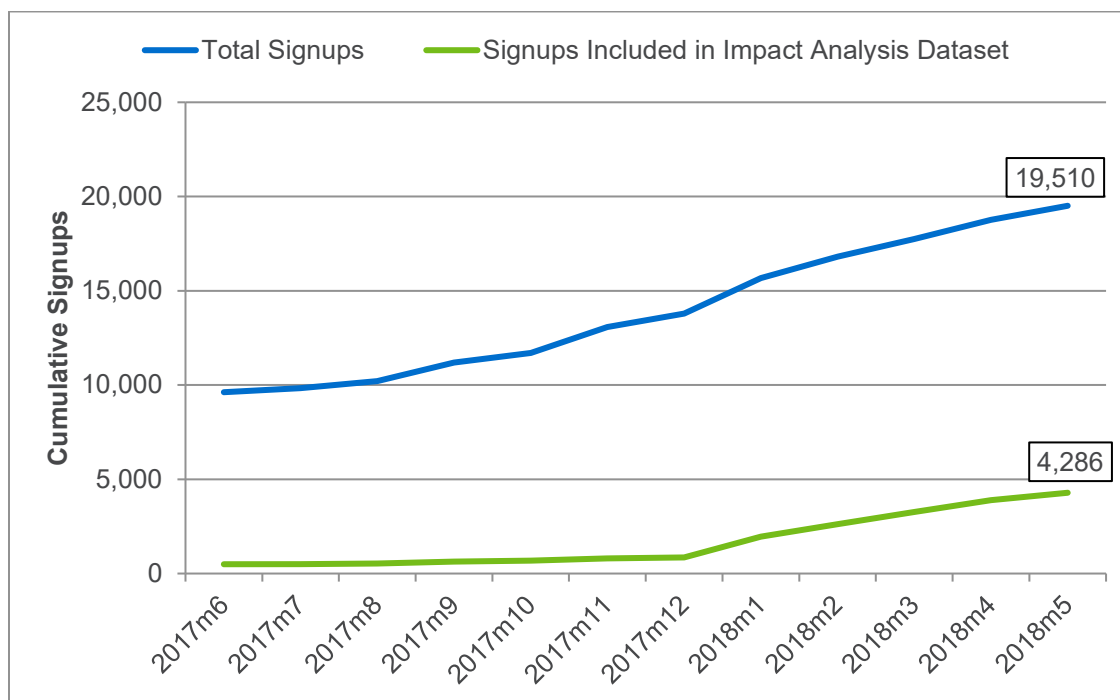
Duke Energy provided Nexant with MyHER participant enrollment information for the Interactive portal. A total of 38,190 DEC and 19,510 DEP MyHER treatment customers signed up to use the portal. For DEC, 13,523 of the 38,190 Interactive users signed into the portal more than once, and 6,880 signed in more than twice between December 2014 and May 2018. For DEP, 6,983 of the 19,510 Interactive users signed into the portal more than once, and 3,575 signed in more than twice between March 2015 and May 2018. The average DEC and DEP MyHER Interactive user has logged in to Interactive 2.6 times.

In order for the LFER regression model to generate monthly energy savings attributable to Interactive, the customer data that the regression model uses to make the estimates must use a year of exposure to MyHER reports prior to enrolling in Interactive. For DEC, 11,101 of the Interactive users (29%) had sufficient data available for the LFER analysis before their Interactive enrollment. 4,286 Interactive users (22%) in DEP had sufficient data to be included in the LFER analysis. Figure 3-10 and Figure 3-11 plot the total number of customers enrolled in MyHER Interactive as well as the subset in the analysis for each month of the 12-month period June 2017 to May 2018 for DEC and DEP, respectively.

**Figure 3-10: DEC MyHER Interactive Portal Enrollment**

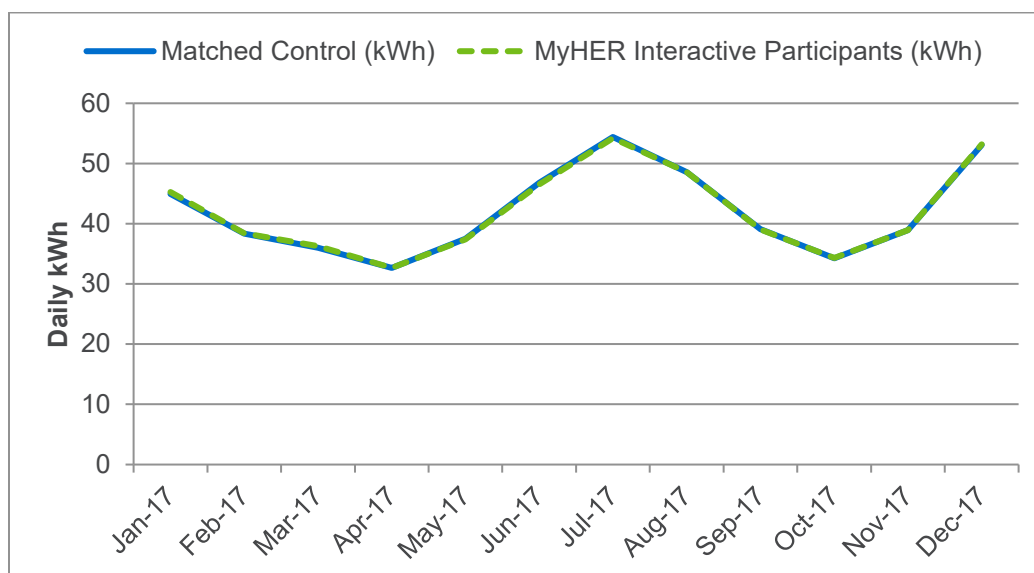


**Figure 3-11: DEP MyHER Interactive Portal Enrollment**

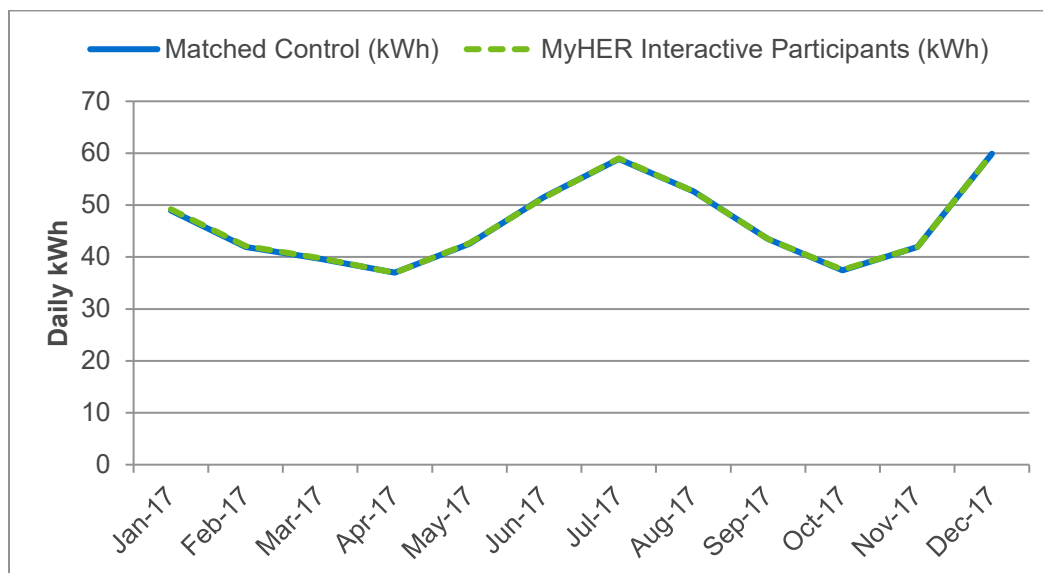


For DEC, many of the Interactive customers used in the estimation analysis were matched on their 2017 billing usage, but some customers who enrolled in Interactive at earlier points in time were matched on their 2014, 2015, or 2016 usage. Figure 3-12 presents the pre-treatment consumption for MyHER Interactive customers and a matched comparison group comprised of MyHER customers that have not enrolled in Interactive for the DEC customers matched on 2017 usage. The matching approach generates two groups with nearly identical consumption patterns over the time period prior to customers' enrollment in MyHER Interactive. On average, the difference in monthly usage between the matched control group and the DEC Interactive treatment group is -0.6% for the 2014 match, 0.4% for the 2015 match, 0.1% for the 2016 match, and 0.0% for the 2017 match. The fixed effects model specification Nexant applies controls for these pre-treatment differences, as discussed earlier in [Section 3.1.5](#).

**Figure 3-12: DEC MyHER Interactive Portal Customers and Matched Comparison Group – 2017 Pre-Interactive Enrollment Periods**



For DEP, most of the Interactive customers used in the estimation analysis were matched on their 2017 billing usage, but some customers who enrolled in Interactive earlier were matched on their 2015 or 2016 usage. Figure 3-13 presents the pre-treatment consumption for MyHER Interactive customers and a matched comparison group comprised of MyHER customers that have not enrolled in Interactive for the DEP customers matched on 2017 usage. The matching approach generates two groups with nearly identical consumption patterns over the time period prior to customers' enrollment in MyHER Interactive. On average, the difference in monthly usage between the matched control group and the DEP Interactive treatment group is 0.3% for the 2015 match, -0.2% for the 2016 match, and 0.1% for the 2017 match. The fixed effects model specification Nexant applies controls for these pre-treatment differences, as discussed earlier in [Section 3.1.5](#).

**Figure 3-13: DEP MyHER Interactive Portal Customers and Matched Comparison Group – 2017 Pre-Interactive Enrollment Periods**

### 3.3.2 Results and Precision

For DEC, the average monthly impact across the 12-month period June 2017 to May 2018 was 21.3 kWh or 255.1 kWh annually per customer, representing the uplift in savings that MyHER Interactive produces over and above the savings produced by the paper MyHER, and this impact is significant at the 90% level of confidence. In aggregate, the DEC MyHER Interactive Portal resulted in 7.38 GWh of annual savings, incremental to the MyHER reports. These high-level findings are summarized in Table 3-26.

**Table 3-26: 90% Confidence Intervals Associated with DEC MyHER Interactive Impact Estimates**

| Parameter                                | Lower Bound (90%) | Point Estimate | Upper Bound (90%) |
|--|-------------------|----------------|-------------------|
| Evaluation Period Savings per Home (kWh) | 41.4              | 255.1          | 468.8             |
| Percent Reduction                        | 0.27%             | 1.65%          | 3.02%             |
| Aggregate Impact (GWh)                   | 0.99              | 7.38           | 13.77             |

On a month-to-month basis, energy impacts were statistically significant during the months of April, May, June, August, September, October, November, and December and range from 0.6% to 2.6%, or from 9 to 36 kWh on an absolute basis.



Figure 3-14 illustrates average monthly energy usage for the DEC MyHER Interactive users (the blue line) and the same for the matched control group (the green line), along with the estimated impact and 90% confidence band (the orange lines and orange dashed lines) by month. Also shown as blue bars are counts of Interactive sign-ups.

**Figure 3-14: DEC MyHER Interactive Portal Energy Impacts**

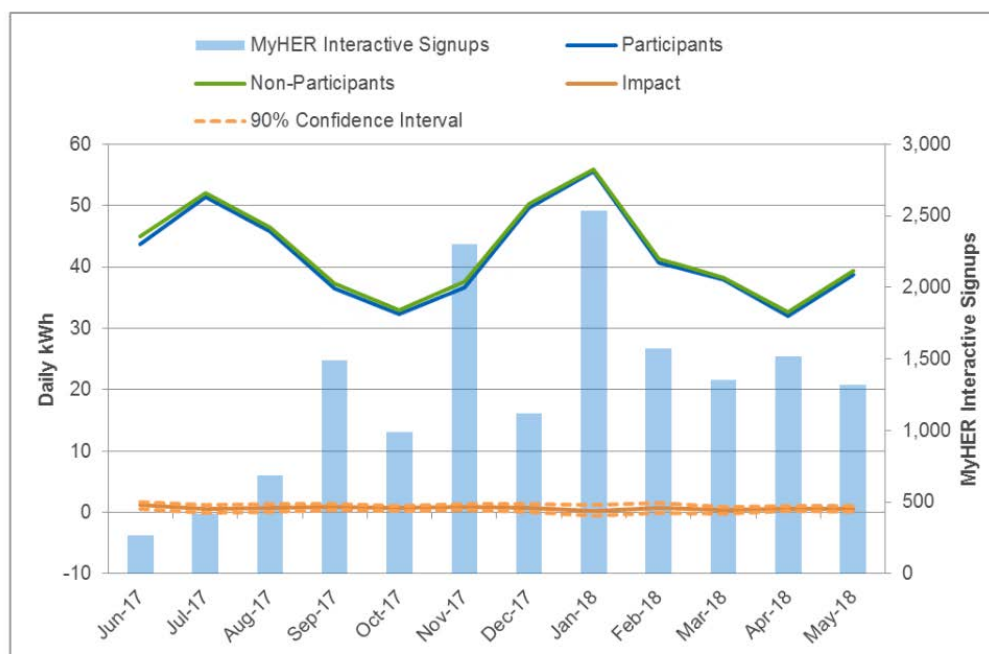


Table 3-27 provides impact model results for DEC, along with the margin of error for estimated impacts. The column at the right side of the table shows asterisks for those months where the energy savings are statistically significant at the 90% level of confidence.

**Table 3-27: DEC MyHER Interactive Monthly Energy Savings**

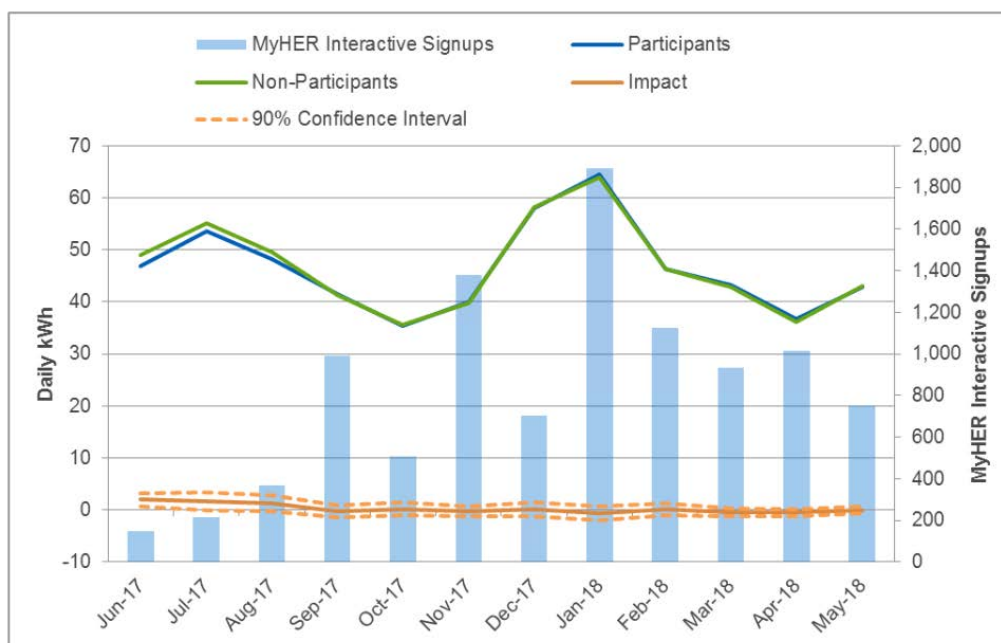
| Month          | Number of Participants Analyzed | MyHER Interactive Signups | Daily kWh        |              |            | 90% Conf. Interval |            | % Impact    |   |
|----------------|---------------------------------|---------------------------|------------------|--------------|------------|--------------------|------------|-------------|---|
|                |                                 |                           | Non-Participants | Participants | Impact     |                    |            |             |   |
| Jun-17         | 4,993                           | 270                       | 44.9             | 43.8         | 1.2        | 0.6                | 1.8        | 2.6%        | * |
| Jul-17         | 5,075                           | 420                       | 52.1             | 51.5         | 0.6        | 0.0                | 1.3        | 1.2%        |   |
| Aug-17         | 5,288                           | 684                       | 46.5             | 45.7         | 0.7        | 0.1                | 1.3        | 1.6%        | * |
| Sep-17         | 5,880                           | 1,490                     | 37.3             | 36.5         | 0.9        | 0.4                | 1.3        | 2.3%        | * |
| Oct-17         | 6,157                           | 990                       | 33.0             | 32.4         | 0.7        | 0.3                | 1.1        | 2.0%        | * |
| Nov-17         | 6,976                           | 2,301                     | 37.6             | 36.7         | 0.9        | 0.5                | 1.4        | 2.5%        | * |
| Dec-17         | 7,356                           | 1,119                     | 50.3             | 49.6         | 0.7        | 0.1                | 1.4        | 1.5%        | * |
| Jan-18         | 8,491                           | 2,537                     | 56.0             | 55.6         | 0.3        | -0.6               | 1.2        | 0.6%        |   |
| Feb-18         | 9,219                           | 1,571                     | 41.3             | 40.7         | 0.7        | -0.1               | 1.5        | 1.6%        |   |
| Mar-18         | 9,910                           | 1,351                     | 38.3             | 37.9         | 0.4        | -0.2               | 1.0        | 1.0%        |   |
| Apr-18         | 10,628                          | 1,515                     | 32.7             | 32.1         | 0.6        | 0.2                | 1.1        | 2.0%        | * |
| May-18         | 11,101                          | 1,316                     | 39.4             | 38.8         | 0.6        | 0.1                | 1.1        | 1.6%        | * |
| <b>Average</b> | <b>7,590</b>                    | <b>1,297</b>              | <b>42.5</b>      | <b>41.8</b>  | <b>0.7</b> | <b>0.5</b>         | <b>0.9</b> | <b>1.6%</b> | * |

For DEP, the average monthly impact across the 12-month period June 2017 to May 2018 was 8.7 kWh, representing the uplift in savings that MyHER Interactive produces over and above the savings produced by the paper MyHER, but this estimate is not statistically significant at the 90% level of confidence. On a month-to-month basis, energy impacts were statistically significant only during June, which represented an impact of 4.2%, or 60 kWh on an absolute basis.

Figure 3-15 illustrates average monthly energy usage for the DEP MyHER Interactive users (the blue line) and the same for the matched control group (the green line), along with the estimated impact and 90% confidence band (the orange lines and orange dashed lines) by month. Also shown as blue bars are counts of Interactive sign-ups.

Table 3-28 provides impact model results for DEP, along with the margin of error for estimated impacts. The column at the right side of the table shows asterisks for those months where the energy savings are statistically significant at the 90% level of confidence. Impacts for DEP were only significant for June 2016, but not for the remaining months or for the year June 2017 through May 2018 overall.

**Figure 3-15: DEP MyHER Interactive Portal Energy Impacts**



**Table 3-28: DEP MyHER Interactive Monthly Energy Savings**

| Month          | Number of Participants Analyzed | MyHER Interactive Signups | Daily kWh        |              |            | 90% Conf. Interval |            | % Impact    |
|----------------|---------------------------------|---------------------------|------------------|--------------|------------|--------------------|------------|-------------|
|                |                                 |                           | Non-Participants | Participants | Impact     |                    |            |             |
| Jun-17         | 494                             | 150                       | 48.9             | 46.9         | 2.0        | 0.8                | 3.3        | 4.2% *      |
| Jul-17         | 505                             | 213                       | 55.2             | 53.5         | 1.6        | -0.1               | 3.4        | 3.0%        |
| Aug-17         | 535                             | 369                       | 49.6             | 48.3         | 1.3        | -0.2               | 2.8        | 2.6%        |
| Sep-17         | 631                             | 992                       | 41.3             | 41.5         | -0.2       | -1.3               | 0.9        | -0.5%       |
| Oct-17         | 677                             | 508                       | 35.6             | 35.5         | 0.2        | -1.1               | 1.4        | 0.5%        |
| Nov-17         | 800                             | 1,381                     | 39.8             | 40.0         | -0.2       | -1.2               | 0.8        | -0.5%       |
| Dec-17         | 853                             | 703                       | 58.2             | 58.1         | 0.2        | -1.2               | 1.5        | 0.3%        |
| Jan-18         | 1,960                           | 1,894                     | 63.9             | 64.5         | -0.6       | -2.0               | 0.7        | -1.0%       |
| Feb-18         | 2,625                           | 1,127                     | 46.3             | 46.2         | 0.1        | -1.1               | 1.2        | 0.2%        |
| Mar-18         | 3,262                           | 934                       | 42.8             | 43.3         | -0.4       | -1.2               | 0.3        | -1.0%       |
| Apr-18         | 3,900                           | 1,015                     | 36.3             | 36.8         | -0.5       | -1.1               | 0.1        | -1.4%       |
| May-18         | 4,286                           | 754                       | 43.0             | 43.0         | 0.0        | -0.6               | 0.7        | 0.0%        |
| <b>Average</b> | <b>1,711</b>                    | <b>837</b>                | <b>46.7</b>      | <b>46.5</b>  | <b>0.3</b> | <b>-0.6</b>        | <b>1.1</b> | <b>0.6%</b> |

Nexant concludes that the DEC MyHER Interactive portal succeeded in generating additional statistically significant savings during much of the evaluation period from June 2017 to May

2018. The DEP MyHER Interactive portal only achieved additional statistically significant savings in the evaluation period during June 2017.

### 3.4 Impact Conclusions and Recommendations

Nexant's impact evaluation shows that Duke Energy's MyHER program continues to trigger a reduction in electric consumption among homes exposed to the program messaging.

MyHER programs also demonstrate an apparent maturation effect, typically on the order of 1-2 years. If Duke Energy continues to consistently introduce new cohorts to the program, program management should generally expect the newest cohorts to underperform relative to the established cohorts. Currently, 15% of DEC and 19% of DEP program participants should be considered as not fully mature.

Additionally, the findings from this evaluation suggest that savings of fully mature cohorts may eventually plateau or degrade over time – the oldest DEC cohort is in its 8<sup>th</sup> year on the program and displays impacts comparable to other cohorts that are in their second or third year on the program.

We find that MyHER also causes an uplift in participation in other energy efficiency programs. We have deducted the energy savings associated with that uplift so that Duke Energy does not claim the delivery of energy reductions associated with that uplift twice – those energy savings have already been claimed by those energy efficiency programs. This uplift in energy efficiency program participation means that MyHER is delivering on its secondary goal to encourage participation in other programs. We also find that the Interactive web portal has begun to show statistically significant energy savings in DEC, but not yet in DEP.

Nexant provides the following recommendations for Duke Energy's consideration:

- **Continue the commitment to simultaneous control and treatment assignment.** New assignments to treatment and control groups must be simultaneous and Tendril and Duke Energy should work to add all newly assigned treatment and control groups to their respective statuses in a single billing month, to the extent that is technically feasible.
- **Continue the practice of making assignments of new accounts to MyHER treatment and control groups once a year, or at most, twice a year.** The numbers of Duke Energy customers becoming eligible for the program each year do not facilitate more frequent assignments. This is due to the fact that sufficient numbers of customers must be set aside for the control group each time a group of customers is assigned to treatment in order for the evaluator to be able to measure the energy savings delivered by the new cohort.
- **Continue to drive engagement with the Interactive Portal.** MyHER Interactive's ability to deliver measurable energy savings is on the rise, as shown by this evaluation in comparison to the prior DEC evaluation, as well as the MyHER evaluations for other Duke Energy jurisdictions completed in the past year. We recommend that Duke Energy continue to drive more MyHER participants to the portal.

## 4 Process Evaluation

This section presents the results of process evaluation activities including in-depth interviews with Duke Energy and implementation staff and surveys of control and treatment households.

### 4.1 Methods

Process evaluations support continuous program improvement by identifying opportunities to improve the effectiveness and efficiency of program operations and services. Process evaluations also identify successful program components that should be enhanced or replicated. Process evaluation activities for MyHER sought to document program operational processes and to understand the experience of those receiving MyHER mailings. The customer survey given to MyHER recipients focused on investigating the recall and influence of MyHER messages among recipients, the extent to which MyHER affects customer engagement and satisfaction with Duke Energy, their use of MyHER Interactive, and subsequent actions taken by participants to reduce household energy consumption. A survey of control group households provided a point of comparison for estimating the effect of MyHER on behavior and attitudes of treatment households.

#### 4.1.1 Data Collection and Sampling Plan

The process evaluation included two primary data collection activities: in-depth interviews with program management and implementation staff, and surveys of a random sample of households selected to receive MyHER reports as well as surveys of a random sample of control group households.

Nexant deployed the household surveys using a mixed-mode survey measurement protocol, the activities associated with which are summarized in Table 4-1 and Table 4-2. In this protocol, customers were contacted by letter on Duke Energy stationery (to assure recipients of the legitimacy of the survey) asking them to go online and complete the survey. The letter contained a two-dollar bill as a cost-effective measure to maximize the survey completion rates. The letter also included a personalized URL for the online survey that points the recipient to a unique location on the internet at which they were able to complete the survey. Customers for whom email addresses were available also received an email inviting them to take the survey online, which also included the same personalized URL that appeared in the letter leading to the survey website at the location where they could complete it. After two weeks, customers who did not respond to the web survey received another letter, this time containing a paper copy of the survey and a return postage-paid envelope asking them to complete the survey by mail. Survey recipients also had the option of calling a toll-free telephone number to complete the survey by telephone. Table 4-1 shows that 337<sup>8</sup> DEC treatment customers and 211 DEC control customers completed the survey, totaling 548 responses from DEC recipients. Two samples of

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<sup>8</sup> 337 total DEC treatment respondents is the sum of 153 and 184 DEC completes by treatment sample.

treatment customers were used to accommodate an expanded set of questions used for comparison with control customers. A treatment-only survey was sent to a second sample of treatment customers that only contained questions specific to the MyHER experience. This approach to using a second treatment-only instrument was taken to prevent the treatment version of the survey from becoming too long. Among the 337 DEC treatment customers that completed the survey, 153 were in the sample that received the treatment-only survey and 184 were in the sample that received the primary instrument designed to compare the responses of treatment and control customers. A total of 211 DEC control customers completed the survey. By state, 420 DEC respondents are located in North Carolina and 128 DEC respondents are located in South Carolina.

**Table 4-1: Summary of Process Evaluation Activities - DEC**

| Population  | Approach                         | Population | Sample     |            | Confidence/Precision |                |
|---|----------------------------------|------------|------------|------------|----------------------|----------------|
|   |                                  |            | Expected   | Actual     | Expected             | Actual         |
| Program management and implementation                 | In-depth interviews              | ~10        | 2-5        | 4          | Not Applicable       | Not Applicable |
| Treatment group households; Treatment only instrument | Mixed-mode; mail, web, and phone | ~1.4 M     | 188        | 153        | 90/6                 | 90/6.7         |
| Treatment group households; Primary instrument        | Mixed-mode; mail, web, and phone | ~1.4 M     | 188        | 184        | 90/6                 | 90/6.0         |
| Control group households; Primary instrument          | Mixed-mode; mail, web, and phone | ~133,000   | 188        | 211        | 90/6                 | 90/5.7         |
| <b>Total Responses</b>                                |                                  |            | <b>564</b> | <b>548</b> |                      |                |

Table 4-2 shows that a total of 539 DEP customers responded to the survey. The DEP survey design was identical to that of DEC, with two treatment samples receiving surveys; one sample received surveys with only treatment-related questions, and the other sample of treatment customers received another survey with questions designed to compare the responses of treatment and control customers. A total of 192 DEP control customers completed the survey, while 171 DEP treatment customers completed the treatment-only survey, and 176 DEP treatment customers completed the primary comparison survey. By state, 473 DEP respondents reside in North Carolina and 29 DEP respondents reside in South Carolina.

**Table 4-2: Summary of Process Evaluation Activities - DEP**

| Population   | Approach                            | Population | Sample     |            | Confidence/Precision |                |
|--|-------------------------------------|------------|------------|------------|----------------------|----------------|
|  |                                     |            | Expected   | Actual     | Expected             | Actual         |
| Program management and implementation                    | In-depth interviews                 | ~10        | 2-5        | 4          | Not Applicable       | Not Applicable |
| Treatment group households;<br>Treatment only instrument | Mixed-mode;<br>mail, web, and phone | ~842,000   | 186        | 171        | 90/06                | 90/6.3         |
| Treatment group households;<br>Primary instrument        | Mixed-mode;<br>mail, web, and phone | ~842,000   | 186        | 176        | 90/06                | 90/6.2         |
| Control group households;<br>Primary instrument          | Mixed-mode;<br>mail, web, and phone | ~117,000   | 186        | 192        | 90/06                | 90/5.9         |
| <b>Total Responses</b>                                   |                                     |            | <b>558</b> | <b>539</b> |                      |                |

Nexant's survey instruments included demographic questions to support comparisons of the treatment and control respondents as well as to support overall comparisons to the jurisdiction's territory. We present summaries of the responses to the demographic questions in [Section 4.2](#), after the summaries of the responses to the survey questions on customer attitudes, energy usage behaviors, energy-savings actions and purchases/investments, and experience with the MyHER program.

#### 4.1.1.1 Interviews

Nexant conducted interviews with key contacts at Duke Energy and Tendril. The interviews built upon information obtained during previous evaluations of the Duke Energy MyHER program in multiple jurisdictions. The central objectives of the interviews were to understand program operations and the main activities required to develop and distribute the MyHER reports to DEP and DEC customers, as well as to understand any developments or enhancements in program delivery.

#### 4.1.1.2 Household Surveys

Both treatment and control groups were surveyed. Treatment households were surveyed as two groups that received different surveys: The first group's survey included questions about the respondents' experience of the reports themselves as well as questions to assess engagement and understanding of household energy use, awareness of Duke Energy efficiency program offers, and satisfaction with the services Duke Energy provides to help households manage



their energy use. The second treatment group and control group surveys were identical, and excluded questions about the information and utility of the MyHER reports, but included identical questions on the other aspects to facilitate comparison with each other, as well as to the first treatment group.

Nexant analyzed the survey results to identify differences between treatment and control group households on the following:

- Reported levels of stated intention for future action;
- Levels of awareness of and interest in household energy use;
- The level of behavioral action or equipment-based upgrades;
- Satisfaction with Duke Energy communications, service, and efficiency options;
- Barriers to energy saving behaviors and purchases; and
- Inclination to seek information on managing household energy use from Duke Energy.

This survey approach is consistent with the RCT design of the program and supports both the impact and process evaluation activities by providing additional insight into potential program effects.

### **Survey Disposition - DEC**

We mailed 553 letters to randomly selected residential customers in the treatment group and 553 letters to the randomly selected residential customers in the control group for the primary survey. We also mailed 553 letters to the treatment customers for the treatment-only survey. The surveys were completed by a total of 337 treatment households (across both surveys) and 211 control households, representing a an overall treatment group response rate of 30% for DEC and a control group response rate of 38%. More than half (69% of the treatment group and 66% of the control group) of the surveys were completed online. Table 4-3 summarizes the treatment and control group survey dispositions in DEC.

**Table 4-3: Survey Disposition - DEC**

| Mode                     | Treatment  |             | Control    |             |
|--------------------------|------------|-------------|------------|-------------|
|                          | Count      | Percent     | Count      | Percent     |
| <b>Completes by Mode</b> |            |             |            |             |
| Web-based Survey         | 232        | 69%         | 140        | 66%         |
| Mail/Paper Survey        | 88         | 26%         | 58         | 27%         |
| Inbound Phone Survey     | 17         | 5%          | 13         | 6%          |
| <b>Total Completes</b>   | <b>337</b> | <b>100%</b> | <b>211</b> | <b>100%</b> |

Table 4-4 presents DEC response rates by state. Higher response rates are observed in both North and South Carolina for control customers relative to treatment customers. In North Carolina, 30% of treatment customers invited to take the survey completed it, as compared to a



36% response rate for control customers in North Carolina. South Carolina response rates were a bit higher: 31% of treatment customers in South Carolina and 45% of control customers in South Carolina completed the survey.

**Table 4-4: Response Rates by State and Treatment Condition - DEC**

| State          | Treatment    |            |               | Control    |            |               |
|----------------|--------------|------------|---------------|------------|------------|---------------|
|                | Sampled      | Completed  | Response Rate | Sampled    | Completed  | Response Rate |
| North Carolina | 866          | 262        | 30%           | 435        | 158        | 36%           |
| South Carolina | 240          | 75         | 31%           | 118        | 53         | 45%           |
| <b>Total</b>   | <b>1,106</b> | <b>337</b> | <b>30%</b>    | <b>553</b> | <b>211</b> | <b>38%</b>    |

### ***Survey Disposition - DEP***

We mailed 552 letters to randomly selected residential customers in the treatment group and 552 letters to the randomly selected residential customers in the control group for the primary survey. We also mailed 552 letters to the treatment customers for the treatment-only survey. The surveys were completed by 347 treatment households (across both surveys) and 192 control households, representing a treatment group response rate of 31% and a control group response rate of 35%. More than half (63% of the treatment group and 61% of the control group) of the DEP surveys were completed online. Table 4-5 outlines the treatment and control group survey dispositions in DEP.

**Table 4-5: Survey Disposition - DEP**

| Mode                     | Treatment  |             | Control    |             |
|--------------------------|------------|-------------|------------|-------------|
|                          | Count      | Percent     | Count      | Percent     |
| <b>Completes by Mode</b> |            |             |            |             |
| Web-based Survey         | 220        | 63%         | 117        | 61%         |
| Mail/Paper Survey        | 104        | 30%         | 67         | 35%         |
| Inbound Phone Survey     | 23         | 7%          | 8          | 4%          |
| <b>Total Completes</b>   | <b>347</b> | <b>100%</b> | <b>192</b> | <b>100%</b> |

Table 4-6 summarizes DEP response rates by state and treatment condition. In North Carolina, 32% of treatment customers invited to take the survey completed it, as compared to a 35% response rate for control customers in North Carolina. South Carolina DEP response rates were on the whole a bit lower: 29% of treatment customers in South Carolina and 32% of control customers in South Carolina completed the survey.

**Table 4-6: Response Rates by State and Treatment Condition - DEP**

| State          | Treatment    |            |               | Control    |            |               |
|----------------|--------------|------------|---------------|------------|------------|---------------|
|                | Sampled      | Completed  | Response Rate | Sampled    | Completed  | Response Rate |
| North Carolina | 976          | 310        | 32%           | 462        | 163        | 35%           |
| South Carolina | 128          | 37         | 29%           | 90         | 29         | 32%           |
| <b>Total</b>   | <b>1,104</b> | <b>347</b> | <b>31%</b>    | <b>552</b> | <b>192</b> | <b>35%</b>    |

## 4.2 Findings

This section presents the findings from in-depth interviews with staff and implementation contractors and the results of the customer surveys.

### 4.2.1 Program Processes and Operations

As in other Duke Energy jurisdictions, MyHER at DEP and DEC is managed primarily through a core team of three Duke Energy staff members: a Manager of Behavioral Programs with oversight of residential behavioral programs, a Program Manager in charge of the day-to-day operations of the MyHER program, and a Data Analyst that is responsible for the substantial data tracking and cleaning tasks required to support the contracted implementation team, as well as internal program reporting to Duke Energy management.

At Tendril, Duke Energy's contracted program implementer, MyHER is supported by a team of people including an Operations Manager, a Home Energy Report Product Manager, an Engineering Manager, a dedicated Operations Engineer, a Quality Control Engineer, an "Ask-the-Expert" technical writer, and an Account Manager responsible for ensuring that the Duke Energy MyHER products meet expectations for quality, timing, and customer satisfaction. Tendril staff track the number of reports sent, the quality of the reports, and the timing of when reports are mailed. Tendril's key performance indicators (KPIs) include in-home dates for each batch as well as the percentage of treatment customers actually treated.

MyHER is Duke Energy's flagship behavioral energy efficiency program. Its primary goals are to achieve energy savings, increase customer satisfaction, and cross-promote enrollment into Duke Energy's demand response and energy efficiency programs. Staff at both organizations described continuous, close coordination to ensure that the data behind the MyHER comparisons are accurate, the tips provided to specific households are appropriate, and that MyHERs are delivered as soon as possible after billing data is received, within the relatively short timeframe between bills.

Program operations are conducted with a customer-focused orientation where the commitment to producing a high-quality product is a demanding process that must be executed consistently each month of the year.

#### 4.2.1.1 MyHER Production

During the period of time under study by this evaluation, MyHERs were mailed out to DEP and DEC customers on paper through the U.S. Mail service about eight times a year, where the mailing gaps generally occurred in January, April, September, and December. During the eight U.S. Mail treatment months, the reports are generated twice per week, a cadence that is designed to facilitate meeting one of Tendril's key performance indicators: that MyHERs arrive at the customers' homes at the cycle's mid-point (though, ideally, as soon as possible after the bill), so as to make the information presentment as useful and timely as possible. Additionally, any customer that has provided Duke Energy with their email address also receives their report by email, and in fact, MyHER reports are generated and emailed to those customers monthly, 12 times a year, while they continue to receive paper reports 8 times a year.<sup>9</sup>

The production process for any given treatment month begins as soon as meter reads for the first billing cycle are processed by Duke Energy's meter data management system. After processing, billing data is uploaded each afternoon, five times a week, to Tendril. Once the data has been received, production proceeds according to the following process, twice a week<sup>10</sup>: Tendril runs report production and conducts quality control checks. Then a flat file containing all the data from the reports in addition to drafts of every report (in PDF format) are sent to Duke Energy for an independent quality control check. Upon approval, Tendril then sends the PDFs to the printhouse, and the printhouse generates a final proof for Duke Energy approval. Finally, after the proof is approved, the printhouse prints and mails all the reports, Tendril emails eHERs on the specified day, and then commences the process of reporting the printing, mailing, and emailing to Duke Energy. There have been issues, however, in the iterative process of reconciling customer email addresses between Duke Energy and Tendril that has resulted in the loss of updated customer emails. There is interest in automating the email update process, but in the meantime in order to avoid further problems, Duke Energy is simply sending Tendril updates quarterly.

This production chain moves quickly: once Tendril generates a batch of reports, the time elapsed until transfer to the printhouse is generally 3-4 hours when all processes are completed according to plan. This timeframe has become the norm, but when quality control problems emerge, that elapsed time can increase significantly. Considering that the printhouse has one week to complete the mailing, and Standard Rate postage can take another week to deliver, making the mid-cycle in-home delivery goal something that takes dedicated effort to achieve.

Prior MyHER process evaluations in other Duke Energy jurisdictions where MyHER is also implemented found that this fast-moving process has seen improvements over time through the adoption of various changes: recently, these have been best characterized by an increased attention to developing procedures and schedules for a number of elements of the MyHER production process. These elements include the Duke Energy product request list, new quality

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<sup>9</sup> Duke Energy will cease delivery of paper MyHER reports, and only send email reports, if the customer requests them to do so.

<sup>10</sup> During the months where only eHERs are produced, reports are generated in one batch per week, rather than two.

control processes at Tendril, and free form text (FFT) content development, as examples. These changes continue to deliver improvements in the number of problems found during report batch quality control checks, though Tendril continues to have some difficulty dealing with last minute requests from Duke Energy. Additionally, Tendril has implemented a number of back office process enhancements in the past year, such as migrating their computational platform to Amazon Web Services (AWS), providing a pre-promotion (i.e., draft) platform to enable Duke Energy staff to review draft PDF reports prior to promoting or finalizing them, and converting their email HER reports to Hypertext Markup Language (HTML) format which provides greater responsiveness and flexibility to Tendril operational staff.

#### 4.2.1.2 Quality Control

Embedded in the early days of this production cycle is a quality control process that is undertaken to ensure that the reports contain accurate information and are of high quality. Duke Energy analyzes a dataset containing all of the information presented in the reports for each production cycle. This data is checked for essentially anything that could be erroneous, ranging from verifying that all the customers receiving reports are eligible to receive them, that no control customers are getting reports, that the reported electricity usage is correct, that no customers who have opted-out are getting reports, and that no one has gotten more than one report a month. Duke Energy also checks for unexpected cluster assignment changes, presentment of messaging and tips and overall print quality.

In the past, these checks have proven to be crucial as they occasionally revealed significant production problems, which were subsequently reviewed in Tendril's governance sessions with Duke Energy. This visibility has typically resulted in issue resolution on a going-forward basis.

Both Duke Energy and Tendril staff report that the incidence of significant production problems has also been dramatically reduced since Tendril implemented quality control automation. Issues that surfaced during this evaluation period were small in scope, and infrequent. In 6 months, roughly 20 incidents were identified by Duke Energy that required Tendril to remove errors it had missed in their initial round of quality control. Tendril's automated quality control process is described as follows, recalling that customer data is transferred to Tendril daily:

- Tendril pulls the Duke Energy billing data into a database (Amazon Redshift; part of the AWS suite) and organizes it in a way that allows it to be fed into the HERs. The HERs are then generated and rendered;
- The QC protocol, which is a set of SQL queries against the data, then runs. This process produces output (presented in Amazon S3; another part of the AWS suite) that reports the results of the checks, indicating the reports that were incorrectly created. Postfiltering is then done for the incorrect reports;
- Tendril staff execute visual checks to be sure nothing noticeable or significant has slipped through to final report presentment; and
- An approved file is then sent to Duke Energy, along with about 100 samples of both paper and electronic HERs.

This automated process has the added benefit of being able to be managed by one person, which has significantly reduced the problems that the “all hands on deck” approach to executing report production and quality control presented in the past.

Prior evaluations of MyHER revealed that some program processes could benefit from improved quality control performance. Improved quality control in these areas can reduce the risk associated with running a program with processes that too often fail quality control checks. Such issues present timing risks (reports may not be sent out on time), customer service risk (reports may be sent out with problems if problems someday are missed), and risk to the overall success of the program (if the QC process is overburdened with detecting too many problems, it can become an overly-leveraged component of program operations). Interviews for this evaluation revealed continued improvement since the prior DEC and DEP evaluations in terms of frequency and significance of issues detected by Duke Energy’s quality control processes.

Tendril is currently implementing a new production platform, the Home Energy Reporting Service (HOMERS), that will allow for the production of reports for multiple billing cycles at once, which will dramatically improve the production process by, notably, eliminating what are referred to as “Batch 1” problems, which are related to the relatively large number of reports produced for the first cycle of the month. Data transfers to Duke will contain much smaller and consistent batch sizes. Additionally, this new platform allows for the continuous importation of customer usage data and production of reports. This will make preventing problems easier because it allows the QC software to be programmed in a way that can verify the proper execution of customer segmentation protocols, as well as larger scale descriptive analyses at a frequency chosen by Tendril, as opposed to having to wait for the entire batch run, as is the case with the legacy system. The development of this new platform is currently near completion at Tendril, and is expected to not only detect emergent problems, but also help prevent detected errors from recurring.

The improvements described above are likely a function of the continuation of Duke Energy and Tendril’s collaborative activities for program success. Duke Energy and Tendril staff join for weekly status meetings, monthly operations meetings, and quarterly governance meetings. These meetings provide a venue for shared brainstorming and roadmapping activities and the ongoing maintenance of a product request list for Tendril. Tendril has additionally commissioned an internal HER Improvement Team with the mandate to make consistent progress on the product request list. This team meets quarterly to reassess the feasibility of each of the list’s items (currently numbering about 25) and reprioritize these items, as needed, based on the priorities Duke Energy has expressed in collaborative meetings. Making progress on this list, for which Tendril produces quarterly reports, has been made a priority by Duke Energy and has resulted in the above described attention in meetings. In general, this prioritization has resulted in 3 items on this list being accomplished in the last quarter.

Duke Energy and Tendril staff have recognized in prior evaluations of Duke Energy’s MyHER program in other jurisdictions, as well as this one, that production problems, when they occur, usually occur following changes to the report or report cycle process. However, our interviewees

also recognized that a strength of Tendril lies in their willingness to dive deep into details and processes to solve problems that may only affect a relatively few number of customers, and to go the extra mile to help address problems that in fact may have originated on the Duke Energy side. Interviews for this evaluation additionally reveal that the Tendril operations team has stabilized in terms of staffing, and that Tendril has added a quality control engineer to program staff. Tendril has also implemented a “Batch 0” strategy where the first batch of reports following any changes to the report is produced not for distribution, but only for quality control purposes, which is reviewed prior to the production of any live batches of reports. This procedural innovation allows Tendril to support Duke Energy’s interest in fine-tuning any new features or changes to reports and to facilitate early detection of unexpected problems. Generally, both Duke Energy and Tendril staff continue to speak highly of the collaborative partnership shared by Duke Energy and Tendril in running the MyHER program and of the open lines of communication that exist and function very well at all levels of program and corporate management.

#### 4.2.1.3 MyHER Components

MyHER reports include several key elements that are customized each month: bar charts, tips, a trend chart, and messages. Duke Energy and Tendril implemented a general refresh of the MyHER report template in 2017, designed to improve readability and to keep the presentation fresh in the eyes of recipients. Graphics were updated and images were added to some modules (described below) that were previously text-only. A new module (also described below) was added that presents usage disaggregated by end use type. Overall, recipient response to this redesign was positive, though program staff did note some difficulty recipients had with interpreting the disaggregated end use presentation.

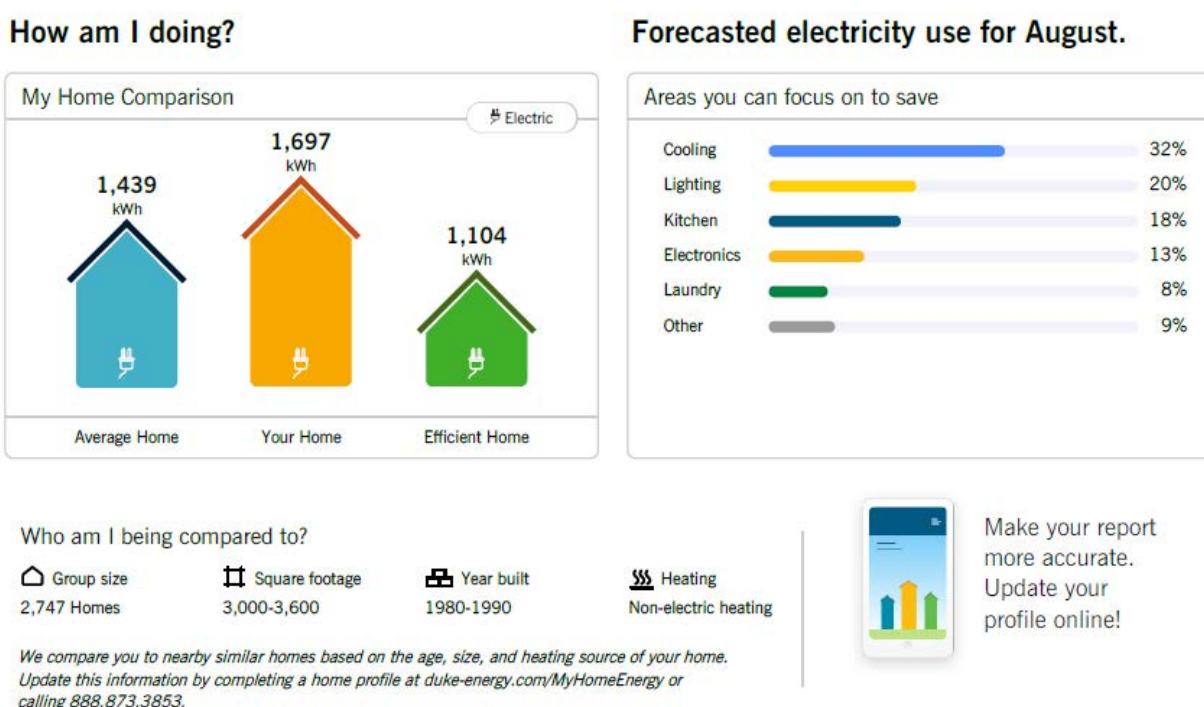
The front page includes two bar chart graphics. The first chart is a vertical bar chart (stylized in the shape of homes) comparing the subject home to the average and most efficient homes for an assigned cluster or “neighborhood” of similar homes. Previously, in Duke Energy jurisdictions with the earliest MyHER program implementations, these graphs were labeled with dollars, but this occasionally caused confusion among recipients if the dollar amount didn’t exactly match their recall of a recent bill. In March 2013, Duke Energy shifted to using kWh as the unit of measurement for the bar charts; Duke Energy conducted customer focus groups in an effort to understand the level of confusion this shift might cause and found that customers reported not paying attention to unit of measurement: they were simply absorbing the shape and directionality of the bar charts (Figure 4-1).

An infographic beneath the bar charts provides the size of the group of comparison homes, the assumed heating type, the approximate square footage, and the approximate age of the similar homes to which the customer’s home is being compared. According to MyHER staff, a common reason for customer phone calls relating to MyHERs is simply the customer’s desire to correct assumed information about a given home. For example, the MyHER could indicate that Duke Energy assumes a home has electric heat when it does not, or has assigned a home to the wrong size category. Any corrections provided in this manner are considered highly reliable and are not changed based on subsequent uploads of third party data.



To the right of the vertical bar chart is a horizontal bar chart that illustrates Tendril's forecast for subject home's electricity usage in the next month, disaggregated by end use type. This chart is intended to provide actionable insights to each customer as to where they might direct their energy savings efforts to make the greatest impact in their energy usage in the month ahead. Tendril staff continues to fine-tune the disaggregation in these forecasts, as a response to customer concerns about the accuracy of this component of the report. To help improve their accuracy, Duke Energy and Tendril continue to push customers to the Interactive portal where they are able to further customize or correct information about their homes that may impact the accuracy of the disaggregated usage forecasts.

**Figure 4-1: MyHER Electricity Usage Comparison and Forecasted Energy Use Bar Charts**

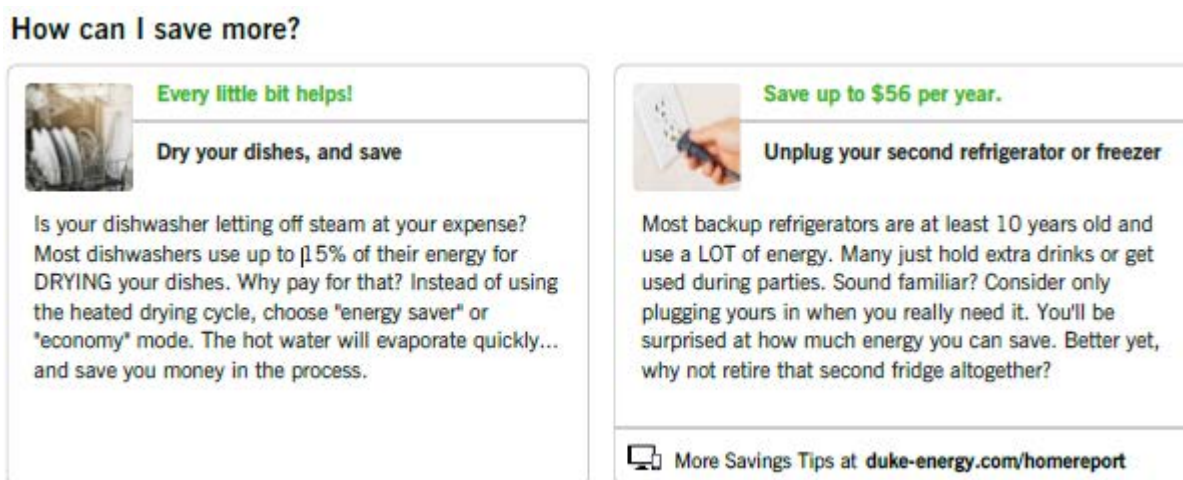


In addition to the comparison graph, each MyHER includes a set of customized action tips under the heading “How can I save more?” (Figure 4-2). These tips are designed to provide information relevant to homes with similar characteristics, as presented in the box accompanying the comparison graph. These tips often are presented with monetary values (appropriately scaled to each customer receiving the tip) that estimate the bill savings that the customer might expect to realize by implementing the action tip.

The Duke Energy MyHER program has a large library of action tips, numbering between 80 and 90. Half of them were initially developed internally at Duke Energy, and Tendril’s “Ask the Expert” technical writer has continued to add to them over time. The large library has enabled the program to avoid any repeats to customers over lengthy periods of time (up to three years). Tip freshness is also managed with display rules that ensure that a diversity of tip types (both in the value of the tip and the area of the household they apply to) is shown, and this management sometimes results in the removal of tips that staff no longer deem relevant. Duke Energy

validates the monetary values estimated by Tendril for each tip action for reasonableness. Duke Energy and Tendril have identified an opportunity for improvement with action tips in developing additional targeting algorithms for tip display. For example, more sophisticated targeting could be developed that cross-references age of home with relevancy for certain actions (e.g., only display a tip to install new windows to customers with older homes). This targeting of tips in this section are developing into “smart actions”, and have been established as a priority at both Duke Energy and Tendril. Tendril has made progress on, converting about 20% of all action tips to smart actions—that is, they are targeted to the appropriate audience. However, not all of the actions and tips in this section are amenable to being used in this fashion, as there is significant variability in their applicability: some tips are only applicable to a few segments, while others have broader customer applicability and have lower capacity to be used as a “targeted” action.

**Figure 4-2: MyHER Tips on Saving Money and Energy**



The back page of the MyHER reports includes a trend chart that displays how the recipient’s home compares to the average and efficient home in energy usage over a year (Figure 4-3). This trend chart can help customers identify certain months where their usage increased relative to the efficient or average home—helping them focus on the equipment and activities most likely to affect their usage. For example, if a home tracks the average home until mid-winter and then spikes well above, that could indicate the heating equipment should be checked.



Figure 4-3: MyHER 13-month Trend Chart



The back page of the MyHER report also reserves space for Duke Energy to include seasonal and programmatic messaging, referred to by program staff as free form text (FFT), that reflects Duke Energy-specific communication objectives. Ensuring that FFT messages are relevant and do not conflict with the actions or tips provided on the front page requires ongoing coordination and monitoring. Broad targeting efforts taking advantage of seasonal relevance, program eligibility, and the presence of end uses such as pools, are used to cross-promote Duke Energy programs. Customer participation databases are cross checked each month to ensure that customers only receive information about programs they have not already participated in; if a customer is found to have participated in the program being promoted in a given month, that customer will receive an alternate, typically more generic, message. Occasionally the action text on the front page will be disabled to accommodate FFT messaging.

FFT messages are developed by the MyHER team in cooperation with Duke Energy's marketing and communications group. Duke Energy staff strive to develop messages that are clever, relevant, and upbeat—some recognize events on the calendar (such as Earth Day) while others provide specific program promotional information or promote general home upgrades (even for measures outside of current programs).

Establishing an FFT calendar early in each year and attempting to avoid last-minute changes to the messages each month has been challenging to implement. Last minute changes have been common due to changes during the course of the year to Duke Energy program promotions and incentive levels. In addition to developing the messages included in each MyHER, the program team must also ensure that the messages conform to expectations established to protect the customer experience. This feature of MyHER is relatively resource-intensive with a lengthy revision-review-approval process with numerous stakeholders accompanying most changes to FFT messages.

To help prevent last minute changes that characterized FFT production in the past, there was renewed focus and energy on prioritizing it as much as possible in 2018 at both Tendril and

Duke Energy. A product of this renewed energy is an FFT tool under development at Tendril. It will allow for faster and more accurate rendering of FFT messaging, as well as the ability for Duke Energy stakeholders to participate directly in the FFT creation and review process; it is being built as a “self-serve” tool. The implementation of such a tool, due for launch in early 2019, is expected to streamline the FFT process significantly.

Finally, the back page of the reports also provides contact information for the MyHER program at Duke Energy. Customers occasionally contact Duke Energy with questions or concerns about MyHERs and, rarely, to opt-out. Duke Energy’s efforts to maintain a high-quality MyHER customer experience is reflected by the high value that is placed on program participant satisfaction and as such, it is closely monitored. Only 1% of MyHER customers contact Duke Energy annually and less than 0.5% of MyHER treatment customers contact Duke Energy to opt-out. The rigorous quality control efforts described earlier have kept quality-related issues from ever reaching customers.

#### **4.2.1.4 MyHER Interactive**

Enrollment in MyHER Interactive is still relatively low. The most reliably successful enrollment generators are email campaigns, sweepstakes, and cross-promotion with the High Bill Alerts program. Envelope messaging has also been used, but is less successful. Email campaigns are a very successful enrollment generator because they can use personalized uniform resource locator PURLs (to enable clicking through to the Interactive screen where the customers’ account number is auto-populated in the registration process). Program staff revamped the content and graphics of the email campaign in 2018.

Duke Energy continues to prioritize enrollment in Interactive. However, enrollment in MyHER Interactive was not as strong as was hoped, so Tendril is developing a marketing plan to increase enrollments in 2019.

Additionally, Duke Energy has 6 product requests in with Tendril for the “User Profile” section of MyHER Interactive, so as to improve the quality of customer-provided data and in turn, improve clustering models, load disaggregation, the applicability of targeted tips, and other applications that use the data. Duke Energy also continues to roll out AMI meters to customers in the DEC and DEP service territories. With the completion of the AMI deployment, the granularity of customer data will increase, which will directly benefit those who enroll in MyHER Interactive. Currently, about 57% of Interactive customers have AMI meters. For these customers, their usage data is available on MyHER Interactive. However, there have been problems with the transfer of this data to Tendril, which has caused some customer data displays to be erroneous. To remedy this, Tendril is in the process of upgrading their data ingester<sup>11</sup>. Duke Energy and Tendril are considering ways to effectively utilize and meaningfully leverage AMI data.

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<sup>11</sup> Data ingestion refers to the process of importing, cleaning, and organizing large or complex sets of data for storage and/or analysis. Tendril’s upgraded data ingester will process AMI data from Duke Energy in a faster, more effective manner.

Few quality control or process issues pertaining to Interactive were reported in our interviews. However, it should be noted that there is currently no mechanism by which Duke Energy can use or check the quality of data presented on Interactive in a systematic or bulk fashion. All checks are made on an individual customer basis. The bulk of quality control for Interactive is carried out by Tendril.

One opportunity for improvement exists in MyHER Interactive's limitation such that a Duke Energy account can only be associated with one email, and only one email may be associated with any account. Currently, Tendril is evaluating the feasibility of a number of solutions to this problem, which has caused issues for customers attempting to enroll. First, they are attempting to shorten the time it takes to archive emails of customers who leave the program (to disassociate the email from the account). Secondly, they are exploring the possibility of allowing more than one email to be associated with an account. Lastly, they may disable the requirement that login ID's be email addresses. These solutions should open up eligibility to accounts associated with homes in ownership transition, rental transition, and will allow those who own more than one home to have all of their homes associated with their Interactive account.

#### **4.2.1.5 Other MyHER Plans to Further Improve Program Operations**

Looking forward, Duke Energy and Tendril are also contemplating other program enhancements that are anticipated to further improve program performance and the customer experience with the program:

- Developing new content specific to shoulder month email MyHERs;
- The full HOMERS rollout;
- Revised service-level agreements (SLAs);
- Duke Energy app; and
- Self-comparisons of energy usage (as opposed to "neighborhood" comparisons).

#### **4.2.2 Customer Surveys - DEC**

The customer surveys included questions focused specifically on the experience of and satisfaction with the information provided in MyHERs and awareness of MyHER Interactive—these questions were asked only of households in the treatment group.

Both treatment and control households answered the remaining questions, which focused on assessing:

- Awareness of Duke Energy efficiency program offers;
- Satisfaction with the Duke Energy, and services Duke Energy provides to help households manage their energy use;
- Levels of awareness of and interest in household energy use; motivations and perceived importance;
- Reported behavioral or equipment-based upgrades; and

- Barriers that prevent customers from undertaking energy savings actions.

#### 4.2.2.1 Comparing Treatment and Control Responses - DEC

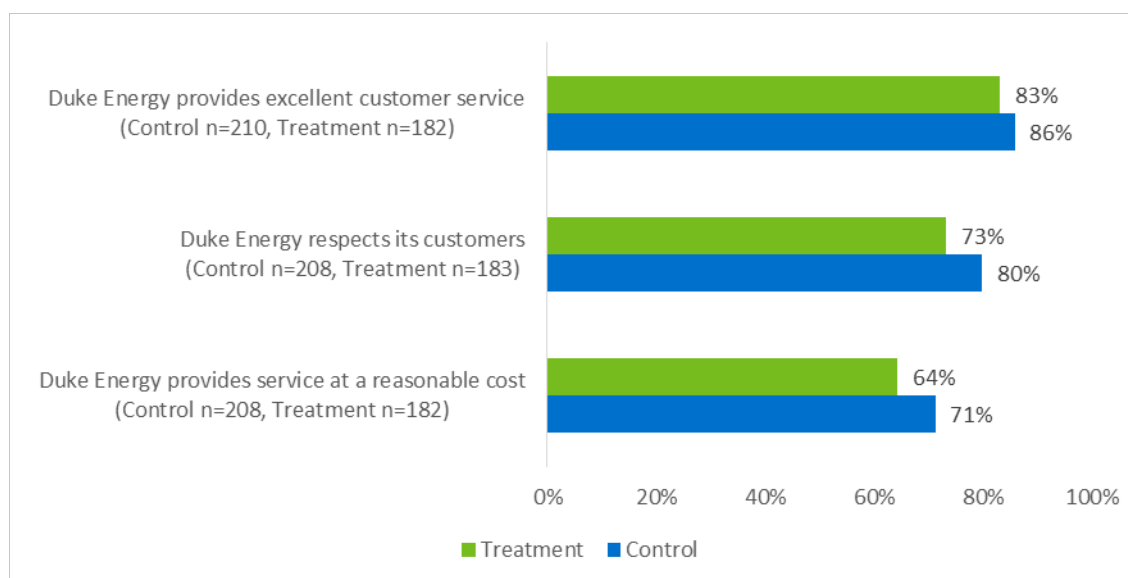
This section presents the results of survey questions asked of both treatment and control households in DEC and compares the response patterns. Statistically significant differences between treatment and control households are noted.

#### Duke Energy Customer Satisfaction

Both treatment and control groups' overall satisfaction with Duke Energy are high. Seventy-three percent of treatment customers and 78% of control customers are satisfied or very satisfied with Duke Energy as their electric supplier (rated 8 or higher on a 0-10 point scale); the difference is not statistically significant at the 90% level of confidence.

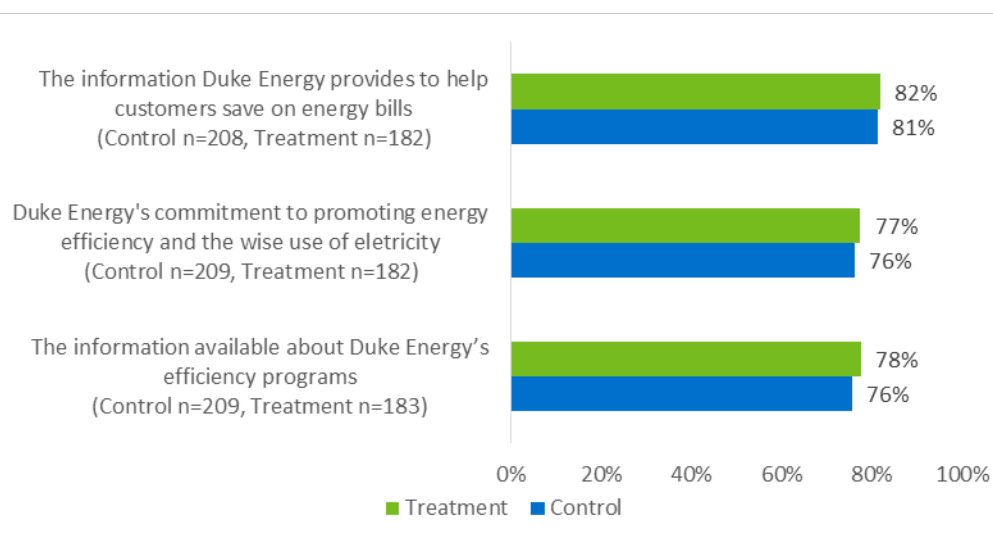
Control households rated Duke Energy higher on providing excellent customer service, respecting its customers, and providing service at a reasonable cost than treatment households. The differences between the control and treatment group are not statistically significant (Figure 4-4). MyHER does not result in a measurable change in stated customer satisfaction with Duke Energy in DEC.

**Figure 4-4: Satisfaction with Various Aspects of Customer Service - DEC**



Additionally, the differences between treatment and control customers with respect to satisfaction with the information available about Duke Energy's efficiency programs, the information Duke Energy provides to help customers save on energy bills, and Duke Energy's commitment to promoting energy efficiency and the wise use of electricity are not statistically significant (Figure 4-5), thus MyHER has not measurably changed customers' satisfaction with Duke Energy's promotion of energy efficiency at DEC.

**Figure 4-5: Satisfaction with Energy Efficiency Offerings and Information - DEC**



### Engagement with Duke Energy's Website

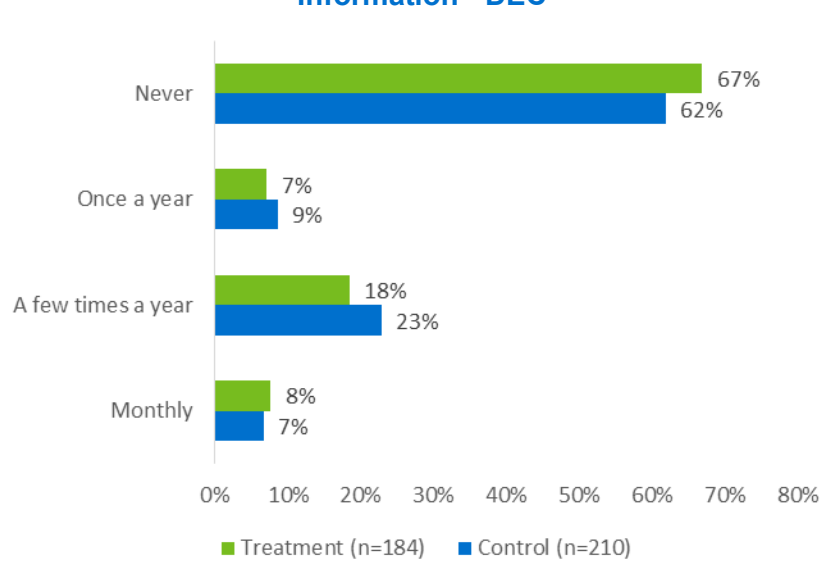
Both groups answered several questions about their use of the Duke Energy website, a proxy for overall engagement with information provided by the utility on energy efficiency and household energy use, and the results showed no significant differences. Table 4-5 shows that 36% of the treatment group and 37% of the control group reported they had never logged in to their Duke Energy accounts. Among those that had logged in, the most commonly reported purpose was to pay their bill.

**Table 4-7: Use of Duke Energy Online Account - DEC**

| Online Account Activity                           | Treatment Group (n=180) | Control Group (n=204) |
|---|-------------------------|-----------------------|
| Never logged in                                   | 36%                     | 37%                   |
| Pay my bill                                       | 36%                     | 37%                   |
| Look for energy efficiency opportunities or ideas | 16%                     | 16%                   |

As shown in Figure 4-6, control group households were more likely to report that they accessed the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make their home more energy efficient, but the difference is not statistically significant. Relatively small percentages of both groups report regular usage of the website for purposes other than bill payment.

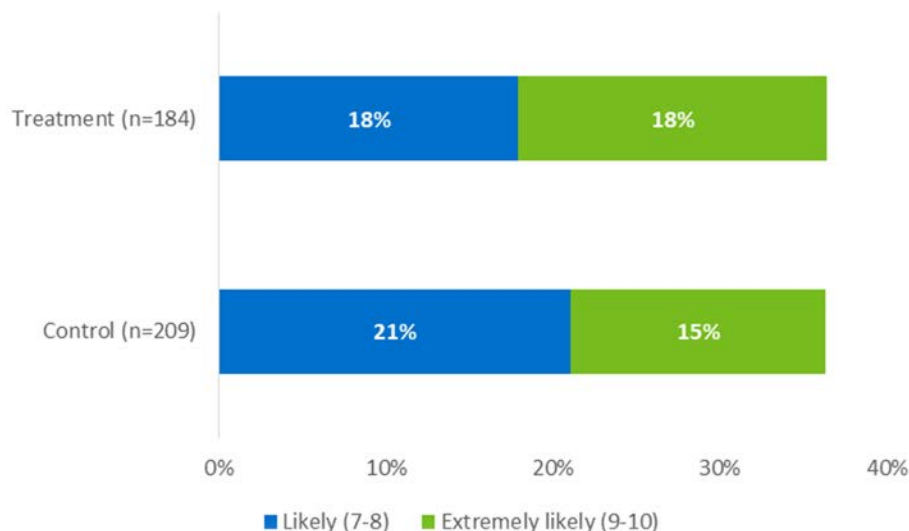
**Figure 4-6: Frequency Accessing the Duke Energy Website to Search for Other Information - DEC**



Thirty-six percent of control group and treatment group customers, respectively, reported they would be likely to check the Duke Energy website for information before purchasing major household equipment. The portion of respondents rating their likelihood a “7” or higher on an 11-point scale of likelihood is plotted in Figure 4-7. Overall, MyHER has not produced a measurable change in customer engagement with Duke Energy’s standard online offerings (distinct from the online MyHER Interactive offering).

While we observe no effect on customer engagement with Duke Energy online resources attributable to MyHER, the survey responses across both treatment and control customers should be placed into context with their demographics. All survey respondents reside in single-family homes, since the MyHER program is only available to customers in single-family homes, so we should expect that the respondents of this survey should skew towards respondents who have attained a greater age than that might be expected of the general Duke Energy customer base. As we indeed show later in this section, the average age of respondents of this survey is older than what would be expected relative to U.S. Census estimates of the age distribution of the population in North and South Carolinas. About 43% of DEC treatment respondents are 65 years of age or older. About 47% of DEC control customers are included in that age bracket as well. This is in comparison to U.S. Census estimates that 16% of the population of the Carolinas falls into the same age bracket. Therefore, Duke Energy should interpret the responses of this survey as representing an older group of customers than their customer base overall. Residents of multi-family homes would be expected to be younger, on average, and would be hypothesized to report higher rates of engagement with Duke Energy’s online content.

**Figure 4-7: Portion Likely to Check Duke Energy Website prior to Purchasing Major Home Equipment - DEC**



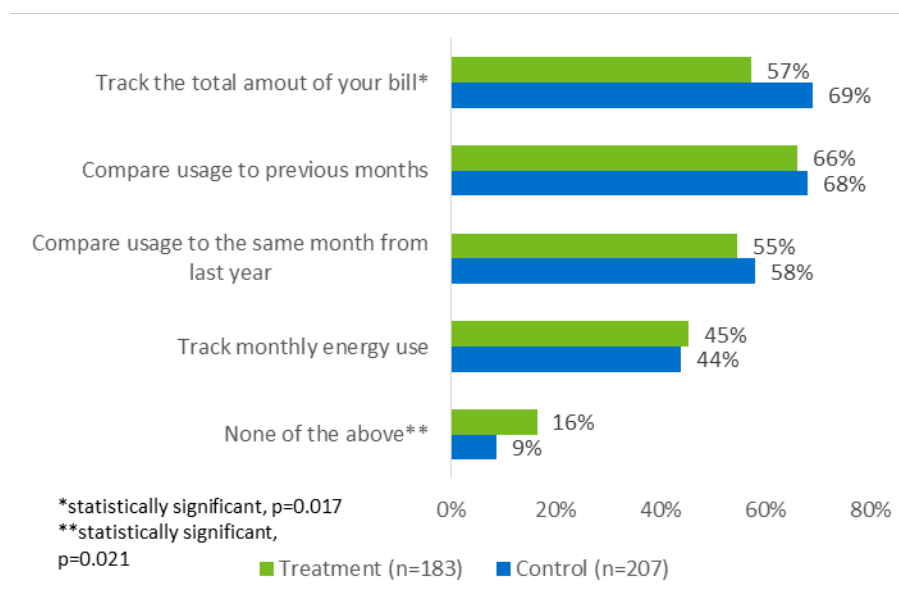
### Reported Energy Saving Behaviors

Treatment customers were much more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (73% to 63%;  $p = .013$ ). Treatment and control customers track information (bills and usage) related to their household's energy usage in the following ways (Figure 4-8):

- Fifty-seven percent of the treatment customers and 69% of the control customers reported tracking the total amount of the bill. The difference is statistically significant at the 90% level of confidence.
- About two-thirds of respondents compared usage to previous months. The difference between the treatment and control groups is not statistically significant.
- More than half of respondents compare usage to the same month from last year, but the difference in responses here between treatment and control groups is not statistically significant at the 90% level of confidence.

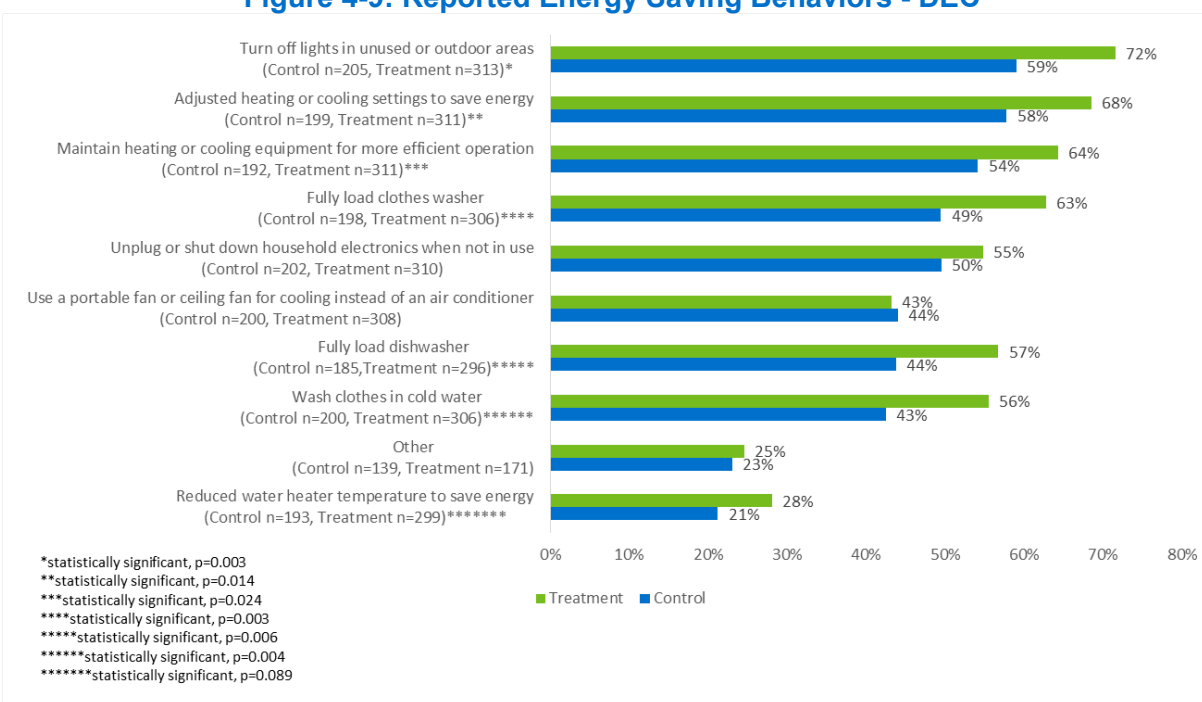


**Figure 4-8: “Which of the Following Do you Do with Regard to Your Household’s Energy Use?” - DEC**



Treatment group respondents were significantly more likely to turn off lights in unused or outdoor areas, adjust heating or cooling setting to save energy, maintain heating or cooling equipment for more efficient operation, fully load clothes washer, fully load dishwasher, wash clothes in cold water, and reduce water heater temperature to save energy than the control group, as shown in Figure 4-9. These differences are statistically significant at the 90% level of confidence.

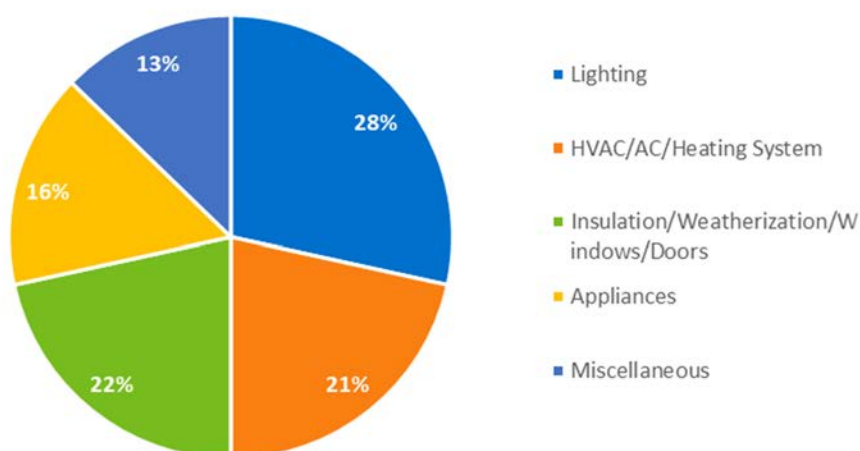
**Figure 4-9: Reported Energy Saving Behaviors - DEC**





Ninety-six respondents (treatment and control customers in total) reported other energy savings actions. Nexant categorized these actions and the results are shown in Figure 4-10. The most commonly reported action, mentioned by 29 respondents, pertains to lighting, such as switching to LED bulbs, etc.

**Figure 4-10: Distribution of Other Energy Savings Behaviors - DEC**



### Reported Energy Efficiency Improvements Made

Respondents were provided with a list of energy efficiency improvements and asked if they had done each in the past year. The treatment group had a significantly higher percentage of customers reported having installed lighting with more energy efficient types than the control customers did (Table 4-8). None of the other differences were statistically significant at the 90% level of confidence.

**Table 4-8: Portion Indicating They Had Made Each Energy Efficiency Upgrade - DEC**

| Upgrade   | Control | Treatment |
|---|---------|-----------|
| Install energy-efficient lighting (Control n=198, Treatment n=311)*   | 52%     | 60%       |
| Purchase ENERGY STAR certified home electronic equipment (a television, for example) (Control n=187, Treatment n=298) | 39%     | 43%       |
| Install energy-efficient kitchen or laundry appliances (Control n=196, Treatment n=306)                               | 34%     | 39%       |
| Install energy-efficient heating/cooling equipment (Control n=196, Treatment n=302)                                   | 33%     | 34%       |
| Install programmable thermostat or "smart" thermostat (Control n=197, Treatment n=307)                                | 32%     | 34%       |
| Caulk or weatherstrip (windows or doors) (Control n=194, Treatment n=307)   | 29%     | 36%       |
| Install energy-efficient water heater (Control n=195, Treatment n=301)  | 26%     | 29%       |
| Add insulation to attic, walls, or floors (Control n=197, Treatment n=301)  | 23%     | 23%       |
| Replace windows or doors with more energy-efficient types (Control n=199, Treatment n=308)                            | 20%     | 26%       |

\*statistically significant, p=0.084

### Behavior and Upgrade Category Variables

To examine broader patterns within the survey responses that cover many specific cases of energy saving behavior and upgrades, participant responses to the behavior and upgrade questions were combined into behavior vs. upgrade categories and were also combined into end-use categories. As shown in (Table 4-9), treatment group respondents were significantly more likely to engage in energy efficiency behaviors and improvements generally, and also undertook significantly more energy efficiency behaviors.

**Table 4-9: Percent of Households That Have Undertaken Energy Efficiency Actions - DEC**

| Behaviors/Improvements   | Treatment Group | Control Group |
|--|-----------------|---------------|
| Any Energy Efficiency Behavior (Treatment n=314, Control n=206)*       | 73%             | 62%           |
| Average Number of Behaviors**  | 5.13            | 4.24          |
| Any Energy Efficiency Improvements (Treatment n=314, Control n=203)*** | 69%             | 61%           |
| Average Number of Improvements   | 3.15            | 2.77          |

\*statistically significant, p=0.009

\*\*statistically significant, p=0.004

\*\*\*statistically significant, p=0.046

Additionally, Table 4-10 shows the proportion of respondents that had undertaken at least one behavior or upgrade in each end use category. In six of the nine categories, treatment group members were significantly more likely to have undertaken at least one of these activities.

These results demonstrate that MyHERs have increased energy efficiency behaviors in treatment customers.

**Table 4-10: Percent of Households That Had Undertaken Energy Efficiency Actions, by End Use Category - DEC**

| Behaviors/Improvements   | Treatment Group | Control Group |
|--|-----------------|---------------|
| Water Heating Behaviors and Upgrades<br>(Treatment n=314, Control n=206)*                  | 71%             | 61%           |
| Water Heating Behaviors<br>(Treatment n=314, Control n=204)**                              | 71%             | 59%           |
| Space Heating Behaviors and Upgrades<br>(Treatment n=314, Control n=205)***                | 72%             | 62%           |
| Space Heating Behaviors<br>(Treatment n=314, Control n=205)****                            | 72%             | 61%           |
| Space Heating Upgrades<br>(Treatment n=310, Control n=202)                                 | 45%             | 46%           |
| Lighting Behaviors and Upgrades<br>(Treatment n=314, Control n=206)*****                   | 73%             | 61%           |
| Electronics and Appliances Behaviors and Upgrades<br>(Treatment n=314, Control n=205)***** | 68%             | 59%           |
| Electronics and Appliances Upgrades<br>(Treatment n=312, Control n=199)                    | 52%             | 48%           |
| Sealing and Insulation Behaviors and Upgrades<br>(Treatment n=312, Control n=200)          | 47%             | 43%           |

\*statistically significant, p=0.024

\*\*statistically significant, p=0.007

\*\*\*statistically significant, p=0.013

\*\*\*\*statistically significant, p=0.009

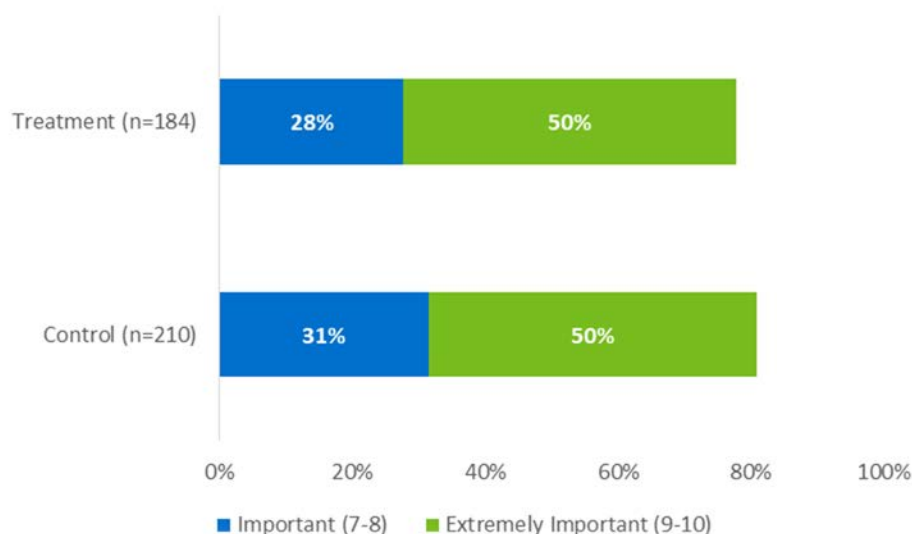
\*\*\*\*\*statistically significant, p=0.005

\*\*\*\*\*statistically significant, p=0.025

### Customer Motivation and Awareness

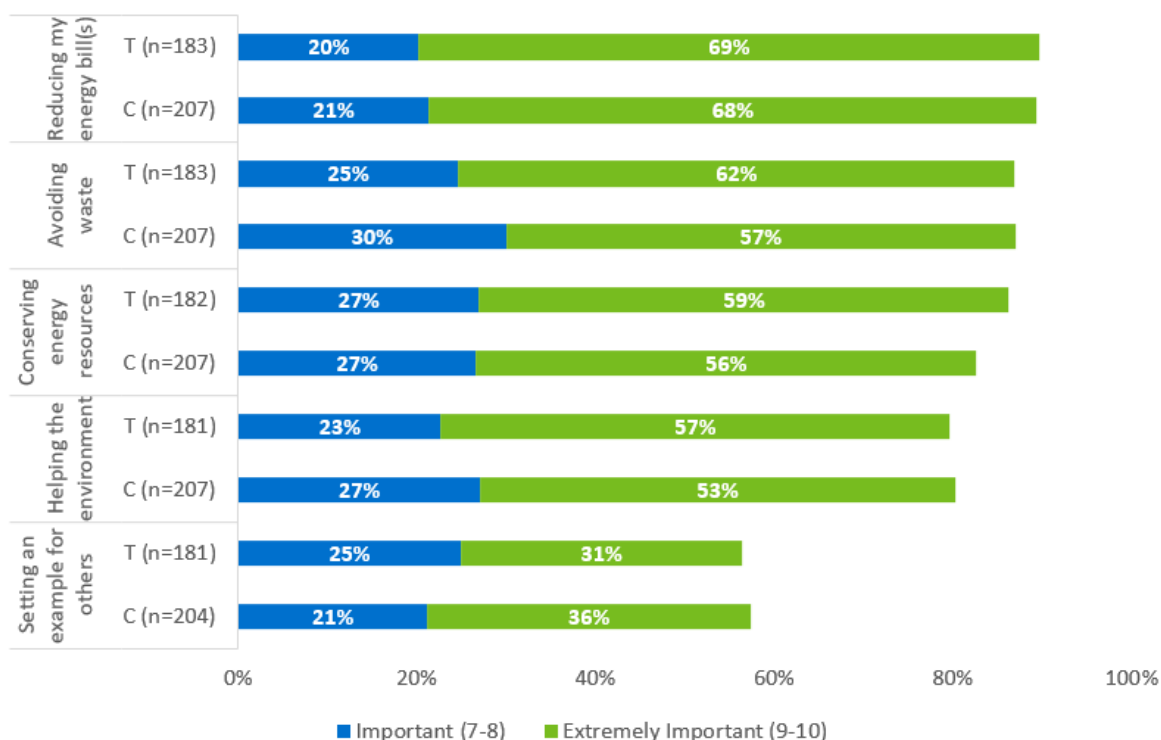
The control group and treatment groups report similar levels of motivation for saving energy. Eighty-one percent of control customers indicated that knowing they are using energy wisely is “important” or “extremely important”, compared to 78% of treatment customers. This difference is not statistically significant (Figure 4-11).

**Figure 4-11: “How Important Is It for You to Know if Your Household is Using Energy Wisely?” - DEC**



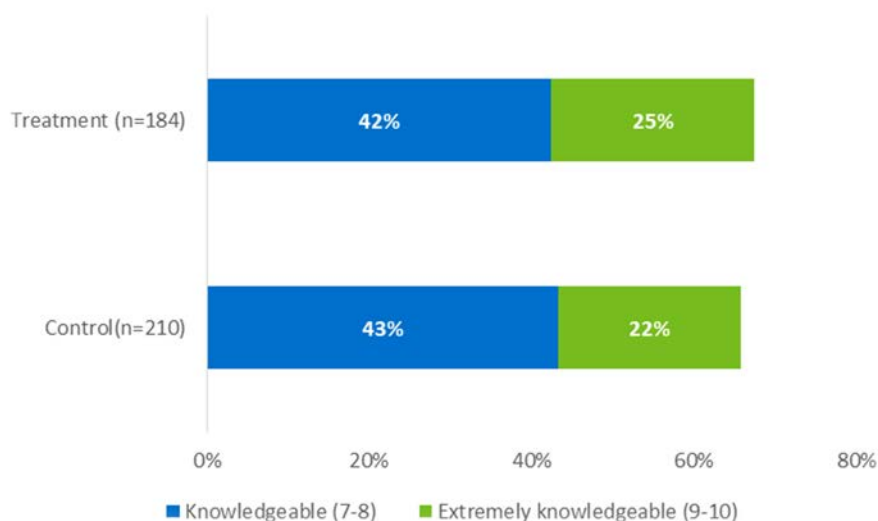
Customers were asked to rate, on a scale of 0 to 10, the importance of various reasons why they might try to reduce their home's energy use. The strongest motivation for both groups is saving money on their energy bills, where 89% of treatment respondents and 89% of control respondents reported that saving money on their energy bills was “important” or “extremely important”. Eighty-seven percent of control respondents and treatment respondents respectively indicated that “avoiding waste” was “important” or “extremely important” to them. Eighty-six percent of treatment customers and 83% of control customers reported that “conserving energy resources” was “important” or “extremely important”. Eighty percent of treatment customers and control customers respectively reported that “helping the environment” was “important” or “extremely important”. None of the differences between treatment and control groups are statistically significant. Figure 4-12 contains the frequency of responses to this question, shown as a percentage for both treatment and control groups.

**Figure 4-12: “Please Indicate How Important Each Statement Is to You” - DEC**



As indicated by Figure 4-13, among treatment customers, 67% rated themselves above a seven on a 0-10 point scale of knowledgeability of ways to save energy, while 65% of control group customers rated themselves this way. The difference is not statistically significant at the 90% level of confidence.

**Figure 4-13: “How Would You Rate Your Knowledge of the Different Ways You Can Save Energy in Your Home?” - DEC**



Treatment respondents that took the treatment-only survey were asked how useful each MyHER feature was to their homes. A similar question was asked of both control group and treatment group respondents who took the primary survey rephrased to ask them how useful they *might expect* that information to be. Table 4-11 presents results of the portion rating each item a “7” or higher on an 11-point scale of the hypothetical usefulness from the control and treatment customers who took the primary survey, and Table 4-12 presents the comparison results between the actual usefulness of each item rated by treatment customers (treatment-only survey) and the hypothetical usefulness rated by control customers in the primary survey).<sup>12</sup>

The results from the hypothetical usefulness rating (Table 4-11) did not find statistically significant differences in expected usefulness of information that is found on MyHER reports. Comparisons between the responses of customers in the treatment-only survey and control customers in the primary survey show that treatment customers respond differently to questions about information presented in MyHERs if the questions are asked in the context of the actual MyHER reports, however the response patterns overall are similar – not much is seen by way of a significant separation between treatment and control customers in terms of usefulness of report content. However, there is one exception: Table 4-12 shows that control customers were significantly more likely to think that “Information about services and offers from Duke Energy” might be useful than treatment customers actually thought they were. This finding suggests that there may be an opportunity to improve the presentment of information in MyHERs about Duke Energy’s services and offerings.

**Table 4-11: Hypothetical Usefulness of HER Features Treatment and Control - DEC**

| HER Feature   | Control Group_Primary Survey | Treatment Group_Primary Survey |
|---|------------------------------|--------------------------------|
| Graphs that display your home's energy use over time              | 71% (n=204)                  | 66% (n=181)                    |
| Information about services and offers from Duke Energy            | 67% (n=205)                  | 65% (n=181)                    |
| Tips to help you save money and energy                            | 67% (n=205)                  | 72% (n=183)                    |
| Examples of the energy use associated with common household items | 67% (n=203)                  | 66% (n=182)                    |
| Your home's energy use compared to that of similar homes          | 57% (n=202)                  | 60% (n=181)                    |
| Customized suggestions for your home                              | 56% (n=200)                  | 63% (n=180)                    |

<sup>12</sup> The implementation of a treatment-only survey, in addition to a primary survey provided to both treatment and control customers, afforded an opportunity to test the responses of treatment customers to a question asking about a MyHER feature they have actually seen vs. asking generally about how useful the information is (outside of the context of MyHER). This test leads us to the conclusion that the way customers are asked about this question matters and we recommend that in future surveys, MyHER treatment customers see questions about report content placed specifically in the context of them having seen the content in their reports, as opposed to in the hypothetical.

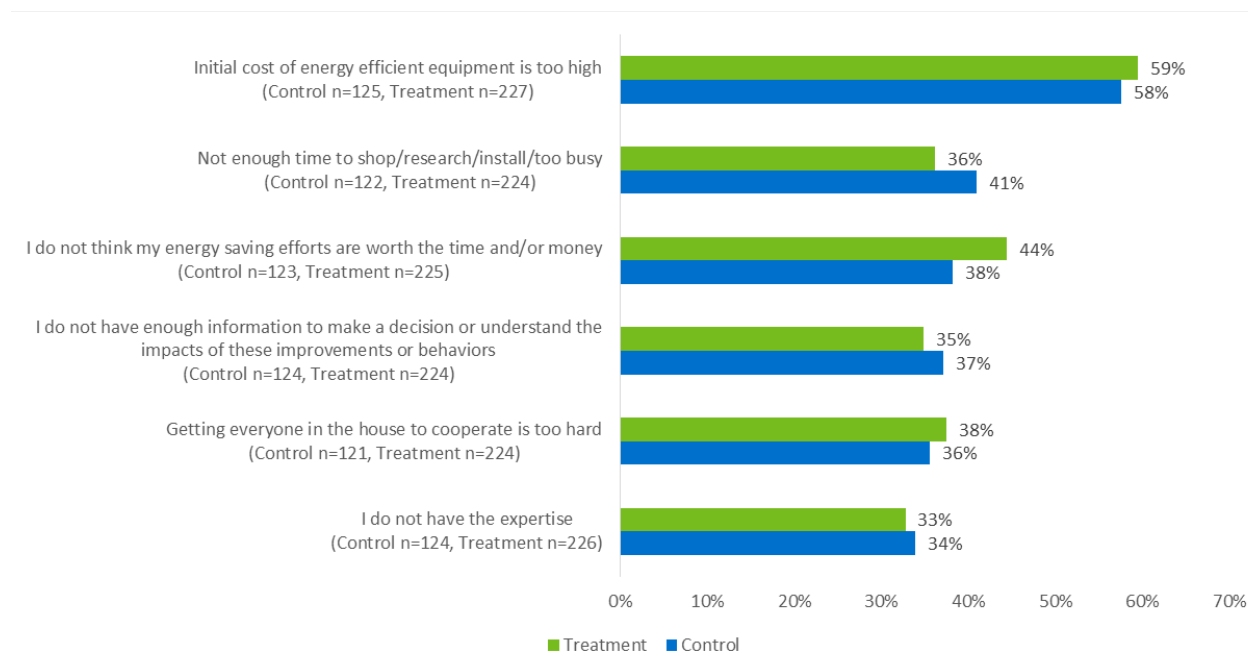
**Table 4-12: Actual Usefulness versus Hypothetical Usefulness of HER Features  
Treatment and Control - DEC**

| HER Feature   | Control<br>Group_Primary<br>Survey | Treatment<br>Group_Treatment<br>Only Survey |
|---|------------------------------------|---|
| Graphs that display your home's energy use over time              | 71% (n=204)                        | 76% (n=135)                                 |
| Information about services and offers from Duke Energy*           | 67% (n=205)                        | 58% (n=134)                                 |
| Tips to help you save money and energy                            | 67% (n=205)                        | 66% (n=135)                                 |
| Examples of the energy use associated with common household items | 67% (n=203)                        | 64% (n=135)                                 |
| Comparison to similar homes                                       | 57% (n=202)                        | 53% (n=135)                                 |
| Customized suggestions for your home                              | 56% (n=200)                        | 59% (n=134)                                 |

\*statistically significant, p=0.089

### Barriers to Customers Undertaking Energy Savings Actions

When asked the reasons why customers might not be able to save as much as energy as they would like, there were no statistically different response patterns between treatment and control customers, which indicates that MyHER is not making a measurable change in the potential barriers mentioned in this survey. The most commonly reported barrier is “the initial cost of energy efficient equipment is too high” (Figure 4-14): 59% of treatment respondents reported this as a barrier and 58% of control respondents did so as well. The least-commonly cited barrier was lack of expertise: 33% of treatment customers cited lack of expertise as a barrier as did 36% of control customers.

**Figure 4-14: Barriers to Customers Undertaking Energy Savings Actions - DEC**

### Suggestions about Duke Energy Improving Service Offerings

The survey provided an open-ended question to elicit suggestions about Duke Energy improving its service offerings to help customers reduce energy use. Only 22% (119 of 548, treatment and control customers in total) offered suggestions, including sixteen who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 42 of the 119 with suggestions, reflected a desire for more energy savings information, programs, free light bulbs, and more incentives:

- *"I would love to have a visit/walk through with someone who could look at our home and make suggestions"*
- *"Send free light bulbs"*
- *"Give rebates on appliances"*
- *"Continue to supply usage statistics"*
- *"Provide a smart device at the breaker box that would connect to your smartphone to tell you your energy consumption. Something real-time would be helpful. Then you would / could modify your daily activities real-time based on what you are seeing"*

Other comments centered on other suggestions, such as better communication and reducing price/providing senior and disability discounts. Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-13.

**Table 4-13: Suggestions about Duke Energy Improving Service Offerings - DEC**

| Suggestion  | Count | Percent of Respondents Mentioning (n=119) | Percent of Total Mentions (n=130) |
|---|-------|---|-----------------------------------|
| Provide more energy savings information, programs, free light bulbs and more incentives | 42    | 35%                                       | 32%                               |
| Better communication  | 23    | 19%                                       | 18%                               |
| Reduce price/provide senior and disability discounts                                    | 22    | 18%                                       | 17%                               |
| Appreciation  | 16    | 13%                                       | 12%                               |
| Miscellaneous   | 7     | 6%  | 5%                                |
| Reduce power outages  | 6     | 5%  | 5%                                |
| Improve website   | 4     | 3%  | 3%                                |
| Provide more detailed info in MyHER/offer MyHER to Townhomes/do more survey             | 5     | 4%  | 4%                                |
| Expressed Frustration   | 5     | 4%  | 4%                                |

### Evidence of MyHER Effects

As noted above, while formal statistical testing found a number of differences among treatment and control group households for individual questions, the Nexant team sought to understand if



the overall pattern of survey responses differed among treatment and control households. To do this, we categorized each survey question by topic area and then counted any survey item in which the treatment households provided a more positive response than the control households. Table 4-14 presents the categories, the count of questions in each category for which the treatment group provided a more favorable response than the control group, and the number of questions in each category. A response is considered “favorable” if the treatment group gave a response that is consistent with the program objectives of MyHER.

**Table 4-14: Survey Response Pattern Index - DEC**

| Question Category  | Count of Questions where T>C | Number of Questions in Topic Area | Portion of Questions where T>C |
|--|------------------------------|-----------------------------------|--------------------------------|
| Duke Energy's Public Stance on Energy Efficiency                 | 3                            | 3                                 | 100%                           |
| Customer Engagement with Duke Energy Website                     | 2                            | 5                                 | 40%                            |
| Customers' Reported Energy-saving Behaviors                      | 10                           | 11                                | 91%                            |
| Customer's Reported Energy Efficiency Improvements Made          | 9                            | 9                                 | 100%                           |
| Customer Motivation, Engagement & Awareness of Energy Efficiency | 4                            | 11                                | 36%                            |
| Barriers to Customer Undertaking Energy Savings Actions          | 3                            | 6                                 | 50%                            |
| Customer Satisfaction with Duke Energy                           | 0                            | 4                                 | 0%                             |
| <b>Total</b>   | <b>31</b>                    | <b>49</b>                         | <b>63%</b>                     |

Nexant's approach consists of the following logical elements:

- Assume the number of positive responses between treatment and control customers will be equal if MyHER lacks influence;
- Count the total number of topics and questions asked of both groups – there are seven topic areas and 49 questions;
- Note any item for which the treatment group outperformed the control group – the treatment group outperformed the control group in 31 questions, or 63% of the total questions;
- Since this value is more than 50% we can conclude that MyHER had wide-ranging enhancing effects across all the various engagement and attitudinal areas probed by the survey.
- Calculate the probability that the difference in response patterns is due to chance, rather than an underlying difference in populations – 2% (p-value = 0.021). Since this probability is less than 10%, we reject the null hypothesis (that the number of positive responses for treatment and control customers are equal) at the 90% level of confidence.

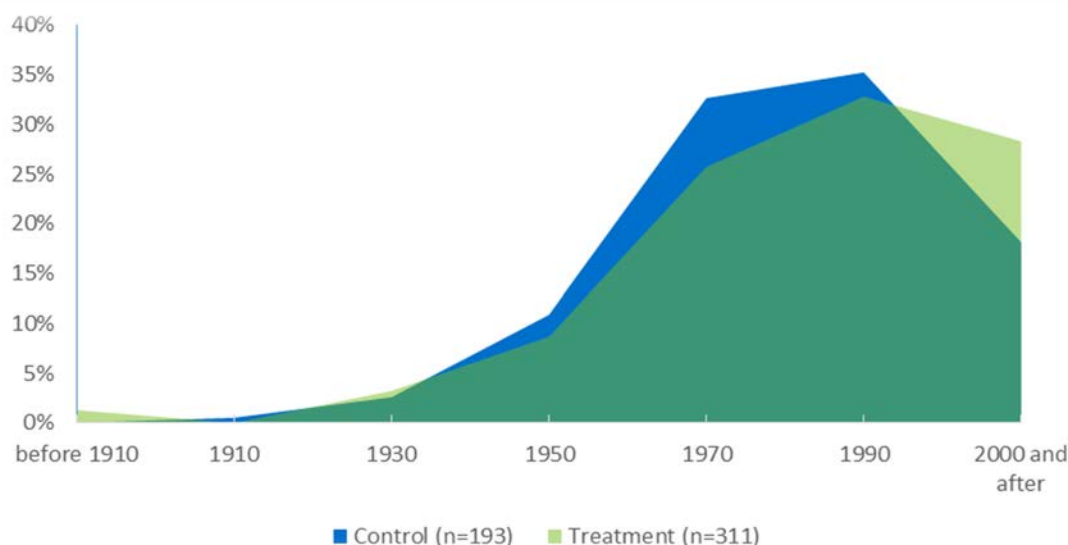
Because this analysis compares the response patterns between the treatment and control group, if the MyHER program did not influence customers, one would expect the treatment group to “score higher” on roughly half of the questions. In other words, if the MyHER is not influencing treatment group customers, there is a 50/50 chance that they will “outperform” the control group as many times as not. For a more detailed description of the index framework, see [Appendix G](#).

We call out the survey area covering general customer satisfaction with Duke Energy as an area of particular note: treatment customers reported lower satisfaction scores than control customers for all four general satisfaction questions. Nexant recommends that the MyHER program staff coordinate with any internal customer satisfaction data collection efforts to cross-reference these findings with any learnings on DEC customer satisfaction. The lower satisfaction scores for DEC treatment customers may indicate an opportunity for new MyHER messaging or content in DEC.

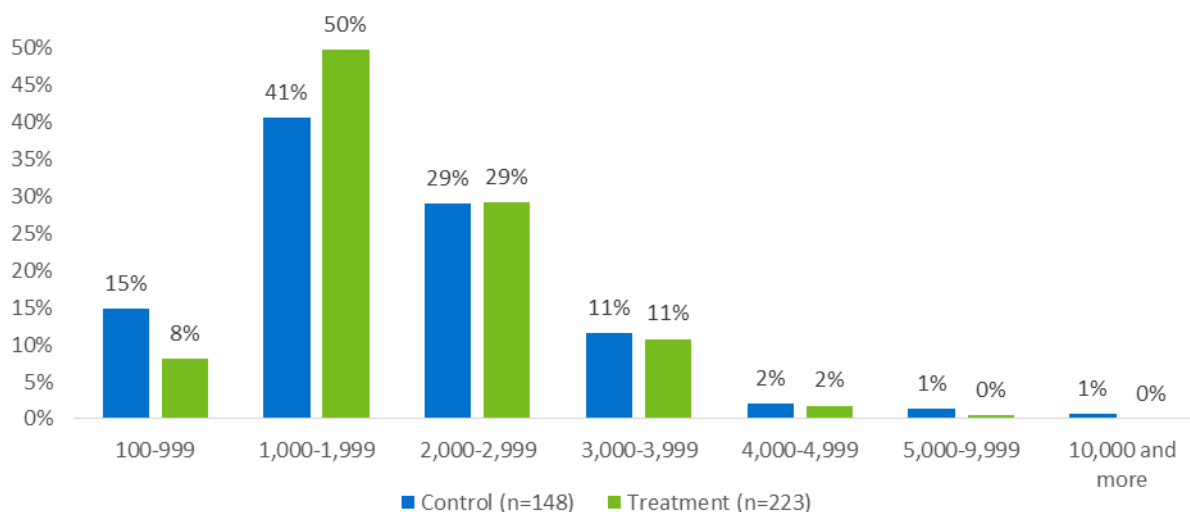
### Respondent Demographics

Nearly all respondents—93% of treatment group customers and 94% of control group customers—own their residence. More than half of households surveyed have two or fewer residents, but about 19% of treatment households and 20% of control households have four or more residents. There are no statistically significant differences in the distribution of ownership or age of homes assigned to the treatment and control groups ([Figure 4-15](#)) (chi-squared test).

**Figure 4-15: “In What Year Was Your Home Built?” - DEC**



[Figure 4-16](#) shows distribution of home square footage is similar between control and treatment households. The average square footage above ground is 2,031 for control households and 1,954 for treatment households, and the difference is not statistically significant.

**Figure 4-16: How many square feet is above ground living space? - DEC**

Respondent ages are relatively close to those reported by the U.S. Census American Community Survey (ACS) for Carolinas. The lowest age category (25-34) is often underrepresented when sampling based on residence in single family homes, given that many members of that population are in apartments, dormitories, or living with other family members. This common underrepresentation is true in this survey study, as well. Additionally, the average age is 62 for both control group respondents and treatment group respondents (see Table 4-15).

**Table 4-15: Respondent Age Relative to American Community Survey - DEC**

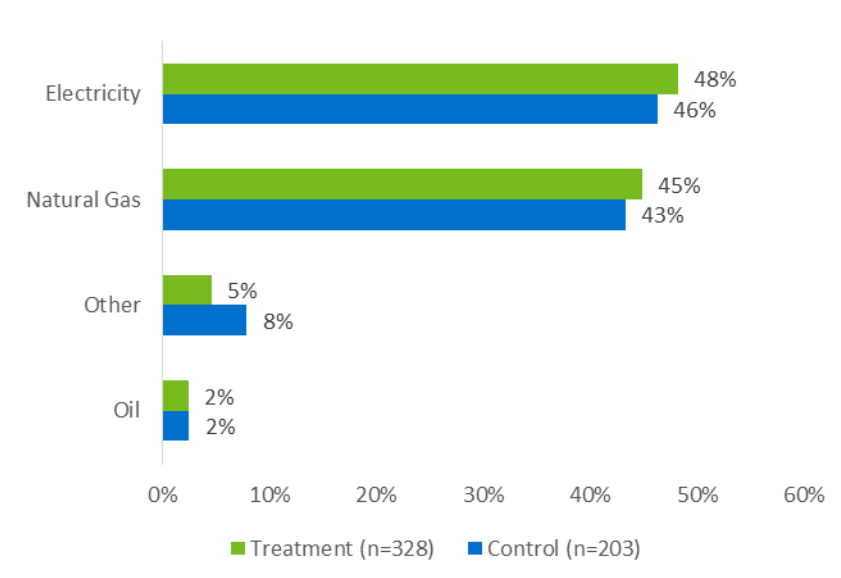
| Age         | Treatment Group (n=311) | Control Group (n=191) | 2017 American Community Survey_Carolinas <sup>13</sup> |
|-------------|-------------------------|-----------------------|--|
| 25-34       | 3%                      | 3%                    | 13%  |
| 35-44       | 8%                      | 9%                    | 13%  |
| 45-54       | 21%                     | 19%                   | 13%  |
| 55-64       | 25%                     | 21%                   | 13%  |
| 65 and over | 43%                     | 47%                   | 16%  |

Figure 4-17 shows the primary heating fuel type used in control and treatment customers' households. Nearly half of treatment (48%) and control (46%) customers use electricity in their

<sup>13</sup> American Community Survey (ACS) is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.  
[https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_SPL\\_K200104&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_SPL_K200104&prodType=table)

households for heating. Forty-five percent of treatment customers and 43% of control customers use natural gas for heating. These differences are not statistically significant.

**Figure 4-17: Primary Heating Fuel in Households - DEC**

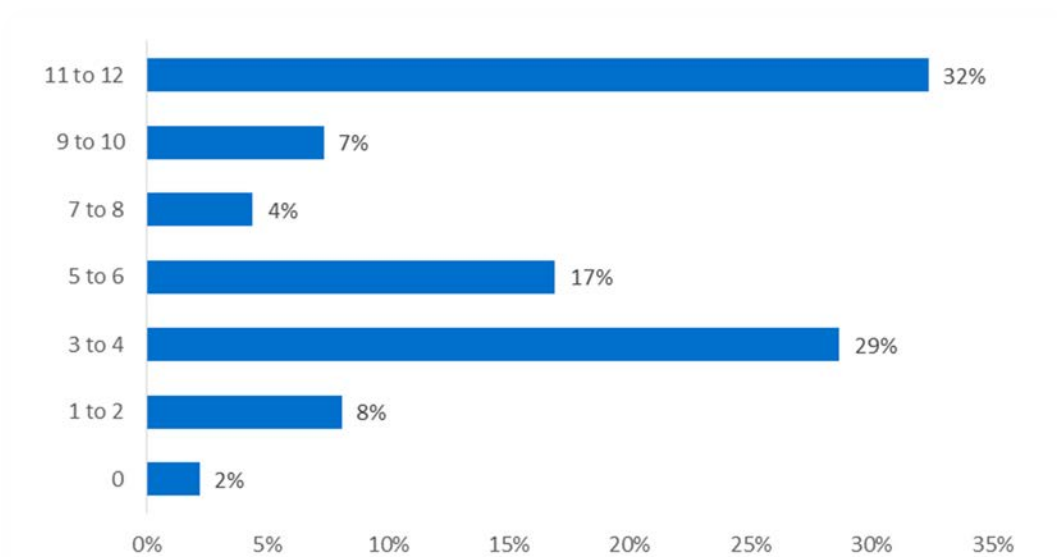


#### 4.2.2.2 Treatment Households: Experience and Satisfaction with MyHER - DEC

A large majority of Treatment Only household respondents, 93%, (142 of 152) recalled receiving at least one of the MyHER reports.

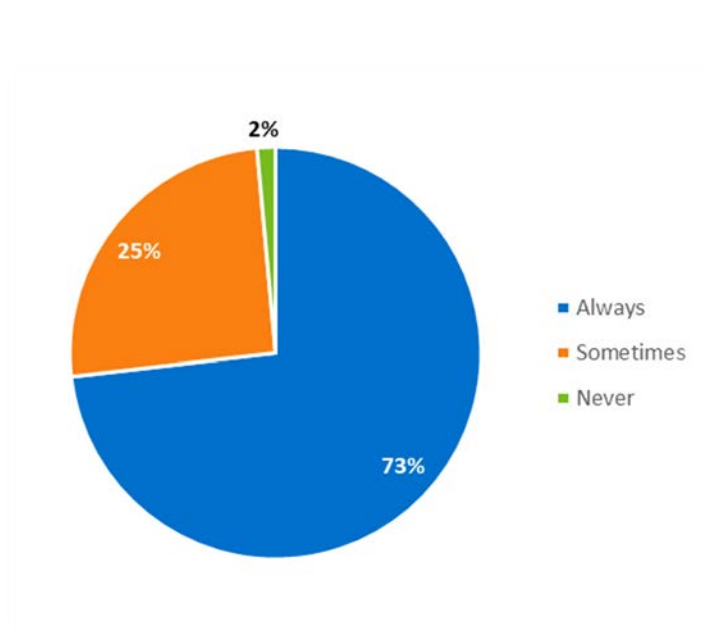
The survey asked those that could recall receiving at least one MyHER report if they could recall how many individual reports they had received “in the past 12 months” (Figure 4-18). The survey launched in January 2019, which means that most recipients would have received 8 MyHERs in the year since February 2018. Thirty-two percent (44 of 136) responded that they received 11 to 12 home energy reports in the past 12 months. The scattered distribution of responses related to recall is consistent with the difficulty of recalling an exact number of reports, however the question is valuable for grounding respondents in the experience of receiving a MyHER before asking them more specific questions about the document.

**Figure 4-18: Reported Number of MyHERs Received “In the past 12 months” (n=136) - DEC**



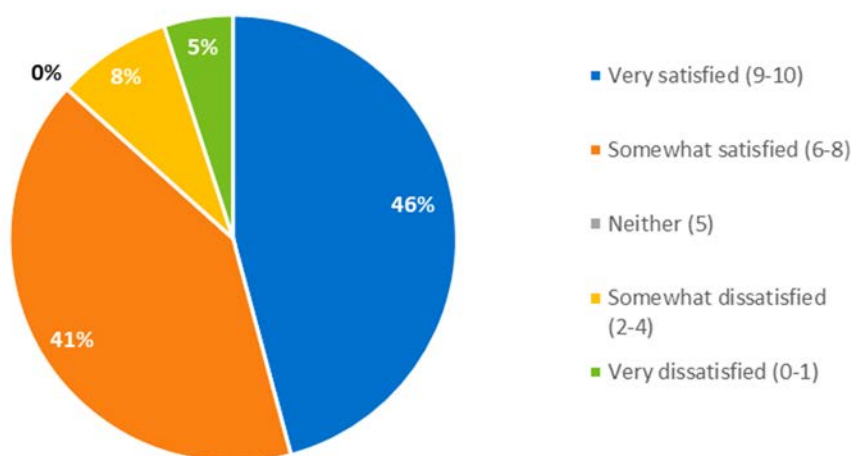
Survey respondents indicated high interest in the MyHER reports. As shown in Figure 4-19, when asked how often they read the reports, 99% of respondents indicated they “always” or “sometimes” read the reports. Two respondents (1%) indicated they do not read the reports.

**Figure 4-19: How Often Customers Report Reading the MyHER (n=138) - DEC**

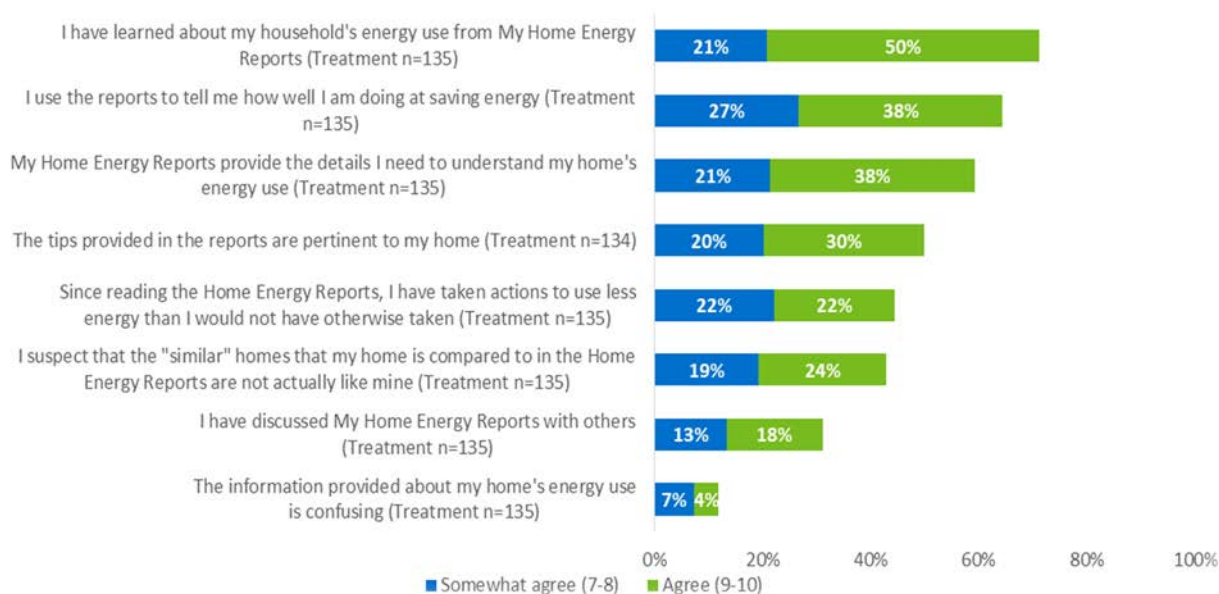


Eighty-seven percent (104 of the 120 respondents that provided a rating) reported being “somewhat” or “very” satisfied with the information contained in the reports (Figure 4-20). The survey asked a further question to the respondents of why they said so: sixty-one of the satisfied respondents provided reasons. Among customers who gave the highest satisfaction ratings, the most common comments on the MyHERs described the reports’ ability to engage the customer and provide greater awareness. The customers who reported being somewhat satisfied most often simply described the reports as “helpful.”

**Figure 4-20: Satisfaction with the Information in MyHER Reports (n=120) - DEC**



When asked to rate their agreement with a series of statements about MyHERs on a scale of 0 to 10, recipients largely agreed that the reports helped them understand their home’s energy use, with 71% of respondents rating their agreement a seven or higher on a 0-10 point scale, and that they use the report to gauge how successful they are at saving energy (65% rating a seven or higher). More than half (59%) agreed that the reports provided the details they needed to understand their home’s energy usage. Respondents provided weaker agreement to statements about the pertinence of the tips provided to their homes and whether they have taken actions to use less energy than they would not have since reading MyHERs. A relatively small percentage (11%) agreed with the statement that the information provided is confusing (Figure 4-21).

**Figure 4-21: Level of Agreement with Statements about MyHER (0-10 Scale) - DEC**

The survey provided an open-ended question to elicit suggestions about potential improvements to MyHER among those that had reported reading at least one report. Only 27% (37 of 136) offered suggestions, including seven who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 16 of the 37 with suggestions, questioned accuracy of the comparison in the report. Fifteen of the 37 with suggestions reflected a desire for more specific information or details about their home and specific actions they should take. Some of these requests reflected interest in understanding at a more granular level how their home uses energy and energy consumption information related to appliances:

- *"By explaining what factors influence our rating"*
- *"I know it's probably not possible but it would be nice to see the actual percentage of what in the household is using what energy..."*
- *"Be more specific as to which appliances, etc. are using how much energy compared to a standard or an efficient use"*
- *"Narrow the comparison to homes closer in size and age along with the number of household members to each consumer"*
- *"Pinpoint possible problems that could be causing energy waste"*

Other comments centered on other suggestions (such as providing free energy assessment, etc.), and a few respondents that simply did not see value in the reports. Responses coded as recommending production changes focus on changing the delivery method of MyHER reports as follows:

- *" Send via email..."*

- “Send them via email instead of wasting paper and stamps”

Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-16.

**Table 4-16: Distribution Suggestions for Improvement (Multiple Responses Allowed) - DEC**

| Suggestion  | Count | Percent of Respondents Mentioning (n=37) | Percent of Total Mentions (n=47) |
|---|-------|--|----------------------------------|
| Don't believe comparison/accuracy                           | 16    | 43%                                      | 34%                              |
| Provide more specific information or details                | 15    | 41%                                      | 32%                              |
| Appreciate the Home Energy Report                           | 7     | 19%                                      | 15%                              |
| Change production (mail, paper, format)                     | 4     | 11%                                      | 9%                               |
| Expressed frustration                                       | 2     | 5%                                       | 4%                               |
| Other suggestions (such as providing home inspection, etc.) | 2     | 5%                                       | 4%                               |
| Don't see value/dislike                                     | 1     | 3%                                       | 2%                               |

Treatment households were also asked questions that focused on the awareness and use of MyHER Interactive, revealing low awareness of the online Interactive platform:

- Only 28% of treatment customers are aware of MyHER Interactive;
- Among aware customers, 92% reported that they had not signed up to use MyHER Interactive; and
- When asked why they haven't signed up to use MyHER Interactive, 30% of respondents reported that they were very busy, 22% reported that they were not interested in it, and 9% further reported that they did not know about it.

### 4.2.3 Customer Surveys - DEP

As was the case for DEC, the DEP customer surveys included a section of questions focused specifically on the experience of and satisfaction with the information provided in MyHERs, and the awareness of MyHER Interactive—these questions were asked only of households in the treatment group. Both treatment and control households answered the remaining questions, which focused on assessing:

- Awareness of Duke Energy efficiency program offers;
- Satisfaction with the Duke Energy, and services Duke Energy provides to help households manage their energy use;
- Levels of awareness of and interest in household energy use; motivations and perceived importance;
- Reported behavioral or equipment-based upgrades; and



- Barriers that prevent customers from undertaking energy savings actions.

#### 4.2.3.1 Comparing Treatment and Control Responses

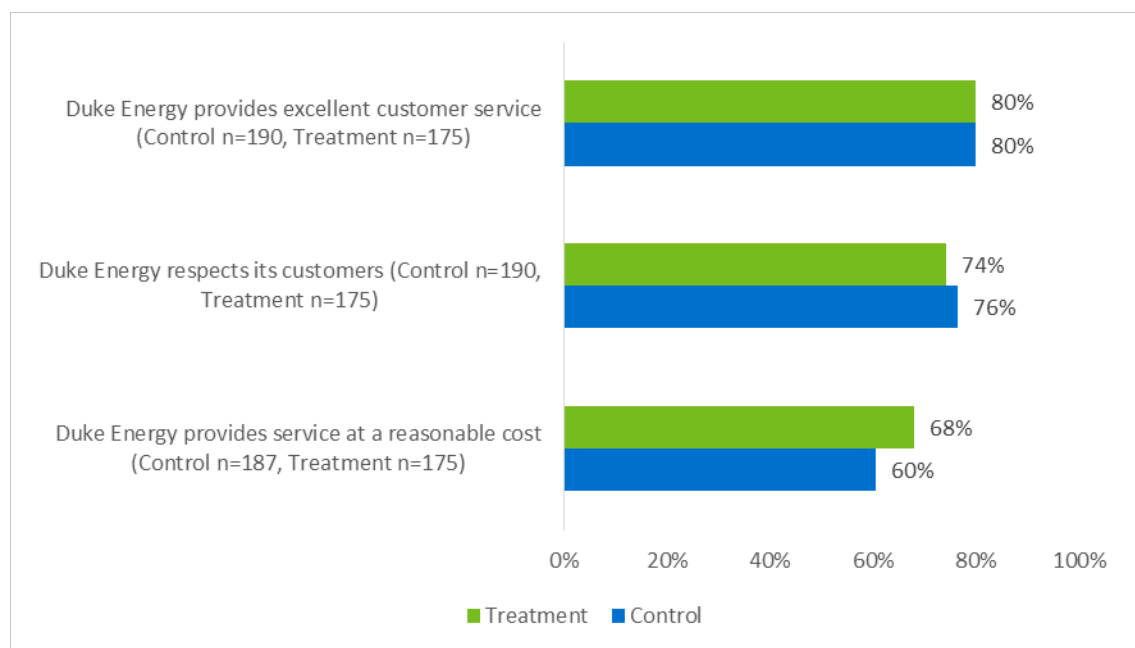
This section presents the results of survey questions asked of both treatment and control households in DEP and compares the response patterns between the two groups. Statistically significant differences between treatment and control households are noted.

#### Duke Energy Customer Satisfaction

Both treatment and control groups' overall satisfaction with Duke Energy are high. Seventy-six percent of treatment customers and 74% of control customers are satisfied or very satisfied with Duke Energy as their electric supplier (rated eight or higher on a 0-10 point scale); the difference is not statistically significant at the 90% level of confidence.

Treatment households rated Duke Energy higher on providing service at a reasonable cost, while control households rated Duke Energy higher on respecting its customers. These differences between treatment and control groups are also not statistically significant (Figure 4-22). Treatment and control households rated Duke Energy the same on providing excellent customer service. MyHER does not result in a measurable change in stated customer satisfaction with Duke Energy in DEP.

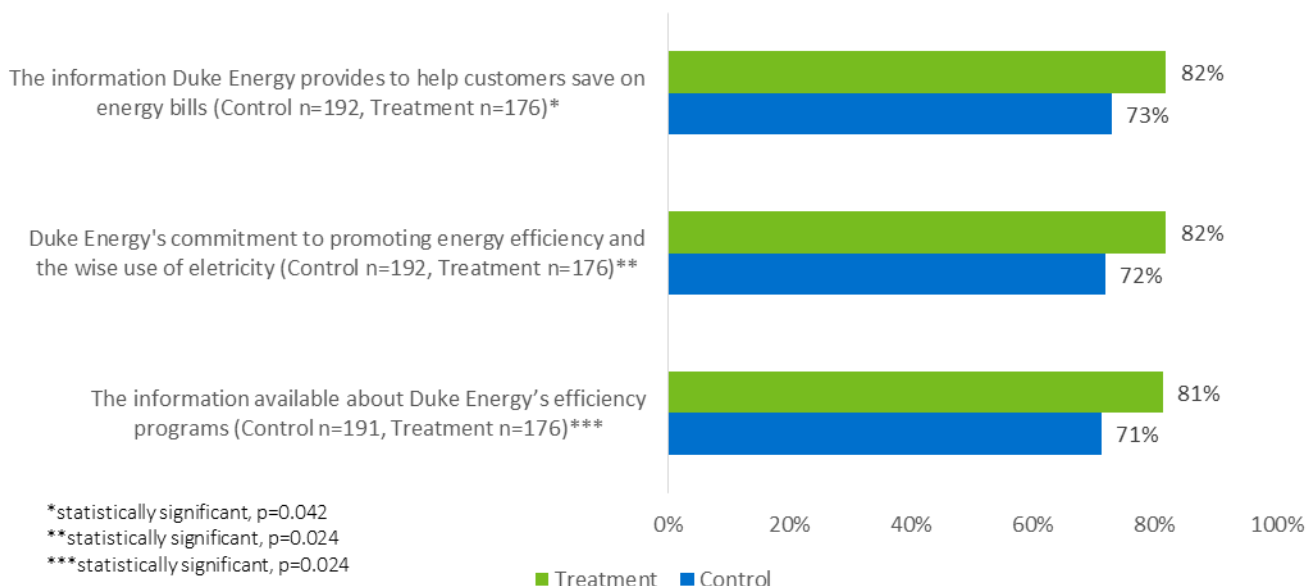
**Figure 4-22: Satisfaction with Various Aspects of Customer Service - DEP**



On the other hand, treatment group responses indicate that MyHER reports had a significant positive effect on customer satisfaction with certain aspects of Duke Energy's energy efficiency efforts (Figure 4-23). The differences between treatment and control customers with respect to satisfaction with the information available about Duke Energy's efficiency programs, the information Duke Energy provides to help customers save on energy bills, and Duke Energy's

commitment to promoting energy efficiency and the wise use of electricity are statistically significant at the 90% level of confidence.

**Figure 4-23: Portion Satisfied with Energy Efficiency Offerings and Information - DEP**



### Engagement with Duke Energy's Website

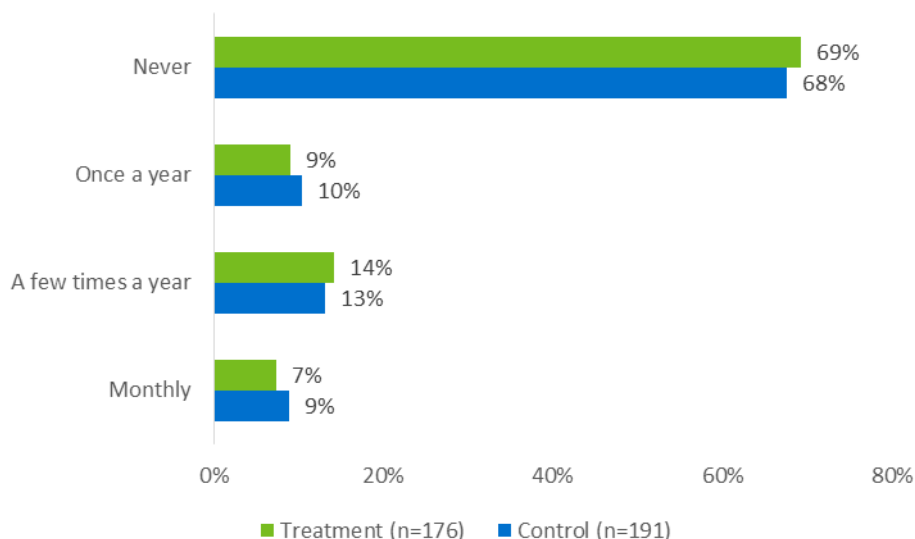
Both groups answered several questions about their use of the Duke Energy website, a proxy for overall engagement with information provided by the utility on energy efficiency and household energy use. Table 4-17 shows that 42% of the treatment group and 38% of the control group reported they had never logged in to their Duke Energy accounts. Among those that had logged in, the most commonly reported purpose was to pay their bill.

**Table 4-17: Use of Duke Energy Online Account - DEP**

| Online Account Activity                           | Treatment Group (n=174) | Control Group (n=185) |
|---|-------------------------|-----------------------|
| Never logged in                                   | 42%                     | 38%                   |
| Pay my bill                                       | 36%                     | 38%                   |
| Look for energy efficiency opportunities or ideas | 10%                     | 8%                    |

Treatment group households were more likely to report that they accessed the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make their home more energy efficient, but the difference is not statistically significant. Relatively small percentages of both groups report regular usage of the website for purposes other than bill payment, as shown in Figure 4-24.

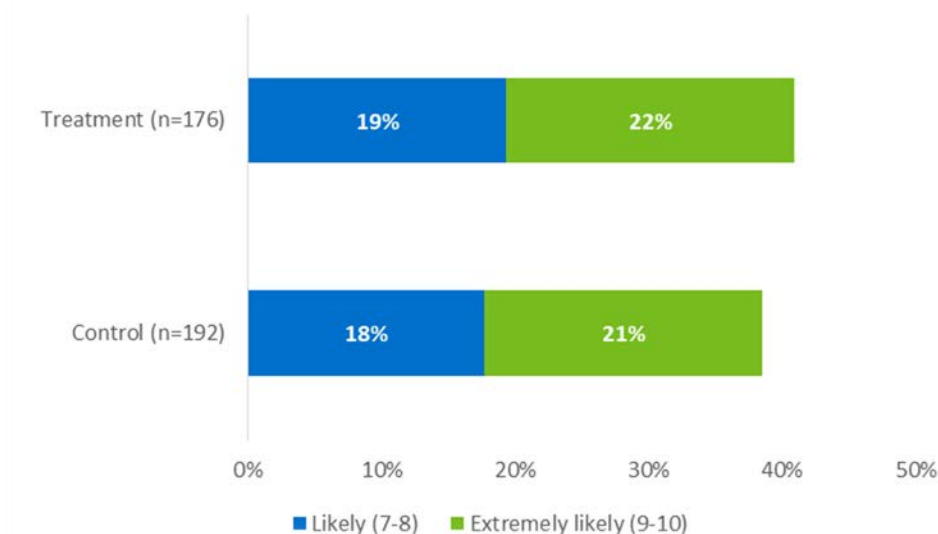
**Figure 4-24: Frequency Accessing the Duke Energy Website to Search for Other Information - DEP**



Thirty-nine percent of control group and 41% of treatment group customers reported they would be likely to check the Duke Energy website for information before purchasing major household equipment. The difference between the control and treatment group is not statistically significant at the 90% level of confidence. The portion of respondents rating their likelihood a “7” or higher on an 11-point scale of likelihood is plotted in Figure 4-25.

Overall, MyHER has not produced a measurable change in customer engagement with Duke Energy’s standard online offerings (distinct from the online MyHER Interactive offering) at DEP. As stated earlier in the presentation of DEC survey findings, these survey responses relating to engagement with Duke Energy’s online resources should be placed into context with the DEP respondents’ demographics. All DEP survey respondents reside in single-family homes, since the MyHER program is only available to customers in single-family homes. We therefore expect that the DEP respondents of this survey should skew towards respondents who have attained a greater age than that might be expected of the general Duke Energy customer base. We indeed find, as we discuss at greater length later in this section, that the average age of respondents of this survey is older than what would be expected relative to U.S. Census estimates of the age distribution of the population in North and South Carolinas. About 45% of DEP treatment respondents are 65 years of age or older. About 44% of DEP control customers are included in that age bracket as well. This is in comparison to U.S. Census estimates that 16% of the population of the Carolinas falls into the same age bracket. Therefore, Duke Energy should interpret the responses of this survey as representing an older group of customers than their customer base overall. Residents of multi-family homes would be expected to be younger, on average, and would be hypothesized to report higher rates of engagement with Duke Energy’s online content.

**Figure 4-25: Portion Likely to Check Duke Energy Website prior to Purchasing Major Home Equipment - DEP**

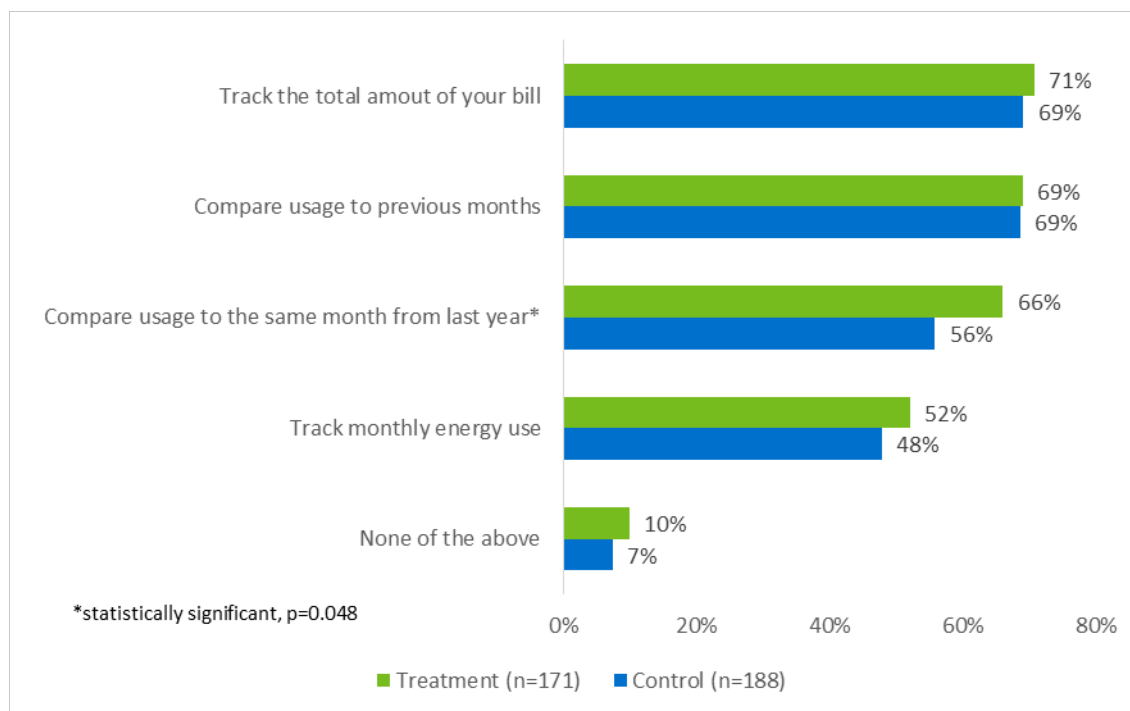


### Reported Energy Saving Behaviors

Treatment and control customers track information (bills and usage) related to their household's energy usage in the following ways (Figure 4-26):

- Seventy-one percent of the treatment customers and 69% of the control customers reported tracking the total amount of the bill. The difference is not statistically significant at the 90% level of confidence.
- Sixty-nine percent of the treatment group and control group, respectively, compared usage to previous months. The difference is not statistically significant.
- Sixty-six percent of the treatment respondents and 56% of the control respondents compared usage to the same month from last year. The difference in responses here between treatment and control groups are statistically significant at the 90% level of confidence.

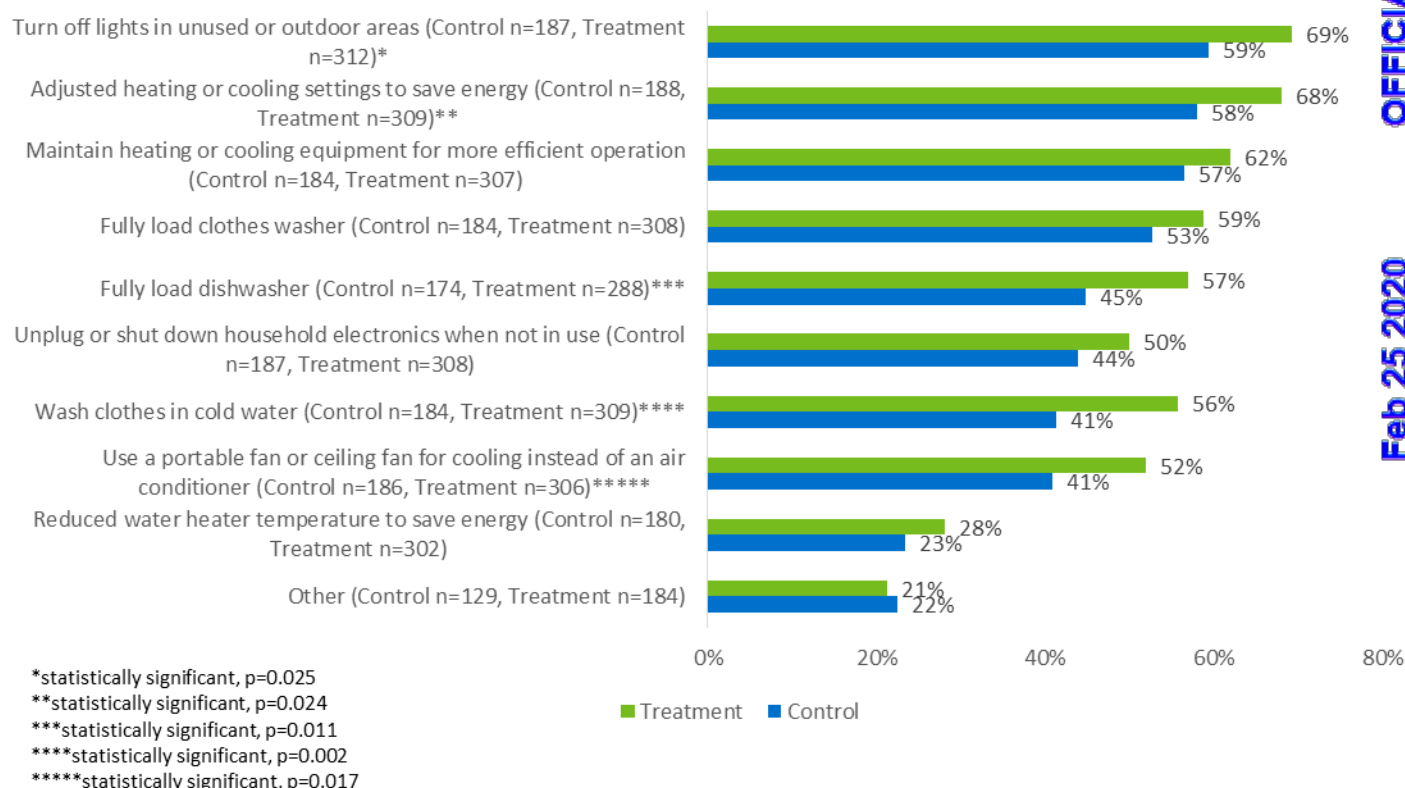
**Figure 4-26: “Which of the Following Do you Do with Regard to Your Household’s Energy Use?” - DEP**



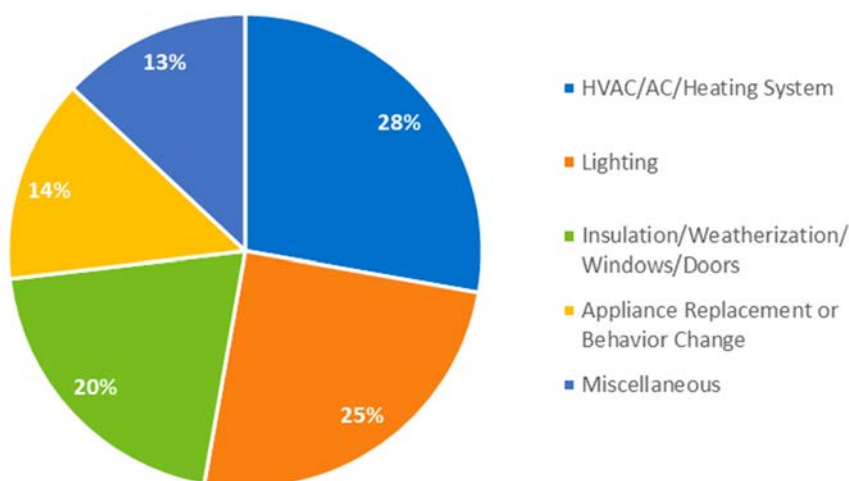
In general, treatment customers were more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (71% to 60%;  $p = 0.008$ ).

Specifically, the treatment group was more likely to turn off lights in unused or outdoor areas, adjust heating or cooling settings to save energy, fully load dishwasher, wash clothes in cold water and use a portable fan or ceiling fan for cooling than treatment group, as shown in Figure 4-27. These differences are statistically significant at the 90% level of confidence.

**Figure 4-27: Reported Energy Saving Behaviors - DEP**



Ninety-three respondents (treatment and control customers in total) reported other energy savings actions as free form text. Nexant categorized these actions and the results are shown in Figure 4-28. The most commonly reported action, mentioned by 30 respondents, pertains to HVAC/AC/Heating system, such as installing a new HVAC system.

**Figure 4-28: Distribution of Other Energy Savings Behaviors - DEP**

### Reported Energy Efficiency Improvements Made

Respondents were provided with a list of energy efficiency improvements and asked if they had done each one in the past year. The treatment group had significantly higher percentages of customers who reported purchasing ENERGY STAR certified home electronic equipment, installing energy-efficient kitchen or laundry appliances, installing energy-efficient heating/cooling equipment, installing programmable thermostat or “smart” thermostat, and adding insulation to attic, walls, or floors than the control customers did (Table 4-18).

**Table 4-18: Portion Indicating They had Made Each Energy Efficiency Upgrade - DEP**

| Upgrade  | Control | Treatment |
|--|---------|-----------|
| Install energy-efficient lighting (Control n=187, Treatment n=306)   | 50%     | 57%       |
| Caulk or weatherstrip (windows or doors) (Control n=186, Treatment n=301)  | 35%     | 38%       |
| Purchase ENERGY STAR certified home electronic equipment (a television, for example) (Control n=178, Treatment n=289)* | 35%     | 45%       |
| Install energy-efficient kitchen or laundry appliances (Control n=185, Treatment n=295)**                              | 30%     | 45%       |
| Install energy-efficient heating/cooling equipment (Control n=179, Treatment n=297)***                                 | 29%     | 38%       |
| Install energy-efficient water heater (Control n=178, Treatment n=293)   | 28%     | 32%       |
| Install programmable thermostat or "smart" thermostat (Control n=182, Treatment n=300)****                             | 26%     | 36%       |
| Replace windows or doors with more energy-efficient types (Control n=184, Treatment n=301)                             | 22%     | 26%       |
| Add insulation to attic, walls, or floors (Control n=180, Treatment n=299)*****  | 20%     | 28%       |

\*statistically significant, p=0.049

\*\*statistically significant, p=0.001

\*\*\*statistically significant, p=0.054

\*\*\*\*statistically significant, p=0.02

\*\*\*\*\*statistically significant, p=0.048

### Behavior and Upgrade Category Variables

To examine broader patterns within the survey responses that cover many specific cases of energy saving behavior and upgrades, participant responses to the behavior and upgrade responses were combined into their respective categories, and were also combined into end-use categories. As shown in Table 4-19, treatment group respondents were significantly more likely to engage in energy efficiency behaviors and improvements, and also undertook significantly more energy efficiency behaviors and upgrades. These results demonstrate that MyHERs have increased energy efficiency behaviors in treatment customers in DEP.



**Table 4-19: Percent of Households That Had Undertaken Energy Efficiency Actions - DEP**

| Behaviors/Improvements  | Treatment Group | Control Group |
|---|-----------------|---------------|
| Any Energy Efficiency Behavior<br>(Treatment n=31, Control n=190)*        | 71%             | 60%           |
| Average Number of Behaviors**   | 5.03            | 4.28          |
| Any Energy Efficiency Improvements<br>(Treatment n=313, Control n=189)*** | 70%             | 57%           |
| Average Number of Improvements****  | 3.28            | 2.67          |

\*statistically significant, p=0.008

\*\*statistically significant, p=0.022

\*\*\*statistically significant, p=0.003

\*\*\*\*statistically significant, p=0.018

Further, Table 4-20 shows the proportion of respondents that had undertaken at least one behavior or upgrade in each end use category. In all nine categories, treatment group members were significantly more likely to have undertaken at least one of these activities. These results further demonstrate that MyHERs have increased energy efficiency behaviors in treatment customers.

**Table 4-20: Percent of Households That Had Undertaken Energy Efficiency Actions, by End Use Category - DEP**

| Behaviors/Improvements   | Treatment Group | Control Group |
|--|-----------------|---------------|
| Water Heating Behaviors/Upgrades<br>(Treatment n=315, Control n=189)*                  | 70%             | 59%           |
| Water Heating Behaviors<br>(Treatment n=315, Control n=187)**                          | 70%             | 58%           |
| Space Heating Behaviors/Upgrades<br>(Treatment n=315, Control n=190)***                | 71%             | 60%           |
| Space Heating Behaviors<br>(Treatment n=315, Control n=190)****                        | 71%             | 60%           |
| Space Heating Upgrades<br>(Treatment n=309, Control n=185)*****                        | 49%             | 37%           |
| Lighting Behaviors/Upgrades<br>(Treatment n=314, Control n=190)*****                   | 71%             | 60%           |
| Electronics and Appliances Behaviors/Upgrades<br>(Treatment n=315, Control n=189)***** | 68%             | 53%           |
| Electronics and Appliances Upgrades<br>(Treatment n=306, Control n=186)*****           | 54%             | 43%           |
| Sealing and Insulation Behaviors/Upgrades<br>(Treatment n=306, Control n=187)*****     | 52%             | 42%           |

\*statistically significant, p=0.001

\*\*statistically significant, p=0.007

\*\*\*statistically significant, p=0.01

\*\*\*\*statistically significant, p=0.01

\*\*\*\*\*statistically significant, p=0.009

\*\*\*\*\*statistically significant, p=0.011

\*\*\*\*\*statistically significant, p=0.001

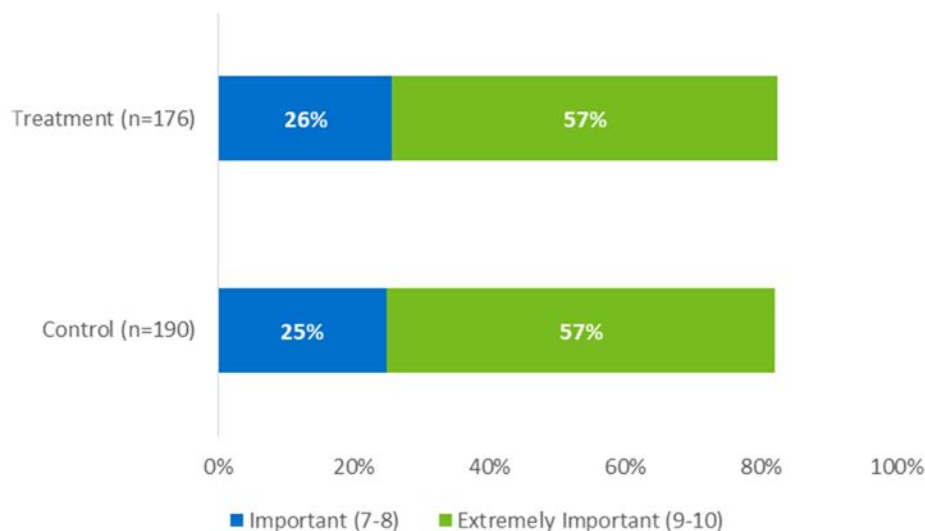
\*\*\*\*\*statistically significant, p=0.016

\*\*\*\*\*statistically significant, p=0.043

### Customer Motivation and Awareness

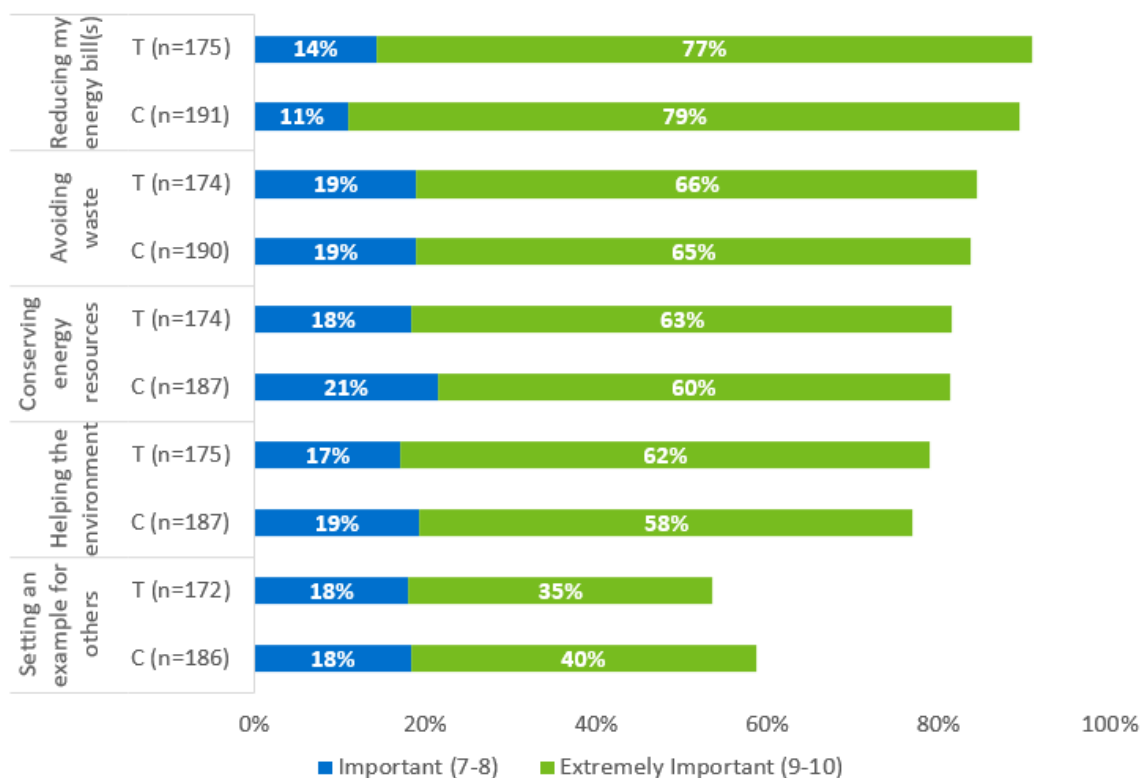
The control group and treatment groups report similar levels of motivation to save energy. Eighty-two percent of control customers and treatment customers respectively, indicated that knowing they are using energy wisely is important or “important” or “extremely important”. (Figure 4-29). The reported percentage for the Treatment group differs from that in the figure due to rounding.

**Figure 4-29: “How Important Is It for You to Know if Your Household is Using Energy Wisely?” - DEP**



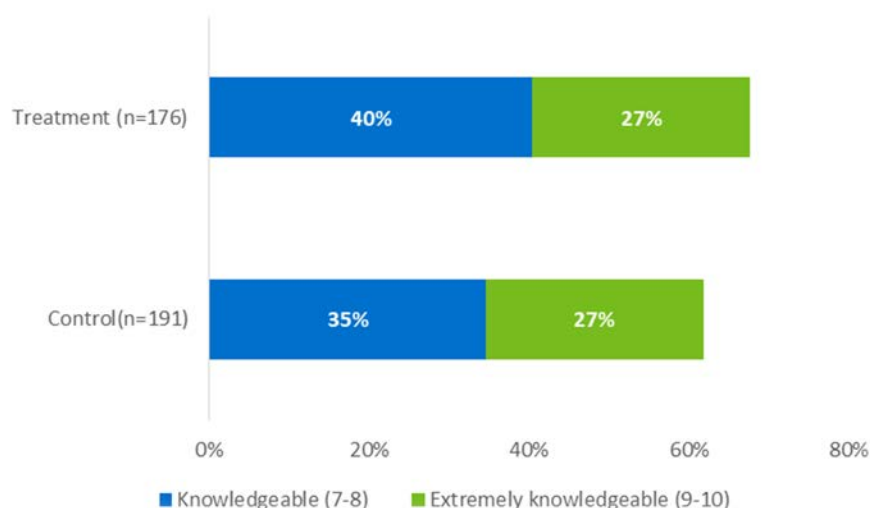
Customers were asked to rate, on a scale of 0 to 10, the importance of various reasons for why they might try to reduce their home’s energy use. The strongest motivation for both groups is saving money on their energy bills, where 91% of treatment respondents and 90% of control respondents reported that saving money on their energy bills was “important” or “extremely important”. Eighty-four percent of control respondents and 85% of treatment respondents, respectively, indicated that “avoiding waste” was important” or “extremely important” to them. Eighty-one percent of both treatment customers and control customers reported that “conserving energy resources” was important” or “extremely important”. Seventy-nine percent of treatment customers and 77% of control customers reported that “helping the environment” was “important” or “extremely important”. Those differences between the treatment and control group are not statistically significant. Figure 4-30 contains the frequency of responses to this question, shown as a percentage for both the treatment and control group.

**Figure 4-30: “Please Indicate How Important Each Statement Is to You” - DEP**



As indicated by Figure 4-31, 67% of treatment customers rated themselves above a seven on a 0-10 point scale of knowledgeability of ways to save energy, while 62% of control group customers rated themselves this way. The difference is not statistically significant at the 90% level of confidence.

**Figure 4-31: “How Would You Rate Your Knowledge of the Different Ways You Can Save Energy in Your Home?” - DEP**



Treatment respondents that took the treatment-only survey were asked how useful each MyHER feature was to their homes. A similar question was asked of both control group and treatment group respondents who took the primary survey rephrased to ask them how useful they *might expect* that information to be. Table 4-21 presents results of the portion, rating each item a “7” or higher on an 11-point scale of the hypothetical usefulness from the control and treatment customers who took the primary survey, and Table 4-22 presents the comparison results between the actual usefulness of each item rated by treatment customers (treatment-only survey) and the hypothetical usefulness rated by control customers in the primary survey).<sup>14</sup>

The results from the hypothetical usefulness rating (Table 4-21) did not find statistically significant differences in expected usefulness of information that is found on MyHER reports. Comparisons between the responses of customers in the treatment-only survey and control customers in the primary survey show that treatment customers respond differently to questions about information presented in MyHERs if the questions are asked in the context of the actual MyHER reports, however the response patterns show some limited significant separation between treatment and control customers in terms of usefulness of report content: Table 4-22 shows that control customers were significantly more likely to report that “Tips to help you save money and energy”, “Information about services and offers from Duke Energy”, and “Comparison to similar homes” would be useful than treatment customers reporting that they are actually useful. This finding suggests that there may be an opportunity to improve the presentment of this information in MyHERs.

**Table 4-21: Hypothetical Usefulness of HER Features Treatment and Control - DEP**

| HER Feature   | Control Group_Primary Survey | Treatment Group_Primary Survey |
|---|------------------------------|--------------------------------|
| Tips to help you save money and energy                            | 73% (n=188)                  | 72% (n=173)                    |
| Graphs that display your home's energy use over time              | 72% (n=185)                  | 73% (n=174)                    |
| Information about services and offers from Duke Energy            | 68% (n=186)                  | 67% (n=172)                    |
| Examples of the energy use associated with common household items | 67% (n=184)                  | 67% (n=173)                    |
| Your home's energy use compared to that of similar homes          | 66% (n=183)                  | 59% (n=173)                    |
| Customized suggestions for your home                              | 60% (n=183)                  | 66% (n=172)                    |

<sup>14</sup> The implementation of a treatment-only survey, in addition to a primary survey provided to both treatment and control customers, afforded an opportunity to test the responses of treatment customers to a question asking about a MyHER feature they have actually seen vs. asking generally about how useful the information is (outside of the context of MyHER). This test leads us to the conclusion that the way customers are asked about this question matters and we recommend that in future surveys, MyHER treatment customers see questions about report content placed specifically in the context of them having seen the content in their reports, as opposed to in the hypothetical.

**Table 4-22: Usefulness or Hypothetical Usefulness of HER Features Treatment and Control - DEP**

| HER Feature   | Control Group_Primary Survey | Treatment Group_Treatment Only Survey |
|---|------------------------------|---------------------------------------|
| Tips to help you save money and energy*                           | 73% (n=188)                  | 64% (n=146)                           |
| Graphs that display your home's energy use over time              | 72% (n=185)                  | 73% (n=147)                           |
| Information about services and offers from Duke Energy**          | 68% (n=186)                  | 54% (n=145)                           |
| Examples of the energy use associated with common household items | 67% (n=184)                  | 60% (n=146)                           |
| Comparison to similar homes***                                    | 66% (n=183)                  | 46% (n=146)                           |
| Customized suggestions for your home                              | 60% (n=183)                  | 54% (n=147)                           |

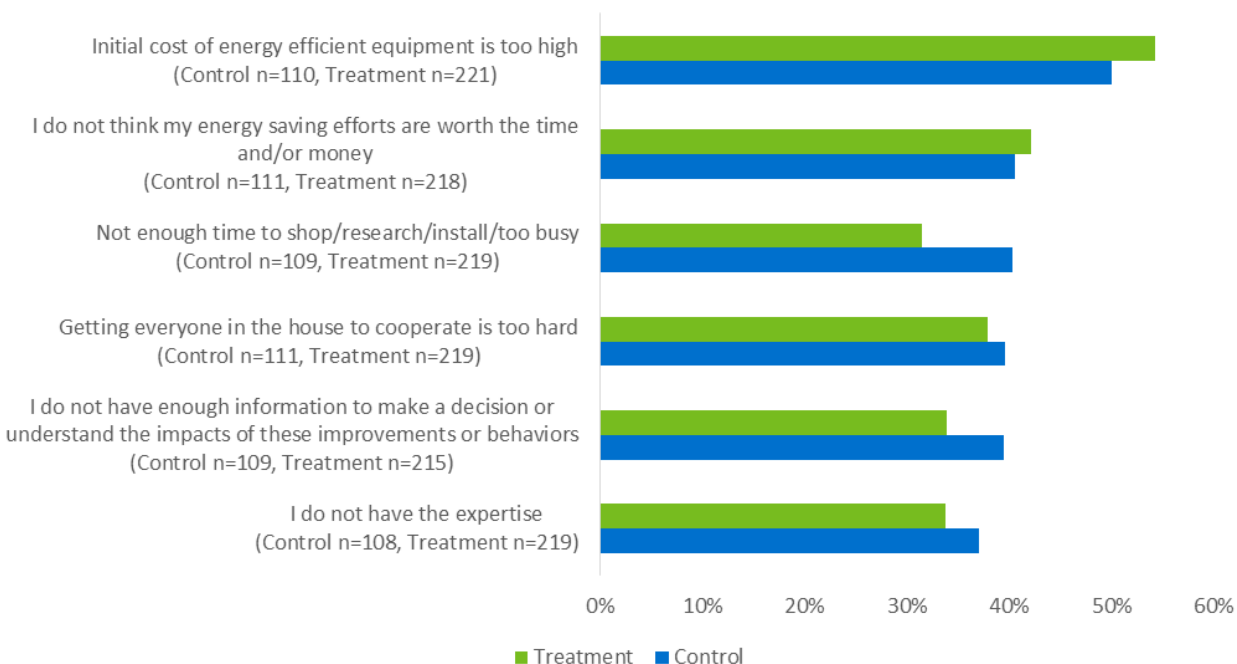
\*statistically significant, p=0.073

\*\*statistically significant, p=0.014

\*\*\*statistically significant, p=0.000

### Barriers to Customers Undertaking Energy Savings Actions

When asked the reasons why customers might not be able to save as much as energy as they would like, there were no statistically different response patterns between treatment and control customers, which indicates that MyHER is not making a measurable change in the potential barriers mentioned in this survey. The most commonly reported barrier is “the initial cost of energy efficient equipment is too high” (Figure 4-32): 54% of treatment respondents reported this as a barrier and 50% of control respondents did so as well. The least-commonly cited barrier was lack of expertise: 34% of treatment customers cited lack of expertise as a barrier as did 37% of control customers. The differences are not statistically significant.

**Figure 4-32: Barriers to Customers Undertaking Energy Savings Actions - DEP**

### Suggestions about Duke Energy Improving Service Offerings

The survey provided an open-ended question to elicit suggestions about Duke Energy improving its service offerings to help customers reduce energy use. Only 22% (116 of 539, treatment and control customers in total) offered suggestions, including fourteen who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 44 of the 116 with suggestions, reflected a desire for more energy savings information, programs, free light bulbs, and more incentives:

- *“They can make available those light bulbs, to us senior citizens that don't use computers. So we can order them”*
- *“Suggestions how to improve energy and reduce bill”*
- *“home energy inspections and a list of energy saving products that can be used to lower monthly costs”*
- *“Provide information regarding the amount of energy it takes to run dishwashers, lamps, televisions...”*
- *“Provide more rebates for large ticket items”*

Other comments centered on other suggestions, such as better communication, reducing price/providing senior and disability discounts, etc. Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-23.

**Table 4-23: Suggestions about Duke Energy Improving Service Offerings - DEP**

| Suggestion  | Count | Percent of Respondents Mentioning (n=116) | Percent of Total Mentions (n=137) |
|---|-------|---|-----------------------------------|
| Provide more energy savings information, programs, free light bulbs and more incentives | 44    | 38%                                       | 32%                               |
| Better communication  | 26    | 22%                                       | 19%                               |
| Reduce price/provide senior and disability discounts                                    | 21    | 18%                                       | 15%                               |
| Miscellaneous   | 16    | 14%                                       | 12%                               |
| Appreciation  | 14    | 12%                                       | 10%                               |
| Express Frustration   | 10    | 9%  | 7%                                |
| Reduce power outages  | 4     | 3%  | 3%                                |
| Provide more detailed info in MyHER / offer MyHER to Townhomes / do more surveys        | 1     | 1%  | 1%                                |
| Improve website   | 1     | 1%  | 1%                                |

### Evidence of MyHER Effects

As noted above, while formal statistical testing found a number of differences among treatment and control group households for individual questions, the Nexant team sought to understand if the overall pattern of survey responses differed among treatment and control households. To do this, we categorized each survey question by topic area and then counted any survey item in which the treatment households provided a more positive response than the control households. Table 4-24 presents the categories, the count of questions in each category for which the treatment group provided a more favorable response than the control group, and the number of questions in each category. A response is considered “favorable” if the treatment group gave a response that is consistent with the program objectives of MyHER.

**Table 4-24: Survey Response Pattern Index - DEP**

| Question Category  | Count of Questions where T>C | Number of Questions in Topic Area | Portion of Questions where T>C |
|--|------------------------------|-----------------------------------|--------------------------------|
| Duke Energy's Public Stance on Energy Efficiency                 | 3                            | 3                                 | 100%                           |
| Customer Engagement with Duke Energy Website                     | 2                            | 5                                 | 40%                            |
| Customers' Reported Energy-saving Behaviors                      | 10                           | 11                                | 91%                            |
| Customer's Reported Energy Efficiency Improvements Made          | 9                            | 9                                 | 100%                           |
| Customer Motivation, Engagement & Awareness of Energy Efficiency | 10                           | 11                                | 91%                            |
| Barriers of Customer Not Undertaking Energy Savings Actions      | 4                            | 6                                 | 67%                            |
| Customer Satisfaction with Duke Energy                           | 2                            | 4                                 | 50%                            |
| <b>Total</b>   | <b>40</b>                    | <b>49</b>                         | <b>82%</b>                     |

Nexant's approach consists of the following logical elements:

- Assume the number of positive responses between treatment and control customers will be equal if MyHER lacks influence;
- Count the total number of topics and questions asked of both groups – there are seven topic areas and 49 questions;
- Note any item for which the treatment group outperformed the control group – the treatment group outperformed the control group in 40 questions, or 82% of the total questions;
- Since this value is more than 50% we can conclude that MyHER had wide-ranging enhancing effects across all the various engagement and attitudinal areas probed by the survey.
- Considering these five areas, calculate the probability that the difference in response patterns is due to chance, rather than an underlying difference in populations – 0% (p-

value = 0.000). Since this probability is less than 10%, we reject the null hypothesis (that the number of positive responses for treatment and control customers is equal) at the 90% level of confidence.

Because this analysis compares the response patterns between the treatment and control group, if the MyHER program did not influence customers, one would expect the treatment group to “score higher” on roughly half of the questions. In other words, if the MyHER is not influencing treatment group customers, there is a 50/50 chance that they will “outperform” the control group as many times as not. For a more detailed description of the index framework, see [Appendix G](#).

### Respondent Demographics

Majority of all respondents—93% of treatment group customers and 88% of control group customers—own their residence. This difference is statistically significant. More than half of households surveyed have two or fewer residents, but about 22% of treatment households and control households respectively, have four or more residents. There are no statistically significant differences in the distribution of age of homes assigned to the treatment and control groups (Figure 4-33) (chi-squared test).

**Figure 4-33: “In What Year Was Your Home Built?” - DEP**

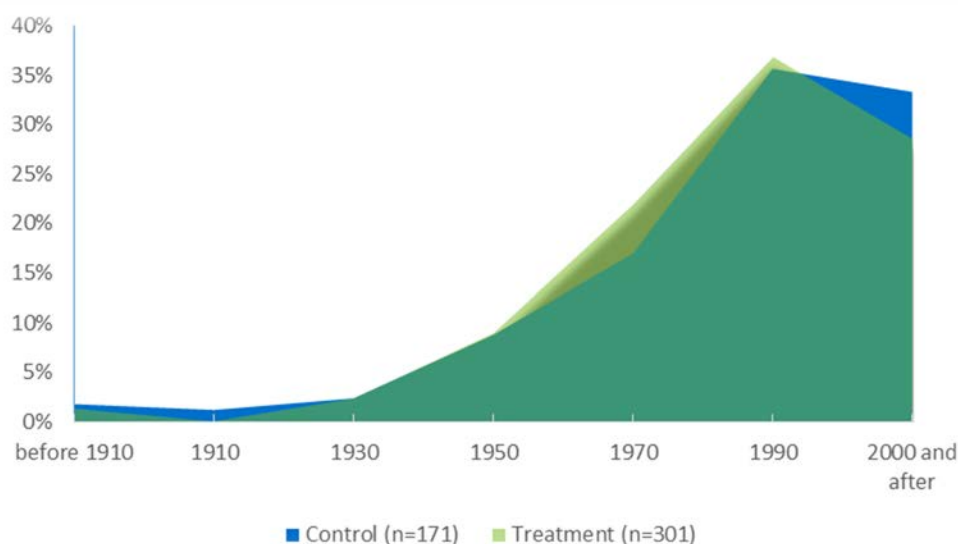
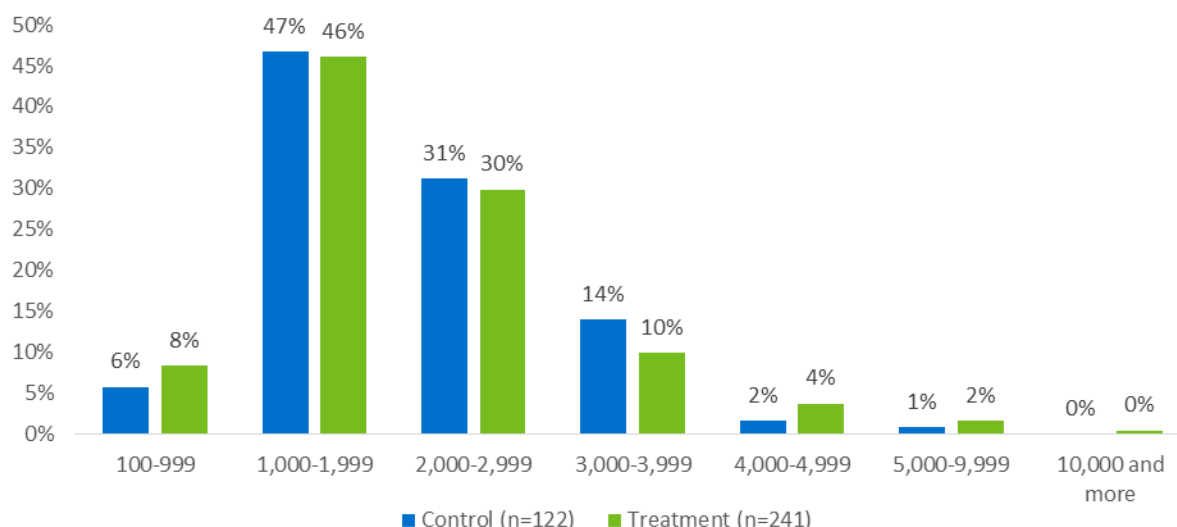


Figure 4-34 shows distribution of home square footage is similar between control and treatment households. The average square footage above ground is 2,022 for control households and 2,110 for treatment households.



**Figure 4-34: How many square feet is above ground living space? - DEP**

Respondent ages are relatively close to those reported by the U.S. Census American Community Survey (ACS) for Carolinas. The lowest age category (25-34) is often underrepresented when sampling based on residence in single family homes, given that many members of that population are in apartments, dormitories, or living with other family members. This common underrepresentation is true in this survey study, as well. The average age is 61 for control group respondents and 62 for treatment group respondents (see Table 4-25).

**Table 4-25: Respondent Age Relative to American Community Survey - DEP**

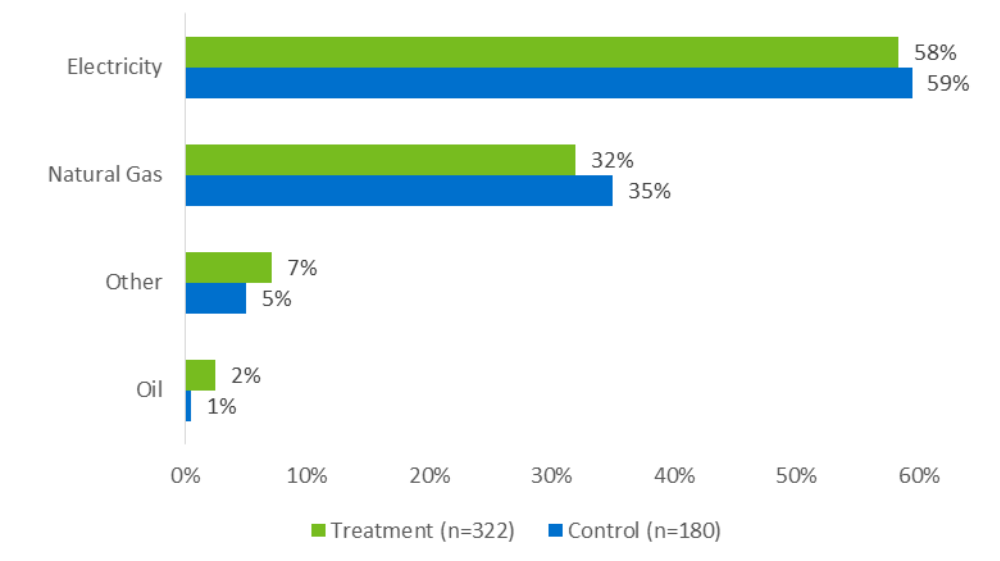
| Age         | Treatment Group (n=320) | Control Group (n=176) | 2017 American Community Survey_Carolinas <sup>15</sup> |
|-------------|-------------------------|-----------------------|--|
| 25-34       | 3%                      | 3%                    | 13%  |
| 35-44       | 14%                     | 9%                    | 13%  |
| 45-54       | 19%                     | 18%                   | 13%  |
| 55-64       | 19%                     | 26%                   | 13%  |
| 65 and over | 45%                     | 44%                   | 16%  |

Figure 4-35 shows the primary heating fuel type used in control and treatment customers' households. More than half of treatment (58%) and control (59%) customers use electricity in

<sup>15</sup> American Community Survey (ACS) is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.  
[https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_SPL\\_K200104&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_SPL_K200104&prodType=table)

their households for heating. Thirty-two percent of treatment customers and 35% of control customers use natural gas for heating.

**Figure 4-35: Primary Heating Fuel in Households - DEP**

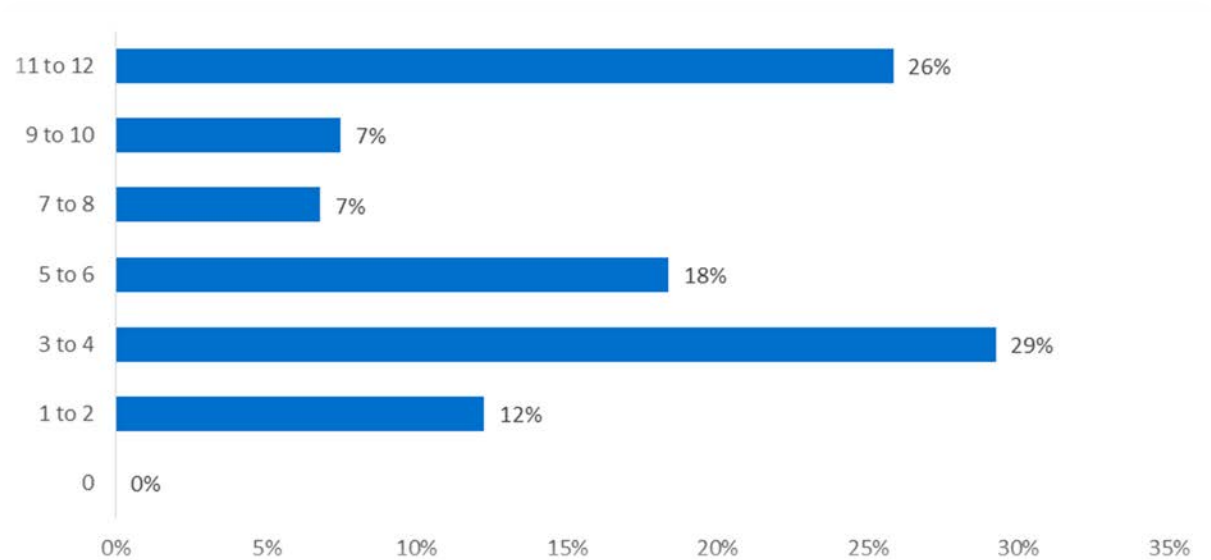


#### 4.2.3.2 Treatment Households: Experience and Satisfaction with MyHER - DEP

A large majority of treatment household respondents, 94%, (160 of 170) recalled receiving at least one of the MyHER reports.

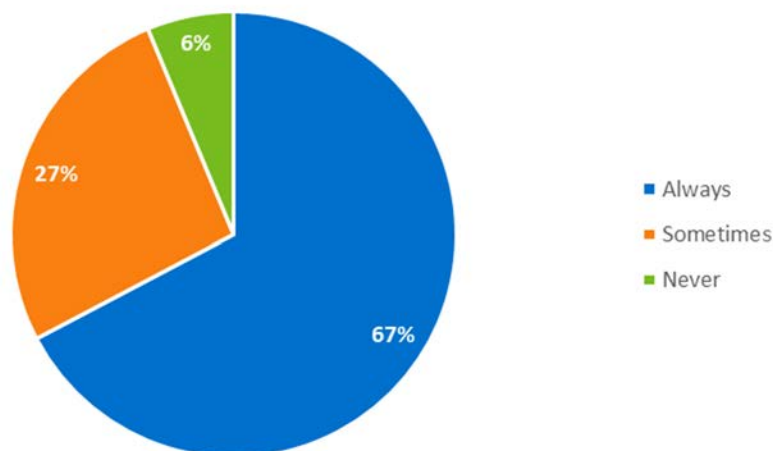
The survey asked those that could recall receiving at least one MyHER report if they could recall how many individual reports they had received “in the past 12 months” (Figure 4-36). The survey launched in January 2019, which means that most recipients would have received 8 MyHERs in the year since February 2018. Twenty-six percent (38 of 147) responded that they received 11 to 12 home energy reports in the past 12 months. The scattered distribution of responses related to recall is consistent with the difficulty of recalling an exact number of reports, however the question is valuable for grounding respondents in the experience of receiving a MyHER before asking them more specific questions about the document.

**Figure 4-36: Reported Number of MyHERs Received “In the past 12 months” (n=147) - DEP**



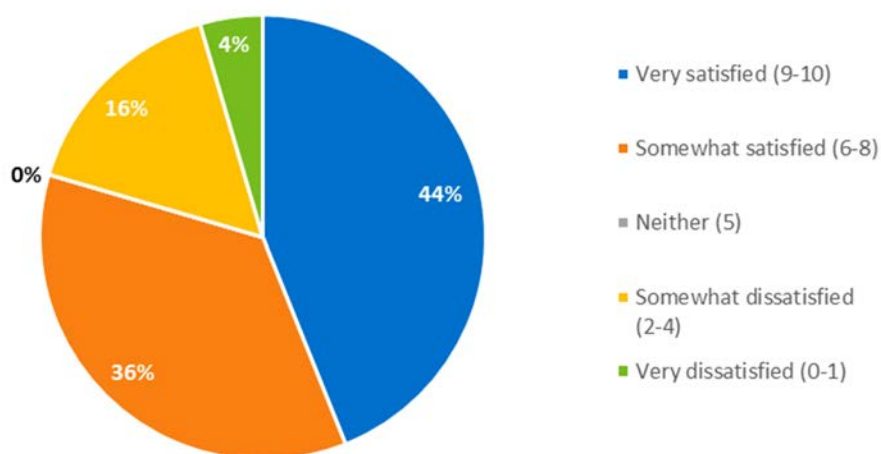
Survey respondents indicated high interest in the MyHER reports. As shown in Figure 4-37, when asked how often they read the reports, 94% of respondents indicated they “always” or “sometimes” read the reports. Ten respondents (6%) indicated they do not read the reports.

**Figure 4-37: How Often Customers Report Reading the MyHER (n=159) - DEP**

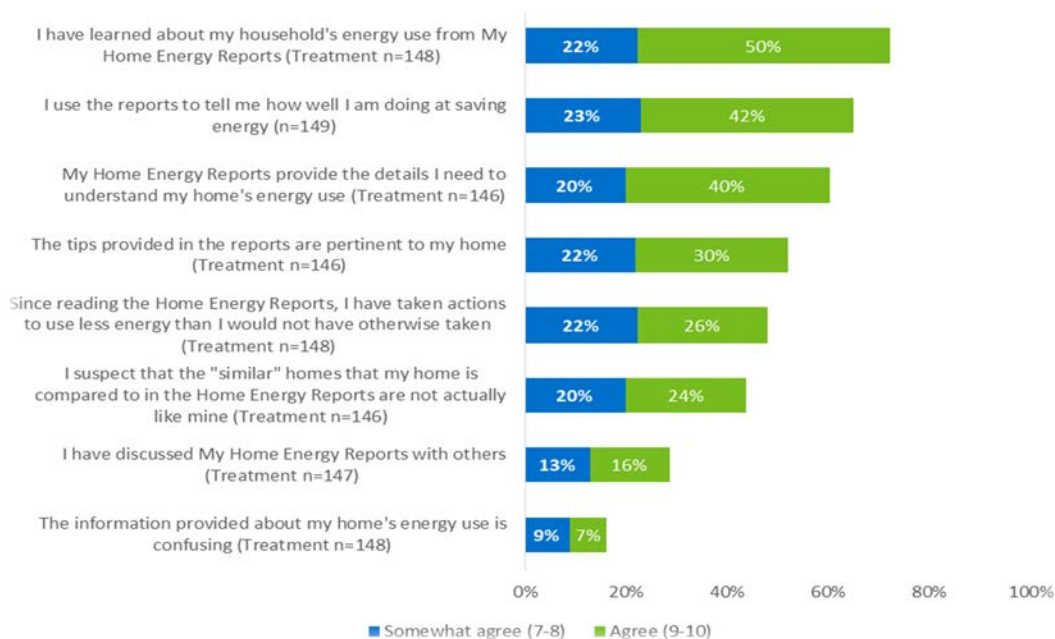


Eighty percent (105 of the 132 respondents that provided a rating) reported being “somewhat” or “very” satisfied with the information contained in the reports (Figure 4-38). The survey asked a further question to the respondents of why they said so: sixty-two of the satisfied respondents provided reasons. Among customers who gave the highest satisfaction ratings, the most common comments on the MyHERs described the reports’ ability to engage the customer and provide greater awareness. The customers who reported being somewhat satisfied most often simply described the reports as “useful.”

**Figure 4-38: Satisfaction with the Information in MyHER Reports (n=132) - DEP**



When asked to rate their agreement with a series of statements about MyHERs on a scale of 0 to 10, recipients largely agreed that the reports helped them understand their home’s energy use, with 72% of respondents rating their agreement a seven or higher on a 0-10 point scale, and that they use the report to gauge how successful they are at saving energy (65% rating a seven or higher). Sixty percent of respondents agreed that the reports provided the details they needed to understand their home’s energy usage. Respondents provided weaker agreement to statements about the pertinence of the tips provided to their homes and whether they have taken actions to use less energy than they would not have since reading MyHERs. A relatively small percentage (16%) agreed with the statement that the information provided is confusing. (Figure 4-39).

**Figure 4-39: Level of Agreement with Statements about MyHER (0-10 Scale) - DEP**

The survey provided an open-ended question to elicit suggestions about potential improvements to MyHER among those that had reported reading at least one report. Only 43% (64 of 149) offered suggestions, including six who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 23 of the 64 with suggestions, reflected a desire for more specific information or details about their home and specific actions they should take. Some of these requests reflected interest in understanding at a more granular level how their home uses energy and energy consumption information related to appliances:

- *"How is energy distributed amongst outlets, appliances, etc."*
- *"More specific about what electronics use the most energy so I can lower the usage"*
- *"Hours of use, including hours of the day, compare to previous months and or years"*
- *"Maybe by specifying where exactly do we need to focus in order to bring the bill payment down"*
- *"Provide size and age of houses compared to"*

Other comments centered on other suggestions (such as providing free energy assessment, etc.), disbelief in the relevance of comparison homes, and a few respondents that simply did not see value in the reports. Responses coded as recommending production changes focus on changing the delivery method of MyHER reports as follows:

- *"Make all these energy reports available online, so that consumer can view it any time"*
- *"Make it available online..."*

Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-26.

**Table 4-26: Distribution Suggestions for Improvement (Multiple Responses Allowed) - DEP**

| Suggestion  | Count | Percent of Respondents Mentioning (n=64) | Percent of Total Mentions (n=75) |
|---|-------|--|----------------------------------|
| Provide more specific information or details                            | 23    | 36%                                      | 31%                              |
| Don't believe comparison/accuracy                                       | 16    | 25%                                      | 21%                              |
| Other suggestions (such as providing information on solar panels, etc.) | 8     | 13%                                      | 11%                              |
| Appreciate the Home Energy Report                                       | 9     | 14%                                      | 12%                              |
| Address unique home/circumstances                                       | 5     | 8%                                       | 7%                               |
| Expressed frustration   | 5     | 8%                                       | 7%                               |
| Provide discounts/incentives/equipment upgrades                         | 5     | 8%                                       | 7%                               |
| Change production (mail, paper, format)                                 | 3     | 5%                                       | 4%                               |
| Don't see value/dislike   | 1     | 2%                                       | 1%                               |

Treatment households were also asked questions that focused on the awareness and use of MyHER Interactive, revealing low awareness of the online Interactive platform:

- Only 35% of treatment customers are aware of MyHER Interactive;
- Among aware customers, 86% reported that they had not signed up to use MyHER Interactive; and
- When asked why they haven't signed up to use MyHER Interactive, 23% of respondents reported that they were very busy, 23% reported that they were not interested in it, 18% reported that they did not have either a computer or internet access, and another 10% reported that they actually did not know about it.

### 4.3 Summary of Process Evaluation Findings

In-depth interviews with MyHER implementation staff reveal that the DEP and DEC MyHER program has benefited from a number of enhancements to the program and improvements in process and program management, and continues to operate effectively. Electronic MyHERs are now sent via email to all treatment customers that have provided Duke Energy with an email address. This enhancement means that report production is now a year-round process since the email reports are sent on a monthly basis for each month of the year. The MyHER report template was also refreshed to increase visual appeal and value to the customer. The new template includes the addition of a module that presents energy usage disaggregated by end-use category, on a looking-forward basis for the month ahead. Also, the template update

included the addition of images to the free form text (FFT) module of the reports. Lastly, the content and graphics of the email template was changed. There has also been increased enrollment for the MyHER Interactive online portal, which is emerging as a priority for Duke Energy and Tendril. The MyHER user experience is expected to be further enhanced in the future as the rollout of AMI meters and increased availability of AMI data continues.

From the backoffice perspective, Tendril, Duke Energy's MyHER program provider, implemented a number of process improvements. Tendril migrated their computational platform to Amazon Web Services (AWS), significantly reducing the time required to process data and generate batches of reports, and developed a pre-production platform to enable Duke Energy to review PDF drafts of MyHERs prior to promotion into production, which realized process efficiencies for Tendril. Additionally, Tendril has made progress on updating the "action tips" section of the report to "smart actions", by introducing the ability for these tips to be targeted to particular groups of MyHER recipients for which the tips are most appropriate. To date, roughly 20% of these tips are now "smart actions". Tendril also transitioned email MyHER production to Hypertext Markup Language (HTML) format to provide greater flexibility in Tendril's production processes.

Duke Energy and Tendril continue to collaborate for success through joint weekly status meetings, monthly operations meetings, and quarterly governance meetings. Working together, monthly key performance indicators (KPIs) such as in-home dates and percentage of treated customers treated are monitored. These meetings provide the venue for brainstorming and roadmapping activities as well as monitoring Duke Energy's MyHER product request list. This list is a priority for Duke Energy, and currently tracks about 25 items. Tendril has implemented an internal HER Improvement team to address the items on the list, and has made progress in this endeavor. Since the prior evaluation, Tendril has improved their performance in product quality, which is rigorously monitored by Duke Energy staff. These improvements have been attributed to a stable operations team at Tendril which has also expanded to include a quality control engineer. This engineer has designed and implemented automated QC checks, using AWS and other software, that have reduced errors in report production, increased the speed of the process, and reduced the staff necessary to manage it. This process will continue to change in 2019, as Tendril implements their HOMERS platform, allowing for increased efficiency in report production and quality control, as well as the implementation of the "self-serve" FFT tool that will eventually allow Duke Energy to produce and manage FFT content. This tool will eliminate the need for the highly resource-intensive collaboration procedure that has characterized FFT content production to this point.

Additionally, Tendril has also adopted a "Batch 0" strategy to implement significant changes to the MyHER reports on a test batch of data prior to producing a live batch to be mailed to customers. Batch 0 reports are tested for quality by both Tendril and Duke Energy and have allowed unexpected problems to be surfaced early and also to allow Duke Energy to fine tune the newly implemented changes. Improved product quality has resulted in fewer problems turning up in the quality control process.



In general, there was a strong emphasis on the development of procedures and strategies to prevent problems in the MyHER production process including a redesigned QC process, progress on the product request list, the management of messaging calendars, and the preparation for the rollout of HOMERS.

Though there has been continued success in communications and data transfers, there were some problems emerging from the process of reconciling customer email lists that resulted in the loss of emails that had been updated by Duke Energy customers, as well as some difficulty that Tendril experienced with importing AMI data from Duke Energy. The latter problem is being remedied with the implementation of a new data ingester, while the former is being addressed by a procedural change until the reconciliation process is automated. Other areas that were noted for potential improvement include improving the MyHER login requirements and Interactive profile questionnaire. The latter improvement is to address a larger concern among customers that the disaggregated energy use figures are not accurate.

### Survey Findings - DEC

Surveys of DEC treatment and control customers show that, among treatment group households:

- 93% recalled receiving at least one MyHER and 99% of those indicated that they “always” or “sometimes” read the reports.
- 87% reported being “very” or “somewhat” satisfied with the information provided by MyHERs.
- Only 28% of MyHER recipients are aware of MyHER Interactive, and only 8% of the aware recipients report that they have signed up to use it. When asked why they haven’t signed up to use MyHER Interactive, 30% of respondents reported that they were too busy, 22% reported that they were not interested in it, and 9% further reported that they did not know about it.
- Seventy-one percent of respondents strongly agree with the statement “I have learned about my household’s energy use from My Home Energy Reports”. Very few (12%) strongly agree with the idea that the energy usage information presented by the reports is confusing.
- The most useful features of the reports, as rated by treatment customer respondents, are the graphs that illustrate the home’s energy usage over time. The least useful-rated feature is customized suggestions for homes.
- 44% of treatment customers reported that MyHERs spurred them to undertake energy saving actions that they would not otherwise have done.
- Most (72%) respondents had no feedback or suggestions to improve the program. Those that made suggestions most frequently questioned the accuracy of the comparison, and requested more specific or detailed information in their MyHERs.

In comparing responses of treatment and control group respondents, there were a number of areas where treatment customers provided responses that more favorably reflected increased



awareness, engagement, or attitudes towards energy savings opportunities and actions relative to control customers:

- Treatment customers are significantly more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (73% to 63%).
- Treatment group respondents were significantly more likely to have engaged in 7 (out of 10) energy saving behaviors and 1 (out of 9) energy efficiency improvement than control respondents.

An index designed to account for overall survey-wide differences in response patterns found a more positive response pattern (31 positive responses out of a total of 49 questions) for treatment customers in simple frequencies across many facets of the survey. Using standard statistical techniques (specifically, the non-parametric sign test), Nexant calculates the probability of randomly obtaining positive results for 31 of 49 questions is 2% and is not likely due to chance. We conclude that exposure to MyHER is positively affecting customer awareness of, engagement in, and attitudes towards energy savings opportunities and actions. MyHER is also implemented with the goal of increasing customer satisfaction with Duke Energy and its stance on Energy Efficiency. These survey results do not show evidence of a measurable uplift in satisfaction in DEC that can be attributed to MyHER.

### Survey Findings - DEP

Surveys of DEP treatment and control customers show that, among treatment group households:

- 94% recalled receiving at least one MyHER and 94% of those indicated that they “always” or “sometimes” read the reports.
- 80% reported being “very” or “somewhat” satisfied with the information provided by MyHERs.
- Only 35% of MyHER recipients are aware of MyHER Interactive, and only 14% of the aware recipients report that they have signed up to use it. When those who hadn't signed up for MyHER Interactive were asked why, 23% of respondents reported that they were too busy, 23% reported that they were not interested in it, 18% reported that they did not have either a computer or internet access, and another 10% reported that they actually did not know about it.
- 48% of treatment-only group members reported that MyHERs spurred them to undertake energy saving actions that they would not otherwise have done.
- Seventy-two percent of respondents agree with the statement: “I have learned about my household’s energy use from My Home Energy Reports”. Few (16%) strongly agree with the idea that the energy usage information presented by the reports is confusing.
- The most useful features of the reports, as rated by treatment customer respondents, are the graphs that illustrate the home’s energy usage over time. The least useful-rated feature is comparison to similar homes.

- More than half (57%) of respondents had no feedback or suggestions to improve the program. Those that made suggestions most frequently reflected a desire for more specific information or details about their home and specific actions they should take in their MyHERs.

In comparing responses of treatment and control group respondents, there were a number of areas where treatment customers provided responses that more favorably reflected increased awareness, engagement, or attitudes towards energy savings opportunities and actions relative to control customers:

- Treatment customers significantly more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (71% to 60%).
- Treatment group respondents were significantly more likely to have engaged in 5 (of 10) energy saving behaviors and 5 (of 9) energy efficiency improvements than control respondents.
- Treatment group respondents reported significantly higher levels of satisfaction with the information Duke Energy makes available about energy efficiency programs, with the information Duke Energy provides to help customers save on energy bills, and with Duke Energy's commitment to promoting energy efficiency and the wise use of electricity.

An index designed to account for overall survey-wide differences in response patterns finds a more positive response pattern for treatment customers in simple frequencies across the entire survey. Thirty-six out of 40 questions show more favorable responses for the treatment group. Using standard statistical techniques (specifically, the non-parametric sign test), Nexant calculates the probability of randomly obtaining this result is nearly 0% and thus extremely likely due to chance. We conclude that exposure to MyHER is increasing awareness of, engagement in, and attitudes towards energy savings opportunities of treatment customers relative to control customers.

## 5 Conclusions and Recommendations

Nexant finds that the MyHER program is an effective channel for increasing customer engagement with energy efficiency and demand side management. The RCT program design facilitates reliable estimates of program energy savings. Further, the energy savings generated by the program are corroborated by survey findings of respondent awareness of, engagement in, and focus on the importance of saving energy. As an additional benefit, Nexant finds that MyHER is a useful tool for enhancing Duke Energy and increases uptake in other Duke Energy efficiency programs. The MyHER program has achieved full deployment among Duke Energy Carolinas and Progress single-family home customers and Nexant recommends that Duke Energy continue to focus on program processes and operations to further increase the efficiency of program delivery.

Duke Energy also launched the MyHER Interactive portal in March 2015. The portal offers additional means for customers to customize or update Duke Energy's data on their premises, demographics, and other characteristics that affect consumption and the classification of each customer. The portal also provides additional custom tips based on updated data provided by the customer. MyHER Interactive sends email challenges to portal users that seek to engage customer in active energy management, additional efficiency upgrades, and conservation behavior. Nexant evaluated the impacts of the MyHER Interactive portal using a matched comparison group because the MyHER Interactive portal was not deployed as a randomized controlled trial (RCT).

### 5.1 Impact Findings

Nexant estimates that the MyHER program saved a total of 292.2 GWh at Duke Energy Carolinas and 141.1 GWh at Duke Energy Progress during the period June 2017 to May 2018. The confidence and relative precision of the estimate is 90% and 6.4%, respectively for DEC and 9.4% for DEP. This impact estimate accounts for the fact that MyHER increases uptake of other Duke Energy programs; 6.0 kWh has been subtracted from the average household program impact to account for the MyHER uplift in other programs in both DEC and DEP. Without such a correction, those savings (6.0, kWh per household per year) would be double counted by Duke Energy.

Nexant estimates that DEC customers that sign up to use the MyHER Interactive Portal saved an additional 21 kWh per month, representing an additional 1.6% in energy savings during the period June 2017 to May 2018. These savings are statistically significant at the 90% level of confidence and are incremental, or over and above the savings that MyHER alone delivers. However, only a relatively small group of DEC MyHER recipients are signed up to use the portal, as of May 2018 38,190 DEC customers are Interactive users, out of 1,151,896 DEC MyHER recipients overall. It's important to note that since MyHER Interactive portal customers volunteered to participate in the portal product, their savings may not represent the expected

savings if all customers were assigned to the portal product by default. DEP MyHER participants do not generate statistically significant energy savings during the period June 2017 to May 2018.

## 5.2 Process Findings

The DEP and DEC MyHER programs are Duke Energy's most mature behavioral programs in terms of delivered energy savings in each jurisdiction. The large volume of data required to generate MyHER and support the program delivery schedule is the primary driver of program activities and focus. Duke Energy and its implementation contractor, Tendril, are successfully managing this process and providing DEP and DEC customers' valuable information for managing home energy consumption.

The DEP and DEC MyHER programs have benefited from a number of process and product management improvements. Careful change management and a stable operations team at Tendril have been key enablers of maintaining a production process that consistently meets MyHER quality control standards.

MyHER participants have been found in this evaluation's customer surveys to display higher levels or incidence of a number of energy savings behaviors, opinions, attitudes, and engagement with energy efficiency. MyHER is also positively affecting customer's perception of Duke Energy's public stance on energy efficiency for DEP, and some aspects of customers' monitoring and tracking household energy consumption habits in both DEC and DEP.

## 5.3 Program Recommendations

- **Continue the commitment to simultaneous control and treatment assignment.** New assignments to treatment and control groups must be simultaneous and Tendril and Duke Energy should work to add all newly assigned treatment and control groups to their respective statuses in a single billing month, to the extent that is technically feasible.
- **Continue the practice of making assignments of new accounts to MyHER treatment and control groups once a year, or at most, twice a year.** The numbers of Duke Energy customers becoming eligible for the program each year do not facilitate more frequent assignments. This is due to the fact that sufficient numbers of customers must be set aside for the control group each time a group of customers is assigned to treatment in order for the evaluator to be able to measure the energy savings delivered by the new cohort.
- **Increase MyHER participant awareness of Interactive.** The process evaluation finds that current awareness of Interactive among DEP and DEC MyHER participants is very low, so another program objective above actual engagement with Interactive is to more effectively get the word out about its existence.
- **Continue to drive engagement with the Interactive Portal.** MyHER Interactive's ability to deliver measurable energy savings is on the rise, as shown by this evaluation in comparison to the prior DEC evaluation, as well as the MyHER evaluations for other

Duke Energy jurisdictions completed in the past year. We recommend that Duke Energy continue to drive more MyHER participants to the portal.

- **Continue to operate MyHER with an eye towards change management.** MyHER's implementer Tendril has made great strides in improving quality control performance since the prior evaluation in the automating of this process. Effective change management and stable staffing have been notable contributors to these improvements and they should continue to be emphasized in MyHER program operations, especially as Tendril's new HER production platform, HOMERS (the Home Energy Reporting Service), is rolled out and its implementation is optimized.
- **Continue to prioritize the structuring of the processes and schedules for program elements.** This organization of tasks for elements such as the FFT report module has been a significant success in the operations of the MyHER program and has made reactive responses to impending deadlines and emergent challenges that characterized these operations in the past much less common. Program staff should seek out additional opportunities for the optimization of program schedules, tasks, and long term goals in this manner.

## Appendix A Summary Forms

### MyHER Carolinas

#### Completed EMV Fact Sheet

#### Description of program

Duke Energy offers the My Home Energy Report (MyHER) to residential customers. MyHER relies on principles of behavioral science to encourage customer engagement with home energy management and energy efficiency. The program accomplishes this primarily by delivering a personalized report comparing each customer's energy use to a peer group of similar homes.

|                             |  |
|-----------------------------|--|
| Date                        | July 10, 2019                                      |
| Region(s)                   | Carolinas  |
| Evaluation Period           | June 2017 – May 2018                               |
| Annual kWh Savings          | 292,174,507 kWh (Report)<br>7,378,007 kWh (Portal) |
| Per Participant kWh Savings | 247.7 kWh/home (Report)<br>255.1 kWh/home (Portal) |
| Coincident kW Impact        | 0.069 kW/home (Report)<br>0.071 kW/home (Portal)   |
| Net-to-Gross Ratio          | Not Applicable                                     |
| Process Evaluation          | Yes  |
| Previous Evaluation(s)      | 2017 – Nexant<br>2014 – TecMarket Works            |

#### Evaluation Methodology

##### Impact Evaluation Activities

- Eligible accounts are randomly assigned to either a treatment (participant) group or a control group. The control group accounts are not exposed to MyHER in order to provide the baseline for estimating savings attributable to the Home Energy Reports. In this randomized controlled trial (RCT) design, the only explanation for the observed differences in energy consumption between the treatment and control group is exposure to MyHER.
- The impact estimate is based on monthly billing data and program participation data provided by Duke Energy.
- The RCT delivery method of the program removes the need for a net-to-gross analysis as the billing analysis directly estimates the net impact of the program.

##### Impact Evaluation Findings

- Realization rate = 108% for energy impacts; 247.7 kWh per home (Report)

##### Process Evaluation Activities

- 337 surveys of treatment customers, 211 surveys for control group customers and staff interviews.

##### Process Evaluation Findings

- 93% of MyHER recipients recall receiving the reports.
- 87% of MyHER recipients are "very" or "somewhat" satisfied with the information provided by the reports.
- 28% of MyHER recipients are aware of MyHER Interactive.
- MyHER produces an uplift in customer awareness of, engagement in, and attitudes towards energy savings opportunities and actions

**MyHER Progress**

## Completed EMV Fact Sheet

Duke Energy offers the My Home Energy Report (MyHER) to residential customers. MyHER relies on principles of behavioral science to encourage customer engagement with home energy management and energy efficiency. The program accomplishes this primarily by delivering a personalized report comparing each customer's energy use to a peer group of similar homes.

|                             |                      |
|-----------------------------|----------------------|
| Date                        | July 10, 2019        |
| Region(s)                   | Progress             |
| Evaluation Period           | June 2017 – May 2018 |
| Annual kWh Savings          | 141,099,476 kWh      |
| Per Participant kWh Savings | 201.2 kWh/home       |
| Coincident kW Impact        | 0.071 kW/home        |
| Net-to-Gross Ratio          | Not Applicable       |
| Process Evaluation          | Yes                  |
| Previous Evaluation(s)      | 2017 – Nexant        |

**Evaluation Methodology****Impact Evaluation Activities**

- *Eligible accounts are randomly assigned to either a treatment (participant) group or a control group. The control group accounts are not exposed to MyHER in order to provide the baseline for estimating savings attributable to the Home Energy Reports. In this randomized controlled trial (RCT) design, the only explanation for the observed differences in energy consumption between the treatment and control group is exposure to MyHER.*
- *The impact estimate is based on monthly billing data and program participation data provided by Duke Energy.*
- *The RCT delivery method of the program removes the need for a net-to-gross analysis as the billing analysis directly estimates the net impact of the program.*

**Impact Evaluation Findings**

- *Realization rate = 137% for energy impacts; 201.2 kWh per home*

**Process Evaluation Activities**

- *347 surveys of treatment customers, 192 surveys for control group customers and staff interviews.*

**Process Evaluation Findings**

- *94% of MyHER recipients recall receiving the reports.*
- *80% of MyHER recipients are “very” or “somewhat” satisfied with the information provided by the reports.*
- *35% of MyHER recipients are aware of MyHER Interactive.*
- *MyHER produces an uplift in customer awareness of, engagement in, and attitudes towards energy savings opportunities and actions*



## Appendix B Measure Impact Results

Table B-1: DSMore Measure Impact Results

| Measure Category          | Prod Code | Jurisdiction | Gross Energy Savings (kWh) | Gross Summer Coincident Demand (kW) | Gross Winter Coincident Demand (kW) | Net to Gross Ratio | Net Energy Savings (kWh) | Net Summer Coincident Demand (kW) | Net Winter Coincident Demand (kW) | Measure Life |
|---------------------------|-----------|--------------|----------------------------|-------------------------------------|-------------------------------------|--------------------|--------------------------|-----------------------------------|-----------------------------------|--------------|
| NC_ My Home Energy Report | HECR      | DEC          | 248                        | 0.0691                              | N/A                                 | 100%               | 248                      | 0.0691                            | N/A                               | 1            |
| MyHER Interactive         |           | DEC          | 255                        | 0.0712                              | N/A                                 | 100%               | 255                      | 0.0712                            | N/A                               | 1            |
| NC_ My Home Energy Report | HECR      | DEP          | 201                        | 0.0712                              | N/A                                 | 100%               | 201                      | 0.0712                            | N/A                               | 1            |



## Appendix C Survey Instruments

### Primary Survey

Q1. Please rate how satisfied you are with Duke Energy as your electric supplier.

| Not at all Satisfied |   |   |   |   |   | Completely Satisfied |   |   |   |    |  |
|----------------------|---|---|---|---|---|----------------------|---|---|---|----|--|
| 0                    | 1 | 2 | 3 | 4 | 5 | 6                    | 7 | 8 | 9 | 10 |  |

Q2. Please rate your overall satisfaction with each of the following aspects of communications from Duke Energy.

|  | Very Satisfied           | Somewhat Satisfied       | Neither                  | Somewhat Dissatisfied    | Very Dissatisfied        |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| The information available about Duke Energy's efficiency programs.                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Duke Energy's commitment to promoting energy efficiency and the wise use of electricity. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| The information Duke Energy provides to help customers save on energy bills.             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Q3. Have you logged in to your Duke Energy account to do any of the following? Check all that apply.

- ☐ I have never logged in
- ☐ Pay my bill
- ☐ Review energy consumption graphs
- ☐ Look for energy efficiency opportunities or ideas
- ☐ None of the above

Q4. How often do you access the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make your home more energy efficient? Select only one.

- ☐ Monthly
- ☐ Once a year
- ☐ A few times a year
- ☐ Never

Q5. If you needed to replace major home equipment or were considering improvements to your home's energy performance today, how likely would you be to check the Duke Energy website for information about energy efficient solutions or incentives?

| Not at all Likely |   |   |   |   |   | Extremely Likely |   |   |   |    |  |
|-------------------|---|---|---|---|---|------------------|---|---|---|----|--|
| 0                 | 1 | 2 | 3 | 4 | 5 | 6                | 7 | 8 | 9 | 10 |  |

Q6. How important is it for you to know if your household is using energy wisely?

| Not at all Important |   |   |   |   |   | Extremely Important |   |   |   |    |  |
|----------------------|---|---|---|---|---|---------------------|---|---|---|----|--|
| 0                    | 1 | 2 | 3 | 4 | 5 | 6                   | 7 | 8 | 9 | 10 |  |

Q7. How would you rate your knowledge of the different ways you can save energy in your home?

| Not at all Knowledgeable |   |   |   |   |   | Extremely Knowledgeable |   |   |   |    |  |
|--------------------------|---|---|---|---|---|-------------------------|---|---|---|----|--|
| 0                        | 1 | 2 | 3 | 4 | 5 | 6                       | 7 | 8 | 9 | 10 |  |

Q8. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?

☐ Yes

☐ No – **Skip to Q12**

Q9. Which actions have been taken?

|   | Yes                      | No                       | Don't Know               |
|---|--------------------------|--------------------------|--------------------------|
| Adjusted heating or cooling settings to save energy                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Reduced water heater temperature to save energy                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Wash clothes in cold water  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fully load clothes washer   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fully load dishwasher   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Turn off lights in unused or outdoor areas                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Unplug or shut down household electronics when not in use                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Maintain heating or cooling equipment for more efficient operation          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Use a portable fan or ceiling fan for cooling instead of an air conditioner | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other, please specify:  |                          |                          |                          |
| Other, please specify:  |                          |                          |                          |

Q10. Which energy efficiency improvements have been made?

|  | Yes                      | No                       | Don't Know               |
|--|--------------------------|--------------------------|--------------------------|
| Install energy-efficient kitchen or laundry appliances                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Install energy-efficient heating/cooling equipment                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Install energy-efficient water heater  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Replace windows or doors with more energy-efficient types                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Caulk or weatherstrip (windows or doors)   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Add insulation to attic, walls, or floors  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Install energy-efficient lighting  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Install programmable thermostat or "smart" thermostat                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Purchase ENERGY STAR certified home electronic equipment (a television, for example) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Q11. Below are some reasons why you might not be able to save as much energy as you would like. How important are each of the following reasons? Scale: 0 = Not at all Important; 10 = Extremely Important

|  | Not at all Important |   |   |   |   |   |   |   |   |   | Extremely Important |  |  |  |  |  |  |  |  |  |
|--|----------------------|---|---|---|---|---|---|---|---|---|---------------------|--|--|--|--|--|--|--|--|--|
| Initial cost of energy efficient equipment is too high   | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |  |  |  |  |  |  |  |  |  |
| Not enough time to shop/research/install /Too busy   | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |  |  |  |  |  |  |  |  |  |
| I do not have the expertise  | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |  |  |  |  |  |  |  |  |  |
| I do not have enough information to make a decision or understand the impacts of these improvements or behaviors | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |  |  |  |  |  |  |  |  |  |
| Getting everyone in the house to cooperate is too hard   | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |  |  |  |  |  |  |  |  |  |
| I do not think my energy saving efforts are worth the time and/or money  | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |  |  |  |  |  |  |  |  |  |

Q12. Which of the following do you do with regard to your household's energy use? Check all that apply.

- ☐ Track monthly energy use  
☐ Track the total amount of your bill  
☐ Compare usage to previous months  
☐ Compare usage to the same month from last year  
☐ None of the above

Q13. Thinking about the information you could have about your home's energy use, please rate how useful each of the following items would be for your household. Scale: 0 = Not at all Useful; 10 = Extremely Useful

|   | Not at all Useful |   |   |   |   |   |   |   |   |   | Extremely Useful |  |  |  |  |  |  |  |  |  |
|---|-------------------|---|---|---|---|---|---|---|---|---|------------------|--|--|--|--|--|--|--|--|--|
| Your home's energy use compared to that of similar homes          | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10               |  |  |  |  |  |  |  |  |  |
| Tips to help you save money and energy                            | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10               |  |  |  |  |  |  |  |  |  |
| Examples of the energy use associated with common household items | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10               |  |  |  |  |  |  |  |  |  |
| Customized suggestions for your home                              | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10               |  |  |  |  |  |  |  |  |  |
| Graphs that display your home's energy use over time              | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10               |  |  |  |  |  |  |  |  |  |
| Information about services and offers from Duke Energy            | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10               |  |  |  |  |  |  |  |  |  |

Q14. The statements below provide reasons why households might try to reduce their home's energy use. Please indicate how important each statement is to you. Scale: 0 = Not at all Important; 10 = Extremely Important

|                               | Not at all Important |   |   |   |   |   |   |   |   |   | Extremely Important |  |  |  |  |  |  |  |  |  |
|-------------------------------|----------------------|---|---|---|---|---|---|---|---|---|---------------------|--|--|--|--|--|--|--|--|--|
| Reducing my energy bill(s)    | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |  |  |  |  |  |  |  |  |  |
| Helping the environment       | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |  |  |  |  |  |  |  |  |  |
| Setting an example for others | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |  |  |  |  |  |  |  |  |  |
| Avoiding waste                | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |  |  |  |  |  |  |  |  |  |
| Conserving energy resources   | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |  |  |  |  |  |  |  |  |  |

Q15. Please indicate your level of agreement with each of the following statements:

|   | Strongly Disagree        | Somewhat Disagree        | Neither                  | Somewhat Agree           | Strongly Agree           |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Duke Energy provides excellent customer service   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Duke Energy respects its customers                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Duke Energy provides service at a reasonable cost | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Q16. Before today, were you aware that you could order free or discounted lighting products through the Duke Energy website?

☐ Yes

☐ No – **Skip to Q17**

Q16a. How many **free** light bulbs have you ordered through the Duke Energy website this year? \_\_\_\_\_

Q16b. How many **discounted** light bulbs have you ordered through the Duke Energy website this year? \_\_\_\_\_

Q17. How could Duke Energy improve upon its service offerings to help you reduce your energy usage?

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Q18. Do you own or rent this residence? ☐ Own ☐ Rent

Q19. Including yourself, how many people live in your home? \_\_\_\_\_

Q20. In what year was your home built? \_\_\_\_\_

Q21. How many square feet is the above-ground living space? \_\_\_\_\_

Q22. What is your primary heating fuel? ☐ Electricity ☐ Natural Gas ☐ Oil ☐ Other

Q23. In what year were you born? \_\_\_\_\_

**Thank you! Please return your completed survey using the enclosed envelope.**

NEXID



## Treatment-only Survey

Q1. Duke Energy sends a personalized report called *My Home Energy Report* to a select group of homes. These reports are mailed in a standard envelope every few months and are meant to provide you with information on how your home's electric energy usage compares with similar homes. Have you seen one of these reports?

☐ Yes

☐ No – **Skip to Q13**

Q2. About how many *My Home Energy Reports* have you received in the past 12 months? \_\_\_\_ **If zero, skip to Q13**

Q3. How often do you read the *My Home Energy Reports*?

☐ Always

☐ Sometimes

☐ Never – **Skip to Q13**

Q4. How much do you agree or disagree with the following statements about *My Home Energy Reports*?

Scale: 0 = Strongly Disagree; 10 = Strongly Agree

|   | Strongly Disagree |   |   |   |   |   |   |   |   |   | Strongly Agree |  |  |  |  |  |  |  |  |  |
|---|-------------------|---|---|---|---|---|---|---|---|---|----------------|--|--|--|--|--|--|--|--|--|
| I have learned about my household's energy use from <i>My Home Energy Reports</i> .   | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10             |  |  |  |  |  |  |  |  |  |
| I use the reports to tell me how well I am doing at saving energy.  | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10             |  |  |  |  |  |  |  |  |  |
| The tips provided in the reports are pertinent to my home.  | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10             |  |  |  |  |  |  |  |  |  |
| <i>My Home Energy Reports</i> provide the details I need to understand my home's energy use.                                  | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10             |  |  |  |  |  |  |  |  |  |
| I have discussed <i>My Home Energy Reports</i> with others.   | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10             |  |  |  |  |  |  |  |  |  |
| The information provided about my home's energy use is confusing.   | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10             |  |  |  |  |  |  |  |  |  |
| I suspect that the "similar" homes that my home is compared to in the <i>Home Energy Reports</i> are not actually like mine.  | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10             |  |  |  |  |  |  |  |  |  |
| I like receiving the <i>Home Energy Reports</i> .   | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10             |  |  |  |  |  |  |  |  |  |
| Since reading the <i>Home Energy Reports</i> , I have taken actions to use less energy than I would not have otherwise taken. | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10             |  |  |  |  |  |  |  |  |  |

Q5. How could Duke Energy make *My Home Energy Reports* more useful for your household? Please provide any suggestions you may have to improve the reports.

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Q6. Please rate how useful each feature of the *Home Energy Report* is to you.

Scale: 0 = Not at all Useful; 10 = Extremely Useful

|   | Not at all Useful |   |   |   |   |   |   |   |   | Extremely Useful |    |
|---|-------------------|---|---|---|---|---|---|---|---|------------------|----|
|   | 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9                | 10 |
| Comparison to similar homes                                       |                   |   |   |   |   |   |   |   |   |                  |    |
| Tips to help you save money and energy                            |                   |   |   |   |   |   |   |   |   |                  |    |
| Examples of the energy use associated with common household items |                   |   |   |   |   |   |   |   |   |                  |    |
| Customized suggestions for your home                              |                   |   |   |   |   |   |   |   |   |                  |    |
| Graphs that display your home's energy use over time              |                   |   |   |   |   |   |   |   |   |                  |    |
| Information about services and offers from Duke Energy            |                   |   |   |   |   |   |   |   |   |                  |    |

Q7. Overall, how satisfied are you with the information in the *My Home Energy Reports* you've received?

Scale: 0 = Not at all Satisfied; 10 = Completely Satisfied

| Not at all Satisfied |   |   |   |   |   |   |   | Completely Satisfied |   |    |
|----------------------|---|---|---|---|---|---|---|----------------------|---|----|
| 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8                    | 9 | 10 |

Q7a. Why do you say that? \_\_\_\_\_

Q8. Are you aware that you can go online to *My Home Energy Interactive* to access more information, above and beyond that found in the *My Home Energy Report*, which describes more ways to save energy?

☐ Yes

☐ No – **Skip to Q9**

Q8a. Have you signed up to use *My Home Energy Interactive*?

☐ Yes

☐ No – **Skip to Q8c**

Q8b. How useful is *My Home Energy Interactive* to you for saving energy?

Scale: 0 = Not at all Useful; 10 = Extremely Useful

| Not at all Useful |   |   |   |   |   |   |   |   | Extremely Useful |    |
|-------------------|---|---|---|---|---|---|---|---|------------------|----|
| 0                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9                | 10 |

Q8c. Why haven't you signed up to use *My Home Energy Interactive*?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Q9. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?

☐ Yes

☐ No – **Skip to Q13**

Q10. Which actions have been taken?

|   | Yes                      | No                       | Don't Know               |
|---|--------------------------|--------------------------|--------------------------|
| Adjusted heating or cooling settings to save energy                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Reduced water heater temperature to save energy                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Wash clothes in cold water  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fully load clothes washer   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fully load dishwasher   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Turn off lights in unused or outdoor areas                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Unplug or shut down household electronics when not in use                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Maintain heating or cooling equipment for more efficient operation          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Use a portable fan or ceiling fan for cooling instead of an air conditioner | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other, please specify:  |                          |                          |                          |
| Other, please specify:  |                          |                          |                          |

Q11. Which energy efficiency improvements have been made?

|  | Yes                      | No                       | Don't Know               |
|--|--------------------------|--------------------------|--------------------------|
| Install energy-efficient kitchen or laundry appliances                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Install energy-efficient heating/cooling system                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Install energy-efficient water heater  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Replace windows or doors with more energy-efficient types                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Caulk or weatherstrip (windows or doors)   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Add insulation to attic, walls, or floors  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Install energy-efficient lighting  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Install programmable thermostat or "smart" thermostat                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Purchase ENERGY STAR-certified home electronic equipment (a television, for example) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Q12. Below are some reasons why you might not be able to save as much energy as you would like. How important are each of the following reasons? Scale: 0 = Not at all Important; 10 = Extremely Important

|  | Not at all Important |   |   |   |   |   |   |   |   |   | Extremely Important |
|--|----------------------|---|---|---|---|---|---|---|---|---|---------------------|
| Initial cost of energy efficient equipment is too high   | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |
| Not enough time to shop/research/install /Too busy   | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |
| I do not have the expertise  | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |
| I do not have enough information to make a decision or understand the impacts of these improvements or behaviors | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |
| Getting everyone in the house to cooperate is too hard   | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |
| I do not think my energy saving efforts are worth the time and/or money  | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                  |

Q13. Do you own or rent this residence? ☐ Own ☐ Rent

Q14. Including yourself, how many people live in your home? \_\_\_\_\_

Q15. In what year was your home built? \_\_\_\_\_

Q16. How many square feet is the above-ground living space? \_\_\_\_\_

Q17. What is your primary heating fuel? ☐ Electricity ☐ Natural Gas ☐ Oil ☐ Other

Q18. In what year were you born? \_\_\_\_\_

**Thank you! Please return your completed survey using the enclosed envelope.**

NEXID



## Appendix D Survey Frequencies: DEC

*PRI\_Q1. Please rate how satisfied you are with Duke Energy as your electric supplier.*

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 2 | 1 | 0 | 1 | 2 | 11 | 6  | 24 | 37 | 40 | 86  | 1           | 211   |
| Percent   | 1 | 0 | 0 | 0 | 1 | 5  | 3  | 11 | 18 | 19 | 41  | 0           | 100   |
| Treatment | 2 | 0 | 1 | 1 | 1 | 14 | 7  | 23 | 35 | 35 | 65  | 0           | 184   |
| Percent   | 1 | 0 | 1 | 1 | 1 | 8  | 4  | 13 | 19 | 19 | 35  | 0           | 100   |
| Total     | 4 | 1 | 1 | 2 | 3 | 25 | 13 | 47 | 72 | 75 | 151 | 1           | 395   |
| Percent   | 1 | 0 | 0 | 1 | 1 | 6  | 3  | 12 | 18 | 19 | 38  | 0           | 100   |

*PRI\_Q2 Please rate your overall satisfaction with each of the following aspects of communications from Duke Energy.*

*PRI\_Q2\_1 The information available about Duke Energy's efficiency programs.*

| Group     | Very Satisfied | Somewhat Satisfied | Neither | Somewhat Dissatisfied | Very Dissatisfied | No Response | Total |
|-----------|----------------|--------------------|---------|-----------------------|-------------------|-------------|-------|
| Control   | 86             | 72                 | 38      | 6                     | 7                 | 2           | 211   |
| Percent   | 41             | 34                 | 18      | 3                     | 3                 | 1           | 100   |
| Treatment | 82             | 60                 | 28      | 5                     | 8                 | 1           | 184   |
| Percent   | 45             | 33                 | 15      | 3                     | 4                 | 1           | 100   |
| Total     | 168            | 132                | 66      | 11                    | 15                | 3           | 395   |
| Percent   | 43             | 33                 | 17      | 3                     | 4                 | 1           | 100   |

*PRI\_Q2\_2 Duke Energy's commitment to promoting energy efficiency and the wise use of electricity.*

| Group     | Very Satisfied | Somewhat Satisfied | Neither | Somewhat Dissatisfied | Very Dissatisfied | No Response | Total |
|-----------|----------------|--------------------|---------|-----------------------|-------------------|-------------|-------|
| Control   | 93             | 66                 | 35      | 8                     | 7                 | 2           | 211   |
| Percent   | 44             | 31                 | 17      | 4                     | 3                 | 1           | 100   |
| Treatment | 80             | 61                 | 27      | 5                     | 9                 | 2           | 184   |
| Percent   | 43             | 33                 | 15      | 3                     | 5                 | 1           | 100   |
| Total     | 173            | 127                | 62      | 13                    | 16                | 4           | 395   |
| Percent   | 44             | 32                 | 16      | 3                     | 4                 | 1           | 100   |

**PRI\_Q2\_3 The information Duke Energy provides to help customers save on energy bills.**

| Group     | Very Satisfied | Somewhat Satisfied | Neither | Somewhat Dissatisfied | Very Dissatisfied | No Response | Total |
|-----------|----------------|--------------------|---------|-----------------------|-------------------|-------------|-------|
| Control   | 93             | 76                 | 23      | 11                    | 5                 | 3           | 211   |
| Percent   | 44             | 36                 | 11      | 5                     | 2                 | 1           | 100   |
| Treatment | 90             | 59                 | 18      | 7                     | 8                 | 2           | 184   |
| Percent   | 49             | 32                 | 10      | 4                     | 4                 | 1           | 100   |
| Total     | 183            | 135                | 41      | 18                    | 13                | 5           | 395   |
| Percent   | 46.33          | 34                 | 10      | 5                     | 3                 | 1           | 100   |

**PRI\_Q3 Have you logged in to your Duke Energy account to do any of the following?  
Check all that apply.**

**PRI\_Q3\_1 I have never logged in**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 129         | 75      | 204   |
| Percent   | 63          | 37      | 100   |
| Treatment | 115         | 65      | 180   |
| Percent   | 64          | 36      | 100   |
| Total     | 244         | 140     | 384   |
| Percent   | 64          | 36      | 100   |

**PRI\_Q3\_2 Pay my bill**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 128         | 76      | 204   |
| Percent   | 63          | 37      | 100   |
| Treatment | 116         | 64      | 180   |
| Percent   | 64          | 36      | 100   |
| Total     | 244         | 140     | 384   |
| Percent   | 64          | 36      | 100   |

**PRI\_Q3\_3 Review energy consumption graphs**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 163         | 41      | 204   |
| Percent   | 80          | 20      | 100   |
| Treatment | 146         | 34      | 180   |
| Percent   | 81          | 19      | 100   |
| Total     | 309         | 75      | 384   |
| Percent   | 80          | 20      | 100   |

**PRI\_Q3\_4 Look for energy efficiency opportunities or ideas**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 172         | 32      | 204   |
| Percent   | 84          | 16      | 100   |
| Treatment | 151         | 29      | 180   |
| Percent   | 84          | 16      | 100   |
| Total     | 323         | 61      | 384   |
| Percent   | 84          | 16      | 100   |

**PRI\_Q3\_5 None of the above**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 171         | 33      | 204   |
| percent   | 84          | 16      | 100   |
| Treatment | 149         | 31      | 180   |
| percent   | 83          | 17      | 100   |
| Total     | 320         | 64      | 384   |
| percent   | 83          | 17      | 100   |

**PRI\_Q4. How often do you access the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make your home more energy efficient? Select only one.**

| Group     | Monthly | Once a year | A few times a year | Never | No Response | Total |
|-----------|---------|-------------|--------------------|-------|-------------|-------|
| Control   | 14      | 18          | 48                 | 130   | 1           | 211   |
| Percent   | 7       | 9           | 23                 | 62    | 0           | 100   |
| Treatment | 14      | 13          | 34                 | 123   | 0           | 184   |
| Percent   | 8       | 7           | 18                 | 67    | 0           | 100   |
| Total     | 28      | 31          | 82                 | 253   | 1           | 395   |
| Percent   | 7       | 8           | 21                 | 64    | 0           | 100   |

**PRI\_Q5. If you needed to replace major home equipment or were considering improvements to your home's energy performance today, how likely would you be to check the Duke Energy website for information about energy efficient solutions or incentives?**

| Group     | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 47 | 12 | 14 | 14 | 4  | 20 | 22 | 21 | 23 | 18 | 14 | 2           | 211   |
| Percent   | 22 | 6  | 7  | 7  | 2  | 9  | 10 | 10 | 11 | 9  | 7  | 1           | 100   |
| Treatment | 46 | 10 | 9  | 10 | 7  | 27 | 8  | 13 | 20 | 12 | 22 | 0           | 184   |
| Percent   | 25 | 5  | 5  | 5  | 4  | 15 | 4  | 7  | 11 | 7  | 12 | 0           | 100   |
| Total     | 93 | 22 | 23 | 24 | 11 | 47 | 30 | 34 | 43 | 30 | 36 | 2           | 395   |
| Percent   | 24 | 6  | 6  | 6  | 3  | 12 | 8  | 9  | 11 | 8  | 9  | 1           | 100   |

**PRI\_Q6. How important is it for you to know if your household is using energy wisely?**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 1 | 2 | 1 | 3 | 3 | 11 | 19 | 26 | 40 | 34 | 70  | 1           | 211   |
| Percent   | 0 | 1 | 0 | 1 | 1 | 5  | 9  | 12 | 19 | 16 | 33  | 0           | 100   |
| Treatment | 3 | 1 | 2 | 0 | 2 | 22 | 11 | 22 | 29 | 24 | 68  | 0           | 184   |
| Percent   | 2 | 1 | 1 | 0 | 1 | 12 | 6  | 12 | 16 | 13 | 37  | 0           | 100   |
| Total     | 4 | 3 | 3 | 3 | 5 | 33 | 30 | 48 | 69 | 58 | 138 | 1           | 395   |
| Percent   | 1 | 1 | 1 | 1 | 1 | 8  | 8  | 12 | 17 | 15 | 35  | 0           | 100   |

**PRI\_Q7. How would you rate your knowledge of the different ways you can save energy in your home?**

| Group     | 0 | 1 | 2  | 3 | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|---|---|----|---|----|----|----|----|----|----|----|-------------|-------|
| Control   | 2 | 0 | 8  | 6 | 6  | 31 | 19 | 43 | 48 | 26 | 21 | 1           | 211   |
| Percent   | 1 | 0 | 4  | 3 | 3  | 15 | 9  | 20 | 23 | 12 | 10 | 0           | 100   |
| Treatment | 2 | 1 | 4  | 2 | 5  | 28 | 18 | 32 | 46 | 21 | 25 | 0           | 184   |
| Percent   | 1 | 1 | 2  | 1 | 3  | 15 | 10 | 17 | 25 | 11 | 14 | 0           | 100   |
| Total     | 4 | 1 | 12 | 8 | 11 | 59 | 37 | 75 | 94 | 47 | 46 | 1           | 395   |
| Percent   | 1 | 0 | 3  | 2 | 3  | 15 | 9  | 19 | 24 | 12 | 12 | 0           | 100   |

***PRI\_Q8 & TRE\_Q9. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?***

| Group     | Yes | No  | No Response | Missing | Total |
|-----------|-----|-----|-------------|---------|-------|
| Control   | 129 | 77  | 5           | 0       | 211   |
| Percent   | 61  | 36  | 2           | 0       | 100   |
| Treatment | 229 | 85  | 6           | 17      | 337   |
| Percent   | 68  | 25  | 2           | 5       | 100   |
| Total     | 358 | 162 | 11          | 17      | 548   |
| Percent   | 65  | 30  | 2           | 3       | 100   |

***PRI\_Q9 & TRE\_Q10. Which actions have been taken?***

***PRI\_Q9\_1 & TRE\_Q10\_1. Adjusted heating or cooling settings to save energy***

| Group     | Yes | No | Don't Know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 115 | 7  | 2          | 5           | 129   |
| Percent   | 89  | 5  | 2          | 4           | 100   |
| Treatment | 213 | 13 | 1          | 2           | 229   |
| Percent   | 93  | 6  | 0          | 1           | 100   |
| Total     | 328 | 20 | 3          | 7           | 358   |
| Percent   | 92  | 6  | 1          | 2           | 100   |

***PRI\_Q9\_2 & TRE\_Q10\_2. Reduced water heater temperature to save energy***

| Group     | Yes | No  | Don't Know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 41  | 75  | 6          | 7           | 129   |
| Percent   | 32  | 58  | 5          | 5           | 100   |
| Treatment | 84  | 130 | 8          | 7           | 229   |
| Percent   | 37  | 57  | 3          | 3           | 100   |
| Total     | 125 | 205 | 14         | 14          | 358   |
| Percent   | 35  | 57  | 4          | 4           | 100   |

***PRI\_Q9\_3 & TRE\_Q10\_3. Wash clothes in cold water***

| Group     | Yes | No | Don't Know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 85  | 38 | 1          | 5           | 129   |
| Percent   | 66  | 29 | 1          | 4           | 100   |
| Treatment | 170 | 51 | 5          | 3           | 229   |
| Percent   | 74  | 22 | 2          | 1           | 100   |
| Total     | 255 | 89 | 6          | 8           | 358   |
| Percent   | 71  | 25 | 2          | 2           | 100   |

***PRI\_Q9\_4 & TRE\_Q10\_4. Fully load clothes washer***

| Group     | Yes | No | Don't Know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 98  | 23 | 3          | 5           | 129   |
| Percent   | 76  | 18 | 2          | 4           | 100   |
| Treatment | 192 | 29 | 5          | 3           | 229   |
| Percent   | 84  | 13 | 2          | 1           | 100   |
| Total     | 290 | 52 | 8          | 8           | 358   |
| Percent   | 81  | 15 | 2          | 2           | 100   |

***PRI\_Q9\_5 & TRE\_Q10\_5. Fully load dishwasher***

| Group     | Yes | No | Don't Know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 81  | 27 | 12         | 9           | 129   |
| Percent   | 63  | 21 | 9          | 7           | 100   |
| Treatment | 168 | 43 | 12         | 6           | 229   |
| Percent   | 73  | 19 | 5          | 3           | 100   |
| Total     | 249 | 70 | 24         | 15          | 358   |
| Percent   | 70  | 20 | 7          | 4           | 100   |

***PRI\_Q9\_6 & TRE\_Q10\_6. Turn off lights in unused or outdoor areas***

| Group     | Yes | No | No Response | Total |
|-----------|-----|----|-------------|-------|
| Control   | 121 | 7  | 1           | 129   |
| Percent   | 94  | 5  | 1           | 100   |
| Treatment | 224 | 4  | 1           | 229   |
| Percent   | 98  | 2  | 0           | 100   |
| Total     | 345 | 11 | 2           | 358   |
| Percent   | 96  | 3  | 1           | 100   |

***PRI\_Q9\_7 & TRE\_Q10\_7. Unplug or shut down household electronics when not in use***

| Group     | Yes | No | No Response | Total |
|-----------|-----|----|-------------|-------|
| Control   | 100 | 25 | 4           | 129   |
| Percent   | 78  | 19 | 3           | 100   |
| Treatment | 170 | 55 | 4           | 229   |
| Percent   | 74  | 24 | 2           | 100   |
| Total     | 270 | 80 | 8           | 358   |
| Percent   | 75  | 22 | 2           | 100   |

***PRI\_Q9\_8 & TRE\_Q10\_8. Maintain heating or cooling equipment for more efficient operation***

| Group     | Yes | No | Don't Know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 104 | 11 | 5          | 9           | 129   |
| Percent   | 81  | 9  | 4          | 7           | 100   |
| Treatment | 200 | 26 | 2          | 1           | 229   |
| Percent   | 87  | 11 | 1          | 0           | 100   |
| Total     | 304 | 37 | 7          | 10          | 358   |
| Percent   | 85  | 10 | 2          | 3           | 100   |

***PRI\_Q9\_9 & TRE\_Q10\_9. Use a portable fan or ceiling fan for cooling instead of an air conditioner***

| Group     | Yes | No  | Don't Know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 88  | 35  | 3          | 3           | 129   |
| Percent   | 68  | 27  | 2          | 2           | 100   |
| Treatment | 133 | 90  | 5          | 1           | 229   |
| Percent   | 58  | 39  | 2          | 0           | 100   |
| Total     | 221 | 125 | 8          | 4           | 358   |
| Percent   | 62  | 35  | 2          | 1           | 100   |

***PRI\_Q9\_10 & TRE\_Q10\_10. Other, please specify:***

| Group     | Yes | No | Don't Know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 32  | 30 | 41         | 26          | 129   |
| Percent   | 25  | 23 | 32         | 20          | 100   |
| Treatment | 42  | 44 | 98         | 45          | 229   |
| Percent   | 18  | 19 | 43         | 20          | 100   |
| Total     | 74  | 74 | 139        | 71          | 358   |
| Percent   | 21  | 21 | 39         | 20          | 100   |

***PRI\_Q9\_11 & TRE\_Q10\_11. Other, please specify:***

| Group     | Yes | No  | Don't Know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 8   | 48  | 44         | 29          | 129   |
| Percent   | 6   | 37  | 34         | 22          | 100   |
| Treatment | 15  | 59  | 107        | 48          | 229   |
| Percent   | 7   | 26  | 47         | 21          | 100   |
| Total     | 23  | 107 | 151        | 77          | 358   |
| Percent   | 6   | 30  | 42         | 22          | 100   |

**PRI\_Q10 & TRE\_Q11. Which energy efficiency improvements have been made?**

**PRI\_Q10\_1 & TRE\_Q11\_1. Install energy-efficient kitchen or laundry appliances**

| Group     | Yes | No  | Don't Know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 66  | 53  | 6          | 4           | 129   |
| Percent   | 51  | 41  | 5          | 3           | 100   |
| Treatment | 120 | 101 | 6          | 2           | 229   |
| Percent   | 52  | 44  | 3          | 1           | 100   |
| Total     | 186 | 154 | 12         | 6           | 358   |
| Percent   | 52  | 43  | 3          | 2           | 100   |

**PRI\_Q10\_2 & TRE\_Q11\_2. Install energy-efficient heating/cooling equipment**

| Group     | Yes | No  | Don't Know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 65  | 54  | 5          | 5           | 129   |
| Percent   | 50  | 42  | 4          | 4           | 100   |
| Treatment | 104 | 113 | 10         | 2           | 229   |
| Percent   | 45  | 49  | 4          | 1           | 100   |
| Total     | 169 | 167 | 15         | 7           | 358   |
| Percent   | 47  | 47  | 4          | 2           | 100   |

**PRI\_Q10\_3 & TRE\_Q11\_3. Install energy-efficient water heater**

| Group     | Yes | No  | Don't Know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 51  | 67  | 6          | 5           | 129   |
| Percent   | 40  | 52  | 5          | 4           | 100   |
| Treatment | 88  | 128 | 10         | 3           | 229   |
| Percent   | 38  | 56  | 4          | 1           | 100   |
| Total     | 139 | 195 | 16         | 8           | 358   |
| Percent   | 39  | 54  | 4          | 2           | 100   |

**PRI\_Q10\_4 & TRE\_Q11\_4. Replace windows or doors with more energy-efficient types)**

| Group     | Yes | No  | Don't Know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 39  | 83  | 1          | 6           | 129   |
| Percent   | 30  | 64  | 1          | 5           | 100   |
| Treatment | 79  | 144 | 3          | 3           | 229   |
| Percent   | 35  | 63  | 1          | 1           | 100   |
| Total     | 118 | 227 | 4          | 9           | 358   |
| Percent   | 33  | 63  | 1          | 3           | 100   |



**PRI\_Q10\_5 & TRE\_Q11\_5. Caulk or weatherstrip (windows or doors)**

| Group     | Yes | No  | Don't Know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 57  | 60  | 6          | 6           | 129   |
| Percent   | 44  | 47  | 5          | 5           | 100   |
| Treatment | 111 | 111 | 3          | 4           | 229   |
| Percent   | 48  | 48  | 1          | 2           | 100   |
| Total     | 168 | 171 | 9          | 10          | 358   |
| Percent   | 47  | 48  | 3          | 3           | 100   |

**PRI\_Q10\_6 & TRE\_Q11\_6. Add insulation to attic, walls, or floors**

| Group     | Yes | No  | Don't Know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 45  | 75  | 3          | 6           | 129   |
| Percent   | 35  | 58  | 2          | 5           | 100   |
| Treatment | 69  | 147 | 4          | 9           | 229   |
| Percent   | 30  | 64  | 2          | 4           | 100   |
| Total     | 114 | 222 | 7          | 15          | 358   |
| Percent   | 32  | 62  | 2          | 4           | 100   |

**PRI\_Q10\_7 & TRE\_Q11\_7. Install energy-efficient lighting**

| Group     | Yes | No | Don't Know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 103 | 18 | 3          | 5           | 129   |
| Percent   | 80  | 14 | 2          | 4           | 100   |
| Treatment | 186 | 40 | 2          | 1           | 229   |
| Percent   | 81  | 17 | 1          | 0           | 100   |
| Total     | 289 | 58 | 5          | 6           | 358   |
| Percent   | 81  | 16 | 1          | 2           | 100   |

**PRI\_Q10\_8 & TRE\_Q11\_8. Install programmable thermostat or "smart" thermostat**

| Group     | Yes | No  | Don't Know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 64  | 56  | 4          | 5           | 129   |
| Percent   | 50  | 43  | 3          | 4           | 100   |
| Treatment | 103 | 119 | 4          | 3           | 229   |
| Percent   | 45  | 52  | 2          | 1           | 100   |
| Total     | 167 | 175 | 8          | 8           | 358   |
| Percent   | 47  | 49  | 2          | 2           | 100   |

**PRI\_Q10\_9 & TRE\_Q11\_9. Purchase ENERGY STAR certified home electronic equipment (a television, for example)**

| Group     | Yes | No  | Don't Know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 73  | 37  | 12         | 7           | 129   |
| Percent   | 57  | 29  | 9          | 5           | 100   |
| Treatment | 128 | 85  | 13         | 3           | 229   |
| Percent   | 56  | 37  | 6          | 1           | 100   |
| Total     | 201 | 122 | 25         | 10          | 358   |
| Percent   | 56  | 34  | 7          | 3           | 100   |

**PRI\_Q11 & TRE\_Q12. Below are some reasons why you might not be able to save as much energy as you would like. How important are each of the following reasons?**

**PRI\_Q11\_1 & TRE\_Q12\_1. Initial cost of energy efficient equipment is too high**

| Group     | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 10 | 2  | 3  | 5  | 7  | 19 | 7  | 18 | 15 | 14 | 25 | 4           | 129   |
| Percent   | 8  | 2  | 2  | 4  | 5  | 15 | 5  | 14 | 12 | 11 | 19 | 3           | 100   |
| Treatment | 14 | 8  | 8  | 7  | 8  | 39 | 8  | 21 | 33 | 16 | 65 | 2           | 229   |
| Percent   | 6  | 3  | 3  | 3  | 3  | 17 | 3  | 9  | 14 | 7  | 28 | 1           | 100   |
| Total     | 24 | 10 | 11 | 12 | 15 | 58 | 15 | 39 | 48 | 30 | 90 | 6           | 358   |
| Percent   | 7  | 3  | 3  | 3  | 4  | 16 | 4  | 11 | 13 | 8  | 25 | 2           | 100   |

**PRI\_Q11\_2 & TRE\_Q12\_2. Not enough time to shop/research/install/too busy**

| Group     | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 20 | 3  | 7  | 7  | 3  | 23 | 9  | 15 | 10 | 9  | 16 | 7           | 129   |
| Percent   | 16 | 2  | 5  | 5  | 2  | 18 | 7  | 12 | 8  | 7  | 12 | 5           | 100   |
| Treatment | 39 | 12 | 11 | 10 | 8  | 57 | 6  | 17 | 26 | 10 | 28 | 5           | 229   |
| Percent   | 17 | 5  | 5  | 4  | 3  | 25 | 3  | 7  | 11 | 4  | 12 | 2           | 100   |
| Total     | 59 | 15 | 18 | 17 | 11 | 80 | 15 | 32 | 36 | 19 | 44 | 12          | 358   |
| Percent   | 16 | 4  | 5  | 5  | 3  | 22 | 4  | 9  | 10 | 5  | 12 | 3           | 100   |

**PRI\_Q11\_3 & TRE\_Q12\_3. I do not have the expertise**

| Group     | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 22 | 4  | 6  | 6  | 7  | 28 | 9  | 11 | 9  | 8  | 14 | 5           | 129   |
| Percent   | 17 | 3  | 5  | 5  | 5  | 22 | 7  | 9  | 7  | 6  | 11 | 4           | 100   |
| Treatment | 41 | 12 | 8  | 12 | 9  | 57 | 13 | 21 | 14 | 11 | 28 | 3           | 229   |
| Percent   | 18 | 5  | 3  | 5  | 4  | 25 | 6  | 9  | 6  | 5  | 12 | 1           | 100   |
| Total     | 63 | 16 | 14 | 18 | 16 | 85 | 22 | 32 | 23 | 19 | 42 | 8           | 358   |
| Percent   | 18 | 4  | 4  | 5  | 4  | 24 | 6  | 9  | 6  | 5  | 12 | 2           | 100   |

**PRI\_Q11\_4 & TRE\_Q12\_4. I do not have enough information to make a decision or understand the impacts of these improvements or behaviors**

| Group     | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 23 | 4  | 6  | 6  | 7  | 23 | 9  | 19 | 12 | 6  | 9  | 5           | 129   |
| Percent   | 18 | 3  | 5  | 5  | 5  | 18 | 7  | 15 | 9  | 5  | 7  | 4           | 100   |
| Treatment | 40 | 6  | 14 | 9  | 9  | 48 | 20 | 16 | 22 | 5  | 35 | 5           | 229   |
| Percent   | 17 | 3  | 6  | 4  | 4  | 21 | 9  | 7  | 10 | 2  | 15 | 2           | 100   |
| Total     | 63 | 10 | 20 | 15 | 16 | 71 | 29 | 35 | 34 | 11 | 44 | 10          | 358   |
| Percent   | 18 | 3  | 6  | 4  | 4  | 20 | 8  | 10 | 10 | 3  | 12 | 3           | 100   |

**PRI\_Q11\_5 & TRE\_Q12\_5. Getting everyone in the house to cooperate is too hard**

| Group     | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 26 | 6  | 3  | 7  | 6  | 22 | 8  | 6  | 7  | 5  | 25 | 8           | 129   |
| Percent   | 20 | 5  | 2  | 5  | 5  | 17 | 6  | 5  | 5  | 4  | 19 | 6           | 100   |
| Treatment | 60 | 12 | 9  | 5  | 7  | 37 | 10 | 14 | 22 | 10 | 38 | 5           | 229   |
| Percent   | 26 | 5  | 4  | 2  | 3  | 16 | 4  | 6  | 10 | 4  | 17 | 2           | 100   |
| Total     | 86 | 18 | 12 | 12 | 13 | 59 | 18 | 20 | 29 | 15 | 63 | 13          | 358   |
| Percent   | 24 | 5  | 3  | 3  | 4  | 16 | 5  | 6  | 8  | 4  | 18 | 4           | 100   |

**PRI\_Q11\_6 & TRE\_Q12\_6. I do not think my energy saving efforts are worth the time and/or money**

| Group     | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 23 | 9  | 5  | 5  | 8  | 20 | 6  | 4  | 12 | 8  | 23 | 6           | 129   |
| Percent   | 18 | 7  | 4  | 4  | 6  | 16 | 5  | 3  | 9  | 6  | 18 | 5           | 100   |
| Treatment | 38 | 16 | 12 | 10 | 3  | 37 | 9  | 13 | 23 | 13 | 51 | 4           | 229   |
| Percent   | 17 | 7  | 5  | 4  | 1  | 16 | 4  | 6  | 10 | 6  | 22 | 2           | 100   |
| Total     | 61 | 25 | 17 | 15 | 11 | 57 | 15 | 17 | 35 | 21 | 74 | 10          | 358   |
| Percent   | 17 | 7  | 5  | 4  | 3  | 16 | 4  | 5  | 10 | 6  | 21 | 3           | 100   |

**PRI\_Q12 Which of the following do you do with regard to your household's energy use? Check all that apply.**

**PRI\_Q12\_1 Track monthly energy use**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 116         | 91      | 207   |
| Percent   | 56          | 44      | 100   |
| Treatment | 100         | 83      | 183   |
| Percent   | 55          | 45      | 100   |
| Total     | 216         | 174     | 390   |
| Percent   | 55          | 45      | 100   |

**PRI\_Q12\_2 Track the total amount of your bill**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 64          | 143     | 207   |
| Percent   | 31          | 69      | 100   |
| Treatment | 78          | 105     | 183   |
| Percent   | 43          | 57      | 100   |
| Total     | 142         | 248     | 390   |
| Percent   | 36          | 64      | 100   |

**PRI\_Q12\_3 Compare usage to previous months**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 66          | 141     | 207   |
| Percent   | 32          | 68      | 100   |
| Treatment | 62          | 121     | 183   |
| Percent   | 34          | 66      | 100   |
| Total     | 128         | 262     | 390   |
| Percent   | 33          | 67      | 100   |

**PRI\_Q12\_4 Compare usage to the same month from last year**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 87          | 120     | 207   |
| Percent   | 42          | 58      | 100   |
| Treatment | 83          | 100     | 183   |
| Percent   | 45          | 55      | 100   |
| Total     | 170         | 220     | 390   |
| Percent   | 44          | 56      | 100   |

**PRI\_Q12\_5 None of the above**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 189         | 18      | 207   |
| Percent   | 91          | 9       | 100   |
| Treatment | 153         | 30      | 183   |
| Percent   | 84          | 16      | 100   |
| Total     | 342         | 48      | 390   |
| Percent   | 88          | 12      | 100   |

**PRI\_Q13. Thinking about the information you could have about your home's energy use, please rate how useful each of the following items would be for your household.**

**PRI\_Q13\_1. Your home's energy use compared to that of similar homes**

| Group     | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 17 | 5  | 5  | 11 | 4  | 34 | 10 | 27 | 22 | 21 | 46 | 9           | 211   |
| Percent   | 8  | 2  | 2  | 5  | 2  | 16 | 5  | 13 | 10 | 10 | 22 | 4           | 100   |
| Treatment | 18 | 5  | 7  | 3  | 7  | 24 | 8  | 26 | 25 | 11 | 47 | 3           | 184   |
| Percent   | 10 | 3  | 4  | 2  | 4  | 13 | 4  | 14 | 14 | 6  | 26 | 2           | 100   |
| Total     | 35 | 10 | 12 | 14 | 11 | 58 | 18 | 53 | 47 | 32 | 93 | 12          | 395   |
| Percent   | 9  | 3  | 3  | 4  | 3  | 15 | 5  | 13 | 12 | 8  | 24 | 3           | 100   |

**PRI\_Q13\_2. Tips to help you save money and energy**

| Group     | 0  | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 5  | 2 | 2 | 3 | 7 | 32 | 16 | 24 | 26 | 24 | 64  | 6           | 211   |
| Percent   | 2  | 1 | 1 | 1 | 3 | 15 | 8  | 11 | 12 | 11 | 30  | 3           | 100   |
| Treatment | 10 | 3 | 3 | 4 | 2 | 24 | 5  | 28 | 29 | 17 | 58  | 1           | 184   |
| Percent   | 5  | 2 | 2 | 2 | 1 | 13 | 3  | 15 | 16 | 9  | 32  | 1           | 100   |
| Total     | 15 | 5 | 5 | 7 | 9 | 56 | 21 | 52 | 55 | 41 | 122 | 7           | 395   |
| Percent   | 4  | 1 | 1 | 2 | 2 | 14 | 5  | 13 | 14 | 10 | 31  | 2           | 100   |

**PRI\_Q13\_3. Examples of the energy use associated with common household items**

| Group     | 0  | 1 | 2 | 3 | 4  | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|---|---|----|----|----|----|----|----|-----|-------------|-------|
| Control   | 6  | 2 | 5 | 2 | 9  | 31 | 12 | 27 | 25 | 21 | 63  | 8           | 211   |
| Percent   | 3  | 1 | 2 | 1 | 4  | 15 | 6  | 13 | 12 | 10 | 30  | 4           | 100   |
| Treatment | 16 | 3 | 3 | 2 | 3  | 24 | 11 | 27 | 28 | 20 | 45  | 2           | 184   |
| Percent   | 9  | 2 | 2 | 1 | 2  | 13 | 6  | 15 | 15 | 11 | 24  | 1           | 100   |
| Total     | 22 | 5 | 8 | 4 | 12 | 55 | 23 | 54 | 53 | 41 | 108 | 10          | 395   |
| Percent   | 6  | 1 | 2 | 1 | 3  | 14 | 6  | 14 | 13 | 10 | 27  | 3           | 100   |

**PRI\_Q13\_4. Customized suggestions for your home**

| Group     | 0  | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|---|----|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 13 | 1 | 10 | 7  | 9  | 35 | 14 | 22 | 16 | 19 | 54 | 11          | 211   |
| Percent   | 6  | 0 | 5  | 3  | 4  | 17 | 7  | 10 | 8  | 9  | 26 | 5           | 100   |
| Treatment | 15 | 5 | 4  | 7  | 2  | 23 | 11 | 23 | 28 | 19 | 43 | 4           | 184   |
| Percent   | 8  | 3 | 2  | 4  | 1  | 13 | 6  | 13 | 15 | 10 | 23 | 2           | 100   |
| Total     | 28 | 6 | 14 | 14 | 11 | 58 | 25 | 45 | 44 | 38 | 97 | 15          | 395   |
| Percent   | 7  | 2 | 4  | 4  | 3  | 15 | 6  | 11 | 11 | 10 | 25 | 4           | 100   |

**PRI\_Q13\_5. Graphs that display your home's energy use over time**

| Group     | 0  | 1 | 2  | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|----|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 11 | 2 | 7  | 3 | 2 | 25 | 10 | 26 | 30 | 19 | 69  | 7           | 211   |
| Percent   | 5  | 1 | 3  | 1 | 1 | 12 | 5  | 12 | 14 | 9  | 33  | 3           | 100   |
| Treatment | 13 | 5 | 3  | 5 | 4 | 25 | 7  | 26 | 24 | 20 | 49  | 3           | 184   |
| Percent   | 7  | 3 | 2  | 3 | 2 | 14 | 4  | 14 | 13 | 11 | 27  | 2           | 100   |
| Total     | 24 | 7 | 10 | 8 | 6 | 50 | 17 | 52 | 54 | 39 | 118 | 10          | 395   |
| Percent   | 6  | 2 | 3  | 2 | 2 | 13 | 4  | 13 | 14 | 10 | 30  | 3           | 100   |

**PRI\_Q13\_6. Information about services and offers from Duke Energy**

| Group     | 0  | 1 | 2 | 3 | 4  | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|---|---|----|----|----|----|----|----|-----|-------------|-------|
| Control   | 9  | 1 | 4 | 4 | 5  | 30 | 14 | 20 | 28 | 24 | 66  | 6           | 211   |
| Percent   | 4  | 0 | 2 | 2 | 2  | 14 | 7  | 9  | 13 | 11 | 31  | 3           | 100   |
| Treatment | 11 | 2 | 5 | 4 | 5  | 27 | 9  | 29 | 20 | 13 | 56  | 3           | 184   |
| Percent   | 6  | 1 | 3 | 2 | 3  | 15 | 5  | 16 | 11 | 7  | 30  | 2           | 100   |
| Total     | 20 | 3 | 9 | 8 | 10 | 57 | 23 | 49 | 48 | 37 | 122 | 9           | 395   |
| Percent   | 5  | 1 | 2 | 2 | 3  | 14 | 6  | 12 | 12 | 9  | 31  | 2           | 100   |

**PRI\_Q14. The statements below provide reasons why households might try to reduce their home's energy use. Please indicate how important each statement is to you.**

**PRI\_Q14\_1. Reducing my energy bill(s)**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 1 | 0 | 1 | 0 | 1 | 11 | 8  | 15 | 29 | 20 | 121 | 4           | 211   |
| Percent   | 0 | 0 | 0 | 0 | 0 | 5  | 4  | 7  | 14 | 9  | 57  | 2           | 100   |
| Treatment | 3 | 0 | 1 | 1 | 1 | 8  | 5  | 16 | 21 | 27 | 100 | 1           | 184   |
| Percent   | 2 | 0 | 1 | 1 | 1 | 4  | 3  | 9  | 11 | 15 | 54  | 1           | 100   |
| Total     | 4 | 0 | 2 | 1 | 2 | 19 | 13 | 31 | 50 | 47 | 221 | 5           | 395   |
| Percent   | 1 | 0 | 1 | 0 | 1 | 5  | 3  | 8  | 13 | 12 | 56  | 1           | 100   |

**PRI\_Q14\_2. Helping the environment**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 2 | 0 | 3 | 4 | 4 | 18 | 10 | 22 | 34 | 18 | 92  | 4           | 211   |
| Percent   | 1 | 0 | 1 | 2 | 2 | 9  | 5  | 10 | 16 | 9  | 44  | 2           | 100   |
| Treatment | 4 | 2 | 2 | 4 | 5 | 14 | 6  | 21 | 20 | 24 | 79  | 3           | 184   |
| Percent   | 2 | 1 | 1 | 2 | 3 | 8  | 3  | 11 | 11 | 13 | 43  | 2           | 100   |
| Total     | 6 | 2 | 5 | 8 | 9 | 32 | 16 | 43 | 54 | 42 | 171 | 7           | 395   |
| Percent   | 2 | 1 | 1 | 2 | 2 | 8  | 4  | 11 | 14 | 11 | 43  | 2           | 100   |

**PRI\_Q14\_3. Setting an example for others**

| Group     | 0  | 1  | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|----|---|----|----|----|----|----|----|----|-----|-------------|-------|
| Control   | 14 | 5  | 8 | 6  | 5  | 33 | 16 | 20 | 23 | 10 | 64  | 7           | 211   |
| Percent   | 7  | 2  | 4 | 3  | 2  | 16 | 8  | 9  | 11 | 5  | 30  | 3           | 100   |
| Treatment | 21 | 6  | 1 | 5  | 9  | 26 | 11 | 24 | 21 | 16 | 41  | 3           | 184   |
| Percent   | 11 | 3  | 1 | 3  | 5  | 14 | 6  | 13 | 11 | 9  | 22  | 2           | 100   |
| Total     | 35 | 11 | 9 | 11 | 14 | 59 | 27 | 44 | 44 | 26 | 105 | 10          | 395   |
| Percent   | 9  | 3  | 2 | 3  | 4  | 15 | 7  | 11 | 11 | 7  | 27  | 3           | 100   |

**PRI\_Q14\_4. Avoiding waste**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 1 | 0 | 3 | 2 | 2 | 13 | 6  | 22 | 40 | 24 | 94  | 4           | 211   |
| Percent   | 0 | 0 | 1 | 1 | 1 | 6  | 3  | 10 | 19 | 11 | 45  | 2           | 100   |
| Treatment | 2 | 1 | 0 | 2 | 4 | 8  | 7  | 15 | 30 | 29 | 85  | 1           | 184   |
| Percent   | 1 | 1 | 0 | 1 | 2 | 4  | 4  | 8  | 16 | 16 | 46  | 1           | 100   |
| Total     | 3 | 1 | 3 | 4 | 6 | 21 | 13 | 37 | 70 | 53 | 179 | 5           | 395   |
| Percent   | 1 | 0 | 1 | 1 | 2 | 5  | 3  | 9  | 18 | 13 | 45  | 1           | 100   |

**PRI\_Q14\_5. Conserving energy resources**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 1 | 0 | 2 | 4 | 1 | 17 | 11 | 22 | 33 | 23 | 93  | 4           | 211   |
| Percent   | 0 | 0 | 1 | 2 | 0 | 8  | 5  | 10 | 16 | 11 | 44  | 2           | 100   |
| Treatment | 3 | 1 | 0 | 2 | 1 | 13 | 5  | 24 | 25 | 33 | 75  | 2           | 184   |
| Percent   | 2 | 1 | 0 | 1 | 1 | 7  | 3  | 13 | 14 | 18 | 41  | 1           | 100   |
| Total     | 4 | 1 | 2 | 6 | 2 | 30 | 16 | 46 | 58 | 56 | 168 | 6           | 395   |
| Percent   | 1 | 0 | 1 | 2 | 1 | 8  | 4  | 12 | 15 | 14 | 43  | 2           | 100   |

**PRI\_Q15. Please indicate your level of agreement with each of the following statements**

**PRI\_Q15\_1. Duke Energy provides excellent customer service**

| Group     | Strongly Disagree | Somewhat Disagree | Neither | Somewhat Agree | Strongly Agree | No Response | Total |
|-----------|-------------------|-------------------|---------|----------------|----------------|-------------|-------|
| Control   | 3                 | 7                 | 20      | 87             | 93             | 1           | 211   |
| Percent   | 1                 | 3                 | 9       | 41             | 44             | 0           | 100   |
| Treatment | 1                 | 4                 | 26      | 72             | 79             | 2           | 184   |
| Percent   | 1                 | 2                 | 14      | 39             | 43             | 1           | 100   |
| Total     | 4                 | 11                | 46      | 159            | 172            | 3           | 395   |
| Percent   | 1                 | 3                 | 12      | 40             | 44             | 1           | 100   |



**PRI\_Q15\_2. Duke Energy respects its customers**

| Group     | Strongly Disagree | Somewhat Disagree | Neither | Somewhat Agree | Strongly Agree | No Response | Total |
|-----------|-------------------|-------------------|---------|----------------|----------------|-------------|-------|
| Control   | 5                 | 14                | 23      | 76             | 90             | 3           | 211   |
| Percent   | 2                 | 7                 | 11      | 36             | 43             | 1           | 100   |
| Treatment | 3                 | 10                | 36      | 66             | 68             | 1           | 184   |
| Percent   | 2                 | 5                 | 20      | 36             | 37             | 1           | 100   |
| Total     | 8                 | 24                | 59      | 142            | 158            | 4           | 395   |
| Percent   | 2                 | 6                 | 15      | 36             | 40             | 1           | 100   |

**PRI\_Q15\_3. Duke Energy provides service at a reasonable cost**

| Group     | Strongly Disagree | Somewhat Disagree | Neither | Somewhat Agree | Strongly Agree | No Response | Total |
|-----------|-------------------|-------------------|---------|----------------|----------------|-------------|-------|
| Control   | 7                 | 23                | 30      | 100            | 48             | 3           | 211   |
| Percent   | 3                 | 11                | 14      | 47             | 23             | 1           | 100   |
| Treatment | 4                 | 22                | 39      | 75             | 42             | 2           | 184   |
| Percent   | 2                 | 12                | 21      | 41             | 23             | 1           | 100   |
| Total     | 11                | 45                | 69      | 175            | 90             | 5           | 395   |
| Percent   | 3                 | 11                | 17      | 44             | 23             | 1           | 100   |

**PRI\_Q16. Before today, were you aware that you could order free or discounted lighting products through the Duke Energy website?**

| Group     | Yes | No  | No Response | Total |
|-----------|-----|-----|-------------|-------|
| Control   | 156 | 52  | 3           | 211   |
| Percent   | 74  | 25  | 1           | 100   |
| Treatment | 118 | 63  | 3           | 184   |
| Percent   | 64  | 34  | 2           | 100   |
| Total     | 274 | 115 | 6           | 395   |
| Percent   | 69  | 29  | 2           | 100   |

**PRI\_Q16a. How many free light bulbs have you ordered through the Duke Energy website this year?**

| Group     | 0   | 1  | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 15 | 16 | 20 | 24 | 30 | 50 | N.R. | M. | T.  |
|-----------|-----|----|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|------|----|-----|
| Control   | 92  | 8  | 3 | 1 | 1 | 1 | 3 | 4 | 2  | 15 | 1  | 4  | 0  | 1  | 1  | 1  | 1  | 3    | 14 | 156 |
| Percent   | 59  | 5  | 2 | 1 | 1 | 1 | 2 | 3 | 1  | 10 | 1  | 3  | 0  | 1  | 1  | 1  | 1  | 2    | 9  | 100 |
| Treatment | 71  | 8  | 0 | 0 | 1 | 1 | 5 | 3 | 3  | 12 | 0  | 0  | 2  | 2  | 0  | 0  | 0  | 0    | 10 | 118 |
| Percent   | 60  | 7  | 0 | 0 | 1 | 1 | 4 | 3 | 3  | 10 | 0  | 0  | 2  | 2  | 0  | 0  | 0  | 0    | 8  | 100 |
| Total     | 163 | 16 | 3 | 1 | 2 | 2 | 8 | 7 | 5  | 27 | 1  | 4  | 2  | 3  | 1  | 1  | 1  | 3    | 24 | 274 |
| Percent   | 59  | 6  | 1 | 0 | 1 | 1 | 3 | 3 | 2  | 10 | 0  | 1  | 1  | 1  | 0  | 0  | 0  | 1    | 9  | 100 |

**PRI\_Q16b. How many discounted light bulbs have you ordered through the Duke Energy website this year?**

| Group     | 0   | 1 | 2 | 4 | 5 | 6 | 8 | 12 | 15 | 16 | 20 | 24 | 30 | No Response | Missing | Total |
|-----------|-----|---|---|---|---|---|---|----|----|----|----|----|----|-------------|---------|-------|
| Control   | 128 | 1 | 0 | 1 | 0 | 0 | 1 | 5  | 1  | 0  | 2  | 2  | 1  | 1           | 13      | 156   |
| Percent   | 82  | 1 | 0 | 1 | 0 | 0 | 1 | 3  | 1  | 0  | 1  | 1  | 1  | 1           | 8       | 100   |
| Treatment | 95  | 3 | 1 | 1 | 1 | 2 | 0 | 0  | 0  | 2  | 1  | 0  | 0  | 0           | 12      | 118   |
| Percent   | 81  | 3 | 1 | 1 | 1 | 2 | 0 | 0  | 0  | 2  | 1  | 0  | 0  | 0           | 10      | 100   |
| Total     | 223 | 4 | 1 | 2 | 1 | 2 | 1 | 5  | 1  | 2  | 3  | 2  | 1  | 1           | 25      | 274   |
| Percent   | 81  | 1 | 0 | 1 | 0 | 1 | 0 | 2  | 0  | 1  | 1  | 1  | 0  | 0           | 9       | 100   |

**PRI\_Q18 & TRE\_Q13. Do you own or rent this residence?**

| Group     | Own | Rent | Missing | Total |
|-----------|-----|------|---------|-------|
| Control   | 192 | 13   | 6       | 211   |
| Percent   | 91  | 6    | 3       | 100   |
| Treatment | 306 | 24   | 7       | 337   |
| Percent   | 91  | 7    | 2       | 100   |
| Total     | 498 | 37   | 13      | 548   |
| Percent   | 91  | 7    | 2       | 100   |

**PRI\_Q19 & TRE\_Q14. Including yourself, how many people live in your home?**

| Group     | 1   | 2   | 3  | 4  | 5  | 6 | 7 | 9 | 10 | No Response | Missing | Total |
|-----------|-----|-----|----|----|----|---|---|---|----|-------------|---------|-------|
| Control   | 43  | 95  | 27 | 26 | 11 | 1 | 1 | 0 | 1  | 0           | 6       | 211   |
| Percent   | 20  | 45  | 13 | 12 | 5  | 0 | 0 | 0 | 0  | 0           | 3       | 100   |
| Treatment | 65  | 149 | 50 | 40 | 16 | 5 | 1 | 1 | 0  | 1           | 9       | 337   |
| Percent   | 19  | 44  | 15 | 12 | 5  | 1 | 0 | 0 | 0  | 0           | 3       | 100   |
| Total     | 108 | 244 | 77 | 66 | 27 | 6 | 2 | 1 | 1  | 1           | 15      | 548   |
| Percent   | 20  | 45  | 14 | 12 | 5  | 1 | 0 | 0 | 0  | 0           | 3       | 100   |

**PRI\_Q22 & TRE\_Q17. What is your primary heating fuel?**

| Group     | Electricity | Natural Gas | Oil | Other | Missing | Total |
|-----------|-------------|-------------|-----|-------|---------|-------|
| Control   | 94          | 88          | 5   | 16    | 8       | 211   |
| Percent   | 45          | 42          | 2   | 8     | 4       | 100   |
| Treatment | 158         | 147         | 8   | 15    | 9       | 337   |
| Percent   | 47          | 44          | 2   | 4     | 3       | 100   |
| Total     | 252         | 235         | 13  | 31    | 17      | 548   |
| Percent   | 46          | 43          | 2   | 6     | 3       | 100   |

**TRE\_Q1. Duke Energy sends a personalized report called My Home Energy Report to a select group of homes. These reports are mailed in a standard envelope every few months and are meant to provide you with information on how your home's electric energy usage compares with similar homes. Have you seen one of these reports?**

| Group     | Yes | No | No Response | Total |
|-----------|-----|----|-------------|-------|
| Treatment | 142 | 10 | 1           | 153   |
| Percent   | 93  | 7  | 1           | 100   |

**TRE\_Q2. About how many My Home Energy Reports have you received in the past 12 months?**

| Group     | 0 | 1 | 2 | 3  | 4  | 5 | 6  | 7 | 8 | 9 | 10 | 11 | 12 | 24 | No Response | Missing | Total |
|-----------|---|---|---|----|----|---|----|---|---|---|----|----|----|----|-------------|---------|-------|
| Treatment | 3 | 2 | 9 | 12 | 27 | 3 | 20 | 1 | 5 | 3 | 7  | 2  | 42 | 1  | 5           | 1       | 143   |
| Percent   | 2 | 1 | 6 | 8  | 19 | 2 | 14 | 1 | 4 | 2 | 5  | 1  | 29 | 1  | 4           | 1       | 100   |

**TRE\_Q3. How often do you read the My Home Energy Reports?**

| Group     | Always | Sometimes | Never | No Response | Missing | Total |
|-----------|--------|-----------|-------|-------------|---------|-------|
| Treatment | 100    | 35        | 2     | 1           | 2       | 140   |
| Percent   | 71     | 25        | 1     | 1           | 1       | 100   |

**TRE\_Q4. How much do you agree or disagree with the following statements about My Home Energy Reports?**

**TRE\_Q4\_1. I have learned about my household's energy use from My Home Energy Reports.**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6 | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|---|----|----|----|----|-------------|---------|-------|
| Treatment | 2 | 2 | 0 | 6 | 7 | 13 | 9 | 17 | 11 | 20 | 48 | 1           | 2       | 138   |
| Percent   | 1 | 1 | 0 | 4 | 5 | 9  | 7 | 12 | 8  | 14 | 35 | 1           | 1       | 100   |

**TRE\_Q4\_2. I use the reports to tell me how well I am doing at saving energy.**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6 | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|---|----|----|----|----|-------------|---------|-------|
| Treatment | 6 | 2 | 3 | 6 | 5 | 20 | 6 | 18 | 18 | 12 | 39 | 1           | 2       | 138   |
| Percent   | 4 | 1 | 2 | 4 | 4 | 14 | 4 | 13 | 13 | 9  | 28 | 1           | 1       | 100   |

**TRE\_Q4\_3. The tips provided in the reports are pertinent to my home.**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7 | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|----|---|----|----|----|-------------|---------|-------|
| Treatment | 4 | 5 | 6 | 5 | 7 | 19 | 21 | 9 | 18 | 13 | 27 | 2           | 2       | 138   |
| Percent   | 3 | 4 | 4 | 4 | 5 | 14 | 15 | 7 | 13 | 9  | 20 | 1           | 1       | 100   |

**TRE\_Q4\_4. My Home Energy Reports provide the details I need to understand my home's energy use.**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|----|-------------|---------|-------|
| Treatment | 6 | 2 | 2 | 5 | 9 | 17 | 14 | 16 | 13 | 15 | 36 | 1           | 2       | 138   |
| Percent   | 4 | 1 | 1 | 4 | 7 | 12 | 10 | 12 | 9  | 11 | 26 | 1           | 1       | 100   |

**TRE\_Q4\_5. I have discussed My Home Energy Reports with others.**

| Group     | 0  | 1  | 2 | 3 | 4 | 5  | 6 | 7 | 8  | 9 | 10 | No Response | Missing | Total |
|-----------|----|----|---|---|---|----|---|---|----|---|----|-------------|---------|-------|
| Treatment | 36 | 17 | 6 | 4 | 7 | 16 | 7 | 8 | 10 | 2 | 22 | 1           | 2       | 138   |
| Percent   | 26 | 12 | 4 | 3 | 5 | 12 | 5 | 6 | 7  | 1 | 16 | 1           | 1       | 100   |

**TRE\_Q4\_6. The information provided about my home's energy use is confusing.**

| Group     | 0  | 1  | 2  | 3  | 4 | 5  | 6 | 7 | 8 | 9 | 10 | No Response | Missing | Total |
|-----------|----|----|----|----|---|----|---|---|---|---|----|-------------|---------|-------|
| Treatment | 51 | 24 | 10 | 12 | 6 | 14 | 2 | 5 | 5 | 3 | 3  | 1           | 2       | 138   |
| Percent   | 37 | 17 | 7  | 9  | 4 | 10 | 1 | 4 | 4 | 2 | 2  | 1           | 1       | 100   |

**TRE\_Q4\_7. I suspect that the "similar" homes that my home is compared to in the Home Energy Reports are not actually like mine.**

| Group     | 0  | 1  | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9 | 10 | No Response | Missing | Total |
|-----------|----|----|---|---|---|----|----|----|----|---|----|-------------|---------|-------|
| Treatment | 13 | 11 | 4 | 6 | 4 | 29 | 10 | 14 | 12 | 9 | 23 | 1           | 2       | 138   |
| Percent   | 9  | 8  | 3 | 4 | 3 | 21 | 7  | 10 | 9  | 7 | 17 | 1           | 1       | 100   |

**TRE\_Q4\_8. Since reading the Home Energy Reports, I have taken actions to use less energy than I would not have otherwise taken.**

| Group     | 0  | 1 | 2 | 3 | 4  | 5  | 6  | 7  | 8  | 9 | 10 | No Response | Missing | Total |
|-----------|----|---|---|---|----|----|----|----|----|---|----|-------------|---------|-------|
| Treatment | 11 | 5 | 5 | 4 | 12 | 28 | 10 | 17 | 13 | 9 | 21 | 1           | 2       | 138   |
| Percent   | 8  | 4 | 4 | 3 | 9  | 20 | 7  | 12 | 9  | 7 | 15 | 1           | 1       | 100   |

**TRE\_Q6. Please rate how useful each feature of the Home Energy Report is to you.**

**TRE\_Q6\_1. Comparison to similar homes**

| Group     | 0  | 1 | 2 | 3 | 4 | 5 | 6  | 7  | 8  | 9 | 10 | No Response | Missing | Total |
|-----------|----|---|---|---|---|---|----|----|----|---|----|-------------|---------|-------|
| Treatment | 15 | 9 | 7 | 8 | 5 | 9 | 11 | 18 | 23 | 9 | 21 | 1           | 2       | 138   |
| Percent   | 11 | 7 | 5 | 6 | 4 | 7 | 8  | 13 | 17 | 7 | 15 | 1           | 1       | 100   |

**TRE\_Q6\_2. Tips to help you save money and energy**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9 | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|----|----|----|---|----|-------------|---------|-------|
| Treatment | 5 | 0 | 2 | 2 | 7 | 20 | 10 | 21 | 24 | 9 | 35 | 1           | 2       | 138   |
| Percent   | 4 | 0 | 1 | 1 | 5 | 14 | 7  | 15 | 17 | 7 | 25 | 1           | 1       | 100   |

**TRE\_Q6\_3. Examples of the energy use associated with common household items**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6 | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|---|----|----|----|----|-------------|---------|-------|
| Treatment | 6 | 1 | 2 | 7 | 5 | 19 | 9 | 18 | 21 | 13 | 34 | 1           | 2       | 138   |
| Percent   | 4 | 1 | 1 | 5 | 4 | 14 | 7 | 13 | 15 | 9  | 25 | 1           | 1       | 100   |

**TRE\_Q6\_4. Customized suggestions for your home**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6 | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|---|----|----|----|----|-------------|---------|-------|
| Treatment | 9 | 2 | 2 | 6 | 8 | 19 | 9 | 22 | 18 | 10 | 29 | 2           | 2       | 138   |
| Percent   | 7 | 1 | 1 | 4 | 6 | 14 | 7 | 16 | 13 | 7  | 21 | 1           | 1       | 100   |

**TRE\_Q6\_5. Graphs that display your home's energy use over time**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6 | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|---|----|----|----|----|-------------|---------|-------|
| Treatment | 5 | 2 | 3 | 1 | 2 | 10 | 9 | 13 | 20 | 19 | 51 | 1           | 2       | 138   |
| Percent   | 4 | 1 | 2 | 1 | 1 | 7  | 7 | 9  | 14 | 14 | 37 | 1           | 1       | 100   |

APPENDIX 0

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**TRE\_Q6\_6. Information about services and offers from Duke Energy**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6 | 7  | 8  | 9 | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|---|----|----|---|----|-------------|---------|-------|
| Treatment | 4 | 4 | 1 | 3 | 7 | 28 | 9 | 21 | 17 | 9 | 31 | 2           | 2       | 138   |
| Percent   | 3 | 3 | 1 | 2 | 5 | 20 | 7 | 15 | 12 | 7 | 22 | 1           | 1       | 100   |

**TRE\_Q7. Overall, how satisfied are you with the information in the My Home Energy Reports you've received?**

| Group     | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|---|---|----|----|----|----|-------------|---------|-------|
| Treatment | 5 | 1 | 5 | 2 | 3 | 0 | 8 | 20 | 21 | 15 | 40 | 16          | 2       | 138   |
| Percent   | 4 | 1 | 4 | 1 | 2 | 0 | 6 | 14 | 15 | 11 | 29 | 12          | 1       | 100   |

**TRE\_Q8. Are you aware that you can go online to My Home Energy Interactive to access more information, above and beyond that found in the My Home Energy Report, which describes more ways to save energy?**

| Group     | Yes | No | No Response | Missing | Total |
|-----------|-----|----|-------------|---------|-------|
| Treatment | 38  | 97 | 1           | 2       | 138   |
| Percent   | 28  | 70 | 1           | 1       | 100   |

**TRE\_Q8a. Have you signed up to use My Home Energy Interactive?**

| Group     | Yes | No | Missing | Total |
|-----------|-----|----|---------|-------|
| Treatment | 3   | 35 | 3       | 41    |
| Percent   | 7   | 85 | 7       | 100   |

**TRE\_Q8b. How useful is My Home Energy Interactive to you for saving energy?**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6 | 7 | 8 | 9 | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|---|---|---|---|----|-------------|---------|-------|
| Treatment | 0 | 0 | 0 | 0 | 0 | 1  | 0 | 0 | 0 | 0 | 2  | 0           | 3       | 6     |
| Percent   | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 33 | 0           | 50      | 100   |

## Appendix E Survey Frequencies: DEP

**PRI\_Q1. Please rate how satisfied you are with Duke Energy as your electric supplier.**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 1 | 0 | 0 | 4 | 2 | 10 | 10 | 22 | 37 | 35 | 69  | 2           | 192   |
| Percent   | 1 | 0 | 0 | 2 | 1 | 5  | 5  | 11 | 19 | 18 | 36  | 1           | 100   |
| Treatment | 0 | 1 | 0 | 2 | 0 | 10 | 11 | 18 | 38 | 23 | 69  | 4           | 176   |
| Percent   | 0 | 1 | 0 | 1 | 0 | 6  | 6  | 10 | 22 | 13 | 39  | 2           | 100   |
| Total     | 1 | 1 | 0 | 6 | 2 | 20 | 21 | 40 | 75 | 58 | 138 | 6           | 368   |
| Percent   | 0 | 0 | 0 | 2 | 1 | 5  | 6  | 11 | 20 | 16 | 38  | 2           | 100   |

**PRI\_Q2 Please rate your overall satisfaction with each of the following aspects of communications from Duke Energy.**

**PRI\_Q2\_1 The information available about Duke Energy's efficiency programs.**

| Group     | Very Satisfied | Somewhat Satisfied | Neither | Somewhat Dissatisfied | Very Dissatisfied | No Response | Total |
|-----------|----------------|--------------------|---------|-----------------------|-------------------|-------------|-------|
| Control   | 71             | 65                 | 44      | 5                     | 6                 | 1           | 192   |
| Percent   | 37             | 34                 | 23      | 3                     | 3                 | 1           | 100   |
| Treatment | 83             | 60                 | 22      | 7                     | 4                 | 0           | 176   |
| Percent   | 47             | 34                 | 13      | 4                     | 2                 | 0           | 100   |
| Total     | 154            | 125                | 66      | 12                    | 10                | 1           | 368   |
| Percent   | 42             | 34                 | 18      | 3                     | 3                 | 0           | 100   |

**PRI\_Q2\_2 Duke Energy's commitment to promoting energy efficiency and the wise use of electricity.**

| Group     | Very Satisfied | Somewhat Satisfied | Neither | Somewhat Dissatisfied | Very Dissatisfied | Total |
|-----------|----------------|--------------------|---------|-----------------------|-------------------|-------|
| Control   | 70             | 68                 | 40      | 8                     | 6                 | 192   |
| Percent   | 36             | 35                 | 21      | 4                     | 3                 | 100   |
| Treatment | 83             | 61                 | 18      | 9                     | 5                 | 176   |
| Percent   | 47             | 35                 | 10      | 5                     | 3                 | 100   |
| Total     | 153            | 129                | 58      | 17                    | 11                | 368   |
| Percent   | 42             | 35                 | 16      | 5                     | 3                 | 100   |

**PRI\_Q2\_3 The information Duke Energy provides to help customers save on energy bills.**

| Group     | Very Satisfied | Somewhat Satisfied | Neither | Somewhat Dissatisfied | Very Dissatisfied | Total |
|-----------|----------------|--------------------|---------|-----------------------|-------------------|-------|
| Control   | 70             | 70                 | 37      | 10                    | 5                 | 192   |
| Percent   | 36             | 36                 | 19      | 5                     | 3                 | 100   |
| Treatment | 83             | 61                 | 16      | 12                    | 4                 | 176   |
| Percent   | 47             | 35                 | 9       | 7                     | 2                 | 100   |
| Total     | 153            | 131                | 53      | 22                    | 9                 | 368   |
| Percent   | 41.58          | 36                 | 14      | 6                     | 2                 | 100   |

**PRI\_Q3 Have you logged in to your Duke Energy account to do any of the following?  
Check all that apply.**

**PRI\_Q3\_1 I have never logged in**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 114         | 71      | 185   |
| Percent   | 62          | 38      | 100   |
| Treatment | 101         | 73      | 174   |
| Percent   | 58          | 42      | 100   |
| Total     | 215         | 144     | 359   |
| Percent   | 60          | 40      | 100   |

**PRI\_Q3\_2 Pay my bill**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 114         | 71      | 185   |
| Percent   | 62          | 38      | 100   |
| Treatment | 112         | 62      | 174   |
| Percent   | 64          | 36      | 100   |
| Total     | 226         | 133     | 359   |
| Percent   | 63          | 37      | 100   |

**PRI\_Q3\_3 Review energy consumption graphs**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 145         | 40      | 185   |
| Percent   | 78          | 22      | 100   |
| Treatment | 141         | 33      | 174   |
| Percent   | 81          | 19      | 100   |
| Total     | 286         | 73      | 359   |
| Percent   | 80          | 20      | 100   |



**PRI\_Q3\_4 Look for energy efficiency opportunities or ideas**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 170         | 15      | 185   |
| Percent   | 92          | 8       | 100   |
| Treatment | 156         | 18      | 174   |
| Percent   | 90          | 10      | 100   |
| Total     | 326         | 33      | 359   |
| Percent   | 91          | 9       | 100   |

**PRI\_Q3\_5 None of the above**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 154         | 31      | 185   |
| percent   | 83          | 17      | 100   |
| Treatment | 142         | 32      | 174   |
| percent   | 82          | 18      | 100   |
| Total     | 296         | 63      | 359   |
| percent   | 82          | 18      | 100   |

**PRI\_Q4. How often do you access the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make your home more energy efficient? Select only one.**

| Group     | Monthly | One a year | A few times a year | Never | No Response | Total |
|-----------|---------|------------|--------------------|-------|-------------|-------|
| Control   | 17      | 20         | 25                 | 129   | 1           | 192   |
| Percent   | 9       | 10         | 13                 | 67    | 1           | 100   |
| Treatment | 13      | 16         | 25                 | 122   | 0           | 176   |
| Percent   | 7       | 9          | 14                 | 69    | 0           | 100   |
| Total     | 30      | 36         | 50                 | 251   | 1           | 368   |
| Percent   | 8       | 10         | 14                 | 68    | 0           | 100   |

**PRI\_Q5. If you needed to replace major home equipment or were considering improvements to your home's energy performance today, how likely would you be to check the Duke Energy website for information about energy efficient solutions or incentives?**

| Group     | 0  | 1  | 2  | 3  | 4 | 5  | 6  | 7  | 8  | 9  | 10 | Total |
|-----------|----|----|----|----|---|----|----|----|----|----|----|-------|
| Control   | 53 | 9  | 5  | 9  | 1 | 29 | 12 | 13 | 21 | 8  | 32 | 192   |
| Percent   | 28 | 5  | 3  | 5  | 1 | 15 | 6  | 7  | 11 | 4  | 17 | 100   |
| Treatment | 39 | 6  | 8  | 11 | 6 | 28 | 6  | 18 | 16 | 19 | 19 | 176   |
| Percent   | 22 | 3  | 5  | 6  | 3 | 16 | 3  | 10 | 9  | 11 | 11 | 100   |
| Total     | 92 | 15 | 13 | 20 | 7 | 57 | 18 | 31 | 37 | 27 | 51 | 368   |
| Percent   | 25 | 4  | 4  | 5  | 2 | 15 | 5  | 8  | 10 | 7  | 14 | 100   |

**PRI\_Q6. How important is it for you to know if your household is using energy wisely?**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 3 | 0 | 2 | 3 | 0 | 15 | 11 | 15 | 32 | 30 | 79  | 2           | 192   |
| Percent   | 2 | 0 | 1 | 2 | 0 | 8  | 6  | 8  | 17 | 16 | 41  | 1           | 100   |
| Treatment | 3 | 0 | 2 | 3 | 0 | 14 | 9  | 19 | 26 | 29 | 71  | 0           | 176   |
| Percent   | 2 | 0 | 1 | 2 | 0 | 8  | 5  | 11 | 15 | 16 | 40  | 0           | 100   |
| Total     | 6 | 0 | 4 | 6 | 0 | 29 | 20 | 34 | 58 | 59 | 150 | 2           | 368   |
| Percent   | 2 | 0 | 1 | 2 | 0 | 8  | 5  | 9  | 16 | 16 | 41  | 1           | 100   |

**PRI\_Q7. How would you rate your knowledge of the different ways you can save energy in your home?**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|----|-------------|-------|
| Control   | 5 | 1 | 5 | 5 | 5 | 29 | 23 | 35 | 31 | 30 | 22 | 1           | 192   |
| Percent   | 3 | 1 | 3 | 3 | 3 | 15 | 12 | 18 | 16 | 16 | 11 | 1           | 100   |
| Treatment | 2 | 3 | 0 | 4 | 2 | 29 | 17 | 29 | 42 | 27 | 21 | 0           | 176   |
| Percent   | 1 | 2 | 0 | 2 | 1 | 16 | 10 | 16 | 24 | 15 | 12 | 0           | 100   |
| Total     | 7 | 4 | 5 | 9 | 7 | 58 | 40 | 64 | 73 | 57 | 43 | 1           | 368   |
| Percent   | 2 | 1 | 1 | 2 | 2 | 16 | 11 | 17 | 20 | 15 | 12 | 0           | 100   |

**PRI\_Q8 & TRE\_Q9. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?**

| Group     | Yes | No  | No Response | Missing | Total |
|-----------|-----|-----|-------------|---------|-------|
| Control   | 114 | 76  | 2           | 0       | 192   |
| Percent   | 59  | 40  | 1           | 0       | 100   |
| Treatment | 225 | 90  | 10          | 22      | 347   |
| Percent   | 65  | 26  | 3           | 6       | 100   |
| Total     | 339 | 166 | 12          | 22      | 539   |
| Percent   | 63  | 31  | 2           | 4       | 100   |

**PRI\_Q9 & TRE\_Q10. Which actions have been taken?**

**PRI\_Q9\_1 & TRE\_Q10\_1. Adjusted heating or cooling settings to save energy**

| Group     | Yes | No | Don't know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 109 | 3  | 0          | 2           | 114   |
| Percent   | 96  | 3  | 0          | 2           | 100   |
| Treatment | 210 | 9  | 2          | 4           | 225   |
| Percent   | 93  | 4  | 1          | 2           | 100   |
| Total     | 319 | 12 | 2          | 6           | 339   |
| Percent   | 94  | 4  | 1          | 2           | 100   |

**PRI\_Q9\_2 & TRE\_Q10\_2. Reduced water heater temperature to save energy**

| Group     | Yes | No  | Don't know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 42  | 62  | 3          | 7           | 114   |
| Percent   | 37  | 54  | 3          | 6           | 100   |
| Treatment | 85  | 127 | 8          | 5           | 225   |
| Percent   | 38  | 56  | 4          | 2           | 100   |
| Total     | 127 | 189 | 11         | 12          | 339   |
| Percent   | 37  | 56  | 3          | 4           | 100   |

**PRI\_Q9\_3 & TRE\_Q10\_3. Wash clothes in cold water**

| Group     | Yes | No | Don't know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 76  | 32 | 2          | 4           | 114   |
| Percent   | 67  | 28 | 2          | 4           | 100   |
| Treatment | 172 | 47 | 2          | 4           | 225   |
| Percent   | 76  | 21 | 1          | 2           | 100   |
| Total     | 248 | 79 | 4          | 8           | 339   |
| Percent   | 73  | 23 | 1          | 2           | 100   |

***PRI\_Q9\_4 & TRE\_Q10\_4. Fully load clothes washer***

| Group     | Yes | No | Don't know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 97  | 11 | 2          | 4           | 114   |
| Percent   | 85  | 10 | 2          | 4           | 100   |
| Treatment | 181 | 37 | 2          | 5           | 225   |
| Percent   | 80  | 16 | 1          | 2           | 100   |
| Total     | 278 | 48 | 4          | 9           | 339   |
| Percent   | 82  | 14 | 1          | 3           | 100   |

***PRI\_Q9\_5 & TRE\_Q10\_5. Fully load dishwasher***

| Group     | Yes | No | Don't know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 78  | 20 | 5          | 11          | 114   |
| Percent   | 68  | 18 | 4          | 10          | 100   |
| Treatment | 164 | 34 | 16         | 11          | 225   |
| Percent   | 73  | 15 | 7          | 5           | 100   |
| Total     | 242 | 54 | 21         | 22          | 339   |
| Percent   | 71  | 16 | 6          | 6           | 100   |

***PRI\_Q9\_6 & TRE\_Q10\_6. Turn off lights in unused or outdoor areas***

| Group     | Yes | No | No Response | Total |
|-----------|-----|----|-------------|-------|
| Control   | 111 | 0  | 3           | 114   |
| Percent   | 97  | 0  | 3           | 100   |
| Treatment | 216 | 6  | 3           | 225   |
| Percent   | 96  | 3  | 1           | 100   |
| Total     | 327 | 6  | 6           | 339   |
| Percent   | 96  | 2  | 2           | 100   |

***PRI\_Q9\_7 & TRE\_Q10\_7. Unplug or shut down household electronics when not in use***

| Group     | Yes | No | Don't know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 82  | 29 | 1          | 2           | 114   |
| Percent   | 72  | 25 | 1          | 2           | 100   |
| Treatment | 154 | 64 | 4          | 3           | 225   |
| Percent   | 68  | 28 | 2          | 1           | 100   |
| Total     | 236 | 93 | 5          | 5           | 339   |
| Percent   | 70  | 27 | 1          | 1           | 100   |

***PRI\_Q9\_8 & TRE\_Q10\_8. Maintain heating or cooling equipment for more efficient operation***

| Group     | Yes       | No        | Don't know | No Response | Total      |
|-----------|-----------|-----------|------------|-------------|------------|
| Control   | 104       | 4         | 3          | 3           | 114        |
| Percent   | <b>91</b> | <b>4</b>  | <b>3</b>   | <b>3</b>    | <b>100</b> |
| Treatment | 190       | 27        | 6          | 2           | 225        |
| Percent   | <b>84</b> | <b>12</b> | <b>3</b>   | <b>1</b>    | <b>100</b> |
| Total     | 294       | 31        | 9          | 5           | 339        |
| Percent   | <b>87</b> | <b>9</b>  | <b>3</b>   | <b>1</b>    | <b>100</b> |

***PRI\_Q9\_9 & TRE\_Q10\_9. Use a portable fan or ceiling fan for cooling instead of an air conditioner***

| Group     | Yes       | No        | Don't know | No Response | Total      |
|-----------|-----------|-----------|------------|-------------|------------|
| Control   | 76        | 34        | 1          | 3           | 114        |
| Percent   | <b>67</b> | <b>30</b> | <b>1</b>   | <b>3</b>    | <b>100</b> |
| Treatment | 159       | 57        | 5          | 4           | 225        |
| Percent   | <b>71</b> | <b>25</b> | <b>2</b>   | <b>2</b>    | <b>100</b> |
| Total     | 235       | 91        | 6          | 7           | 339        |
| Percent   | <b>69</b> | <b>27</b> | <b>2</b>   | <b>2</b>    | <b>100</b> |

***PRI\_Q9\_10 & TRE\_Q10\_10. Other, please specify:***

| Group     | Yes       | No        | Don't know | No Response | Total      |
|-----------|-----------|-----------|------------|-------------|------------|
| Control   | 29        | 24        | 34         | 27          | 114        |
| Percent   | <b>25</b> | <b>21</b> | <b>30</b>  | <b>24</b>   | <b>100</b> |
| Treatment | 39        | 55        | 78         | 53          | 225        |
| Percent   | <b>17</b> | <b>24</b> | <b>35</b>  | <b>24</b>   | <b>100</b> |
| Total     | 68        | 79        | 112        | 80          | 339        |
| Percent   | <b>20</b> | <b>23</b> | <b>33</b>  | <b>24</b>   | <b>100</b> |

***PRI\_Q9\_11 & TRE\_Q10\_11. Other, please specify:***

| Group     | Yes      | No        | Don't know | No Response | Total      |
|-----------|----------|-----------|------------|-------------|------------|
| Control   | 10       | 36        | 39         | 29          | 114        |
| Percent   | <b>9</b> | <b>32</b> | <b>34</b>  | <b>25</b>   | <b>100</b> |
| Treatment | 15       | 71        | 82         | 57          | 225        |
| Percent   | <b>7</b> | <b>32</b> | <b>36</b>  | <b>25</b>   | <b>100</b> |
| Total     | 25       | 107       | 121        | 86          | 339        |
| Percent   | <b>7</b> | <b>32</b> | <b>36</b>  | <b>25</b>   | <b>100</b> |

**PRI\_Q10 & TRE\_Q11. Which energy efficiency improvements have been made?****PRI\_Q10\_1 & TRE\_Q11\_1. Install energy-efficient kitchen or laundry appliances**

| Group     | Yes | No  | Don't know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 56  | 53  | 3          | 2           | 114   |
| Percent   | 49  | 46  | 3          | 2           | 100   |
| Treatment | 133 | 72  | 11         | 9           | 225   |
| Percent   | 59  | 32  | 5          | 4           | 100   |
| Total     | 189 | 125 | 14         | 11          | 339   |
| Percent   | 56  | 37  | 4          | 3           | 100   |

**PRI\_Q10\_2 & TRE\_Q11\_2. Install energy-efficient heating/cooling equipment**

| Group     | Yes | No  | Don't know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 52  | 51  | 8          | 3           | 114   |
| Percent   | 46  | 45  | 7          | 3           | 100   |
| Treatment | 112 | 95  | 14         | 4           | 225   |
| Percent   | 50  | 42  | 6          | 2           | 100   |
| Total     | 164 | 146 | 22         | 7           | 339   |
| Percent   | 48  | 43  | 6          | 2           | 100   |

**PRI\_Q10\_3 & TRE\_Q11\_3. Install energy-efficient water heater**

| Group     | Yes | No  | Don't know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 50  | 52  | 9          | 3           | 114   |
| Percent   | 44  | 46  | 8          | 3           | 100   |
| Treatment | 95  | 108 | 17         | 5           | 225   |
| Percent   | 42  | 48  | 8          | 2           | 100   |
| Total     | 145 | 160 | 26         | 8           | 339   |
| Percent   | 43  | 47  | 8          | 2           | 100   |

**PRI\_Q10\_4 & TRE\_Q11\_4. Replace windows or doors with more energy-efficient types)**

| Group     | Yes | No  | Don't know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 41  | 67  | 3          | 3           | 114   |
| Percent   | 36  | 59  | 3          | 3           | 100   |
| Treatment | 78  | 133 | 6          | 8           | 225   |
| Percent   | 35  | 59  | 3          | 4           | 100   |
| Total     | 119 | 200 | 9          | 11          | 339   |
| Percent   | 35  | 59  | 3          | 3           | 100   |

***PRI\_Q10\_5 & TRE\_Q11\_5. Caulk or weatherstrip (windows or doors)***

| Group     | Yes | No  | Don't know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 66  | 44  | 3          | 1           | 114   |
| Percent   | 58  | 39  | 3          | 1           | 100   |
| Treatment | 115 | 96  | 6          | 8           | 225   |
| Percent   | 51  | 43  | 3          | 4           | 100   |
| Total     | 181 | 140 | 9          | 9           | 339   |
| Percent   | 53  | 41  | 3          | 3           | 100   |

***PRI\_Q10\_6 & TRE\_Q11\_6. Add insulation to attic, walls, or floors***

| Group     | Yes | No  | Don't know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 36  | 68  | 5          | 5           | 114   |
| Percent   | 32  | 60  | 4          | 4           | 100   |
| Treatment | 84  | 125 | 8          | 8           | 225   |
| Percent   | 37  | 56  | 4          | 4           | 100   |
| Total     | 120 | 193 | 13         | 13          | 339   |
| Percent   | 35  | 57  | 4          | 4           | 100   |

***PRI\_Q10\_7 & TRE\_Q11\_7. Install energy-efficient lighting***

| Group     | Yes | No | Don't know | No Response | Total |
|-----------|-----|----|------------|-------------|-------|
| Control   | 93  | 18 | 3          | 0           | 114   |
| Percent   | 82  | 16 | 3          | 0           | 100   |
| Treatment | 173 | 43 | 5          | 4           | 225   |
| Percent   | 77  | 19 | 2          | 2           | 100   |
| Total     | 266 | 61 | 8          | 4           | 339   |
| Percent   | 78  | 18 | 2          | 1           | 100   |

***PRI\_Q10\_8 & TRE\_Q11\_8. Install programmable thermostat or "smart" thermostat***

| Group     | Yes | No  | Don't know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 47  | 59  | 3          | 5           | 114   |
| Percent   | 41  | 52  | 3          | 4           | 100   |
| Treatment | 108 | 102 | 8          | 7           | 225   |
| Percent   | 48  | 45  | 4          | 3           | 100   |
| Total     | 155 | 161 | 11         | 12          | 339   |
| Percent   | 46  | 47  | 3          | 4           | 100   |

**PRI\_Q10\_9 & TRE\_Q11\_9. Purchase ENERGY STAR certified home electronic equipment (a television, for example)**

| Group     | Yes | No  | Don't know | No Response | Total |
|-----------|-----|-----|------------|-------------|-------|
| Control   | 63  | 39  | 10         | 2           | 114   |
| Percent   | 55  | 34  | 9          | 2           | 100   |
| Treatment | 129 | 70  | 16         | 10          | 225   |
| Percent   | 57  | 31  | 7          | 4           | 100   |
| Total     | 192 | 109 | 26         | 12          | 339   |
| Percent   | 57  | 32  | 8          | 4           | 100   |

**PRI\_Q11 & TRE\_Q12. Below are some reasons why you might not be able to save as much energy as you would like. How important are each of the following reasons?**

**PRI\_Q11\_1 & TRE\_Q12\_1. Initial cost of energy efficient equipment is too high**

| Group     | 0  | 1  | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|---|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 8  | 4  | 3 | 4  | 6  | 19 | 11 | 11 | 9  | 12 | 23 | 4           | 114   |
| Percent   | 7  | 4  | 3 | 4  | 5  | 17 | 10 | 10 | 8  | 11 | 20 | 4           | 100   |
| Treatment | 20 | 6  | 4 | 8  | 13 | 35 | 15 | 24 | 27 | 10 | 59 | 4           | 225   |
| Percent   | 9  | 3  | 2 | 4  | 6  | 16 | 7  | 11 | 12 | 4  | 26 | 2           | 100   |
| Total     | 28 | 10 | 7 | 12 | 19 | 54 | 26 | 35 | 36 | 22 | 82 | 8           | 339   |
| Percent   | 8  | 3  | 2 | 4  | 6  | 16 | 8  | 10 | 11 | 6  | 24 | 2           | 100   |

**PRI\_Q11\_2 & TRE\_Q12\_2. Not enough time to shop/research/install/too busy**

| Group     | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 17 | 7  | 4  | 2  | 5  | 25 | 5  | 15 | 12 | 6  | 11 | 5           | 114   |
| Percent   | 15 | 6  | 4  | 2  | 4  | 22 | 4  | 13 | 11 | 5  | 10 | 4           | 100   |
| Treatment | 42 | 8  | 9  | 13 | 16 | 49 | 13 | 18 | 17 | 7  | 27 | 6           | 225   |
| Percent   | 19 | 4  | 4  | 6  | 7  | 22 | 6  | 8  | 8  | 3  | 12 | 3           | 100   |
| Total     | 59 | 15 | 13 | 15 | 21 | 74 | 18 | 33 | 29 | 13 | 38 | 11          | 339   |
| Percent   | 17 | 4  | 4  | 4  | 6  | 22 | 5  | 10 | 9  | 4  | 11 | 3           | 100   |



**PRI\_Q11\_3 & TRE\_Q12\_3. I do not have the expertise**

| Group     | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 | No Response | Total |
|-----------|----|----|----|----|----|----|----|----|----|---|----|-------------|-------|
| Control   | 22 | 5  | 7  | 8  | 6  | 16 | 4  | 22 | 3  | 2 | 13 | 6           | 114   |
| Percent   | 19 | 4  | 6  | 7  | 5  | 14 | 4  | 19 | 3  | 2 | 11 | 5           | 100   |
| Treatment | 42 | 10 | 8  | 13 | 8  | 53 | 11 | 21 | 14 | 7 | 32 | 6           | 225   |
| Percent   | 19 | 4  | 4  | 6  | 4  | 24 | 5  | 9  | 6  | 3 | 14 | 3           | 100   |
| Total     | 64 | 15 | 15 | 21 | 14 | 69 | 15 | 43 | 17 | 9 | 45 | 12          | 339   |
| Percent   | 19 | 4  | 4  | 6  | 4  | 20 | 4  | 13 | 5  | 3 | 13 | 4           | 100   |

**PRI\_Q11\_4 & TRE\_Q12\_4. I do not have enough information to make a decision or understand the impacts of these improvements or behaviors**

| Group     | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|----|----|----|----|----|----|----|----|-------------|-------|
| Control   | 22 | 7  | 7  | 1  | 4  | 19 | 6  | 16 | 10 | 3  | 14 | 5           | 114   |
| Percent   | 19 | 6  | 6  | 1  | 4  | 17 | 5  | 14 | 9  | 3  | 12 | 4           | 100   |
| Treatment | 37 | 13 | 13 | 11 | 8  | 52 | 8  | 18 | 15 | 8  | 32 | 10          | 225   |
| Percent   | 16 | 6  | 6  | 5  | 4  | 23 | 4  | 8  | 7  | 4  | 14 | 4           | 100   |
| Total     | 59 | 20 | 20 | 12 | 12 | 71 | 14 | 34 | 25 | 11 | 46 | 15          | 339   |
| Percent   | 17 | 6  | 6  | 4  | 4  | 21 | 4  | 10 | 7  | 3  | 14 | 4           | 100   |

**PRI\_Q11\_5 & TRE\_Q12\_5. Getting everyone in the house to cooperate is too hard**

| Group     | 0  | 1  | 2  | 3 | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|---|----|----|----|----|----|----|----|-------------|-------|
| Control   | 34 | 7  | 3  | 2 | 5  | 12 | 4  | 12 | 9  | 3  | 20 | 3           | 114   |
| Percent   | 30 | 6  | 3  | 2 | 4  | 11 | 4  | 11 | 8  | 3  | 18 | 3           | 100   |
| Treatment | 53 | 12 | 11 | 5 | 6  | 42 | 7  | 19 | 16 | 10 | 38 | 6           | 225   |
| Percent   | 24 | 5  | 5  | 2 | 3  | 19 | 3  | 8  | 7  | 4  | 17 | 3           | 100   |
| Total     | 87 | 19 | 14 | 7 | 11 | 54 | 11 | 31 | 25 | 13 | 58 | 9           | 339   |
| Percent   | 26 | 6  | 4  | 2 | 3  | 16 | 3  | 9  | 7  | 4  | 17 | 3           | 100   |

**PRI\_Q11\_6 & TRE\_Q12\_6. I do not think my energy saving efforts are worth the time and/or money**

| Group     | 0  | 1  | 2  | 3 | 4  | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|----|----|---|----|----|----|----|----|----|----|-------------|-------|
| Control   | 26 | 4  | 5  | 3 | 5  | 19 | 4  | 4  | 10 | 3  | 28 | 3           | 114   |
| Percent   | 23 | 4  | 4  | 3 | 4  | 17 | 4  | 4  | 9  | 3  | 25 | 3           | 100   |
| Treatment | 47 | 12 | 15 | 5 | 8  | 30 | 9  | 20 | 19 | 11 | 42 | 7           | 225   |
| Percent   | 21 | 5  | 7  | 2 | 4  | 13 | 4  | 9  | 8  | 5  | 19 | 3           | 100   |
| Total     | 73 | 16 | 20 | 8 | 13 | 49 | 13 | 24 | 29 | 14 | 70 | 10          | 339   |
| Percent   | 22 | 5  | 6  | 2 | 4  | 14 | 4  | 7  | 9  | 4  | 21 | 3           | 100   |

**PRI\_Q12 Which of the following do you do with regard to your household's energy use? Check all that apply.**

**PRI\_Q12\_1 Track monthly energy use**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 98          | 90      | 188   |
| Percent   | 52          | 48      | 100   |
| Treatment | 82          | 89      | 171   |
| Percent   | 48          | 52      | 100   |
| Total     | 180         | 179     | 359   |
| Percent   | 50          | 50      | 100   |

**PRI\_Q12\_2 Track the total amount of your bill**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 58          | 130     | 188   |
| Percent   | 31          | 69      | 100   |
| Treatment | 50          | 121     | 171   |
| Percent   | 29          | 71      | 100   |
| Total     | 108         | 251     | 359   |
| Percent   | 30          | 70      | 100   |

**PRI\_Q12\_3 Compare usage to previous months**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 59          | 129     | 188   |
| Percent   | 31          | 69      | 100   |
| Treatment | 53          | 118     | 171   |
| Percent   | 31          | 69      | 100   |
| Total     | 112         | 247     | 359   |
| Percent   | 31          | 69      | 100   |

**PRI\_Q12\_4 Compare usage to the same month from last year**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 83          | 105     | 188   |
| Percent   | 44          | 56      | 100   |
| Treatment | 58          | 113     | 171   |
| Percent   | 34          | 66      | 100   |
| Total     | 141         | 218     | 359   |
| Percent   | 39          | 61      | 100   |

**PRI\_Q12\_5 None of the above**

| Group     | Not Checked | Checked | Total |
|-----------|-------------|---------|-------|
| Control   | 174         | 14      | 188   |
| Percent   | 93          | 7       | 100   |
| Treatment | 154         | 17      | 171   |
| Percent   | 90          | 10      | 100   |
| Total     | 328         | 31      | 359   |
| Percent   | 91          | 9       | 100   |

**PRI\_Q13. Thinking about the information you could have about your home's energy use, please rate how useful each of the following items would be for your household.**

**PRI\_Q13\_1. Your home's energy use compared to that of similar homes**

| Group     | 0  | 1 | 2 | 3  | 4 | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Total |
|-----------|----|---|---|----|---|----|----|----|----|----|----|-------------|-------|
| Control   | 19 | 3 | 4 | 5  | 3 | 22 | 6  | 19 | 26 | 24 | 52 | 9           | 192   |
| Percent   | 10 | 2 | 2 | 3  | 2 | 11 | 3  | 10 | 14 | 13 | 27 | 5           | 100   |
| Treatment | 23 | 3 | 4 | 7  | 4 | 16 | 14 | 19 | 18 | 19 | 46 | 3           | 176   |
| Percent   | 13 | 2 | 2 | 4  | 2 | 9  | 8  | 11 | 10 | 11 | 26 | 2           | 100   |
| Total     | 42 | 6 | 8 | 12 | 7 | 38 | 20 | 38 | 44 | 43 | 98 | 12          | 368   |
| Percent   | 11 | 2 | 2 | 3  | 2 | 10 | 5  | 10 | 12 | 12 | 27 | 3           | 100   |

**PRI\_Q13\_2. Tips to help you save money and energy**

| Group     | 0  | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 14 | 3 | 3 | 0 | 5 | 20 | 6  | 15 | 22 | 31 | 69  | 4           | 192   |
| Percent   | 7  | 2 | 2 | 0 | 3 | 10 | 3  | 8  | 11 | 16 | 36  | 2           | 100   |
| Treatment | 9  | 2 | 2 | 2 | 4 | 22 | 8  | 10 | 28 | 26 | 60  | 3           | 176   |
| Percent   | 5  | 1 | 1 | 1 | 2 | 13 | 5  | 6  | 16 | 15 | 34  | 2           | 100   |
| Total     | 23 | 5 | 5 | 2 | 9 | 42 | 14 | 25 | 50 | 57 | 129 | 7           | 368   |
| Percent   | 6  | 1 | 1 | 1 | 2 | 11 | 4  | 7  | 14 | 15 | 35  | 2           | 100   |

**PRI\_Q13\_3. Examples of the energy use associated with common household items**

| Group     | 0  | 1 | 2 | 3 | 4  | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|---|---|----|----|----|----|----|----|-----|-------------|-------|
| Control   | 14 | 6 | 2 | 3 | 5  | 22 | 9  | 21 | 24 | 19 | 59  | 8           | 192   |
| Percent   | 7  | 3 | 1 | 2 | 3  | 11 | 5  | 11 | 13 | 10 | 31  | 4           | 100   |
| Treatment | 11 | 3 | 1 | 2 | 6  | 25 | 9  | 16 | 32 | 24 | 44  | 3           | 176   |
| Percent   | 6  | 2 | 1 | 1 | 3  | 14 | 5  | 9  | 18 | 14 | 25  | 2           | 100   |
| Total     | 25 | 9 | 3 | 5 | 11 | 47 | 18 | 37 | 56 | 43 | 103 | 11          | 368   |
| Percent   | 7  | 2 | 1 | 1 | 3  | 13 | 5  | 10 | 15 | 12 | 28  | 3           | 100   |

**PRI\_Q13\_4. Customized suggestions for your home**

| Group     | 0  | 1 | 2 | 3 | 4  | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|---|---|----|----|----|----|----|----|-----|-------------|-------|
| Control   | 23 | 3 | 6 | 3 | 8  | 23 | 8  | 21 | 15 | 21 | 52  | 9           | 192   |
| Percent   | 12 | 2 | 3 | 2 | 4  | 12 | 4  | 11 | 8  | 11 | 27  | 5           | 100   |
| Treatment | 11 | 3 | 3 | 4 | 4  | 25 | 9  | 16 | 22 | 22 | 53  | 4           | 176   |
| Percent   | 6  | 2 | 2 | 2 | 2  | 14 | 5  | 9  | 13 | 13 | 30  | 2           | 100   |
| Total     | 34 | 6 | 9 | 7 | 12 | 48 | 17 | 37 | 37 | 43 | 105 | 13          | 368   |
| Percent   | 9  | 2 | 2 | 2 | 3  | 13 | 5  | 10 | 10 | 12 | 29  | 4           | 100   |

**PRI\_Q13\_5. Graphs that display your home's energy use over time**

| Group     | 0  | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 20 | 2 | 3 | 0 | 4 | 17 | 5  | 15 | 27 | 21 | 71  | 7           | 192   |
| Percent   | 10 | 1 | 2 | 0 | 2 | 9  | 3  | 8  | 14 | 11 | 37  | 4           | 100   |
| Treatment | 12 | 4 | 1 | 2 | 3 | 14 | 11 | 13 | 30 | 25 | 59  | 2           | 176   |
| Percent   | 7  | 2 | 1 | 1 | 2 | 8  | 6  | 7  | 17 | 14 | 34  | 1           | 100   |
| Total     | 32 | 6 | 4 | 2 | 7 | 31 | 16 | 28 | 57 | 46 | 130 | 9           | 368   |
| Percent   | 9  | 2 | 1 | 1 | 2 | 8  | 4  | 8  | 15 | 13 | 35  | 2           | 100   |

**PRI\_Q13\_6. Information about services and offers from Duke Energy**

| Group     | 0  | 1 | 2 | 3 | 4  | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|---|---|----|----|----|----|----|----|-----|-------------|-------|
| Control   | 19 | 1 | 4 | 0 | 5  | 22 | 9  | 22 | 23 | 23 | 58  | 6           | 192   |
| Percent   | 10 | 1 | 2 | 0 | 3  | 11 | 5  | 11 | 12 | 12 | 30  | 3           | 100   |
| Treatment | 10 | 4 | 1 | 5 | 7  | 22 | 8  | 22 | 26 | 17 | 50  | 4           | 176   |
| Percent   | 6  | 2 | 1 | 3 | 4  | 13 | 5  | 13 | 15 | 10 | 28  | 2           | 100   |
| Total     | 29 | 5 | 5 | 5 | 12 | 44 | 17 | 44 | 49 | 40 | 108 | 10          | 368   |
| Percent   | 8  | 1 | 1 | 1 | 3  | 12 | 5  | 12 | 13 | 11 | 29  | 3           | 100   |

**PRI\_Q14. The statements below provide reasons why households might try to reduce their home's energy use. Please indicate how important each statement is to you.**

**PRI\_Q14\_1. Reducing my energy bill(s)**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6 | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|---|---|---|---|---|----|---|----|----|----|-----|-------------|-------|
| Control   | 4 | 2 | 1 | 0 | 0 | 11 | 2 | 7  | 14 | 28 | 122 | 1           | 192   |
| Percent   | 2 | 1 | 1 | 0 | 0 | 6  | 1 | 4  | 7  | 15 | 64  | 1           | 100   |
| Treatment | 3 | 0 | 1 | 1 | 2 | 5  | 4 | 4  | 21 | 27 | 107 | 1           | 176   |
| Percent   | 2 | 0 | 1 | 1 | 1 | 3  | 2 | 2  | 12 | 15 | 61  | 1           | 100   |
| Total     | 7 | 2 | 2 | 1 | 2 | 16 | 6 | 11 | 35 | 55 | 229 | 2           | 368   |
| Percent   | 2 | 1 | 1 | 0 | 1 | 4  | 2 | 3  | 10 | 15 | 62  | 1           | 100   |

**PRI\_Q14\_2. Helping the environment**

| Group     | 0  | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 9  | 1 | 2 | 3 | 2 | 17 | 9  | 13 | 23 | 13 | 95  | 5           | 192   |
| Percent   | 5  | 1 | 1 | 2 | 1 | 9  | 5  | 7  | 12 | 7  | 49  | 3           | 100   |
| Treatment | 7  | 0 | 3 | 5 | 3 | 10 | 9  | 14 | 16 | 24 | 84  | 1           | 176   |
| Percent   | 4  | 0 | 2 | 3 | 2 | 6  | 5  | 8  | 9  | 14 | 48  | 1           | 100   |
| Total     | 16 | 1 | 5 | 8 | 5 | 27 | 18 | 27 | 39 | 37 | 179 | 6           | 368   |
| Percent   | 4  | 0 | 1 | 2 | 1 | 7  | 5  | 7  | 11 | 10 | 49  | 2           | 100   |

**PRI\_Q14\_3. Setting an example for others**

| Group     | 0  | 1  | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|----|---|----|----|----|----|----|----|----|-----|-------------|-------|
| Control   | 28 | 4  | 2 | 7  | 6  | 21 | 9  | 13 | 21 | 16 | 59  | 6           | 192   |
| Percent   | 15 | 2  | 1 | 4  | 3  | 11 | 5  | 7  | 11 | 8  | 31  | 3           | 100   |
| Treatment | 23 | 6  | 3 | 7  | 7  | 22 | 12 | 12 | 19 | 15 | 46  | 4           | 176   |
| Percent   | 13 | 3  | 2 | 4  | 4  | 13 | 7  | 7  | 11 | 9  | 26  | 2           | 100   |
| Total     | 51 | 10 | 5 | 14 | 13 | 43 | 21 | 25 | 40 | 31 | 105 | 10          | 368   |
| Percent   | 14 | 3  | 1 | 4  | 4  | 12 | 6  | 7  | 11 | 8  | 29  | 3           | 100   |

**PRI\_Q14\_4. Avoiding waste**

| Group     | 0  | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 7  | 2 | 3 | 2 | 0 | 12 | 5  | 7  | 29 | 22 | 101 | 2           | 192   |
| Percent   | 4  | 1 | 2 | 1 | 0 | 6  | 3  | 4  | 15 | 11 | 53  | 1           | 100   |
| Treatment | 4  | 0 | 2 | 1 | 3 | 11 | 6  | 11 | 22 | 25 | 89  | 2           | 176   |
| Percent   | 2  | 0 | 1 | 1 | 2 | 6  | 3  | 6  | 13 | 14 | 51  | 1           | 100   |
| Total     | 11 | 2 | 5 | 3 | 3 | 23 | 11 | 18 | 51 | 47 | 190 | 4           | 368   |
| Percent   | 3  | 1 | 1 | 1 | 1 | 6  | 3  | 5  | 14 | 13 | 52  | 1           | 100   |

**PRI\_Q14\_5. Conserving energy resources**

| Group     | 0  | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10  | No Response | Total |
|-----------|----|---|---|---|---|----|----|----|----|----|-----|-------------|-------|
| Control   | 8  | 1 | 2 | 1 | 1 | 15 | 7  | 15 | 25 | 17 | 95  | 5           | 192   |
| Percent   | 4  | 1 | 1 | 1 | 1 | 8  | 4  | 8  | 13 | 9  | 49  | 3           | 100   |
| Treatment | 4  | 0 | 2 | 2 | 2 | 15 | 7  | 8  | 24 | 25 | 85  | 2           | 176   |
| Percent   | 2  | 0 | 1 | 1 | 1 | 9  | 4  | 5  | 14 | 14 | 48  | 1           | 100   |
| Total     | 12 | 1 | 4 | 3 | 3 | 30 | 14 | 23 | 49 | 42 | 180 | 7           | 368   |
| Percent   | 3  | 0 | 1 | 1 | 1 | 8  | 4  | 6  | 13 | 11 | 49  | 2           | 100   |

**PRI\_Q15. Please indicate your level of agreement with each of the following statements**

**PRI\_Q15\_1. Duke Energy provides excellent customer service**

| Group     | Strongly Disagree | Somewhat Disagree | Neither | Somewhat Agree | Strongly Agree | No Response | Total |
|-----------|-------------------|-------------------|---------|----------------|----------------|-------------|-------|
| Control   | 7                 | 9                 | 22      | 69             | 83             | 2           | 192   |
| Percent   | 4                 | 5                 | 11      | 36             | 43             | 1           | 100   |
| Treatment | 2                 | 10                | 23      | 62             | 78             | 1           | 176   |
| Percent   | 1                 | 6                 | 13      | 35             | 44             | 1           | 100   |
| Total     | 9                 | 19                | 45      | 131            | 161            | 3           | 368   |
| Percent   | 2                 | 5                 | 12      | 36             | 44             | 1           | 100   |

**PRI\_Q15\_2. Duke Energy respects its customers**

| Group     | Strongly Disagree | Somewhat Disagree | Neither | Somewhat Agree | Strongly Agree | No Response | Total |
|-----------|-------------------|-------------------|---------|----------------|----------------|-------------|-------|
| Control   | 8                 | 11                | 26      | 57             | 88             | 2           | 192   |
| Percent   | 4                 | 6                 | 14      | 30             | 46             | 1           | 100   |
| Treatment | 4                 | 9                 | 32      | 54             | 76             | 1           | 176   |
| Percent   | 2                 | 5                 | 18      | 31             | 43             | 1           | 100   |
| Total     | 12                | 20                | 58      | 111            | 164            | 3           | 368   |
| Percent   | 3                 | 5                 | 16      | 30             | 45             | 1           | 100   |

**PRI\_Q15\_3. Duke Energy provides service at a reasonable cost**

| Group     | Strongly Disagree | Somewhat Disagree | Neither | Somewhat Agree | Strongly Agree | No Response | Total |
|-----------|-------------------|-------------------|---------|----------------|----------------|-------------|-------|
| Control   | 6                 | 25                | 43      | 69             | 44             | 5           | 192   |
| Percent   | 3                 | 13                | 22      | 36             | 23             | 3           | 100   |
| Treatment | 5                 | 27                | 24      | 86             | 33             | 1           | 176   |
| Percent   | 3                 | 15                | 14      | 49             | 19             | 1           | 100   |
| Total     | 11                | 52                | 67      | 155            | 77             | 6           | 368   |
| Percent   | 3                 | 14                | 18      | 42             | 21             | 2           | 100   |

**PRI\_Q16. Before today, were you aware that you could order free or discounted lighting products through the Duke Energy website?**

| Group     | Yes | No  | No Response | Total |
|-----------|-----|-----|-------------|-------|
| Control   | 39  | 150 | 3           | 192   |
| Percent   | 20  | 78  | 2           | 100   |
| Treatment | 39  | 134 | 3           | 176   |
| Percent   | 22  | 76  | 2           | 100   |
| Total     | 78  | 284 | 6           | 368   |
| Percent   | 21  | 77  | 2           | 100   |

**PRI\_Q16a. How many free light bulbs have you ordered through the Duke Energy website this year?**

| Group     | 0  | 1 | 4 | 6 | 10 | 12 | 14 | 30 | Missing | Total |
|-----------|----|---|---|---|----|----|----|----|---------|-------|
| Control   | 32 | 1 | 0 | 0 | 0  | 1  | 0  | 0  | 5       | 39    |
| Percent   | 82 | 3 | 0 | 0 | 0  | 3  | 0  | 0  | 13      | 100   |
| Treatment | 32 | 0 | 1 | 1 | 1  | 0  | 1  | 1  | 2       | 39    |
| Percent   | 82 | 0 | 3 | 3 | 3  | 0  | 3  | 3  | 5       | 100   |
| Total     | 64 | 1 | 1 | 1 | 1  | 1  | 1  | 1  | 7       | 78    |
| Percent   | 82 | 1 | 1 | 1 | 1  | 1  | 1  | 1  | 9       | 100   |

**PRI\_Q16b. How many discounted light bulbs have you ordered through the Duke Energy website this year?**

| Group     | 0  | 6 | 10 | 12 | 20 | 24 | 25 | 30 | Missing | Total |
|-----------|----|---|----|----|----|----|----|----|---------|-------|
| Control   | 32 | 0 | 0  | 1  | 0  | 1  | 1  | 0  | 4       | 39    |
| Percent   | 82 | 0 | 0  | 3  | 0  | 3  | 3  | 0  | 10      | 100   |
| Treatment | 33 | 1 | 1  | 0  | 1  | 0  | 0  | 1  | 2       | 39    |
| Percent   | 85 | 3 | 3  | 0  | 3  | 0  | 0  | 3  | 5       | 100   |
| Total     | 65 | 1 | 1  | 1  | 1  | 1  | 1  | 1  | 6       | 78    |
| Percent   | 83 | 1 | 1  | 1  | 1  | 1  | 1  | 1  | 8       | 100   |

**PRI\_Q18 & TRE\_Q13. Do you own or rent this residence?**

| Group     | Own | Rent | Missing | No Response | Total |
|-----------|-----|------|---------|-------------|-------|
| Control   | 161 | 21   | 8       | 2           | 192   |
| Percent   | 84  | 11   | 4       | 1           | 100   |
| Treatment | 310 | 24   | 10      | 3           | 347   |
| Percent   | 89  | 7    | 3       | 1           | 100   |
| Total     | 471 | 45   | 18      | 5           | 539   |
| Percent   | 87  | 8    | 3       | 1           | 100   |

**PRI\_Q19 & TRE\_Q14. Including yourself, how many people live in your home?**

| Group     | 1   | 2   | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 19 | No Response | Missing | Total |
|-----------|-----|-----|----|----|----|---|---|---|---|----|-------------|---------|-------|
| Control   | 49  | 66  | 28 | 22 | 11 | 4 | 0 | 1 | 1 | 1  | 1           | 8       | 192   |
| Percent   | 26  | 34  | 15 | 11 | 6  | 2 | 0 | 1 | 1 | 1  | 1           | 4       | 100   |
| Treatment | 65  | 155 | 39 | 47 | 17 | 5 | 1 | 0 | 0 | 1  | 7           | 10      | 347   |
| Percent   | 19  | 45  | 11 | 14 | 5  | 1 | 0 | 0 | 0 | 0  | 2           | 3       | 100   |
| Total     | 114 | 221 | 67 | 69 | 28 | 9 | 1 | 1 | 1 | 2  | 8           | 18      | 539   |
| Percent   | 21  | 41  | 12 | 13 | 5  | 2 | 0 | 0 | 0 | 0  | 1           | 3       | 100   |

**PRI\_Q22 & TRE\_Q17. What is your primary heating fuel?**

| Group     | Electricity | Natural Gas | Oil | Other | Don't know | No Response | Missing | Total |
|-----------|-------------|-------------|-----|-------|------------|-------------|---------|-------|
| Control   | 107         | 63          | 1   | 9     | 3          | 1           | 8       | 192   |
| Percent   | 56          | 33          | 1   | 5     | 2          | 1           | 4       | 100   |
| Treatment | 188         | 103         | 8   | 23    | 3          | 3           | 19      | 347   |
| Percent   | 54          | 30          | 2   | 7     | 1          | 1           | 5       | 100   |
| Total     | 295         | 166         | 9   | 32    | 6          | 4           | 27      | 539   |
| Percent   | 55          | 31          | 2   | 6     | 1          | 1           | 5       | 100   |



**TRE\_Q1. Duke Energy sends a personalized report called My Home Energy Report to a select group of homes. These reports are mailed in a standard envelope every few months and are meant to provide you with information on how your home's electric energy usage compares with similar homes. Have you seen one of these reports?**

| Group     | Yes | No | No Response | Total |
|-----------|-----|----|-------------|-------|
| Treatment | 160 | 10 | 1           | 171   |
| Percent   | 94  | 6  | 1           | 100   |

**TRE\_Q2. About how many My Home Energy Reports have you received in the past 12 months?**

| Group     | 1 | 2  | 3  | 4  | 5 | 6  | 7 | 8 | 9 | 10 | 11 | 12 | No Response | Missing | Total |
|-----------|---|----|----|----|---|----|---|---|---|----|----|----|-------------|---------|-------|
| Treatment | 4 | 14 | 14 | 29 | 6 | 21 | 2 | 8 | 2 | 9  | 1  | 37 | 13          | 1       | 161   |
| Percent   | 2 | 9  | 9  | 18 | 4 | 13 | 1 | 5 | 1 | 6  | 1  | 23 | 8           | 1       | 100   |

**TRE\_Q3. How often do you read the My Home Energy Reports?**

| Group     | Always | Sometimes | Never | No Response | Missing | Total |
|-----------|--------|-----------|-------|-------------|---------|-------|
| Treatment | 107    | 42        | 10    | 1           | 1       | 161   |
| Percent   | 66     | 26        | 6     | 1           | 1       | 100   |

**TRE\_Q4. How much do you agree or disagree with the following statements about My Home Energy Reports?**

**TRE\_Q4\_1. I have learned about my household's energy use from My Home Energy Reports.**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|----|-------------|---------|-------|
| Treatment | 5 | 2 | 2 | 4 | 2 | 16 | 10 | 14 | 19 | 22 | 52 | 1           | 2       | 151   |
| Percent   | 3 | 1 | 1 | 3 | 1 | 11 | 7  | 9  | 13 | 15 | 34 | 1           | 1       | 100   |

**TRE\_Q4\_2. I use the reports to tell me how well I am doing at saving energy.**

| Group     | 0 | 1 | 2 | 3  | 4 | 5  | 6 | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|----|---|----|---|----|----|----|----|-------------|---------|-------|
| Treatment | 6 | 1 | 5 | 10 | 6 | 16 | 6 | 20 | 14 | 19 | 44 | 2           | 2       | 151   |
| Percent   | 4 | 1 | 3 | 7  | 4 | 11 | 4 | 13 | 9  | 13 | 29 | 1           | 1       | 100   |

**TRE\_Q4\_3. The tips provided in the reports are pertinent to my home.**

| Group     | 0 | 1 | 2 | 3  | 4 | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|----|---|----|----|----|----|----|----|-------------|---------|-------|
| Treatment | 4 | 3 | 7 | 10 | 9 | 22 | 15 | 13 | 19 | 15 | 29 | 3           | 2       | 151   |
| Percent   | 3 | 2 | 5 | 7  | 6 | 15 | 10 | 9  | 13 | 10 | 19 | 2           | 1       | 100   |

**TRE\_Q4\_4. My Home Energy Reports provide the details I need to understand my home's energy use.**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|----|-------------|---------|-------|
| Treatment | 5 | 2 | 6 | 3 | 6 | 24 | 12 | 14 | 15 | 15 | 44 | 3           | 2       | 151   |
| Percent   | 3 | 1 | 4 | 2 | 4 | 16 | 8  | 9  | 10 | 10 | 29 | 2           | 1       | 100   |

**TRE\_Q4\_5. I have discussed My Home Energy Reports with others.**

| Group     | 0  | 1  | 2  | 3 | 4 | 5  | 6 | 7  | 8 | 9 | 10 | No Response | Missing | Total |
|-----------|----|----|----|---|---|----|---|----|---|---|----|-------------|---------|-------|
| Treatment | 43 | 19 | 10 | 8 | 6 | 13 | 6 | 10 | 9 | 5 | 18 | 2           | 2       | 151   |
| Percent   | 28 | 13 | 7  | 5 | 4 | 9  | 4 | 7  | 6 | 3 | 12 | 1           | 1       | 100   |

**TRE\_Q4\_6. The information provided about my home's energy use is confusing.**

| Group     | 0  | 1  | 2  | 3  | 4 | 5  | 6 | 7 | 8 | 9 | 10 | No Response | Missing | Total |
|-----------|----|----|----|----|---|----|---|---|---|---|----|-------------|---------|-------|
| Treatment | 41 | 24 | 17 | 18 | 7 | 13 | 4 | 6 | 7 | 4 | 7  | 1           | 2       | 151   |
| Percent   | 27 | 16 | 11 | 12 | 5 | 9  | 3 | 4 | 5 | 3 | 5  | 1           | 1       | 100   |

**TRE\_Q4\_7. I suspect that the "similar" homes that my home is compared to in the Home Energy Reports are not actually like mine.**

| Group     | 0  | 1 | 2  | 3  | 4 | 5  | 6 | 7 | 8  | 9 | 10 | No Response | Missing | Total |
|-----------|----|---|----|----|---|----|---|---|----|---|----|-------------|---------|-------|
| Treatment | 15 | 6 | 12 | 13 | 7 | 22 | 7 | 7 | 22 | 9 | 26 | 3           | 2       | 151   |
| Percent   | 10 | 4 | 8  | 9  | 5 | 15 | 5 | 5 | 15 | 6 | 17 | 2           | 1       | 100   |

**TRE\_Q4\_8. Since reading the Home Energy Reports, I have taken actions to use less energy than I would not have otherwise taken.**

| Group     | 0  | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|----|---|---|---|---|----|----|----|----|----|----|-------------|---------|-------|
| Treatment | 13 | 5 | 6 | 9 | 7 | 27 | 10 | 17 | 16 | 12 | 26 | 1           | 2       | 151   |
| Percent   | 9  | 3 | 4 | 6 | 5 | 18 | 7  | 11 | 11 | 8  | 17 | 1           | 1       | 100   |

**TRE\_Q6. Please rate how useful each feature of the Home Energy Report is to you.**

**TRE\_Q6\_1. Comparison to similar homes**

| Group     | 0  | 1  | 2 | 3 | 4  | 5  | 6 | 7  | 8  | 9 | 10 | No Response | Missing | Total |
|-----------|----|----|---|---|----|----|---|----|----|---|----|-------------|---------|-------|
| Treatment | 19 | 10 | 3 | 7 | 12 | 21 | 7 | 17 | 18 | 7 | 25 | 3           | 2       | 151   |
| Percent   | 13 | 7  | 2 | 5 | 8  | 14 | 5 | 11 | 12 | 5 | 17 | 2           | 1       | 100   |

**TRE\_Q6\_2. Tips to help you save money and energy**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6 | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|---|----|----|----|----|-------------|---------|-------|
| Treatment | 3 | 7 | 4 | 3 | 8 | 20 | 8 | 16 | 22 | 17 | 38 | 3           | 2       | 151   |
| Percent   | 2 | 5 | 3 | 2 | 5 | 13 | 5 | 11 | 15 | 11 | 25 | 2           | 1       | 100   |

**TRE\_Q6\_3. Examples of the energy use associated with common household items**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|----|-------------|---------|-------|
| Treatment | 8 | 3 | 3 | 2 | 3 | 30 | 10 | 15 | 24 | 13 | 35 | 3           | 2       | 151   |
| Percent   | 5 | 2 | 2 | 1 | 2 | 20 | 7  | 10 | 16 | 9  | 23 | 2           | 1       | 100   |

**TRE\_Q6\_4. Customized suggestions for your home**

| Group     | 0 | 1 | 2  | 3 | 4  | 5  | 6 | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|----|---|----|----|---|----|----|----|----|-------------|---------|-------|
| Treatment | 4 | 4 | 11 | 2 | 12 | 25 | 9 | 16 | 20 | 13 | 31 | 2           | 2       | 151   |
| Percent   | 3 | 3 | 7  | 1 | 8  | 17 | 6 | 11 | 13 | 9  | 21 | 1           | 1       | 100   |

**TRE\_Q6\_5. Graphs that display your home's energy use over time**

| Group     | 0 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|----|----|----|----|----|----|-------------|---------|-------|
| Treatment | 3 | 3 | 1 | 5 | 5 | 12 | 10 | 13 | 24 | 20 | 51 | 2           | 2       | 151   |
| Percent   | 2 | 2 | 1 | 3 | 3 | 8  | 7  | 9  | 16 | 13 | 34 | 1           | 1       | 100   |

**TRE\_Q6\_6. Information about services and offers from Duke Energy**

| Group     | 0 | 1 | 2 | 3 | 4  | 5  | 6 | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|----|----|---|----|----|----|----|-------------|---------|-------|
| Treatment | 4 | 7 | 8 | 5 | 13 | 21 | 8 | 14 | 19 | 16 | 30 | 4           | 2       | 151   |
| Percent   | 3 | 5 | 5 | 3 | 9  | 14 | 5 | 9  | 13 | 11 | 20 | 3           | 1       | 100   |

**TRE\_Q7. Overall, how satisfied are you with the information in the My Home Energy Reports you've received?**

| Group     | 0 | 1 | 2 | 3  | 4 | 5 | 6  | 7  | 8  | 9  | 10 | No Response | Missing | Total |
|-----------|---|---|---|----|---|---|----|----|----|----|----|-------------|---------|-------|
| Treatment | 4 | 2 | 0 | 15 | 6 | 0 | 10 | 18 | 19 | 15 | 43 | 17          | 2       | 151   |
| Percent   | 3 | 1 | 0 | 10 | 4 | 0 | 7  | 12 | 13 | 10 | 28 | 11          | 1       | 100   |

**TRE\_Q8. Are you aware that you can go online to My Home Energy Interactive to access more information, above and beyond that found in the My Home Energy Report, which describes more ways to save energy?**

| Group     | Yes | No | No Response | Missing | Total |
|-----------|-----|----|-------------|---------|-------|
| Treatment | 50  | 93 | 6           | 2       | 151   |
| Percent   | 33  | 62 | 4           | 1       | 100   |

**TRE\_Q8a. Have you signed up to use My Home Energy Interactive?**

| Group     | Yes | No | Missing | Total |
|-----------|-----|----|---------|-------|
| Treatment | 7   | 44 | 7       | 58    |
| Percent   | 12  | 76 | 12      | 100   |

**TRE\_Q8b. How useful is My Home Energy Interactive to you for saving energy?**

| Group     | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9 | 10 | No Response | Missing | Total |
|-----------|---|---|---|---|---|---|---|---|----|---|----|-------------|---------|-------|
| Treatment | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 2  | 1 | 1  | 0           | 7       | 14    |
| Percent   | 0 | 0 | 7 | 0 | 0 | 7 | 7 | 0 | 14 | 7 | 7  | 0           | 50      | 100   |

## Appendix F Detailed Regression Outputs/Models

Table F-1: Regression Coefficients for DEC Cohort 1

Number of obs = 1762110  
 F(211,1746190) = 3462.28  
 Prob>F = 0.0000  
 R-squared = 0.6990  
 AdjR-squared = 0.6963  
 Root MSE = 14.2230

| Variable | Coefficient | Std. Err. | t      | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|--------|--------|--------------------|-----------|
| i.ym     |             |           |        |        |                    |           |
| 12/2008  | 5.191487    | .2007457  | 25.86  | 0.000  | 4.798033           | 5.584942  |
| 01/2009  | 8.474034    | .2007376  | 42.21  | 0.000  | 8.080595           | 8.867473  |
| 02/2009  | 4.944045    | .2007376  | 24.63  | 0.000  | 4.550607           | 5.337484  |
| 03/2009  | -4.473073   | .2007376  | -22.28 | 0.000  | -4.866511          | -4.079634 |
| 04/2009  | -10.36862   | .2007399  | -51.65 | 0.000  | -10.76206          | -9.975177 |
| 05/2009  | -5.134012   | .2007376  | -25.58 | 0.000  | -5.52745           | -4.740573 |
| 06/2009  | 8.447003    | .2007622  | 42.07  | 0.000  | 8.053516           | 8.84049   |
| 07/2009  | 12.29769    | .2007376  | 61.26  | 0.000  | 11.90425           | 12.69113  |
| 08/2009  | 10.50211    | .2007376  | 52.32  | 0.000  | 10.10867           | 10.89554  |
| 09/2009  | -1.928812   | .2007376  | -9.61  | 0.000  | -2.322251          | -1.535373 |
| 10/2009  | -10.3154    | .2007376  | -51.39 | 0.000  | -10.70884          | -9.921959 |
| 11/2009  | -5.556012   | .2007376  | -27.68 | 0.000  | -5.949451          | -5.162574 |
| 12/2009  | 12.49879    | .2007376  | 62.26  | 0.000  | 12.10535           | 12.89222  |
| 01/2010  | 17.97165    | .2007376  | 89.53  | 0.000  | 17.57821           | 18.36509  |
| 02/2010  | 12.75866    | .2007376  | 63.56  | 0.000  | 12.36522           | 13.1521   |
| 03/2010  | -2.580372   | .2007376  | -12.85 | 0.000  | -2.973811          | -2.186933 |
| 05/2010  | -1.914499   | .2193415  | -8.73  | 0.000  | -2.3444            | -1.484597 |
| 06/2010  | 13.97785    | .2193415  | 63.73  | 0.000  | 13.54795           | 14.40775  |
| 07/2010  | 21.27298    | .2193415  | 96.99  | 0.000  | 20.84308           | 21.70289  |
| 08/2010  | 16.37607    | .2193517  | 74.66  | 0.000  | 15.94615           | 16.806    |
| 09/2010  | 3.002323    | .2193415  | 13.69  | 0.000  | 2.572421           | 3.432225  |
| 10/2010  | -10.85536   | .2193415  | -49.49 | 0.000  | -11.28526          | -10.42546 |
| 11/2010  | -2.931544   | .2193415  | -13.37 | 0.000  | -3.361445          | -2.501642 |
| 12/2010  | 15.42983    | .2193415  | 70.35  | 0.000  | 14.99993           | 15.85973  |
| 01/2011  | 16.05199    | .2193467  | 73.18  | 0.000  | 15.62208           | 16.4819   |
| 02/2011  | 1.516525    | .2193467  | 6.91   | 0.000  | 1.086613           | 1.946437  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |        |       |           |           |
|---------|-----------|----------|--------|-------|-----------|-----------|
| 03/2011 | -8.668877 | .2193467 | -39.52 | 0.000 | -9.098789 | -8.238966 |
| 04/2011 | -10.7024  | .2193467 | -48.79 | 0.000 | -11.13231 | -10.27249 |
| 05/2011 | -2.066455 | .2193467 | -9.42  | 0.000 | -2.496367 | -1.636544 |
| 06/2011 | 11.27938  | .2193467 | 51.42  | 0.000 | 10.84947  | 11.70929  |
| 07/2011 | 18.50946  | .2193467 | 84.38  | 0.000 | 18.07955  | 18.93937  |
| 08/2011 | 15.38748  | .2193467 | 70.15  | 0.000 | 14.95757  | 15.81739  |
| 09/2011 | -2.419517 | .2193467 | -11.03 | 0.000 | -2.849429 | -1.989605 |
| 10/2011 | -11.95917 | .2193467 | -54.52 | 0.000 | -12.38908 | -11.52925 |
| 11/2011 | -6.773594 | .2193467 | -30.88 | 0.000 | -7.203506 | -6.343682 |
| 12/2011 | .3503983  | .2193467 | 1.60   | 0.110 | -.0795136 | .7803101  |
| 01/2012 | 2.137307  | .2193467 | 9.74   | 0.000 | 1.707396  | 2.567219  |
| 02/2012 | -2.023987 | .2193467 | -9.23  | 0.000 | -2.453899 | -1.594075 |
| 03/2012 | -10.96786 | .2193467 | -50.00 | 0.000 | -11.39777 | -10.53795 |
| 04/2012 | -12.02501 | .2193467 | -54.82 | 0.000 | -12.45493 | -11.5951  |
| 05/2012 | -5.344883 | .2193467 | -24.37 | 0.000 | -5.774795 | -4.914972 |
| 06/2012 | 5.043491  | .2193467 | 22.99  | 0.000 | 4.613579  | 5.473403  |
| 07/2012 | 15.05386  | .2193467 | 68.63  | 0.000 | 14.62395  | 15.48378  |
| 08/2012 | 7.429274  | .2193467 | 33.87  | 0.000 | 6.999362  | 7.859186  |
| 09/2012 | -4.481343 | .2193467 | -20.43 | 0.000 | -4.911255 | -4.051431 |
| 10/2012 | -11.71996 | .2193467 | -53.43 | 0.000 | -12.14987 | -11.29005 |
| 11/2012 | -3.644662 | .2193467 | -16.62 | 0.000 | -4.074574 | -3.21475  |
| 12/2012 | -.3900915 | .2193467 | -1.78  | 0.075 | -.8200034 | .0398203  |
| 01/2013 | 3.125439  | .2193467 | 14.25  | 0.000 | 2.695527  | 3.555351  |
| 02/2013 | 4.334034  | .2193467 | 19.76  | 0.000 | 3.904122  | 4.763946  |
| 03/2013 | -1.639171 | .2193467 | -7.47  | 0.000 | -2.069083 | -1.209259 |
| 04/2013 | -10.92128 | .2193467 | -49.79 | 0.000 | -11.3512  | -10.49137 |
| 05/2013 | -9.073495 | .2193467 | -41.37 | 0.000 | -9.503407 | -8.643583 |
| 06/2013 | 1.977657  | .2193467 | 9.02   | 0.000 | 1.547745  | 2.407569  |
| 07/2013 | 6.9278    | .2193467 | 31.58  | 0.000 | 6.497888  | 7.357712  |
| 08/2013 | 4.202586  | .2193467 | 19.16  | 0.000 | 3.772674  | 4.632497  |
| 09/2013 | -3.535703 | .2193467 | -16.12 | 0.000 | -3.965615 | -3.105791 |
| 10/2013 | -12.08457 | .2193467 | -55.09 | 0.000 | -12.51448 | -11.65466 |
| 11/2013 | -4.151322 | .2193467 | -18.93 | 0.000 | -4.581234 | -3.72141  |
| 12/2013 | 5.982545  | .2193467 | 27.27  | 0.000 | 5.552633  | 6.412457  |
| 01/2014 | 13.94471  | .2193467 | 63.57  | 0.000 | 13.5148   | 14.37462  |
| 02/2014 | 6.439797  | .2193467 | 29.36  | 0.000 | 6.009885  | 6.869709  |
| 03/2014 | -4.763844 | .2193467 | -21.72 | 0.000 | -5.193755 | -4.333932 |
| 04/2014 | -11.30048 | .2193467 | -51.52 | 0.000 | -11.73039 | -10.87057 |
| 05/2014 | -5.923049 | .2193518 | -27.00 | 0.000 | -6.352971 | -5.493127 |
| 06/2014 | 5.586936  | .2193518 | 25.47  | 0.000 | 5.157014  | 6.016858  |
| 07/2014 | 6.807551  | .2193518 | 31.03  | 0.000 | 6.377629  | 7.237473  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |        |       |           |           |
|---------|-----------|----------|--------|-------|-----------|-----------|
| 08/2014 | 4.594464  | .2193467 | 20.95  | 0.000 | 4.164553  | 5.024376  |
| 09/2014 | -2.844089 | .2193467 | -12.97 | 0.000 | -3.274001 | -2.414177 |
| 10/2014 | -12.83725 | .2193467 | -58.52 | 0.000 | -13.26717 | -12.40734 |
| 11/2014 | -3.794079 | .2193467 | -17.30 | 0.000 | -4.223991 | -3.364168 |
| 12/2014 | 5.624176  | .2193415 | 25.64  | 0.000 | 5.194275  | 6.054078  |
| 01/2015 | 7.697574  | .2193415 | 35.09  | 0.000 | 7.267672  | 8.127475  |
| 02/2015 | 8.480056  | .2193415 | 38.66  | 0.000 | 8.050154  | 8.909958  |
| 03/2015 | -6.031693 | .2193415 | -27.50 | 0.000 | -6.461595 | -5.601791 |
| 04/2015 | -13.39654 | .2193415 | -61.08 | 0.000 | -13.82644 | -12.96664 |
| 05/2015 | -5.456317 | .2193415 | -24.88 | 0.000 | -5.886219 | -5.026415 |
| 06/2015 | 7.45144   | .2193415 | 33.97  | 0.000 | 7.021538  | 7.881341  |
| 07/2015 | 13.00821  | .2193415 | 59.31  | 0.000 | 12.57831  | 13.43811  |
| 08/2015 | 8.063715  | .2193415 | 36.76  | 0.000 | 7.633813  | 8.493616  |
| 09/2015 | -5.04434  | .2193415 | -23.00 | 0.000 | -5.474241 | -4.614438 |
| 10/2015 | -14.22894 | .2193415 | -64.87 | 0.000 | -14.65884 | -13.79903 |
| 11/2015 | -10.26639 | .2193415 | -46.81 | 0.000 | -10.69629 | -9.836487 |
| 12/2015 | -4.744726 | .2193415 | -21.63 | 0.000 | -5.174627 | -4.314824 |
| 01/2016 | 4.96105   | .2193465 | 22.62  | 0.000 | 4.531139  | 5.390962  |
| 02/2016 | 2.108975  | .2193816 | 9.61   | 0.000 | 1.678995  | 2.538955  |
| 03/2016 | -11.48936 | .2195124 | -52.34 | 0.000 | -11.9196  | -11.05912 |
| 04/2016 | -13.86226 | .2197353 | -63.09 | 0.000 | -14.29294 | -13.43159 |
| 05/2016 | -7.251094 | .2199293 | -32.97 | 0.000 | -7.682147 | -6.82004  |
| 06/2016 | 7.00792   | .2201299 | 31.84  | 0.000 | 6.576473  | 7.439367  |
| 07/2016 | 15.72801  | .2204102 | 71.36  | 0.000 | 15.29602  | 16.16001  |
| 08/2016 | 11.98578  | .2206354 | 54.32  | 0.000 | 11.55334  | 12.41821  |
| 09/2016 | 1.356097  | .220921  | 6.14   | 0.000 | .9230997  | 1.789095  |
| 10/2016 | -12.62069 | .221172  | -57.06 | 0.000 | -13.05418 | -12.1872  |
| 11/2016 | -9.658069 | .2213335 | -43.64 | 0.000 | -10.09188 | -9.224264 |
| 12/2016 | -.6289618 | .2215121 | -2.84  | 0.005 | -1.063118 | -.1948056 |
| 01/2017 | -2.849558 | .2216975 | -12.85 | 0.000 | -3.284077 | -2.415039 |
| 02/2017 | -8.607431 | .221851  | -38.80 | 0.000 | -9.042251 | -8.172611 |
| 03/2017 | -10.77751 | .2220055 | -48.55 | 0.000 | -11.21263 | -10.34238 |
| 04/2017 | -13.76509 | .2222722 | -61.93 | 0.000 | -14.20073 | -13.32944 |
| 05/2017 | -8.217315 | .2225359 | -36.93 | 0.000 | -8.653478 | -7.781152 |
| 06/2017 | 1.158951  | .2228875 | 5.20   | 0.000 | .722099   | 1.595803  |
| 07/2017 | 8.833328  | .2231686 | 39.58  | 0.000 | 8.395925  | 9.270731  |
| 08/2017 | 4.53006   | .2234059 | 20.28  | 0.000 | 4.092192  | 4.967928  |
| 09/2017 | -5.786104 | .2236804 | -25.87 | 0.000 | -6.22451  | -5.347698 |
| 10/2017 | -11.066   | .2239339 | -49.42 | 0.000 | -11.5049  | -10.62709 |
| 11/2017 | -8.475153 | .2241597 | -37.81 | 0.000 | -8.914499 | -8.035808 |
| 12/2017 | 4.758375  | .2243693 | 21.21  | 0.000 | 4.318619  | 5.198131  |



APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                      |           |          |        |       |           |           |
|----------------------|-----------|----------|--------|-------|-----------|-----------|
| 01/2018              | 9.863339  | .2246289 | 43.91  | 0.000 | 9.423074  | 10.3036   |
| 02/2018              | -5.781853 | .2248725 | -25.71 | 0.000 | -6.222595 | -5.34111  |
| 03/2018              | -9.912905 | .2250997 | -44.04 | 0.000 | -10.35409 | -9.471718 |
| 04/2018              | -13.94758 | .2253348 | -61.90 | 0.000 | -14.38923 | -13.50593 |
| 05/2018              | -6.950921 | .2255593 | -30.82 | 0.000 | -7.393009 | -6.508832 |
| i.ym#c.treatme<br>nt |           |          |        |       |           |           |
| 05/2010              | -.1910499 | .2394967 | -0.80  | 0.425 | -.6604551 | .2783552  |
| 06/2010              | -.2860475 | .2394967 | -1.19  | 0.232 | -.7554527 | .1833577  |
| 07/2010              | -.5401676 | .2394967 | -2.26  | 0.024 | -1.009573 | -.0707624 |
| 08/2010              | -.4921973 | .239506  | -2.06  | 0.040 | -.9616208 | -.0227738 |
| 09/2010              | -.463216  | .2394967 | -1.93  | 0.053 | -.9326212 | .0061891  |
| 10/2010              | -.5357518 | .2394967 | -2.24  | 0.025 | -1.005157 | -.0663467 |
| 11/2010              | -.1931776 | .2394967 | -0.81  | 0.420 | -.6625827 | .2762276  |
| 12/2010              | .0610646  | .2394967 | 0.25   | 0.799 | -.4083406 | .5304697  |
| 01/2011              | .0866716  | .2395014 | 0.36   | 0.717 | -.3827428 | .556086   |
| 02/2011              | .0078406  | .2395126 | 0.03   | 0.974 | -.4615958 | .477277   |
| 03/2011              | -.454115  | .2395126 | -1.90  | 0.058 | -.9235514 | .0153213  |
| 04/2011              | -.484397  | .2395126 | -2.02  | 0.043 | -.9538333 | -.0149606 |
| 05/2011              | -.7348654 | .2395238 | -3.07  | 0.002 | -1.204324 | -.2654072 |
| 06/2011              | -.5874111 | .2395126 | -2.45  | 0.014 | -1.056847 | -.1179747 |
| 07/2011              | -.8212494 | .2395126 | -3.43  | 0.001 | -1.290686 | -.3518131 |
| 08/2011              | -.6037938 | .2395126 | -2.52  | 0.012 | -1.07323  | -.1343574 |
| 09/2011              | -.5673285 | .2395126 | -2.37  | 0.018 | -1.036765 | -.0978922 |
| 10/2011              | -.5760798 | .2395126 | -2.41  | 0.016 | -1.045516 | -.1066434 |
| 11/2011              | -.4092845 | .2395126 | -1.71  | 0.087 | -.8787209 | .0601518  |
| 12/2011              | -.3575161 | .2395126 | -1.49  | 0.136 | -.8269524 | .1119203  |
| 01/2012              | -.2747792 | .2395126 | -1.15  | 0.251 | -.7442156 | .1946571  |
| 02/2012              | -.3863291 | .2395126 | -1.61  | 0.107 | -.8557654 | .0831073  |
| 03/2012              | -.556866  | .2395126 | -2.32  | 0.020 | -1.026302 | -.0874297 |
| 04/2012              | -.685426  | .2395126 | -2.86  | 0.004 | -1.154862 | -.2159896 |
| 05/2012              | -.5552546 | .2395126 | -2.32  | 0.020 | -1.024691 | -.0858182 |
| 06/2012              | -.6511456 | .2395126 | -2.72  | 0.007 | -1.120582 | -.1817092 |
| 07/2012              | -.5138519 | .2395126 | -2.15  | 0.032 | -.9832883 | -.0444155 |
| 08/2012              | -.6455145 | .2395126 | -2.70  | 0.007 | -1.114951 | -.1760781 |
| 09/2012              | -.5557067 | .2395126 | -2.32  | 0.020 | -1.025143 | -.0862704 |
| 10/2012              | -.6565749 | .2395014 | -2.74  | 0.006 | -1.125989 | -.1871605 |
| 11/2012              | -.983766  | .2395014 | -4.11  | 0.000 | -1.45318  | -.5143516 |
| 12/2012              | -.4109544 | .2395014 | -1.72  | 0.086 | -.8803688 | .05846    |
| 01/2013              | -.2759519 | .2395014 | -1.15  | 0.249 | -.7453663 | .1934625  |
| 02/2013              | -.3054777 | .2395014 | -1.28  | 0.202 | -.7748921 | .1639367  |

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APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |       |       |           |           |
|---------|-----------|----------|-------|-------|-----------|-----------|
| 03/2013 | -.5427792 | .2395014 | -2.27 | 0.023 | -1.012194 | -.0733648 |
| 04/2013 | -.582956  | .2395014 | -2.43 | 0.015 | -1.05237  | -.1135416 |
| 05/2013 | -.7678896 | .2395014 | -3.21 | 0.001 | -1.237304 | -.2984752 |
| 06/2013 | -.8816336 | .2395014 | -3.68 | 0.000 | -1.351048 | -.4122192 |
| 07/2013 | -1.034716 | .2395014 | -4.32 | 0.000 | -1.504131 | -.565302  |
| 08/2013 | -.9875511 | .2395014 | -4.12 | 0.000 | -1.456966 | -.5181367 |
| 09/2013 | -.6532961 | .2395014 | -2.73 | 0.006 | -1.122711 | -.1838818 |
| 10/2013 | -.6239904 | .2395014 | -2.61 | 0.009 | -1.093405 | -.154576  |
| 11/2013 | -.3569448 | .2395014 | -1.49 | 0.136 | -.8263592 | .1124696  |
| 12/2013 | -.1515506 | .2395014 | -0.63 | 0.527 | -.620965  | .3178638  |
| 01/2014 | -.2228782 | .2395014 | -0.93 | 0.352 | -.6922926 | .2465362  |
| 02/2014 | -.1320108 | .2395014 | -0.55 | 0.582 | -.6014252 | .3374036  |
| 03/2014 | -.36386   | .2395014 | -1.52 | 0.129 | -.8332744 | .1055544  |
| 04/2014 | -.6727505 | .2395014 | -2.81 | 0.005 | -1.142165 | -.2033362 |
| 05/2014 | -.6869799 | .2395061 | -2.87 | 0.004 | -1.156403 | -.2175563 |
| 06/2014 | -.9441145 | .2395061 | -3.94 | 0.000 | -1.413538 | -.474691  |
| 07/2014 | -.9629565 | .2395061 | -4.02 | 0.000 | -1.43238  | -.4935329 |
| 08/2014 | -.9183834 | .2395014 | -3.83 | 0.000 | -1.387798 | -.448969  |
| 09/2014 | -.7614144 | .2395014 | -3.18 | 0.001 | -1.230829 | -.292     |
| 10/2014 | -.6365438 | .2395014 | -2.66 | 0.008 | -1.105958 | -.1671294 |
| 11/2014 | -.4433267 | .2395014 | -1.85 | 0.064 | -.9127411 | .0260877  |
| 12/2014 | -.2697246 | .2394967 | -1.13 | 0.260 | -.7391298 | .1996806  |
| 01/2015 | -.2573507 | .2394967 | -1.07 | 0.283 | -.7267559 | .2120545  |
| 02/2015 | -.3339995 | .2394967 | -1.39 | 0.163 | -.8034046 | .1354057  |
| 03/2015 | -.5212122 | .2394967 | -2.18 | 0.030 | -.9906174 | -.0518071 |
| 04/2015 | -.6320871 | .2394967 | -2.64 | 0.008 | -1.101492 | -.1626819 |
| 05/2015 | -.6295939 | .2394967 | -2.63 | 0.009 | -1.098999 | -.1601887 |
| 06/2015 | -.5415726 | .2394967 | -2.26 | 0.024 | -1.010978 | -.0721674 |
| 07/2015 | -.4877207 | .2394967 | -2.04 | 0.042 | -.9571259 | -.0183156 |
| 08/2015 | -.5460176 | .2394967 | -2.28 | 0.023 | -1.015423 | -.0766125 |
| 09/2015 | -.6018334 | .2394967 | -2.51 | 0.012 | -1.071239 | -.1324282 |
| 10/2015 | -.6344547 | .2394967 | -2.65 | 0.008 | -1.10386  | -.1650496 |
| 11/2015 | -.4519346 | .2394967 | -1.89 | 0.059 | -.9213398 | .0174705  |
| 12/2015 | -.2701377 | .2394967 | -1.13 | 0.259 | -.7395429 | .1992674  |
| 01/2016 | -.0118044 | .2395238 | -0.05 | 0.961 | -.4812627 | .457654   |
| 02/2016 | .0119737  | .2396241 | 0.05  | 0.960 | -.4576812 | .4816286  |
| 03/2016 | -.3992353 | .2399267 | -1.66 | 0.096 | -.8694835 | .0710128  |
| 04/2016 | -.5908526 | .2403388 | -2.46 | 0.014 | -1.061908 | -.1197969 |
| 05/2016 | -.6390015 | .2408954 | -2.65 | 0.008 | -1.111148 | -.1668549 |
| 06/2016 | -.6533725 | .2413804 | -2.71 | 0.007 | -1.12647  | -.1802753 |
| 07/2016 | -.6972425 | .2419413 | -2.88 | 0.004 | -1.171439 | -.223046  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |        |       |           |           |
|---------|-----------|----------|--------|-------|-----------|-----------|
| 08/2016 | -.5881896 | .2424409 | -2.43  | 0.015 | -1.063365 | -.1130138 |
| 09/2016 | -.533938  | .2431858 | -2.20  | 0.028 | -1.010574 | -.0573022 |
| 10/2016 | -.6331126 | .243749  | -2.60  | 0.009 | -1.110852 | -.1553731 |
| 11/2016 | -.4772002 | .2442789 | -1.95  | 0.051 | -.9559785 | .001578   |
| 12/2016 | -.3995216 | .2446356 | -1.63  | 0.102 | -.8789989 | .0799558  |
| 01/2017 | -.5412792 | .244975  | -2.21  | 0.027 | -1.021422 | -.0611367 |
| 02/2017 | -.4773872 | .2453217 | -1.95  | 0.052 | -.9582092 | .0034348  |
| 03/2017 | -.5299467 | .2456578 | -2.16  | 0.031 | -1.011427 | -.048466  |
| 04/2017 | -.6764316 | .2462687 | -2.75  | 0.006 | -1.15911  | -.1937534 |
| 05/2017 | -.6656495 | .2469533 | -2.70  | 0.007 | -1.149669 | -.1816296 |
| 06/2017 | -.7430946 | .2477597 | -3.00  | 0.003 | -1.228695 | -.2574941 |
| 07/2017 | -.723818  | .2483676 | -2.91  | 0.004 | -1.21061  | -.2370262 |
| 08/2017 | -.7733249 | .2489882 | -3.11  | 0.002 | -1.261333 | -.2853167 |
| 09/2017 | -.9654595 | .2495057 | -3.87  | 0.000 | -1.454482 | -.476437  |
| 10/2017 | -.725397  | .2499668 | -2.90  | 0.004 | -1.215323 | -.2354707 |
| 11/2017 | -.6503956 | .2504678 | -2.60  | 0.009 | -1.141304 | -.1594875 |
| 12/2017 | -.6432011 | .2509038 | -2.56  | 0.010 | -1.134964 | -.1514384 |
| 01/2018 | -.8176798 | .2513993 | -3.25  | 0.001 | -1.310414 | -.3249459 |
| 02/2018 | -.7727947 | .2518814 | -3.07  | 0.002 | -1.266473 | -.2791159 |
| 03/2018 | -.7919056 | .2523102 | -3.14  | 0.002 | -1.286425 | -.2973863 |
| 04/2018 | -.6624927 | .2527603 | -2.62  | 0.009 | -1.157894 | -.1670912 |
| 05/2018 | -.7587147 | .2532945 | -3.00  | 0.003 | -1.255163 | -.2622664 |
| 06/2018 | -.8077236 | .2681764 | -3.01  | 0.003 | -1.33334  | -.2821072 |
|         |           |          |        |       |           |           |
| cons    | 45.77712  | .1655728 | 276.48 | 0.000 | 45.4526   | 46.10163  |

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Table F-2: Regression Coefficients for DEC Cohort 2

Number of obs = 66019536  
 F(184,65383332) = 107813.97  
 Prob>F = 0.0000  
 R-squared = 0.6861  
 AdjR-squared = 0.6831  
 Root MSE = 14.5232

| Variable | Coefficient | Std. Err. | t     | P >  t | 95% Conf. Interval |          |
|----------|-------------|-----------|-------|--------|--------------------|----------|
| i.y      |             |           |       |        |                    |          |
| 12/2008  | 15.60621    | 3.538483  | 4.41  | 0.000  | 8.670906           | 22.54151 |
| 01/2009  | 18.55965    | 3.538483  | 5.25  | 0.000  | 11.62435           | 25.49495 |
| 02/2009  | 15.16359    | 3.538483  | 4.29  | 0.000  | 8.228292           | 22.09889 |
| 03/2009  | 6.65773     | 3.538483  | 1.88  | 0.060  | -.2775681          | 13.59303 |
| 04/2009  | .6109856    | 3.538482  | 0.17  | 0.863  | -6.324312          | 7.546284 |
| 05/2009  | 4.159499    | 3.538482  | 1.18  | 0.240  | -2.775798          | 11.0948  |
| 06/2009  | 14.83888    | 3.538482  | 4.19  | 0.000  | 7.903585           | 21.77418 |
| 07/2009  | 18.6593     | 3.538481  | 5.27  | 0.000  | 11.72401           | 25.5946  |
| 08/2009  | 17.93512    | 3.538481  | 5.07  | 0.000  | 10.99982           | 24.87041 |
| 09/2009  | 6.611174    | 3.538481  | 1.87  | 0.062  | -.3241207          | 13.54647 |
| 10/2009  | .494279     | 3.53848   | 0.14  | 0.889  | -6.441015          | 7.429573 |
| 11/2009  | 5.650804    | 3.53848   | 1.60  | 0.110  | -1.28449           | 12.5861  |
| 12/2009  | 21.0607     | 3.53848   | 5.95  | 0.000  | 14.1254            | 27.99599 |
| 01/2010  | 25.40384    | 3.53848   | 7.18  | 0.000  | 18.46855           | 32.33914 |
| 02/2010  | 21.15344    | 3.538479  | 5.98  | 0.000  | 14.21814           | 28.08873 |
| 03/2010  | 7.036302    | 3.538479  | 1.99  | 0.047  | .1010102           | 13.97159 |
| 04/2010  | -.1561714   | 3.538479  | -0.04 | 0.965  | -7.091462          | 6.779119 |
| 05/2010  | 6.554885    | 3.538478  | 1.85  | 0.064  | -.3804053          | 13.49017 |
| 06/2010  | 20.61625    | 3.538478  | 5.83  | 0.000  | 13.68096           | 27.55154 |
| 07/2010  | 26.5117     | 3.538477  | 7.49  | 0.000  | 19.57641           | 33.44699 |
| 08/2010  | 22.42108    | 3.538477  | 6.34  | 0.000  | 15.48579           | 29.35637 |
| 09/2010  | 10.95032    | 3.538477  | 3.09  | 0.002  | 4.015031           | 17.88561 |
| 10/2010  | .0531436    | 3.538477  | 0.02  | 0.988  | -6.882143          | 6.988431 |
| 11/2010  | 7.951184    | 3.538476  | 2.25  | 0.025  | 1.015897           | 14.88647 |
| 12/2010  | 24.3034     | 3.538476  | 6.87  | 0.000  | 17.36811           | 31.23868 |
| 01/2011  | 24.59635    | 3.538476  | 6.95  | 0.000  | 17.66107           | 31.53164 |
| 02/2011  | 12.14872    | 3.538476  | 3.43  | 0.001  | 5.213439           | 19.08401 |
| 03/2011  | 3.271488    | 3.538475  | 0.92  | 0.355  | -3.663796          | 10.20677 |
| 04/2011  | .0254961    | 3.538475  | 0.01  | 0.994  | -6.909788          | 6.96078  |
| 05/2011  | 6.722884    | 3.538475  | 1.90  | 0.057  | -.2123994          | 13.65817 |
| 06/2011  | 18.30611    | 3.538475  | 5.17  | 0.000  | 11.37082           | 25.24139 |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |       |       |           |          |
|---------|-----------|----------|-------|-------|-----------|----------|
| 07/2011 | 24.57749  | 3.538474 | 6.95  | 0.000 | 17.6422   | 31.51277 |
| 08/2011 | 21.24229  | 3.538474 | 6.00  | 0.000 | 14.307    | 28.17757 |
| 09/2011 | 6.32984   | 3.538474 | 1.79  | 0.074 | -6.05441  | 13.26512 |
| 10/2011 | -.7090731 | 3.538473 | -0.20 | 0.841 | -7.644354 | 6.226207 |
| 11/2011 | 4.789263  | 3.538473 | 1.35  | 0.176 | -2.146016 | 11.72454 |
| 12/2011 | 11.08201  | 3.538473 | 3.13  | 0.002 | 4.146733  | 18.01729 |
| 01/2012 | 12.99586  | 3.538472 | 3.67  | 0.000 | 6.060582  | 19.93114 |
| 02/2012 | 9.304971  | 3.538472 | 2.63  | 0.009 | 2.369693  | 16.24025 |
| 03/2012 | .2922054  | 3.538472 | 0.08  | 0.934 | -6.643072 | 7.227483 |
| 04/2012 | -1.444199 | 3.538472 | -0.41 | 0.683 | -8.379476 | 5.491079 |
| 05/2012 | 3.84496   | 3.538476 | 1.09  | 0.277 | -3.090325 | 10.78025 |
| 06/2012 | 13.37637  | 3.538477 | 3.78  | 0.000 | 6.441086  | 20.31166 |
| 07/2012 | 22.48779  | 3.538472 | 6.36  | 0.000 | 15.55251  | 29.42307 |
| 08/2012 | 15.61638  | 3.53847  | 4.41  | 0.000 | 8.681104  | 22.55165 |
| 10/2012 | -.1389972 | 3.539339 | -0.04 | 0.969 | -7.075974 | 6.797979 |
| 11/2012 | 6.747932  | 3.539339 | 1.91  | 0.057 | -.1890448 | 13.68491 |
| 12/2012 | 11.72247  | 3.539339 | 3.31  | 0.001 | 4.785494  | 18.65945 |
| 01/2013 | 15.2848   | 3.539339 | 4.32  | 0.000 | 8.347819  | 22.22177 |
| 02/2013 | 16.0512   | 3.539339 | 4.54  | 0.000 | 9.114225  | 22.98818 |
| 03/2013 | 10.31997  | 3.539329 | 2.92  | 0.004 | 3.383015  | 17.25693 |
| 04/2013 | .7307316  | 3.539329 | 0.21  | 0.836 | -6.206225 | 7.667688 |
| 05/2013 | 2.014527  | 3.539329 | 0.57  | 0.569 | -4.92243  | 8.951484 |
| 06/2013 | 10.40249  | 3.539329 | 2.94  | 0.003 | 3.465537  | 17.33945 |
| 07/2013 | 15.21497  | 3.539329 | 4.30  | 0.000 | 8.278016  | 22.15193 |
| 08/2013 | 12.16316  | 3.539329 | 3.44  | 0.001 | 5.226203  | 19.10012 |
| 09/2013 | 4.993709  | 3.539329 | 1.41  | 0.158 | -1.943248 | 11.93067 |
| 10/2013 | -.5978868 | 3.539329 | -0.17 | 0.866 | -7.534844 | 6.33907  |
| 11/2013 | 8.227127  | 3.539329 | 2.32  | 0.020 | 1.29017   | 15.16408 |
| 12/2013 | 17.12029  | 3.539329 | 4.84  | 0.000 | 10.18333  | 24.05724 |
| 01/2014 | 23.99797  | 3.539329 | 6.78  | 0.000 | 17.06102  | 30.93493 |
| 02/2014 | 18.12497  | 3.539329 | 5.12  | 0.000 | 11.18801  | 25.06192 |
| 03/2014 | 8.762832  | 3.539329 | 2.48  | 0.013 | 1.825875  | 15.69979 |
| 04/2014 | .3260062  | 3.539329 | 0.09  | 0.927 | -6.610951 | 7.262963 |
| 05/2014 | 3.696197  | 3.539329 | 1.04  | 0.296 | -3.24076  | 10.63315 |
| 06/2014 | 13.51021  | 3.539329 | 3.82  | 0.000 | 6.57325   | 20.44716 |
| 07/2014 | 13.74943  | 3.539329 | 3.88  | 0.000 | 6.812471  | 20.68639 |
| 08/2014 | 12.28417  | 3.539329 | 3.47  | 0.001 | 5.347213  | 19.22113 |
| 09/2014 | 5.353721  | 3.539329 | 1.51  | 0.130 | -1.583237 | 12.29068 |
| 10/2014 | -1.159543 | 3.539329 | -0.33 | 0.743 | -8.096501 | 5.777415 |
| 11/2014 | 8.391809  | 3.539329 | 2.37  | 0.018 | 1.454851  | 15.32877 |
| 12/2014 | 16.67983  | 3.539329 | 4.71  | 0.000 | 9.742874  | 23.61679 |

## APPENDIX F

## DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |       |       |           |          |
|---------|-----------|----------|-------|-------|-----------|----------|
| 01/2015 | 19.03981  | 3.539328 | 5.38  | 0.000 | 12.10285  | 25.97677 |
| 02/2015 | 21.99416  | 3.539329 | 6.21  | 0.000 | 15.0572   | 28.93112 |
| 03/2015 | 7.006767  | 3.539329 | 1.98  | 0.048 | .0698103  | 13.94372 |
| 04/2015 | -1.618107 | 3.539329 | -0.46 | 0.648 | -8.555064 | 5.31885  |
| 05/2015 | 4.506174  | 3.539329 | 1.27  | 0.203 | -2.430783 | 11.44313 |
| 06/2015 | 16.51763  | 3.539329 | 4.67  | 0.000 | 9.580674  | 23.45459 |
| 07/2015 | 20.28945  | 3.539329 | 5.73  | 0.000 | 13.35249  | 27.22641 |
| 08/2015 | 15.72859  | 3.539329 | 4.44  | 0.000 | 8.791636  | 22.66555 |
| 09/2015 | 4.758353  | 3.539329 | 1.34  | 0.179 | -2.178604 | 11.69531 |
| 10/2015 | -2.040086 | 3.539329 | -0.58 | 0.564 | -8.977043 | 4.896871 |
| 11/2015 | 2.449674  | 3.539329 | 0.69  | 0.489 | -4.487283 | 9.386632 |
| 12/2015 | 7.374783  | 3.539329 | 2.08  | 0.037 | .4378261  | 14.31174 |
| 01/2016 | 16.87508  | 3.539329 | 4.77  | 0.000 | 9.93812   | 23.81204 |
| 02/2016 | 14.81747  | 3.53933  | 4.19  | 0.000 | 7.880515  | 21.75443 |
| 03/2016 | 1.449485  | 3.539335 | 0.41  | 0.682 | -5.487484 | 8.386454 |
| 04/2016 | -1.655205 | 3.539341 | -0.47 | 0.640 | -8.592187 | 5.281777 |
| 05/2016 | 2.03059   | 3.539348 | 0.57  | 0.566 | -4.906405 | 8.967584 |
| 06/2016 | 13.63592  | 3.539355 | 3.85  | 0.000 | 6.698916  | 20.57293 |
| 07/2016 | 21.68849  | 3.539363 | 6.13  | 0.000 | 14.75146  | 28.62551 |
| 08/2016 | 19.69544  | 3.539369 | 5.56  | 0.000 | 12.75841  | 26.63248 |
| 09/2016 | 10.20204  | 3.539377 | 2.88  | 0.004 | 3.264991  | 17.13909 |
| 10/2016 | -1.283525 | 3.539383 | -0.36 | 0.717 | -8.220589 | 5.653538 |
| 11/2016 | 2.897853  | 3.539389 | 0.82  | 0.413 | -4.039222 | 9.834927 |
| 12/2016 | 12.58997  | 3.539395 | 3.56  | 0.000 | 5.652881  | 19.52705 |
| 01/2017 | 10.76085  | 3.539401 | 3.04  | 0.002 | 3.823751  | 17.69795 |
| 02/2017 | 4.390035  | 3.539406 | 1.24  | 0.215 | -2.547074 | 11.32714 |
| 03/2017 | 2.278205  | 3.539411 | 0.64  | 0.520 | -4.658913 | 9.215322 |
| 04/2017 | -1.117221 | 3.539417 | -0.32 | 0.752 | -8.05435  | 5.819909 |
| 05/2017 | 2.517216  | 3.539423 | 0.71  | 0.477 | -4.419927 | 9.454358 |
| 06/2017 | 10.64104  | 3.539432 | 3.01  | 0.003 | 3.703883  | 17.5782  |
| 07/2017 | 17.42826  | 3.539439 | 4.92  | 0.000 | 10.49109  | 24.36544 |
| 08/2017 | 12.37889  | 3.539445 | 3.50  | 0.000 | 5.441705  | 19.31608 |
| 09/2017 | 4.11828   | 3.539452 | 1.16  | 0.245 | -2.81892  | 11.05548 |
| 10/2017 | -.1526433 | 3.539458 | -0.04 | 0.966 | -7.089855 | 6.784568 |
| 11/2017 | 4.710299  | 3.539466 | 1.33  | 0.183 | -2.226926 | 11.64752 |
| 12/2017 | 18.23206  | 3.539472 | 5.15  | 0.000 | 11.29482  | 25.16929 |
| 01/2018 | 21.79532  | 3.539477 | 6.16  | 0.000 | 14.85807  | 28.73257 |
| 02/2018 | 7.776363  | 3.539483 | 2.20  | 0.028 | .8391038  | 14.71362 |
| 03/2018 | 4.591732  | 3.539489 | 1.30  | 0.195 | -2.345538 | 11.529   |
| 04/2018 | -1.023749 | 3.539494 | -0.29 | 0.772 | -7.961031 | 5.913532 |
| 05/2018 | 4.715948  | 3.539501 | 1.33  | 0.183 | -2.221346 | 11.65324 |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |        |       |           |           |
|------------------|-----------|----------|--------|-------|-----------|-----------|
| 06/2018          | 8.871852  | 3.539601 | 2.51   | 0.012 | 1.934362  | 15.80934  |
| i.ym#c.treatment |           |          |        |       |           |           |
| 10/2012          | -.840534  | .0857929 | -9.80  | 0.000 | -1.008685 | -.672383  |
| 11/2012          | -.6158147 | .0849309 | -7.25  | 0.000 | -.7822762 | -.4493533 |
| 12/2012          | -.9676389 | .0849346 | -11.39 | 0.000 | -1.134108 | -.8011701 |
| 01/2013          | -.6976332 | .0849016 | -8.22  | 0.000 | -.8640373 | -.5312291 |
| 02/2013          | -.8442805 | .0848814 | -9.95  | 0.000 | -1.010645 | -.6779161 |
| 03/2013          | -.9611976 | .084455  | -11.38 | 0.000 | -1.126726 | -.7956688 |
| 04/2013          | -.5014042 | .0844052 | -5.94  | 0.000 | -.6668354 | -.335973  |
| 05/2013          | -.6168377 | .0844077 | -7.31  | 0.000 | -.7822737 | -.4514016 |
| 06/2013          | .2525404  | .0844003 | 2.99   | 0.003 | .0871189  | .417962   |
| 07/2013          | .1679476  | .0843964 | 1.99   | 0.047 | .0025337  | .3333615  |
| 08/2013          | -.1075249 | .0843856 | -1.27  | 0.203 | -.2729176 | .0578677  |
| 09/2013          | .185229   | .0843737 | 2.20   | 0.028 | .0198595  | .3505985  |
| 10/2013          | -.6812523 | .0843209 | -8.08  | 0.000 | -.8465182 | -.5159864 |
| 11/2013          | -1.086973 | .0842983 | -12.89 | 0.000 | -1.252195 | -.9217514 |
| 12/2013          | -.9384901 | .0842995 | -11.13 | 0.000 | -1.103714 | -.773266  |
| 01/2014          | -.8469811 | .0842631 | -10.05 | 0.000 | -1.012134 | -.6818285 |
| 02/2014          | -1.160827 | .0842618 | -13.78 | 0.000 | -1.325977 | -.9956765 |
| 03/2014          | -1.102494 | .0842631 | -13.08 | 0.000 | -1.267647 | -.9373415 |
| 04/2014          | -.8452056 | .0842631 | -10.03 | 0.000 | -1.010358 | -.680053  |
| 05/2014          | -.3981435 | .0842655 | -4.72  | 0.000 | -.5633009 | -.2329861 |
| 06/2014          | -.0148477 | .084268  | -0.18  | 0.860 | -.1800099 | .1503146  |
| 07/2014          | .3927861  | .0842692 | 4.66   | 0.000 | .2276214  | .5579508  |
| 08/2014          | -.3569773 | .0842717 | -4.24  | 0.000 | -.5221468 | -.1918078 |
| 09/2014          | .146575   | .0842717 | 1.74   | 0.082 | -.0185945 | .3117445  |
| 10/2014          | -.8074913 | .0842742 | -9.58  | 0.000 | -.9726656 | -.642317  |
| 11/2014          | -.8933922 | .0842742 | -10.60 | 0.000 | -1.058567 | -.7282179 |
| 12/2014          | -.5790381 | .0842482 | -6.87  | 0.000 | -.7441616 | -.4139147 |
| 01/2015          | -.753809  | .084247  | -8.95  | 0.000 | -.9189301 | -.5886879 |
| 02/2015          | -1.536854 | .0842507 | -18.24 | 0.000 | -1.701982 | -1.371726 |
| 03/2015          | -1.178561 | .0842507 | -13.99 | 0.000 | -1.343689 | -1.013432 |
| 04/2015          | -.7316073 | .0842532 | -8.68  | 0.000 | -.8967405 | -.5664741 |
| 05/2015          | -.216203  | .0842544 | -2.57  | 0.010 | -.3813386 | -.0510673 |
| 06/2015          | -.0699967 | .0842557 | -0.83  | 0.406 | -.2351348 | .0951414  |
| 07/2015          | .0738049  | .0842569 | 0.88   | 0.381 | -.0913357 | .2389455  |
| 08/2015          | .0956977  | .0842583 | 1.14   | 0.256 | -.0694454 | .2608409  |
| 09/2015          | -.2657058 | .0842583 | -3.15  | 0.002 | -.430849  | -.1005626 |
| 10/2015          | -.8266346 | .0842608 | -9.81  | 0.000 | -.9917828 | -.6614864 |
| 11/2015          | -1.18499  | .0842609 | -14.06 | 0.000 | -1.350139 | -1.019842 |
| 12/2015          | -.8655857 | .084261  | -10.27 | 0.000 | -1.030734 | -.7004371 |



APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |        |       |           |           |
|---------|-----------|----------|--------|-------|-----------|-----------|
| 01/2016 | -.7369833 | .0842738 | -8.75  | 0.000 | -.9021568 | -.5718098 |
| 02/2016 | -1.372489 | .0843195 | -16.28 | 0.000 | -1.537752 | -1.207226 |
| 03/2016 | -1.1059   | .0845333 | -13.08 | 0.000 | -1.271582 | -.9402177 |
| 04/2016 | -.9229459 | .0848208 | -10.88 | 0.000 | -1.089192 | -.7567001 |
| 05/2016 | -.3351069 | .085112  | -3.94  | 0.000 | -.5019234 | -.1682904 |
| 06/2016 | .3111512  | .0854262 | 3.64   | 0.000 | .143719   | .4785835  |
| 07/2016 | .416008   | .0857828 | 4.85   | 0.000 | .2478768  | .5841393  |
| 08/2016 | .3587588  | .086059  | 4.17   | 0.000 | .1900863  | .5274312  |
| 09/2016 | -.0348806 | .0864056 | -0.40  | 0.686 | -.2042326 | .1344713  |
| 10/2016 | -.7398302 | .0866785 | -8.54  | 0.000 | -.909717  | -.5699435 |
| 11/2016 | -.961785  | .0869257 | -11.06 | 0.000 | -1.132156 | -.7914139 |
| 12/2016 | -1.424701 | .0871976 | -16.34 | 0.000 | -1.595605 | -1.253797 |
| 01/2017 | -1.330731 | .0874459 | -15.22 | 0.000 | -1.502122 | -1.159341 |
| 02/2017 | -.9211357 | .0876705 | -10.51 | 0.000 | -1.092967 | -.7493047 |
| 03/2017 | -1.004827 | .0878734 | -11.43 | 0.000 | -1.177056 | -.8325988 |
| 04/2017 | -1.222549 | .0881431 | -13.87 | 0.000 | -1.395306 | -1.049791 |
| 05/2017 | -.530477  | .0884276 | -6.00  | 0.000 | -.7037919 | -.3571621 |
| 06/2017 | -.2310028 | .088785  | -2.60  | 0.009 | -.4050183 | -.0569873 |
| 07/2017 | .164544   | .0891015 | 1.85   | 0.065 | -.0100917 | .3391797  |
| 08/2017 | .1487353  | .0893719 | 1.66   | 0.096 | -.0264303 | .3239009  |
| 09/2017 | -.593236  | .0896693 | -6.62  | 0.000 | -.7689846 | -.4174875 |
| 10/2017 | -.4416378 | .0899238 | -4.91  | 0.000 | -.6178851 | -.2653905 |
| 11/2017 | -1.13602  | .0902223 | -12.59 | 0.000 | -1.312853 | -.959188  |
| 12/2017 | -1.967648 | .0904728 | -21.75 | 0.000 | -2.144971 | -1.790324 |
| 01/2018 | -1.022046 | .0907028 | -11.27 | 0.000 | -1.199821 | -.8442722 |
| 02/2018 | -1.24192  | .0909442 | -13.66 | 0.000 | -1.420167 | -1.063672 |
| 03/2018 | -1.294107 | .0911858 | -14.19 | 0.000 | -1.472828 | -1.115386 |
| 04/2018 | -1.025383 | .0914225 | -11.22 | 0.000 | -1.204567 | -.8461979 |
| 05/2018 | -.6825252 | .0916871 | -7.44  | 0.000 | -.8622286 | -.5028219 |
| 06/2018 | .5910098  | .0958751 | 6.16   | 0.000 | .403098   | .7789215  |
| 07/2018 | 4.231694  | 3.611954 | 1.17   | 0.241 | -2.847607 | 11.31099  |
|         |           |          |        |       |           |           |
| cons    | 32.27554  | 3.538422 | 9.12   | 0.000 | 25.34036  | 39.21072  |

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**Table F-3: Regression Coefficients for DEC Cohort 3**

Number of obs = 40604310  
F(157,40091478) = 70899.87  
Prob>F = 0.0000  
R-squared = 0.6872  
AdjR-squared = 0.6832  
Root MSE = 14.5430

| Variable | Coefficient | Std. Err. | t     | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|-------|--------|--------------------|-----------|
| i.y      |             |           |       |        |                    |           |
| 12/2008  | 4.800107    | 3.052301  | 1.57  | 0.116  | -1.182292          | 10.78251  |
| 01/2009  | 8.610748    | 3.0523    | 2.82  | 0.005  | 2.628349           | 14.59315  |
| 02/2009  | 5.412161    | 3.052299  | 1.77  | 0.076  | -.5702365          | 11.39456  |
| 03/2009  | -3.517968   | 3.052299  | -1.15 | 0.249  | -9.500363          | 2.464428  |
| 04/2009  | -8.94665    | 3.052298  | -2.93 | 0.003  | -14.92904          | -2.964255 |
| 05/2009  | -5.550734   | 3.052297  | -1.82 | 0.069  | -11.53313          | .4316593  |
| 06/2009  | 5.096909    | 3.052297  | 1.67  | 0.095  | -.8854824          | 11.0793   |
| 07/2009  | 9.083436    | 3.052296  | 2.98  | 0.003  | 3.101046           | 15.06583  |
| 08/2009  | 8.128167    | 3.052295  | 2.66  | 0.008  | 2.145779           | 14.11055  |
| 09/2009  | -3.162188   | 3.052294  | -1.04 | 0.300  | -9.144574          | 2.820198  |
| 10/2009  | -9.100818   | 3.052293  | -2.98 | 0.003  | -15.0832           | -3.118434 |
| 11/2009  | -4.361905   | 3.052292  | -1.43 | 0.153  | -10.34429          | 1.620478  |
| 12/2009  | 11.13158    | 3.052292  | 3.65  | 0.000  | 5.149194           | 17.11396  |
| 01/2010  | 14.49521    | 3.052291  | 4.75  | 0.000  | 8.512831           | 20.47759  |
| 02/2010  | 10.89715    | 3.05229   | 3.57  | 0.000  | 4.914774           | 16.87953  |
| 03/2010  | -3.095136   | 3.05229   | -1.01 | 0.311  | -9.077514          | 2.887242  |
| 04/2010  | -9.618042   | 3.052289  | -3.15 | 0.002  | -15.60042          | -3.635665 |
| 05/2010  | -3.324066   | 3.052288  | -1.09 | 0.276  | -9.306441          | 2.658308  |
| 06/2010  | 10.91221    | 3.052287  | 3.58  | 0.000  | 4.929841           | 16.89459  |
| 07/2010  | 16.63914    | 3.052286  | 5.45  | 0.000  | 10.65677           | 22.62151  |
| 08/2010  | 12.89966    | 3.052286  | 4.23  | 0.000  | 6.917294           | 18.88203  |
| 09/2010  | 1.158567    | 3.052285  | 0.38  | 0.704  | -4.823801          | 7.140936  |
| 10/2010  | -9.297072   | 3.052284  | -3.05 | 0.002  | -15.27944          | -3.314705 |
| 11/2010  | -2.228662   | 3.052283  | -0.73 | 0.465  | -8.211028          | 3.753704  |
| 12/2010  | 13.72268    | 3.052281  | 4.50  | 0.000  | 7.740317           | 19.70504  |
| 01/2011  | 14.22493    | 3.05228   | 4.66  | 0.000  | 8.242569           | 20.20729  |
| 02/2011  | 1.972608    | 3.05228   | 0.65  | 0.518  | -4.009751          | 7.954967  |
| 03/2011  | -6.208965   | 3.052279  | -2.03 | 0.042  | -12.19132          | -.226607  |
| 04/2011  | -9.801175   | 3.052279  | -3.21 | 0.001  | -15.78353          | -3.818819 |
| 05/2011  | -2.970979   | 3.052278  | -0.97 | 0.330  | -8.953334          | 3.011376  |
| 06/2011  | 8.251382    | 3.052277  | 2.70  | 0.007  | 2.269028           | 14.23374  |



APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |       |       |           |           |
|---------|-----------|----------|-------|-------|-----------|-----------|
| 07/2011 | 15.05179  | 3.052276 | 4.93  | 0.000 | 9.069437  | 21.03414  |
| 08/2011 | 11.00737  | 3.052276 | 3.61  | 0.000 | 5.025023  | 16.98972  |
| 09/2011 | -3.53773  | 3.052275 | -1.16 | 0.246 | -9.520079 | 2.444619  |
| 10/2011 | -10.13682 | 3.052274 | -3.32 | 0.001 | -16.11917 | -4.154473 |
| 11/2011 | -5.304448 | 3.052274 | -1.74 | 0.082 | -11.2868  | .6778992  |
| 12/2011 | 1.088651  | 3.052274 | 0.36  | 0.721 | -4.893697 | 7.070998  |
| 01/2012 | 2.56618   | 3.052274 | 0.84  | 0.400 | -3.416166 | 8.548527  |
| 02/2012 | -4.115271 | 3.052273 | -0.13 | 0.893 | -6.393873 | 5.570819  |
| 03/2012 | -9.293764 | 3.052273 | -3.04 | 0.002 | -15.27611 | -3.311419 |
| 04/2012 | -10.83941 | 3.052272 | -3.55 | 0.000 | -16.82175 | -4.857068 |
| 05/2012 | -5.790665 | 3.052271 | -1.90 | 0.058 | -11.77301 | .1916767  |
| 06/2012 | 4.227752  | 3.05227  | 1.39  | 0.166 | -1.754588 | 10.21009  |
| 07/2012 | 12.66149  | 3.052269 | 4.15  | 0.000 | 6.679154  | 18.64383  |
| 08/2012 | 6.13941   | 3.052268 | 2.01  | 0.044 | .1570739  | 12.12175  |
| 09/2012 | -5.064978 | 3.052267 | -1.66 | 0.097 | -11.04731 | .9173565  |
| 10/2012 | -10.21502 | 3.052267 | -3.35 | 0.001 | -16.19735 | -4.232688 |
| 11/2012 | -3.700038 | 3.052266 | -1.21 | 0.225 | -9.68237  | 2.282293  |
| 12/2012 | 1.193116  | 3.052264 | 0.39  | 0.696 | -4.789211 | 7.175444  |
| 01/2013 | 4.405621  | 3.052262 | 1.44  | 0.149 | -1.576703 | 10.38794  |
| 02/2013 | 5.09963   | 3.05226  | 1.67  | 0.095 | -.882689  | 11.08195  |
| 03/2013 | -.4906964 | 3.052257 | -0.16 | 0.872 | -6.473011 | 5.491619  |
| 04/2013 | -9.723053 | 3.052255 | -3.19 | 0.001 | -15.70536 | -3.740742 |
| 05/2013 | -8.05872  | 3.052253 | -2.64 | 0.008 | -14.04103 | -2.076414 |
| 06/2013 | .551404   | 3.05225  | 0.18  | 0.857 | -5.430897 | 6.533705  |
| 07/2013 | 5.409738  | 3.052248 | 1.77  | 0.076 | -.5725577 | 11.39203  |
| 08/2013 | 2.308546  | 3.052245 | 0.76  | 0.449 | -3.673745 | 8.290836  |
| 09/2013 | -5.072823 | 3.052243 | -1.66 | 0.097 | -11.05511 | .9094641  |
| 10/2013 | -10.80706 | 3.052241 | -3.54 | 0.000 | -16.78934 | -4.824778 |
| 11/2013 | -2.349596 | 3.052239 | -0.77 | 0.441 | -8.331875 | 3.632683  |
| 12/2013 | 6.189431  | 3.052238 | 2.03  | 0.043 | .2071557  | 12.17171  |
| 01/2014 | 12.71102  | 3.052238 | 4.16  | 0.000 | 6.728742  | 18.6933   |
| 02/2014 | 6.987426  | 3.052235 | 2.29  | 0.022 | 1.005156  | 12.9697   |
| 03/2014 | -2.046078 | 3.052237 | -0.67 | 0.503 | -8.028352 | 3.936196  |
| 04/2014 | -10.05183 | 3.052231 | -3.29 | 0.001 | -16.03409 | -4.069567 |
| 05/2014 | -6.329871 | 3.052232 | -2.07 | 0.038 | -12.31214 | -.347607  |
| 06/2014 | 3.61481   | 3.052228 | 1.18  | 0.236 | -2.367448 | 9.597068  |
| 07/2014 | 3.793964  | 3.052227 | 1.24  | 0.214 | -2.188291 | 9.776219  |
| 08/2014 | 2.388031  | 3.052224 | 0.78  | 0.434 | -3.594219 | 8.370281  |
| 09/2014 | -4.630212 | 3.052221 | -1.52 | 0.129 | -10.61246 | 1.352033  |
| 10/2014 | -11.21452 | 3.052222 | -3.67 | 0.000 | -17.19677 | -5.232276 |
| 11/2014 | -1.953173 | 3.052218 | -0.64 | 0.522 | -7.935411 | 4.029064  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |       |       |           |           |
|---------|-----------|----------|-------|-------|-----------|-----------|
| 01/2015 | 8.419659  | 3.05412  | 2.76  | 0.006 | 2.433694  | 14.40562  |
| 02/2015 | 12.0633   | 3.053307 | 3.95  | 0.000 | 6.078928  | 18.04767  |
| 03/2015 | -2.622299 | 3.053307 | -0.86 | 0.390 | -8.606671 | 3.362072  |
| 04/2015 | -10.99208 | 3.053307 | -3.60 | 0.000 | -16.97645 | -5.00771  |
| 05/2015 | -4.858547 | 3.053307 | -1.59 | 0.112 | -10.84292 | 1.125825  |
| 06/2015 | 6.97091   | 3.053307 | 2.28  | 0.022 | .9865374  | 12.95528  |
| 07/2015 | 10.56639  | 3.053307 | 3.46  | 0.001 | 4.582019  | 16.55076  |
| 08/2015 | 6.219886  | 3.053307 | 2.04  | 0.042 | .2355132  | 12.20426  |
| 09/2015 | -4.476623 | 3.053307 | -1.47 | 0.143 | -10.461   | 1.507749  |
| 10/2015 | -11.29456 | 3.053307 | -3.70 | 0.000 | -17.27893 | -5.31019  |
| 11/2015 | -7.138996 | 3.053307 | -2.34 | 0.019 | -13.12337 | -1.154623 |
| 12/2015 | -2.345706 | 3.053307 | -0.77 | 0.442 | -8.330078 | 3.638667  |
| 01/2016 | 7.305592  | 3.053004 | 2.39  | 0.017 | 1.321814  | 13.28937  |
| 02/2016 | 5.167734  | 3.053005 | 1.69  | 0.091 | -.8160463 | 11.15151  |
| 03/2016 | -7.910725 | 3.053013 | -2.59 | 0.010 | -13.89452 | -1.92693  |
| 04/2016 | -10.89657 | 3.053025 | -3.57 | 0.000 | -16.88039 | -4.91275  |
| 05/2016 | -7.143642 | 3.053036 | -2.34 | 0.019 | -13.12748 | -1.1598   |
| 06/2016 | 4.332453  | 3.05305  | 1.42  | 0.156 | -1.651414 | 10.31632  |
| 07/2016 | 12.35783  | 3.053063 | 4.05  | 0.000 | 6.373932  | 18.34172  |
| 08/2016 | 10.63225  | 3.053075 | 3.48  | 0.000 | 4.648337  | 16.61617  |
| 09/2016 | 1.210586  | 3.053091 | 0.40  | 0.692 | -4.773363 | 7.194534  |
| 10/2016 | -10.36873 | 3.053103 | -3.40 | 0.001 | -16.3527  | -4.384755 |
| 11/2016 | -6.557732 | 3.053113 | -2.15 | 0.032 | -12.54172 | -.5737399 |
| 12/2016 | 2.734994  | 3.053123 | 0.90  | 0.370 | -3.249018 | 8.719005  |
| 01/2017 | 1.080316  | 3.053131 | 0.35  | 0.723 | -4.903711 | 7.064344  |
| 02/2017 | -5.081815 | 3.05314  | -1.66 | 0.096 | -11.06586 | .9022294  |
| 03/2017 | -7.07275  | 3.053148 | -2.32 | 0.021 | -13.05681 | -1.088689 |
| 04/2017 | -10.3789  | 3.05316  | -3.40 | 0.001 | -16.36298 | -4.394817 |
| 05/2017 | -6.473595 | 3.05317  | -2.12 | 0.034 | -12.4577  | -.4894912 |
| 06/2017 | 1.672422  | 3.053184 | 0.55  | 0.584 | -4.311709 | 7.656553  |
| 07/2017 | 8.493432  | 3.053196 | 2.78  | 0.005 | 2.509278  | 14.47759  |
| 08/2017 | 3.566817  | 3.053209 | 1.17  | 0.243 | -2.417362 | 9.550996  |
| 09/2017 | -4.763079 | 3.053222 | -1.56 | 0.119 | -10.74728 | 1.221127  |
| 10/2017 | -8.978536 | 3.053233 | -2.94 | 0.003 | -14.96276 | -2.99431  |
| 11/2017 | -4.669028 | 3.053244 | -1.53 | 0.126 | -10.65328 | 1.315221  |
| 12/2017 | 8.236015  | 3.053254 | 2.70  | 0.007 | 2.251748  | 14.22028  |
| 01/2018 | 12.3005   | 3.053262 | 4.03  | 0.000 | 6.31622   | 18.28479  |
| 02/2018 | -1.551407 | 3.05327  | -0.51 | 0.611 | -7.535706 | 4.432893  |
| 03/2018 | -4.526992 | 3.053278 | -1.48 | 0.138 | -10.51131 | 1.457323  |
| 04/2018 | -10.04692 | 3.053288 | -3.29 | 0.001 | -16.03126 | -4.062587 |
| 05/2018 | -3.988248 | 3.053299 | -1.31 | 0.191 | -9.972604 | 1.996108  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |        |       |           |           |
|------------------|-----------|----------|--------|-------|-----------|-----------|
| 06/2018          | .6335512  | 3.053467 | 0.21   | 0.836 | -5.351135 | 6.618238  |
| i.ym#c.treatment |           |          |        |       |           |           |
| 01/2015          | .0377955  | .114059  | 0.33   | 0.740 | -.1857559 | .261347   |
| 02/2015          | -.833235  | .0892735 | -9.33  | 0.000 | -1.008208 | -.6582621 |
| 03/2015          | -.7262734 | .0892039 | -8.14  | 0.000 | -.9011097 | -.551437  |
| 04/2015          | -.5938088 | .0891373 | -6.66  | 0.000 | -.7685147 | -.419103  |
| 05/2015          | -.306374  | .0891457 | -3.44  | 0.001 | -.4810964 | -.1316517 |
| 06/2015          | .1450813  | .0889965 | 1.63   | 0.103 | -.0293486 | .3195113  |
| 07/2015          | .3757419  | .0889162 | 4.23   | 0.000 | .2014694  | .5500144  |
| 08/2015          | .0726542  | .0888267 | 0.82   | 0.413 | -.1014431 | .2467514  |
| 09/2015          | -.4029971 | .0887425 | -4.54  | 0.000 | -.5769292 | -.2290651 |
| 10/2015          | -.682674  | .0887454 | -7.69  | 0.000 | -.8566118 | -.5087363 |
| 11/2015          | -.6008986 | .0887482 | -6.77  | 0.000 | -.7748419 | -.4269552 |
| 12/2015          | -.6356207 | .0887498 | -7.16  | 0.000 | -.8095671 | -.4616743 |
| 01/2016          | -.9710795 | .0774821 | -12.53 | 0.000 | -1.122942 | -.8192174 |
| 02/2016          | -.8419055 | .0775239 | -10.86 | 0.000 | -.9938496 | -.6899613 |
| 03/2016          | -.7040577 | .077845  | -9.04  | 0.000 | -.8566311 | -.5514843 |
| 04/2016          | -.6087804 | .0783888 | -7.77  | 0.000 | -.7624197 | -.4551411 |
| 05/2016          | -.3715941 | .0788764 | -4.71  | 0.000 | -.5261889 | -.2169992 |
| 06/2016          | -.0540306 | .0794407 | -0.68  | 0.496 | -.2097315 | .1016704  |
| 07/2016          | .1053861  | .0799999 | 1.32   | 0.188 | -.0514108 | .262183   |
| 08/2016          | -.1484794 | .0805214 | -1.84  | 0.065 | -.3062985 | .0093396  |
| 09/2016          | -.2846716 | .081177  | -3.51  | 0.000 | -.4437757 | -.1255676 |
| 10/2016          | -.53451   | .081661  | -6.55  | 0.000 | -.6945627 | -.3744573 |
| 11/2016          | -.6804318 | .0820996 | -8.29  | 0.000 | -.841344  | -.5195196 |
| 12/2016          | -.6992574 | .082492  | -8.48  | 0.000 | -.8609388 | -.537576  |
| 01/2017          | -.8758714 | .0828364 | -10.57 | 0.000 | -1.038228 | -.7135151 |
| 02/2017          | -.8394719 | .0831888 | -10.09 | 0.000 | -1.002519 | -.6764248 |
| 03/2017          | -.8224493 | .0835177 | -9.85  | 0.000 | -.986141  | -.6587576 |
| 04/2017          | -.5234548 | .0839714 | -6.23  | 0.000 | -.6880358 | -.3588738 |
| 05/2017          | -.4768314 | .0844012 | -5.65  | 0.000 | -.6422547 | -.3114082 |
| 06/2017          | -.2849351 | .0849403 | -3.35  | 0.001 | -.4514151 | -.1184552 |
| 07/2017          | -.2419255 | .0854177 | -2.83  | 0.005 | -.4093411 | -.0745099 |
| 08/2017          | -.3216228 | .0859063 | -3.74  | 0.000 | -.4899961 | -.1532495 |
| 09/2017          | -.37507   | .0864309 | -4.34  | 0.000 | -.5444715 | -.2056684 |
| 10/2017          | -.7246407 | .0868411 | -8.34  | 0.000 | -.8948461 | -.5544353 |
| 11/2017          | -.9305442 | .0872721 | -10.66 | 0.000 | -1.101594 | -.7594939 |
| 12/2017          | -.8993463 | .0876383 | -10.26 | 0.000 | -1.071114 | -.7275784 |
| 01/2018          | -1.502409 | .0879592 | -17.08 | 0.000 | -1.674806 | -1.330012 |
| 02/2018          | -1.09973  | .0882721 | -12.46 | 0.000 | -1.27274  | -.9267195 |
| 03/2018          | -1.204989 | .0885769 | -13.60 | 0.000 | -1.378596 | -1.031381 |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |       |       |           |           |
|---------|-----------|----------|-------|-------|-----------|-----------|
| 04/2018 | -.8783212 | .0889505 | -9.87 | 0.000 | -1.052661 | -.7039813 |
| 05/2018 | -.5710127 | .0893625 | -6.39 | 0.000 | -.7461601 | -.3958654 |
| 06/2018 | -.7933233 | .0953859 | -8.32 | 0.000 | -.9802761 | -.6063704 |
| 07/2018 | -1.619952 | 3.283889 | -0.49 | 0.622 | -8.056256 | 4.816353  |
|         |           |          |       |       |           |           |
| cons    | 40.62169  | 3.05215  | 13.31 | 0.000 | 34.63958  | 46.60379  |

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**Table F-4: Regression Coefficients for DEC Cohort 4**

Number of obs = 2786506  
F(66,2704706) = 11996.52  
Prob>F = 0.0000  
R-squared = 0.6768  
AdjR-squared = 0.6670  
Root MSE = 13.4629

| Variable | Coefficient | Std. Err. | t       | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|---------|--------|--------------------|-----------|
| i.y      |             |           |         |        |                    |           |
| 11/2014  | -2.129968   | .5160509  | -4.13   | 0.000  | -3.141409          | -1.118526 |
| 12/2014  | .7995394    | .1809991  | 4.42    | 0.000  | .4447874           | 1.154291  |
| 01/2015  | 3.89335     | .159155   | 24.46   | 0.000  | 3.581412           | 4.205288  |
| 02/2015  | 5.849923    | .1488146  | 39.31   | 0.000  | 5.558252           | 6.141594  |
| 03/2015  | -9.51515    | .1428783  | -66.60  | 0.000  | -9.795186          | -9.235113 |
| 04/2015  | -15.97402   | .1391285  | -114.81 | 0.000  | -16.24671          | -15.70133 |
| 05/2015  | -9.411435   | .1361754  | -69.11  | 0.000  | -9.678333          | -9.144536 |
| 06/2015  | 1.840266    | .1343183  | 13.70   | 0.000  | 1.577007           | 2.103525  |
| 07/2015  | 5.658733    | .1337927  | 42.29   | 0.000  | 5.396504           | 5.920962  |
| 08/2015  | 2.205322    | .1337911  | 16.48   | 0.000  | 1.943097           | 2.467548  |
| 09/2015  | -7.724652   | .1337896  | -57.74  | 0.000  | -7.986875          | -7.462429 |
| 10/2015  | -13.9259    | .1337888  | -104.09 | 0.000  | -14.18812          | -13.66368 |
| 11/2015  | -9.326421   | .1337878  | -69.71  | 0.000  | -9.58864           | -9.064201 |
| 12/2015  | -4.45948    | .133787   | -33.33  | 0.000  | -4.721698          | -4.197262 |
| 01/2016  | 5.543039    | .1337978  | 41.43   | 0.000  | 5.2808             | 5.805278  |
| 02/2016  | 3.400328    | .1337861  | 25.42   | 0.000  | 3.138111           | 3.662544  |
| 03/2016  | -9.983961   | .1337864  | -74.63  | 0.000  | -10.24618          | -9.721744 |
| 04/2016  | -12.95555   | .133787   | -96.84  | 0.000  | -13.21777          | -12.69333 |
| 05/2016  | -9.032726   | .1337919  | -67.51  | 0.000  | -9.294954          | -8.770499 |
| 07/2016  | 9.598957    | .1560437  | 61.51   | 0.000  | 9.293117           | 9.904797  |
| 08/2016  | 8.037947    | .1566562  | 51.31   | 0.000  | 7.730906           | 8.344988  |
| 09/2016  | -8.8432209  | .157321   | -5.36   | 0.000  | -1.151565          | -.5348773 |
| 10/2016  | -12.11847   | .1579077  | -76.74  | 0.000  | -12.42796          | -11.80898 |
| 11/2016  | -8.161454   | .1584371  | -51.51  | 0.000  | -8.471985          | -7.850923 |
| 12/2016  | 1.069164    | .1589149  | 6.73    | 0.000  | .7576961           | 1.380631  |
| 01/2017  | -.5059034   | .1593422  | -3.17   | 0.001  | -.8182085          | -.1935983 |
| 02/2017  | -6.49126    | .1597712  | -40.63  | 0.000  | -6.804406          | -6.178114 |
| 03/2017  | -8.551896   | .1602284  | -53.37  | 0.000  | -8.865938          | -8.237854 |
| 04/2017  | -11.85432   | .1608505  | -73.70  | 0.000  | -12.16958          | -11.53906 |
| 05/2017  | -7.881329   | .1613408  | -48.85  | 0.000  | -8.197551          | -7.565107 |
| 06/2017  | .0995906    | .1620685  | 0.61    | 0.539  | -.218058           | .4172392  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |        |       |           |           |
|------------------|-----------|----------|--------|-------|-----------|-----------|
| 07/2017          | 6.745274  | .1628356 | 41.42  | 0.000 | 6.426122  | 7.064426  |
| 08/2017          | 2.178437  | .1635059 | 13.32  | 0.000 | 1.857971  | 2.498903  |
| 09/2017          | -5.947133 | .1640964 | -36.24 | 0.000 | -6.268756 | -5.62551  |
| 10/2017          | -10.11436 | .1645538 | -61.47 | 0.000 | -10.43688 | -9.791838 |
| 11/2017          | -6.043799 | .1651138 | -36.60 | 0.000 | -6.367416 | -5.720181 |
| 12/2017          | 6.906876  | .1655694 | 41.72  | 0.000 | 6.582366  | 7.231386  |
| 01/2018          | 11.01763  | .1659428 | 66.39  | 0.000 | 10.69239  | 11.34287  |
| 02/2018          | -2.829121 | .1663363 | -17.01 | 0.000 | -3.155134 | -2.503107 |
| 03/2018          | -6.102164 | .1667903 | -36.59 | 0.000 | -6.429067 | -5.775261 |
| 04/2018          | -11.26316 | .1672252 | -67.35 | 0.000 | -11.59092 | -10.9354  |
| 05/2018          | -4.986363 | .1679172 | -29.70 | 0.000 | -5.315475 | -4.657251 |
| i.ym#c.treatment |           |          |        |       |           |           |
| 07/2016          | .1828978  | .113821  | 1.61   | 0.108 | -.0401874 | .4059831  |
| 08/2016          | .0753366  | .1150448 | 0.65   | 0.513 | -.1501472 | .3008203  |
| 09/2016          | .0573918  | .1164161 | 0.49   | 0.622 | -.1707796 | .2855632  |
| 10/2016          | -.0432637 | .1175481 | -0.37  | 0.713 | -.2736539 | .1871265  |
| 11/2016          | -.2011198 | .1185656 | -1.70  | 0.090 | -.4335042 | .0312646  |
| 12/2016          | -.3388227 | .11946   | -2.84  | 0.005 | -.5729601 | -.1046853 |
| 01/2017          | -.4191447 | .1202964 | -3.48  | 0.000 | -.6549213 | -.1833681 |
| 02/2017          | -.322171  | .1211429 | -2.66  | 0.008 | -.5596067 | -.0847353 |
| 03/2017          | -.3026794 | .1220086 | -2.48  | 0.013 | -.5418119 | -.0635469 |
| 04/2017          | -.305068  | .1231544 | -2.48  | 0.013 | -.5464463 | -.0636897 |
| 05/2017          | -.2628031 | .1240657 | -2.12  | 0.034 | -.5059675 | -.0196386 |
| 06/2017          | -.2290852 | .1254093 | -1.83  | 0.068 | -.4748829 | .0167126  |
| 07/2017          | -.1646681 | .1268028 | -1.30  | 0.194 | -.4131971 | .0838609  |
| 08/2017          | -.1280379 | .1280134 | -1.00  | 0.317 | -.3789398 | .1228639  |
| 09/2017          | -.1215365 | .1290981 | -0.94  | 0.346 | -.3745642 | .1314913  |
| 10/2017          | -.2776967 | .129931  | -2.14  | 0.033 | -.5323568 | -.0230365 |
| 11/2017          | -.5977234 | .1309114 | -4.57  | 0.000 | -.8543051 | -.3411417 |
| 12/2017          | -.7841506 | .1317133 | -5.95  | 0.000 | -1.042304 | -.5259972 |
| 01/2018          | -.6980149 | .1323786 | -5.27  | 0.000 | -.9574723 | -.4385574 |
| 02/2018          | -.6492616 | .1330744 | -4.88  | 0.000 | -.9100827 | -.3884404 |
| 03/2018          | -.6414613 | .1338591 | -4.79  | 0.000 | -.9038203 | -.3791022 |
| 04/2018          | -.4786892 | .1346351 | -3.56  | 0.000 | -.7425691 | -.2148092 |
| 05/2018          | -.3898461 | .1357834 | -2.87  | 0.004 | -.6559768 | -.1237155 |
| 06/2018          | -.2791806 | .1445601 | -1.93  | 0.053 | -.5625133 | .004152   |
|                  |           |          |        |       |           |           |
| cons             | 40.93424  | .1251303 | 327.13 | 0.000 | 40.68899  | 41.17949  |

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Table F-5: Regression Coefficients for DEC Cohort 5

Number of obs = 5015283  
 F(55,4813508) = 24906.39  
 Prob>F = 0.0000  
 R-squared = 0.6783  
 AdjR-squared = 0.6648  
 Root MSE = 13.3705

| Variable | Coefficient | Std. Err. | t       | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|---------|--------|--------------------|-----------|
| i.ym     |             |           |         |        |                    |           |
| 11/2014  | -.5435081   | .5493008  | -0.99   | 0.322  | -1.620118          | .5331018  |
| 12/2014  | 2.555639    | .1699153  | 15.04   | 0.000  | 2.222611           | 2.888667  |
| 01/2015  | 5.198331    | .1671576  | 31.10   | 0.000  | 4.870708           | 5.525954  |
| 02/2015  | 7.457801    | .164184   | 45.42   | 0.000  | 7.136006           | 7.779595  |
| 03/2015  | -8.452811   | .1610993  | -52.47  | 0.000  | -8.76856           | -8.137062 |
| 04/2015  | -16.87648   | .1581985  | -106.68 | 0.000  | -17.18654          | -16.56642 |
| 05/2015  | -11.28277   | .1552743  | -72.66  | 0.000  | -11.5871           | -10.97844 |
| 06/2015  | -.2107536   | .1507475  | -1.40   | 0.162  | -.5062134          | .0847061  |
| 07/2015  | 2.855071    | .1288381  | 22.16   | 0.000  | 2.602553           | 3.107589  |
| 08/2015  | -2.192529   | .1159251  | -18.91  | 0.000  | -2.419738          | -1.96532  |
| 09/2015  | -11.72147   | .1103524  | -106.22 | 0.000  | -11.93775          | -11.50518 |
| 10/2015  | -16.57337   | .106735   | -155.28 | 0.000  | -16.78257          | -16.36417 |
| 11/2015  | -11.69213   | .1046589  | -111.72 | 0.000  | -11.89726          | -11.487   |
| 12/2015  | -7.018907   | .102948   | -68.18  | 0.000  | -7.220681          | -6.817132 |
| 01/2016  | 3.029555    | .1017131  | 29.79   | 0.000  | 2.830201           | 3.228909  |
| 02/2016  | .2910354    | .1006586  | 2.89    | 0.004  | .0937482           | .4883227  |
| 03/2016  | -12.67847   | .0996331  | -127.25 | 0.000  | -12.87374          | -12.48319 |
| 04/2016  | -15.18306   | .0987026  | -153.83 | 0.000  | -15.37651          | -14.9896  |
| 05/2016  | -11.15793   | .0979399  | -113.93 | 0.000  | -11.34989          | -10.96597 |
| 06/2016  | .2973939    | .0971935  | 3.06    | 0.002  | .1068981           | .4878897  |
| 07/2016  | 7.903994    | .0965266  | 81.88   | 0.000  | 7.714806           | 8.093183  |
| 08/2016  | 6.071698    | .0959907  | 63.25   | 0.000  | 5.883559           | 6.259836  |
| 09/2016  | -2.666698   | .0956047  | -27.89  | 0.000  | -2.85408           | -2.479316 |
| 10/2016  | -13.20457   | .0955226  | -138.24 | 0.000  | -13.3918           | -13.01735 |
| 11/2016  | -8.784182   | .0955225  | -91.96  | 0.000  | -8.971403          | -8.596961 |
| 12/2016  | .493144     | .0955222  | 5.16    | 0.000  | .3059239           | .6803641  |
| 01/2017  | -1.243375   | .095522   | -13.02  | 0.000  | -1.430595          | -1.056156 |
| 02/2017  | -7.227807   | .0955222  | -75.67  | 0.000  | -7.415027          | -7.040587 |
| 03/2017  | -9.279795   | .0955247  | -97.15  | 0.000  | -9.46702           | -9.09257  |
| 04/2017  | -12.69417   | .0955735  | -132.82 | 0.000  | -12.88149          | -12.50685 |
| 06/2017  | -.9581217   | .1736778  | -5.52   | 0.000  | -1.298524          | -.6177193 |



APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |        |       |           |           |
|------------------|-----------|----------|--------|-------|-----------|-----------|
| 07/2017          | 5.859184  | .1751748 | 33.45  | 0.000 | 5.515847  | 6.20252   |
| 08/2017          | 1.226236  | .1766362 | 6.94   | 0.000 | .8800355  | 1.572437  |
| 09/2017          | -6.870248 | .1780275 | -38.59 | 0.000 | -7.219175 | -6.52132  |
| 10/2017          | -11.16482 | .1791494 | -62.32 | 0.000 | -11.51594 | -10.81369 |
| 11/2017          | -6.590741 | .1181327 | -55.79 | 0.000 | -6.822276 | -6.359205 |
| 12/2017          | 5.810316  | .1184699 | 49.04  | 0.000 | 5.57812   | 6.042513  |
| 01/2018          | 9.980797  | .1187885 | 84.02  | 0.000 | 9.747976  | 10.21362  |
| 02/2018          | -3.575404 | .1191229 | -30.01 | 0.000 | -3.80888  | -3.341927 |
| 03/2018          | -6.785102 | .1194497 | -56.80 | 0.000 | -7.019219 | -6.550985 |
| 04/2018          | -11.58747 | .1198312 | -96.70 | 0.000 | -11.82234 | -11.35261 |
| 05/2018          | -4.981079 | .1203004 | -41.41 | 0.000 | -5.216863 | -4.745294 |
| i.ym#c.treatment |           |          |        |       |           |           |
| 06/2017          | -.5173647 | .1557323 | -3.32  | 0.001 | -.8225946 | -.2121349 |
| 07/2017          | -.6983529 | .1575726 | -4.43  | 0.000 | -1.00719  | -.3895162 |
| 08/2017          | -.5044947 | .1593592 | -3.17  | 0.002 | -.8168331 | -.1921563 |
| 09/2017          | -.4812305 | .1610643 | -2.99  | 0.003 | -.7969108 | -.1655502 |
| 10/2017          | -.2823175 | .1624306 | -1.74  | 0.082 | -.6006757 | .0360408  |
| 11/2017          | -.4001677 | .0892927 | -4.48  | 0.000 | -.5751782 | -.2251573 |
| 12/2017          | -.0392246 | .0899129 | -0.44  | 0.663 | -.2154507 | .1370015  |
| 01/2018          | -.0004226 | .0904822 | -0.00  | 0.996 | -.1777645 | .1769192  |
| 02/2018          | -.3374415 | .091078  | -3.70  | 0.000 | -.5159511 | -.1589318 |
| 03/2018          | -.3964715 | .0916601 | -4.33  | 0.000 | -.5761219 | -.216821  |
| 04/2018          | -.7122844 | .092324  | -7.72  | 0.000 | -.8932362 | -.5313325 |
| 05/2018          | -1.211497 | .0931284 | -13.01 | 0.000 | -1.394026 | -1.028969 |
| 06/2018          | -1.349513 | .0995255 | -13.56 | 0.000 | -1.54458  | -1.154447 |
|                  |           |          |        |       |           |           |
| cons             | 41.63829  | .0909139 | 458.00 | 0.000 | 41.4601   | 41.81647  |

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Table F-6: Regression Coefficients for DEC Cohort 6

Number of obs = 932468  
 F(79,912163) = 4651.03  
 Prob>F = 0.0000  
 R-squared = 0.6947  
 AdjR-squared = 0.6879  
 Root MSE = 14.3218

| Variable | Coefficient | Std. Err. | t      | P >  t | 95% Conf. Interval |            |
|----------|-------------|-----------|--------|--------|--------------------|------------|
| i.ym     |             |           |        |        |                    |            |
| 12/2008  | 5.041887    | .1955036  | 25.79  | 0.000  | 4.658706           | 5.425067   |
| 01/2009  | 8.460343    | .1955007  | 43.28  | 0.000  | 8.077168           | 8.843518   |
| 02/2009  | 4.973629    | .1955007  | 25.44  | 0.000  | 4.590455           | 5.356804   |
| 03/2009  | -4.451376   | .1955007  | -22.77 | 0.000  | -4.834551          | -4.068201  |
| 04/2009  | -10.17105   | .1955022  | -52.03 | 0.000  | -10.55422          | -9.787869  |
| 05/2009  | -4.912101   | .1955007  | -25.13 | 0.000  | -5.295276          | -4.528927  |
| 06/2009  | 8.786893    | .1955198  | 44.94  | 0.000  | 8.403681           | 9.170105   |
| 07/2009  | 12.66884    | .1955007  | 64.80  | 0.000  | 12.28567           | 13.05202   |
| 08/2009  | 10.79143    | .1955007  | 55.20  | 0.000  | 10.40826           | 11.17461   |
| 09/2009  | -1.687633   | .1955007  | -8.63  | 0.000  | -2.070807          | -1.304458  |
| 10/2009  | -10.13697   | .1955007  | -51.85 | 0.000  | -10.52015          | -9.753796  |
| 11/2009  | -5.4866     | .1955007  | -28.06 | 0.000  | -5.869774          | -5.103425  |
| 12/2009  | 12.36428    | .1955007  | 63.24  | 0.000  | 11.98111           | 12.74746   |
| 01/2010  | 17.60885    | .1955007  | 90.07  | 0.000  | 17.22567           | 17.99202   |
| 02/2010  | 12.61609    | .1955007  | 64.53  | 0.000  | 12.23291           | 12.99926   |
| 03/2010  | -2.469856   | .1955007  | -12.63 | 0.000  | -2.853031          | -2.086681  |
| 11/2015  | -10.18717   | .2210844  | -46.08 | 0.000  | -10.62049          | -9.753851  |
| 12/2015  | -4.665506   | .2210844  | -21.10 | 0.000  | -5.098824          | -4.232187  |
| 01/2016  | 5.039164    | .2210892  | 22.79  | 0.000  | 4.605837           | 5.472491   |
| 02/2016  | 2.188841    | .2211231  | 9.90   | 0.000  | 1.755447           | 2.622235   |
| 03/2016  | -11.4052    | .2212496  | -51.55 | 0.000  | -11.83884          | -10.97155  |
| 04/2016  | -13.77942   | .2214656  | -62.22 | 0.000  | -14.21349          | -13.34536  |
| 05/2016  | -7.164986   | .2216541  | -32.33 | 0.000  | -7.59942           | -6.730551  |
| 06/2016  | 7.092381    | .2218493  | 31.97  | 0.000  | 6.657564           | 7.527198   |
| 07/2016  | 15.79796    | .2221225  | 71.12  | 0.000  | 15.36261           | 16.23332   |
| 08/2016  | 12.0507     | .2223425  | 54.20  | 0.000  | 11.61492           | 12.48648   |
| 09/2016  | 1.411673    | .2226219  | 6.34   | 0.000  | .9753416           | 1.848004   |
| 10/2016  | -12.57083   | .2228677  | -56.40 | 0.000  | -13.00764          | -12.13401  |
| 11/2016  | -9.608094   | .223026   | -43.08 | 0.000  | -10.04522          | -9.17097   |
| 12/2016  | -5.816872   | .2232015  | -2.61  | 0.009  | -1.019155          | -1.1442198 |
| 01/2017  | -2.80344    | .2233837  | -12.55 | 0.000  | -3.241264          | -2.365615  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |        |       |           |           |
|------------------|-----------|----------|--------|-------|-----------|-----------|
| 02/2017          | -8.565695 | .2235348 | -38.32 | 0.000 | -9.003816 | -8.127574 |
| 03/2017          | -10.73747 | .2236869 | -48.00 | 0.000 | -11.17589 | -10.29905 |
| 04/2017          | -13.73371 | .2239498 | -61.32 | 0.000 | -14.17265 | -13.29478 |
| 05/2017          | -8.190045 | .22421   | -36.53 | 0.000 | -8.629489 | -7.750601 |
| 06/2017          | 1.173897  | .2245572 | 5.23   | 0.000 | .7337723  | 1.614021  |
| 07/2017          | 8.841137  | .2248349 | 39.32  | 0.000 | 8.400468  | 9.281806  |
| 08/2017          | 4.531975  | .2250696 | 20.14  | 0.000 | 4.090846  | 4.973104  |
| 09/2017          | -5.786436 | .2253412 | -25.68 | 0.000 | -6.228098 | -5.344775 |
| 10/2017          | -11.07195 | .2255921 | -49.08 | 0.000 | -11.51411 | -10.6298  |
| 11/2017          | -8.484853 | .2258159 | -37.57 | 0.000 | -8.927445 | -8.042262 |
| 12/2017          | 4.745923  | .2260237 | 21.00  | 0.000 | 4.302925  | 5.188922  |
| 01/2018          | 9.844017  | .2262811 | 43.50  | 0.000 | 9.400514  | 10.28752  |
| 02/2018          | -5.799516 | .2265228 | -25.60 | 0.000 | -6.243493 | -5.355538 |
| 03/2018          | -9.931726 | .2267483 | -43.80 | 0.000 | -10.37615 | -9.487307 |
| 04/2018          | -13.96921 | .2269819 | -61.54 | 0.000 | -14.41409 | -13.52433 |
| 05/2018          | -6.979706 | .2272049 | -30.72 | 0.000 | -7.42502  | -6.534392 |
| i.ym#c.treatment |           |          |        |       |           |           |
| 11/2015          | .08458    | .2079576 | 0.41   | 0.684 | -.3230099 | .4921699  |
| 12/2015          | .1099624  | .2079576 | 0.53   | 0.597 | -.2976275 | .5175523  |
| 01/2016          | -.2175456 | .2079633 | -1.05  | 0.296 | -.6251467 | .1900555  |
| 02/2016          | -.1796001 | .2080442 | -0.86  | 0.388 | -.5873598 | .2281596  |
| 03/2016          | -.0315635 | .2083977 | -0.15  | 0.880 | -.440016  | .3768891  |
| 04/2016          | -.0395616 | .2088236 | -0.19  | 0.850 | -.4488488 | .3697257  |
| 05/2016          | -.0551549 | .2092673 | -0.26  | 0.792 | -.4653118 | .3550019  |
| 06/2016          | -.0480782 | .2097605 | -0.23  | 0.819 | -.4592019 | .3630455  |
| 07/2016          | -.0691823 | .2103488 | -0.33  | 0.742 | -.4814589 | .3430942  |
| 08/2016          | -.0422501 | .2108154 | -0.20  | 0.841 | -.4554414 | .3709411  |
| 09/2016          | -.1268783 | .2114394 | -0.60  | 0.548 | -.5412925 | .2875358  |
| 10/2016          | -.208193  | .2118933 | -0.98  | 0.326 | -.6234967 | .2071108  |
| 11/2016          | -.4404545 | .2123196 | -2.07  | 0.038 | -.8565939 | -.0243151 |
| 12/2016          | -.5706292 | .2127374 | -2.68  | 0.007 | -.9875875 | -.153671  |
| 01/2017          | -.6035371 | .2131731 | -2.83  | 0.005 | -1.021349 | -.185725  |
| 02/2017          | -.3146924 | .2134679 | -1.47  | 0.140 | -.7330823 | .1036975  |
| 03/2017          | -.2962436 | .2137588 | -1.39  | 0.166 | -.7152036 | .1227165  |
| 04/2017          | -.1736185 | .2143096 | -0.81  | 0.418 | -.5936581 | .2464212  |
| 05/2017          | -.1094373 | .2148385 | -0.51  | 0.610 | -.5305137 | .311639   |
| 06/2017          | -.2106441 | .2155687 | -0.98  | 0.328 | -.6331515 | .2118633  |
| 07/2017          | -.3139904 | .2161692 | -1.45  | 0.146 | -.7376749 | .1096941  |
| 08/2017          | -.4149419 | .2166938 | -1.91  | 0.056 | -.8396545 | .0097707  |
| 09/2017          | -.4059735 | .2172397 | -1.87  | 0.062 | -.8317561 | .0198091  |
| 10/2017          | -.351112  | .2177589 | -1.61  | 0.107 | -.7779122 | .0756882  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |        |       |           |           |
|---------|-----------|----------|--------|-------|-----------|-----------|
| 11/2017 | -.5587344 | .2182237 | -2.56  | 0.010 | -.9864456 | -.1310232 |
| 12/2017 | -.62449   | .2186823 | -2.86  | 0.004 | -1.0531   | -.19588   |
| 01/2018 | -.8825185 | .2191279 | -4.03  | 0.000 | -1.312002 | -.4530352 |
| 02/2018 | -.5237236 | .2196562 | -2.38  | 0.017 | -.9542425 | -.0932047 |
| 03/2018 | -.6866934 | .2200998 | -3.12  | 0.002 | -1.118082 | -.2553052 |
| 04/2018 | -.4439611 | .2206005 | -2.01  | 0.044 | -.8763306 | -.0115916 |
| 05/2018 | -.499444  | .2210376 | -2.26  | 0.024 | -.9326702 | -.0662177 |
| 06/2018 | -.6342094 | .2331416 | -2.72  | 0.007 | -1.091159 | -.1772597 |
|         |           |          |        |       |           |           |
| cons    | 45.58088  | .1674973 | 272.13 | 0.000 | 45.25259  | 45.90917  |

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Table F-7: Regression Coefficients for DEC Cohort 7

Number of obs = 8299134  
 F(108,8180957) = 22249.73  
 Prob>F = 0.0000  
 R-squared = 0.7006  
 AdjR-squared = 0.6963  
 Root MSE = 14.8302

| Variable | Coefficient | Std. Err. | t      | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|--------|--------|--------------------|-----------|
| i.y      |             |           |        |        |                    |           |
| 12/2008  | 6.63468     | .1067528  | 62.15  | 0.000  | 6.425448           | 6.843912  |
| 01/2009  | 10.50638    | .1067023  | 98.46  | 0.000  | 10.29725           | 10.71552  |
| 02/2009  | 7.248244    | .1066483  | 67.96  | 0.000  | 7.039217           | 7.457271  |
| 03/2009  | -1.858576   | .1065871  | -17.44 | 0.000  | -2.067483          | -1.649669 |
| 04/2009  | -7.724038   | .106532   | -72.50 | 0.000  | -7.932836          | -7.515239 |
| 05/2009  | -4.904396   | .1064595  | -46.07 | 0.000  | -5.113053          | -4.695739 |
| 06/2009  | 5.135311    | .1063953  | 48.27  | 0.000  | 4.926781           | 5.343842  |
| 07/2009  | 8.90383     | .1063155  | 83.75  | 0.000  | 8.695456           | 9.112205  |
| 08/2009  | 8.088819    | .1062409  | 76.14  | 0.000  | 7.880591           | 8.297047  |
| 09/2009  | -2.589432   | .1061753  | -24.39 | 0.000  | -2.797532          | -2.381332 |
| 10/2009  | -7.883209   | .1060962  | -74.30 | 0.000  | -8.091154          | -7.675264 |
| 11/2009  | -2.734342   | .1060323  | -25.79 | 0.000  | -2.942161          | -2.526522 |
| 12/2009  | 12.9659     | .1059685  | 122.36 | 0.000  | 12.7582            | 13.17359  |
| 01/2010  | 16.56347    | .1059189  | 156.38 | 0.000  | 16.35587           | 16.77106  |
| 02/2010  | 12.76491    | .105867   | 120.57 | 0.000  | 12.55741           | 12.9724   |
| 03/2010  | -1.560876   | .1058037  | -14.75 | 0.000  | -1.768248          | -1.353505 |
| 04/2010  | -8.540132   | .1057297  | -80.77 | 0.000  | -8.747359          | -8.332906 |
| 05/2010  | -2.732645   | .1056449  | -25.87 | 0.000  | -2.939705          | -2.525584 |
| 06/2010  | 10.76693    | .1055719  | 101.99 | 0.000  | 10.56001           | 10.97385  |
| 07/2010  | 16.23684    | .1054992  | 153.90 | 0.000  | 16.03006           | 16.44361  |
| 08/2010  | 12.6379     | .1054367  | 119.86 | 0.000  | 12.43124           | 12.84455  |
| 09/2010  | 1.491803    | .1053833  | 14.16  | 0.000  | 1.285256           | 1.698351  |
| 10/2010  | -8.168209   | .1053197  | -77.56 | 0.000  | -8.374632          | -7.961786 |
| 11/2010  | -.5088313   | .1052718  | -4.83  | 0.000  | -.7151602          | -.3025024 |
| 12/2010  | 15.77979    | .1052173  | 149.97 | 0.000  | 15.57357           | 15.98601  |
| 01/2011  | 16.31188    | .1051705  | 155.10 | 0.000  | 16.10575           | 16.51801  |
| 02/2011  | 3.798693    | .1051237  | 36.14  | 0.000  | 3.592654           | 4.004731  |
| 03/2011  | -4.666683   | .105064   | -44.42 | 0.000  | -4.872605          | -4.460761 |
| 04/2011  | -8.529953   | .1050072  | -81.23 | 0.000  | -8.735764          | -8.324143 |
| 05/2011  | -2.30731    | .1049513  | -21.98 | 0.000  | -2.513011          | -2.101609 |
| 06/2011  | 8.407116    | .1048911  | 80.15  | 0.000  | 8.201534           | 8.612699  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |        |       |           |           |
|---------|-----------|----------|--------|-------|-----------|-----------|
| 07/2011 | 14.8288   | .1048115 | 141.48 | 0.000 | 14.62337  | 15.03422  |
| 08/2011 | 11.00042  | .1047064 | 105.06 | 0.000 | 10.7952   | 11.20564  |
| 09/2011 | -2.913439 | .1045977 | -27.85 | 0.000 | -3.118447 | -2.708432 |
| 10/2011 | -8.915685 | .1045466 | -85.28 | 0.000 | -9.120592 | -8.710777 |
| 11/2011 | -3.662732 | .1045456 | -35.03 | 0.000 | -3.867638 | -3.457827 |
| 12/2011 | 2.784185  | .1045443 | 26.63  | 0.000 | 2.579281  | 2.989088  |
| 01/2012 | 4.476587  | .1045273 | 42.83  | 0.000 | 4.271717  | 4.681457  |
| 02/2012 | 1.30326   | .10448   | 12.47  | 0.000 | 1.098483  | 1.508037  |
| 03/2012 | -7.954345 | .1044434 | -76.16 | 0.000 | -8.15905  | -7.74964  |
| 04/2012 | -9.741258 | .1044409 | -93.27 | 0.000 | -9.945959 | -9.536558 |
| 05/2012 | -4.950153 | .1044409 | -47.40 | 0.000 | -5.154854 | -4.745453 |
| 06/2012 | 4.580658  | .104441  | 43.86  | 0.000 | 4.375958  | 4.785359  |
| 07/2012 | 12.81242  | .1044409 | 122.68 | 0.000 | 12.60772  | 13.01712  |
| 08/2012 | 6.515639  | .104441  | 62.39  | 0.000 | 6.310938  | 6.720339  |
| 11/2015 | -6.372445 | .1256059 | -50.73 | 0.000 | -6.618628 | -6.126262 |
| 12/2015 | -1.447519 | .1256059 | -11.52 | 0.000 | -1.693702 | -1.201336 |
| 01/2016 | 8.053045  | .1256142 | 64.11  | 0.000 | 7.806845  | 8.299244  |
| 02/2016 | 5.993706  | .125644  | 47.70  | 0.000 | 5.747449  | 6.239964  |
| 03/2016 | -7.376266 | .1257824 | -58.64 | 0.000 | -7.622795 | -7.129737 |
| 04/2016 | -10.48149 | .1259675 | -83.21 | 0.000 | -10.72838 | -10.2346  |
| 05/2016 | -6.797012 | .1261557 | -53.88 | 0.000 | -7.044273 | -6.549752 |
| 06/2016 | 4.808092  | .1263586 | 38.05  | 0.000 | 4.560434  | 5.055751  |
| 07/2016 | 12.85767  | .1265898 | 101.57 | 0.000 | 12.60956  | 13.10578  |
| 08/2016 | 10.86405  | .126768  | 85.70  | 0.000 | 10.61559  | 11.11251  |
| 09/2016 | 1.366338  | .126994  | 10.76  | 0.000 | 1.117434  | 1.615242  |
| 10/2016 | -10.12053 | .127172  | -79.58 | 0.000 | -10.36978 | -9.871275 |
| 11/2016 | -5.940203 | .1273335 | -46.65 | 0.000 | -6.189772 | -5.690634 |
| 12/2016 | 3.746748  | .1275126 | 29.38  | 0.000 | 3.496828  | 3.996668  |
| 01/2017 | 1.91543   | .1276766 | 15.00  | 0.000 | 1.665188  | 2.165672  |
| 02/2017 | -4.458172 | .1278252 | -34.88 | 0.000 | -4.708705 | -4.207639 |
| 03/2017 | -6.570818 | .1279588 | -51.35 | 0.000 | -6.821613 | -6.320024 |
| 04/2017 | -9.967335 | .1281367 | -77.79 | 0.000 | -10.21848 | -9.716192 |
| 05/2017 | -6.33538  | .1283256 | -49.37 | 0.000 | -6.586894 | -6.083867 |
| 06/2017 | 1.787446  | .1285641 | 13.90  | 0.000 | 1.535465  | 2.039426  |
| 07/2017 | 8.571358  | .1287744 | 66.56  | 0.000 | 8.318965  | 8.823751  |
| 08/2017 | 3.520584  | .1289543 | 27.30  | 0.000 | 3.267838  | 3.77333   |
| 09/2017 | -4.741817 | .1291531 | -36.71 | 0.000 | -4.994952 | -4.488681 |
| 10/2017 | -9.012064 | .1293237 | -69.69 | 0.000 | -9.265534 | -8.758594 |
| 11/2017 | -4.150784 | .1295249 | -32.05 | 0.000 | -4.404649 | -3.89692  |
| 12/2017 | 9.370016  | .129694  | 72.25  | 0.000 | 9.115821  | 9.624212  |
| 01/2018 | 12.93185  | .1298495 | 99.59  | 0.000 | 12.67735  | 13.18635  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |        |       |           |           |
|------------------|-----------|----------|--------|-------|-----------|-----------|
| 02/2018          | -1.087792 | .1300131 | -8.37  | 0.000 | -1.342613 | -.8329714 |
| 03/2018          | -4.273792 | .1301772 | -32.83 | 0.000 | -4.528935 | -4.018649 |
| 04/2018          | -9.890106 | .1303374 | -75.88 | 0.000 | -10.14556 | -9.634649 |
| 05/2018          | -4.150729 | .1305172 | -31.80 | 0.000 | -4.406538 | -3.89492  |
| i.ym#c.treatment |           |          |        |       |           |           |
| 11/2015          | -.0371516 | .0982694 | -0.38  | 0.705 | -.2297561 | .1554529  |
| 12/2015          | -.1025569 | .0982697 | -1.04  | 0.297 | -.295162  | .0900482  |
| 01/2016          | -.0952013 | .0982833 | -0.97  | 0.333 | -.2878331 | .0974305  |
| 02/2016          | -.1078629 | .0983325 | -1.10  | 0.273 | -.300591  | .0848653  |
| 03/2016          | -.1347891 | .0985748 | -1.37  | 0.172 | -.3279923 | .058414   |
| 04/2016          | -.1659005 | .0989088 | -1.68  | 0.093 | -.3597582 | .0279572  |
| 05/2016          | -.181293  | .0992522 | -1.83  | 0.068 | -.3758239 | .0132378  |
| 06/2016          | -.2988676 | .0996305 | -3.00  | 0.003 | -.4941399 | -.1035953 |
| 07/2016          | -.3339437 | .1000505 | -3.34  | 0.001 | -.5300392 | -.1378483 |
| 08/2016          | -.3068337 | .1003827 | -3.06  | 0.002 | -.5035802 | -.1100872 |
| 09/2016          | -.2748773 | .1007907 | -2.73  | 0.006 | -.4724236 | -.0773311 |
| 10/2016          | -.1441438 | .1011125 | -1.43  | 0.154 | -.3423207 | .054033   |
| 11/2016          | -.123375  | .1014063 | -1.22  | 0.224 | -.3221278 | .0753777  |
| 12/2016          | -.2335462 | .1017181 | -2.30  | 0.022 | -.4329101 | -.0341823 |
| 01/2017          | -.2909031 | .1020073 | -2.85  | 0.004 | -.4908337 | -.0909724 |
| 02/2017          | -.2518571 | .1022726 | -2.46  | 0.014 | -.4523077 | -.0514065 |
| 03/2017          | -.2672344 | .1025103 | -2.61  | 0.009 | -.4681508 | -.0663179 |
| 04/2017          | -.3105615 | .1028324 | -3.02  | 0.003 | -.5121093 | -.1090138 |
| 05/2017          | -.3154442 | .1031603 | -3.06  | 0.002 | -.5176348 | -.1132536 |
| 06/2017          | -.3646096 | .1035768 | -3.52  | 0.000 | -.5676165 | -.1616027 |
| 07/2017          | -.5011984 | .1039479 | -4.82  | 0.000 | -.7049326 | -.2974642 |
| 08/2017          | -.4079286 | .1042687 | -3.91  | 0.000 | -.6122916 | -.2035657 |
| 09/2017          | -.3313687 | .1046242 | -3.17  | 0.002 | -.5364284 | -.126309  |
| 10/2017          | -.2276498 | .1049184 | -2.17  | 0.030 | -.4332861 | -.0220135 |
| 11/2017          | -.2772142 | .1052634 | -2.63  | 0.008 | -.4835266 | -.0709018 |
| 12/2017          | -.4037421 | .1055507 | -3.83  | 0.000 | -.6106177 | -.1968664 |
| 01/2018          | -.5183084 | .1058129 | -4.90  | 0.000 | -.7256979 | -.3109189 |
| 02/2018          | -.3762491 | .1060947 | -3.55  | 0.000 | -.5841909 | -.1683073 |
| 03/2018          | -.3108275 | .1063713 | -2.92  | 0.003 | -.5193115 | -.1023435 |
| 04/2018          | -.2742283 | .1066624 | -2.57  | 0.010 | -.4832827 | -.0651739 |
| 05/2018          | -.2879504 | .1069818 | -2.69  | 0.007 | -.4976308 | -.07827   |
| 06/2018          | -.3500807 | .1116893 | -3.13  | 0.002 | -.5689878 | -.1311737 |
|                  |           |          |        |       |           |           |
| cons             | 40.30704  | .0950932 | 423.87 | 0.000 | 40.12066  | 40.49342  |

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Table F-8: Regression Coefficients for DEC Cohort 8

Number of obs = 5307646  
 F(135,5231818) = 9498.05  
 Prob>F = 0.0000  
 R-squared = 0.7128  
 AdjR-squared = 0.7087  
 Root MSE = 14.9134

| Variable | Coefficient | Std. Err. | t      | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|--------|--------|--------------------|-----------|
| i.y      |             |           |        |        |                    |           |
| 12/2008  | 4.665554    | .1284077  | 36.33  | 0.000  | 4.41388            | 4.917229  |
| 01/2009  | 7.884682    | .1283026  | 61.45  | 0.000  | 7.633213           | 8.13615   |
| 02/2009  | 4.619858    | .1282018  | 36.04  | 0.000  | 4.368587           | 4.871129  |
| 03/2009  | -3.759741   | .1281051  | -29.35 | 0.000  | -4.010823          | -3.50866  |
| 04/2009  | -9.435569   | .1279839  | -73.72 | 0.000  | -9.686413          | -9.184726 |
| 05/2009  | -5.94497    | .1278607  | -46.50 | 0.000  | -6.195572          | -5.694367 |
| 06/2009  | 4.577267    | .1277431  | 35.83  | 0.000  | 4.326895           | 4.827639  |
| 07/2009  | 8.525671    | .1275873  | 66.82  | 0.000  | 8.275604           | 8.775737  |
| 08/2009  | 7.816227    | .1274158  | 61.34  | 0.000  | 7.566497           | 8.065958  |
| 09/2009  | -3.59539    | .1272721  | -28.25 | 0.000  | -3.844838          | -3.345941 |
| 10/2009  | -9.605671   | .1271463  | -75.55 | 0.000  | -9.854873          | -9.356468 |
| 11/2009  | -4.805069   | .1270129  | -37.83 | 0.000  | -5.05401           | -4.556128 |
| 12/2009  | 10.12117    | .1269192  | 79.74  | 0.000  | 9.872409           | 10.36992  |
| 01/2010  | 14.09355    | .1268292  | 111.12 | 0.000  | 13.84497           | 14.34213  |
| 02/2010  | 10.33827    | .1267061  | 81.59  | 0.000  | 10.08993           | 10.58661  |
| 03/2010  | -3.474907   | .1265927  | -27.45 | 0.000  | -3.723024          | -3.22679  |
| 04/2010  | -10.14663   | .1264552  | -80.24 | 0.000  | -10.39448          | -9.898786 |
| 05/2010  | -3.688045   | .126273   | -29.21 | 0.000  | -3.935536          | -3.440555 |
| 06/2010  | 10.36194    | .1261212  | 82.16  | 0.000  | 10.11475           | 10.60914  |
| 07/2010  | 16.14098    | .125978   | 128.13 | 0.000  | 15.89406           | 16.38789  |
| 08/2010  | 12.15247    | .1258577  | 96.56  | 0.000  | 11.90579           | 12.39914  |
| 09/2010  | .6684701    | .1257539  | 5.32   | 0.000  | .421997            | .9149432  |
| 10/2010  | -10.00717   | .125636   | -79.65 | 0.000  | -10.25342          | -9.760931 |
| 11/2010  | -2.711028   | .1255112  | -21.60 | 0.000  | -2.957026          | -2.465031 |
| 12/2010  | 13.08271    | .1248498  | 104.79 | 0.000  | 12.83801           | 13.32741  |
| 01/2011  | 13.41232    | .1247462  | 107.52 | 0.000  | 13.16782           | 13.65682  |
| 02/2011  | 1.505877    | .1246218  | 12.08  | 0.000  | 1.261622           | 1.750131  |
| 03/2011  | -6.780822   | .1245043  | -54.46 | 0.000  | -7.024846          | -6.536798 |
| 04/2011  | -10.25104   | .1243865  | -82.41 | 0.000  | -10.49483          | -10.00724 |
| 05/2011  | -3.707322   | .1242591  | -29.84 | 0.000  | -3.950865          | -3.463779 |
| 06/2011  | 7.670862    | .1241328  | 61.80  | 0.000  | 7.427567           | 7.914158  |



APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |         |       |           |           |
|---------|-----------|----------|---------|-------|-----------|-----------|
| 07/2011 | 14.08484  | .1239602 | 113.62  | 0.000 | 13.84188  | 14.3278   |
| 08/2011 | 10.43422  | .123824  | 84.27   | 0.000 | 10.19153  | 10.67691  |
| 09/2011 | -4.085844 | .1236838 | -33.03  | 0.000 | -4.32826  | -3.843428 |
| 10/2011 | -10.76552 | .1235026 | -87.17  | 0.000 | -11.00758 | -10.52346 |
| 11/2011 | -5.747247 | .1233199 | -46.60  | 0.000 | -5.98895  | -5.505545 |
| 12/2011 | .4708192  | .1231544 | 3.82    | 0.000 | .2294409  | .7121975  |
| 01/2012 | 2.229247  | .1229934 | 18.12   | 0.000 | 1.988185  | 2.47031   |
| 02/2012 | -1.142252 | .1227078 | -9.31   | 0.000 | -1.382755 | -.9017493 |
| 03/2012 | -10.24984 | .1216331 | -84.27  | 0.000 | -10.48824 | -10.01144 |
| 04/2012 | -11.85453 | .1205722 | -98.32  | 0.000 | -12.09084 | -11.61821 |
| 05/2012 | -7.040986 | .1194806 | -58.93  | 0.000 | -7.275164 | -6.806809 |
| 06/2012 | 2.522609  | .1180561 | 21.37   | 0.000 | 2.291224  | 2.753995  |
| 07/2012 | 10.63797  | .1164128 | 91.38   | 0.000 | 10.4098   | 10.86613  |
| 08/2012 | 4.200655  | .1159483 | 36.23   | 0.000 | 3.9734    | 4.427909  |
| 09/2012 | -6.141831 | .1158662 | -53.01  | 0.000 | -6.368924 | -5.914737 |
| 10/2012 | -10.94715 | .1157883 | -94.54  | 0.000 | -11.17409 | -10.72021 |
| 11/2012 | -4.144843 | .115706  | -35.82  | 0.000 | -4.371622 | -3.918063 |
| 12/2012 | .5006342  | .1156251 | 4.33    | 0.000 | .2740131  | .7272553  |
| 01/2013 | 4.159401  | .1154921 | 36.01   | 0.000 | 3.933041  | 4.385761  |
| 02/2013 | 4.623465  | .1141373 | 40.51   | 0.000 | 4.399759  | 4.84717   |
| 03/2013 | -1.691674 | .1119129 | -15.12  | 0.000 | -1.911019 | -1.472328 |
| 04/2013 | -10.71707 | .1108811 | -96.65  | 0.000 | -10.93439 | -10.49975 |
| 05/2013 | -9.385884 | .1105303 | -84.92  | 0.000 | -9.602519 | -9.169249 |
| 06/2013 | -.8121385 | .1104983 | -7.35   | 0.000 | -1.028711 | -.5955657 |
| 07/2013 | 4.019102  | .1104702 | 36.38   | 0.000 | 3.802584  | 4.235619  |
| 08/2013 | 1.097629  | .1104415 | 9.94    | 0.000 | .8811679  | 1.314091  |
| 09/2013 | -5.601978 | .1104156 | -50.74  | 0.000 | -5.818388 | -5.385567 |
| 10/2013 | -11.1088  | .1103913 | -100.63 | 0.000 | -11.32516 | -10.89244 |
| 11/2013 | -2.61966  | .1103726 | -23.73  | 0.000 | -2.835986 | -2.403333 |
| 12/2013 | 5.934792  | .1103622 | 53.78   | 0.000 | 5.718486  | 6.151097  |
| 01/2014 | 12.70092  | .1103539 | 115.09  | 0.000 | 12.48463  | 12.91721  |
| 02/2014 | 7.079014  | .1103435 | 64.15   | 0.000 | 6.862744  | 7.295283  |
| 03/2014 | -1.800152 | .110331  | -16.32  | 0.000 | -2.016397 | -1.583907 |
| 04/2014 | -10.18771 | .1103205 | -92.35  | 0.000 | -10.40394 | -9.971489 |
| 05/2014 | -6.75133  | .1103119 | -61.20  | 0.000 | -6.967538 | -6.535123 |
| 06/2014 | 2.93814   | .1103014 | 26.64   | 0.000 | 2.721953  | 3.154327  |
| 07/2014 | 3.363768  | .1102713 | 30.50   | 0.000 | 3.14764   | 3.579896  |
| 08/2014 | 1.527332  | .1097456 | 13.92   | 0.000 | 1.312235  | 1.74243   |
| 09/2014 | -5.125591 | .1092542 | -46.91  | 0.000 | -5.339726 | -4.911457 |
| 10/2014 | -11.57056 | .1087406 | -106.41 | 0.000 | -11.78369 | -11.35743 |
| 11/2014 | -2.212373 | .1083036 | -20.43  | 0.000 | -2.424644 | -2.000102 |



APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |        |       |           |           |
|------------------|-----------|----------|--------|-------|-----------|-----------|
| 11/2015          | -7.786029 | .1195374 | -65.13 | 0.000 | -8.020318 | -7.55174  |
| 12/2015          | -2.99641  | .1195383 | -25.07 | 0.000 | -3.2307   | -2.762119 |
| 01/2016          | 6.667491  | .1195434 | 55.77  | 0.000 | 6.43319   | 6.901792  |
| 02/2016          | 4.529995  | .1195698 | 37.89  | 0.000 | 4.295642  | 4.764348  |
| 03/2016          | -8.547934 | .1197704 | -71.37 | 0.000 | -8.78268  | -8.313189 |
| 04/2016          | -11.53369 | .1201094 | -96.03 | 0.000 | -11.7691  | -11.29828 |
| 05/2016          | -7.779562 | .1204119 | -64.61 | 0.000 | -8.015565 | -7.543559 |
| 06/2016          | 3.698339  | .1207616 | 30.63  | 0.000 | 3.46165   | 3.935027  |
| 07/2016          | 11.72515  | .1211075 | 96.82  | 0.000 | 11.48778  | 11.96251  |
| 08/2016          | 10.00137  | .1214333 | 82.36  | 0.000 | 9.763361  | 10.23937  |
| 09/2016          | .5802458  | .1218473 | 4.76   | 0.000 | .3414294  | .8190622  |
| 10/2016          | -10.99863 | .1221547 | -90.04 | 0.000 | -11.23805 | -10.75921 |
| 11/2016          | -7.187041 | .1224334 | -58.70 | 0.000 | -7.427006 | -6.947076 |
| 12/2016          | 2.105999  | .1226829 | 17.17  | 0.000 | 1.865545  | 2.346453  |
| 01/2017          | .4515227  | .1229016 | 3.67   | 0.000 | .2106399  | .6924054  |
| 02/2017          | -5.710318 | .1231276 | -46.38 | 0.000 | -5.951644 | -5.468993 |
| 03/2017          | -7.701129 | .1233379 | -62.44 | 0.000 | -7.942867 | -7.459391 |
| 04/2017          | -11.00663 | .1236309 | -89.03 | 0.000 | -11.24894 | -10.76432 |
| 05/2017          | -7.101803 | .1239091 | -57.31 | 0.000 | -7.344661 | -6.858946 |
| 06/2017          | 1.044401  | .1242602 | 8.40   | 0.000 | .8008555  | 1.287947  |
| 07/2017          | 7.866372  | .1245683 | 63.15  | 0.000 | 7.622222  | 8.110521  |
| 08/2017          | 2.939208  | .1248888 | 23.53  | 0.000 | 2.69443   | 3.183985  |
| 09/2017          | -5.390468 | .1252344 | -43.04 | 0.000 | -5.635923 | -5.145013 |
| 10/2017          | -9.605647 | .1255052 | -76.54 | 0.000 | -9.851633 | -9.359661 |
| 11/2017          | -5.296113 | .1257904 | -42.10 | 0.000 | -5.542657 | -5.049568 |
| 12/2017          | 7.608321  | .1260331 | 60.37  | 0.000 | 7.361301  | 7.855342  |
| 01/2018          | 11.67184  | .1262456 | 92.45  | 0.000 | 11.4244   | 11.91927  |
| 02/2018          | -2.180505 | .1264529 | -17.24 | 0.000 | -2.428348 | -1.932662 |
| 03/2018          | -5.155833 | .1266551 | -40.71 | 0.000 | -5.404072 | -4.907593 |
| 04/2018          | -10.67642 | .1269045 | -84.13 | 0.000 | -10.92515 | -10.42769 |
| 05/2018          | -4.617779 | .1271795 | -36.31 | 0.000 | -4.867046 | -4.368512 |
| i.ym#c.treatment |           |          |        |       |           |           |
| 11/2015          | -.104931  | .110377  | -0.95  | 0.342 | -.321266  | .1114041  |
| 12/2015          | -.0904764 | .110382  | -0.82  | 0.412 | -.3068212 | .1258684  |
| 01/2016          | -.240037  | .1103935 | -2.17  | 0.030 | -.4564043 | -.0236696 |
| 02/2016          | -.365843  | .1104566 | -3.31  | 0.001 | -.582334  | -.1493521 |
| 03/2016          | -.2549059 | .1109388 | -2.30  | 0.022 | -.472342  | -.0374698 |
| 04/2016          | -.2275735 | .1117059 | -2.04  | 0.042 | -.4465131 | -.0086339 |
| 05/2016          | -.2434956 | .1124013 | -2.17  | 0.030 | -.4637981 | -.0231931 |
| 06/2016          | -.2538641 | .1132241 | -2.24  | 0.025 | -.4757794 | -.0319488 |
| 07/2016          | -.1666165 | .1140145 | -1.46  | 0.144 | -.3900809 | .056848   |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |        |       |           |           |
|---------|-----------|----------|--------|-------|-----------|-----------|
| 08/2016 | -.1863185 | .1147453 | -1.62  | 0.104 | -.4112152 | .0385783  |
| 09/2016 | -.205087  | .1156041 | -1.77  | 0.076 | -.4316669 | .021493   |
| 10/2016 | -.2845099 | .1162077 | -2.45  | 0.014 | -.5122729 | -.0567469 |
| 11/2016 | -.2214904 | .1167966 | -1.90  | 0.058 | -.4504076 | .0074269  |
| 12/2016 | -.2502649 | .1173095 | -2.13  | 0.033 | -.4801873 | -.0203425 |
| 01/2017 | -.3032699 | .1177743 | -2.58  | 0.010 | -.5341034 | -.0724364 |
| 02/2017 | -.3129059 | .1182413 | -2.65  | 0.008 | -.5446545 | -.0811573 |
| 03/2017 | -.3410571 | .1186914 | -2.87  | 0.004 | -.573688  | -.1084262 |
| 04/2017 | -.3438212 | .1192805 | -2.88  | 0.004 | -.5776067 | -.1100358 |
| 05/2017 | -.3832894 | .1198336 | -3.20  | 0.001 | -.618159  | -.1484199 |
| 06/2017 | -.3325817 | .1205142 | -2.76  | 0.006 | -.5687853 | -.096378  |
| 07/2017 | -.2901547 | .1211789 | -2.39  | 0.017 | -.5276611 | -.0526483 |
| 08/2017 | -.4532241 | .1218012 | -3.72  | 0.000 | -.6919501 | -.214498  |
| 09/2017 | -.5107921 | .1224879 | -4.17  | 0.000 | -.750864  | -.2707202 |
| 10/2017 | -.5119521 | .1230486 | -4.16  | 0.000 | -.7531229 | -.2707812 |
| 11/2017 | -.4492225 | .1236348 | -3.63  | 0.000 | -.6915423 | -.2069026 |
| 12/2017 | -.6012704 | .1240946 | -4.85  | 0.000 | -.8444913 | -.3580494 |
| 01/2018 | -.7673052 | .124539  | -6.16  | 0.000 | -1.011397 | -.5232132 |
| 02/2018 | -.5773163 | .1249784 | -4.62  | 0.000 | -.8222695 | -.332363  |
| 03/2018 | -.5391807 | .1253574 | -4.30  | 0.000 | -.7848768 | -.2934845 |
| 04/2018 | -.4942607 | .1258908 | -3.93  | 0.000 | -.7410022 | -.2475191 |
| 05/2018 | -.6235547 | .126472  | -4.93  | 0.000 | -.8714354 | -.375674  |
| 06/2018 | -.6160671 | .1352241 | -4.56  | 0.000 | -.8811016 | -.3510327 |
|         |           |          |        |       |           |           |
| cons    | 40.88909  | .093722  | 436.28 | 0.000 | 40.7054   | 41.07278  |

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Table F-9: Regression Coefficients for DEP Cohort 1

Number of obs = 33350747  
 F(95,32692933) = 116722.9  
 Prob>F = 0.0000  
 R-squared = 0.7049  
 AdjR-squared = 0.6990  
 Root MSE = 14.7490

| Variable | Coefficient | Std. Err. | t       | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|---------|--------|--------------------|-----------|
| i.ym     |             |           |         |        |                    |           |
| 12/2013  | 12.2834     | .0643833  | 190.79  | 0.000  | 12.15721           | 12.40959  |
| 01/2014  | 16.09035    | .0642157  | 250.57  | 0.000  | 15.96449           | 16.21621  |
| 02/2014  | 11.61602    | .0641994  | 180.94  | 0.000  | 11.49019           | 11.74184  |
| 03/2014  | .194614     | .0641805  | 3.03    | 0.002  | .0688227           | .3204054  |
| 04/2014  | -9.439009   | .0641602  | -147.12 | 0.000  | -9.56476           | -9.313257 |
| 05/2014  | -7.483544   | .0641366  | -116.68 | 0.000  | -7.60925           | -7.357838 |
| 06/2014  | 3.605807    | .0641143  | 56.24   | 0.000  | 3.480145           | 3.731469  |
| 07/2014  | 3.776511    | .0640892  | 58.93   | 0.000  | 3.650899           | 3.902124  |
| 08/2014  | .7913161    | .0640772  | 12.35   | 0.000  | .6657271           | .9169051  |
| 09/2014  | -4.432772   | .0640772  | -69.18  | 0.000  | -4.558361          | -4.307183 |
| 10/2014  | -10.87639   | .0640773  | -169.74 | 0.000  | -11.00198          | -10.7508  |
| 11/2014  | -.953653    | .0640774  | -14.88  | 0.000  | -1.079242          | -.8280636 |
| 01/2015  | 12.46407    | .0808453  | 154.17  | 0.000  | 12.30562           | 12.62252  |
| 02/2015  | 15.36702    | .0808455  | 190.08  | 0.000  | 15.20857           | 15.52547  |
| 03/2015  | -7.267612   | .0808463  | -89.89  | 0.000  | -7.426068          | -7.109157 |
| 04/2015  | -13.06598   | .0808473  | -161.61 | 0.000  | -13.22444          | -12.90752 |
| 05/2015  | -7.276841   | .0808513  | -90.00  | 0.000  | -7.435307          | -7.118376 |
| 06/2015  | 6.42289     | .0808513  | 79.44   | 0.000  | 6.264424           | 6.581356  |
| 07/2015  | 9.933711    | .0808515  | 122.86  | 0.000  | 9.775245           | 10.09218  |
| 08/2015  | 4.242141    | .0808502  | 52.47   | 0.000  | 4.083677           | 4.400605  |
| 09/2015  | -5.783397   | .0808505  | -71.53  | 0.000  | -5.941861          | -5.624933 |
| 10/2015  | -13.42975   | .0808515  | -166.10 | 0.000  | -13.58821          | -13.27128 |
| 11/2015  | -9.268152   | .080852   | -114.63 | 0.000  | -9.426619          | -9.109685 |
| 12/2015  | -2.697141   | .0808502  | -33.36  | 0.000  | -2.855605          | -2.538678 |
| 01/2016  | 8.638449    | .0808523  | 106.84  | 0.000  | 8.479981           | 8.796916  |
| 02/2016  | 5.955176    | .0808522  | 73.66   | 0.000  | 5.796709           | 6.113644  |
| 03/2016  | -8.873138   | .080874   | -109.72 | 0.000  | -9.031648          | -8.714628 |
| 04/2016  | -13.3391    | .0808945  | -164.89 | 0.000  | -13.49765          | -13.18055 |
| 05/2016  | -9.483721   | .0809217  | -117.20 | 0.000  | -9.642325          | -9.325117 |
| 06/2016  | 2.159006    | .081034   | 26.64   | 0.000  | 2.000182           | 2.31783   |
| 07/2016  | 11.7407     | .0811849  | 144.62  | 0.000  | 11.58158           | 11.89982  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |         |       |           |           |
|------------------|-----------|----------|---------|-------|-----------|-----------|
| 08/2016          | 10.27816  | .0813185 | 126.39  | 0.000 | 10.11877  | 10.43754  |
| 09/2016          | -2.21304  | .0814679 | -27.16  | 0.000 | -2.372714 | -2.053366 |
| 10/2016          | -13.0337  | .081593  | -159.74 | 0.000 | -13.19362 | -12.87378 |
| 11/2016          | -7.00772  | .0817209 | -85.75  | 0.000 | -7.16789  | -6.84755  |
| 12/2016          | 3.412713  | .0818273 | 41.71   | 0.000 | 3.252335  | 3.573092  |
| 01/2017          | 1.293354  | .0819326 | 15.79   | 0.000 | 1.132769  | 1.453939  |
| 02/2017          | -5.060346 | .0820269 | -61.69  | 0.000 | -5.221116 | -4.899576 |
| 03/2017          | -7.398162 | .0821172 | -90.09  | 0.000 | -7.559108 | -7.237215 |
| 04/2017          | -10.65626 | .0822438 | -129.57 | 0.000 | -10.81745 | -10.49506 |
| 05/2017          | -6.130672 | .0823515 | -74.45  | 0.000 | -6.292078 | -5.969266 |
| 06/2017          | 1.350413  | .0824829 | 16.37   | 0.000 | 1.188749  | 1.512076  |
| 07/2017          | 8.146761  | .0826304 | 98.59   | 0.000 | 7.984809  | 8.308714  |
| 08/2017          | 2.655059  | .0827752 | 32.08   | 0.000 | 2.492823  | 2.817296  |
| 09/2017          | -5.745961 | .0829125 | -69.30  | 0.000 | -5.908467 | -5.583456 |
| 10/2017          | -10.83542 | .0830296 | -130.50 | 0.000 | -10.99816 | -10.67269 |
| 11/2017          | -5.806494 | .0831559 | -69.83  | 0.000 | -5.969476 | -5.643511 |
| 12/2017          | 11.02851  | .0832607 | 132.46  | 0.000 | 10.86532  | 11.1917   |
| 01/2018          | 15.14194  | .0833635 | 181.64  | 0.000 | 14.97855  | 15.30533  |
| 02/2018          | -2.588517 | .0834621 | -31.01  | 0.000 | -2.7521   | -2.424934 |
| 03/2018          | -5.478516 | .0835579 | -65.57  | 0.000 | -5.642286 | -5.314745 |
| 04/2018          | -11.58877 | .0836662 | -138.51 | 0.000 | -11.75275 | -11.42478 |
| 05/2018          | -6.145086 | .0837831 | -73.35  | 0.000 | -6.309298 | -5.980874 |
| i.ym#c.treatment |           |          |         |       |           |           |
| 01/2015          | -.4817097 | .0607594 | -7.93   | 0.000 | -.600796  | -.3626235 |
| 02/2015          | -.436845  | .0606836 | -7.20   | 0.000 | -.5557827 | -.3179072 |
| 03/2015          | -.1174143 | .0606575 | -1.94   | 0.053 | -.2363008 | .0014722  |
| 04/2015          | -.0673995 | .0606275 | -1.11   | 0.266 | -.1862273 | .0514283  |
| 05/2015          | -.1747214 | .0606331 | -2.88   | 0.004 | -.29356   | -.0558828 |
| 06/2015          | -.4916212 | .0605496 | -8.12   | 0.000 | -.6102963 | -.3729461 |
| 07/2015          | -1.060098 | .0604023 | -17.55  | 0.000 | -1.178484 | -.9417117 |
| 08/2015          | -.0259156 | .0603607 | -0.43   | 0.668 | -.1442204 | .0923892  |
| 09/2015          | .5182035  | .0603221 | 8.59    | 0.000 | .3999744  | .6364326  |
| 10/2015          | -.5007566 | .0603235 | -8.30   | 0.000 | -.6189885 | -.3825246 |
| 11/2015          | -.5913001 | .0603244 | -9.80   | 0.000 | -.7095337 | -.4730665 |
| 12/2015          | -.8549834 | .0603219 | -14.17  | 0.000 | -.9732122 | -.7367546 |
| 01/2016          | -.9830312 | .0603248 | -16.30  | 0.000 | -1.101266 | -.8647967 |
| 02/2016          | -1.071648 | .0603251 | -17.76  | 0.000 | -1.189883 | -.9534131 |
| 03/2016          | -.6991122 | .0603606 | -11.58  | 0.000 | -.8174168 | -.5808076 |
| 04/2016          | -.5303321 | .060395  | -8.78   | 0.000 | -.6487041 | -.41196   |
| 05/2016          | -.6681653 | .0604398 | -11.06  | 0.000 | -.7866251 | -.5497055 |
| 06/2016          | -.9008946 | .0606266 | -14.86  | 0.000 | -1.019721 | -.7820686 |

## APPENDIX F

## DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |        |       |           |           |
|---------|-----------|----------|--------|-------|-----------|-----------|
| 07/2016 | .3912485  | .0608749 | 6.43   | 0.000 | .2719359  | .510561   |
| 08/2016 | .6585321  | .0610927 | 10.78  | 0.000 | .5387926  | .7782715  |
| 09/2016 | -.5908955 | .0613353 | -9.63  | 0.000 | -.7111105 | -.4706806 |
| 10/2016 | -.4819024 | .0615381 | -7.83  | 0.000 | -.6025148 | -.36129   |
| 11/2016 | -.8080836 | .0617412 | -13.09 | 0.000 | -.9290941 | -.6870732 |
| 12/2016 | -.9301903 | .0619118 | -15.02 | 0.000 | -1.051535 | -.8088453 |
| 01/2017 | -.7288759 | .0620791 | -11.74 | 0.000 | -.8505488 | -.607203  |
| 02/2017 | -.6644125 | .0622298 | -10.68 | 0.000 | -.7863807 | -.5424443 |
| 03/2017 | -.5728819 | .0623733 | -9.18  | 0.000 | -.6951314 | -.4506325 |
| 04/2017 | -.6203572 | .0625727 | -9.91  | 0.000 | -.7429974 | -.497717  |
| 05/2017 | -.747571  | .0627427 | -11.91 | 0.000 | -.8705444 | -.6245977 |
| 06/2017 | -.734003  | .0629484 | -11.66 | 0.000 | -.8573796 | -.6106264 |
| 07/2017 | -.6906028 | .0631787 | -10.93 | 0.000 | -.8144309 | -.5667748 |
| 08/2017 | -.7995024 | .0634028 | -12.61 | 0.000 | -.9237696 | -.6752353 |
| 09/2017 | -.0924717 | .0636168 | -1.45  | 0.146 | -.2171584 | .032215   |
| 10/2017 | .3488348  | .063798  | 5.47   | 0.000 | .2237929  | .4738767  |
| 11/2017 | -.8007647 | .0639923 | -12.51 | 0.000 | -.9261874 | -.6753421 |
| 12/2017 | -1.339632 | .0641537 | -20.88 | 0.000 | -1.46537  | -1.213893 |
| 01/2018 | -1.25309  | .0643109 | -19.48 | 0.000 | -1.379137 | -1.127043 |
| 02/2018 | -.8744615 | .0644618 | -13.57 | 0.000 | -1.000804 | -.7481186 |
| 03/2018 | -.6129992 | .0646076 | -9.49  | 0.000 | -.7396277 | -.4863707 |
| 04/2018 | -.6321574 | .0647741 | -9.76  | 0.000 | -.7591122 | -.5052025 |
| 05/2018 | -.6934061 | .0649537 | -10.68 | 0.000 | -.8207129 | -.5660992 |
| 06/2018 | -.9752954 | .0654621 | -14.90 | 0.000 | -1.103599 | -.846992  |
|         |           |          |        |       |           |           |
| cons    | 44.96266  | .0614262 | 731.98 | 0.000 | 44.84226  | 45.08305  |

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Table F-10: Regression Coefficients for DEP Cohort 2

Number of obs = 1324363  
 F(83,1291654) = 5018.47  
 Prob>F = 0.0000  
 R-squared = 0.6873  
 AdjR-squared = 0.6793  
 Root MSE = 14.3698

| Variable | Coefficient | Std. Err. | t      | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|--------|--------|--------------------|-----------|
| i.y      |             |           |        |        |                    |           |
| 12/2013  | 10.59739    | .2911435  | 36.40  | 0.000  | 10.02676           | 11.16802  |
| 01/2014  | 18.6943     | .284998   | 65.59  | 0.000  | 18.13571           | 19.25288  |
| 02/2014  | 14.98298    | .282832   | 52.97  | 0.000  | 14.42864           | 15.53732  |
| 03/2014  | .0714642    | .2802071  | 0.26   | 0.799  | -.4777321          | .6206605  |
| 04/2014  | -9.570875   | .2778032  | -34.45 | 0.000  | -10.11536          | -9.02639  |
| 05/2014  | -10.6451    | .2752273  | -38.68 | 0.000  | -11.18453          | -10.10566 |
| 06/2014  | 3.708345    | .2729562  | 13.59  | 0.000  | 3.17336            | 4.24333   |
| 07/2014  | 4.282465    | .2704597  | 15.83  | 0.000  | 3.752373           | 4.812557  |
| 08/2014  | -3.142081   | .2451161  | -12.82 | 0.000  | -3.6225            | -2.661662 |
| 09/2014  | -9.089674   | .2293094  | -39.64 | 0.000  | -9.539113          | -8.640236 |
| 10/2014  | -12.47666   | .2211061  | -56.43 | 0.000  | -12.91002          | -12.0433  |
| 11/2014  | -3.60765    | .2168758  | -16.63 | 0.000  | -4.032719          | -3.182581 |
| 12/2014  | 4.460534    | .2154846  | 20.70  | 0.000  | 4.038191           | 4.882876  |
| 01/2015  | 10.01601    | .215483   | 46.48  | 0.000  | 9.593666           | 10.43834  |
| 02/2015  | 12.8998     | .2154815  | 59.87  | 0.000  | 12.47747           | 13.32214  |
| 03/2015  | -8.531963   | .215477   | -39.60 | 0.000  | -8.954291          | -8.109636 |
| 04/2015  | -14.4935    | .2154747  | -67.26 | 0.000  | -14.91582          | -14.07118 |
| 05/2015  | -9.523378   | .2154734  | -44.20 | 0.000  | -9.945698          | -9.101057 |
| 06/2015  | 2.650262    | .21547    | 12.30  | 0.000  | 2.227948           | 3.072576  |
| 07/2015  | 5.867211    | .2154669  | 27.23  | 0.000  | 5.444903           | 6.289519  |
| 08/2015  | 1.184402    | .2154642  | 5.50   | 0.000  | .7620995           | 1.606705  |
| 09/2015  | -7.280168   | .2154631  | -33.79 | 0.000  | -7.702468          | -6.857867 |
| 10/2015  | -13.87055   | .2154625  | -64.38 | 0.000  | -14.29285          | -13.44825 |
| 11/2015  | -9.83021    | .2154619  | -45.62 | 0.000  | -10.25251          | -9.407912 |
| 01/2016  | 7.759313    | .2538258  | 30.57  | 0.000  | 7.261823           | 8.256803  |
| 02/2016  | 5.457167    | .2538377  | 21.50  | 0.000  | 4.959654           | 5.954681  |
| 03/2016  | -9.121958   | .2540502  | -35.91 | 0.000  | -9.619888          | -8.624028 |
| 04/2016  | -13.48322   | .2542302  | -53.04 | 0.000  | -13.9815           | -12.98494 |
| 05/2016  | -10.04955   | .2545241  | -39.48 | 0.000  | -10.54841          | -9.550696 |
| 06/2016  | .5504089    | .2554268  | 2.15   | 0.031  | .0497812           | 1.051037  |
| 07/2016  | 9.391358    | .2564471  | 36.62  | 0.000  | 8.88873            | 9.893986  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |        |       |           |           |
|------------------|-----------|----------|--------|-------|-----------|-----------|
| 08/2016          | 8.828805  | .2573584 | 34.31  | 0.000 | 8.324392  | 9.333219  |
| 09/2016          | -2.198706 | .2586277 | -8.50  | 0.000 | -2.705608 | -1.691805 |
| 10/2016          | -12.65787 | .2597651 | -48.73 | 0.000 | -13.167   | -12.14874 |
| 11/2016          | -7.470831 | .2608013 | -28.65 | 0.000 | -7.981993 | -6.959669 |
| 12/2016          | 2.649381  | .2619808 | 10.11  | 0.000 | 2.135907  | 3.162854  |
| 01/2017          | .8161692  | .2626015 | 3.11   | 0.002 | .3014793  | 1.330859  |
| 02/2017          | -5.108788 | .2633038 | -19.40 | 0.000 | -5.624854 | -4.592721 |
| 03/2017          | -7.10749  | .2639027 | -26.93 | 0.000 | -7.62473  | -6.590249 |
| 04/2017          | -10.36758 | .2649704 | -39.13 | 0.000 | -10.88691 | -9.848242 |
| 05/2017          | -6.229106 | .265656  | -23.45 | 0.000 | -6.749783 | -5.708429 |
| 06/2017          | .6069767  | .2664214 | 2.28   | 0.023 | .0847999  | 1.129153  |
| 07/2017          | 7.115578  | .267587  | 26.59  | 0.000 | 6.591117  | 7.640039  |
| 08/2017          | 2.278062  | .2686861 | 8.48   | 0.000 | 1.751447  | 2.804678  |
| 09/2017          | -5.002681 | .2696091 | -18.56 | 0.000 | -5.531106 | -4.474257 |
| 10/2017          | -9.639181 | .2704857 | -35.64 | 0.000 | -10.16932 | -9.109038 |
| 11/2017          | -5.715277 | .2715362 | -21.05 | 0.000 | -6.247478 | -5.183075 |
| 12/2017          | 10.73481  | .2722424 | 39.43  | 0.000 | 10.20122  | 11.2684   |
| 01/2018          | 15.18117  | .2728966 | 55.63  | 0.000 | 14.6463   | 15.71604  |
| 02/2018          | -2.281692 | .2734719 | -8.34  | 0.000 | -2.817688 | -1.745696 |
| 03/2018          | -4.950265 | .274138  | -18.06 | 0.000 | -5.487566 | -4.412964 |
| 04/2018          | -10.96508 | .2748404 | -39.90 | 0.000 | -11.50376 | -10.4264  |
| 05/2018          | -5.712968 | .2756631 | -20.72 | 0.000 | -6.253259 | -5.172678 |
| i.ym#c.treatment |           |          |        |       |           |           |
| 01/2016          | -.2940158 | .1902775 | -1.55  | 0.122 | -.6669533 | .0789217  |
| 02/2016          | -.3127838 | .1902194 | -1.64  | 0.100 | -.6856073 | .0600396  |
| 03/2016          | .140052   | .1906249 | 0.73   | 0.463 | -.2335662 | .5136702  |
| 04/2016          | .1417772  | .1909861 | 0.74   | 0.458 | -.2325491 | .5161035  |
| 05/2016          | -.0330458 | .1915494 | -0.17  | 0.863 | -.4084761 | .3423844  |
| 06/2016          | -.372274  | .1932973 | -1.93  | 0.054 | -.75113   | .0065821  |
| 07/2016          | -.4670928 | .1953296 | -2.39  | 0.017 | -.8499321 | -.0842535 |
| 08/2016          | -.3679604 | .1971357 | -1.87  | 0.062 | -.7543396 | .0184187  |
| 09/2016          | -.0095294 | .1995383 | -0.05  | 0.962 | -.4006176 | .3815588  |
| 10/2016          | .0961081  | .2016543 | 0.48   | 0.634 | -.2991274 | .4913436  |
| 11/2016          | .0530629  | .2035533 | 0.26   | 0.794 | -.3458947 | .4520205  |
| 12/2016          | -.1555799 | .2055601 | -0.76  | 0.449 | -.5584707 | .2473108  |
| 01/2017          | .06298    | .2067812 | 0.30   | 0.761 | -.342304  | .4682641  |
| 02/2017          | .0083661  | .2080313 | 0.04   | 0.968 | -.3993681 | .4161003  |
| 03/2017          | -.034834  | .2091218 | -0.17  | 0.868 | -.4447055 | .3750376  |
| 04/2017          | -.0862931 | .2109464 | -0.41  | 0.682 | -.4997408 | .3271546  |
| 05/2017          | -.2581741 | .2121577 | -1.22  | 0.224 | -.6739959 | .1576478  |
| 06/2017          | -.1880658 | .2136218 | -0.88  | 0.379 | -.6067572 | .2306255  |



APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |        |       |           |           |
|---------|-----------|----------|--------|-------|-----------|-----------|
| 07/2017 | -.3441835 | .2155689 | -1.60  | 0.110 | -.7666912 | .0783241  |
| 08/2017 | -.3619368 | .217431  | -1.66  | 0.096 | -.7880942 | .0642205  |
| 09/2017 | -.3588089 | .2190726 | -1.64  | 0.101 | -.7881838 | .0705659  |
| 10/2017 | -.1918852 | .2205187 | -0.87  | 0.384 | -.6240943 | .240324   |
| 11/2017 | -.2994767 | .2222814 | -1.35  | 0.178 | -.7351407 | .1361874  |
| 12/2017 | -.6200525 | .2235098 | -2.77  | 0.006 | -1.058124 | -.181981  |
| 01/2018 | -.8011186 | .2246129 | -3.57  | 0.000 | -1.241352 | -.360885  |
| 02/2018 | -.2764544 | .2256365 | -1.23  | 0.220 | -.7186943 | .1657855  |
| 03/2018 | -.1774399 | .2267308 | -0.78  | 0.434 | -.6218245 | .2669448  |
| 04/2018 | -.0360123 | .2279476 | -0.16  | 0.874 | -.4827819 | .4107573  |
| 05/2018 | -.2245772 | .2293994 | -0.98  | 0.328 | -.6741923 | .2250378  |
| 06/2018 | -.5141316 | .2321059 | -2.22  | 0.027 | -.9690513 | -.0592119 |
|         |           |          |        |       |           |           |
| cons    | 42.70114  | .2000864 | 213.41 | 0.000 | 42.30898  | 43.0933   |

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**Table F-11: Regression Coefficients for DEP Cohort 3**

Number of obs = 1870493  
F(77,1816295) = 7279.54  
Prob>F = 0.0000  
R-squared = 0.6797  
AdjR-squared = 0.6701  
Root MSE = 14.2891

| Variable | Coefficient | Std. Err. | t       | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|---------|--------|--------------------|-----------|
| i.ym     |             |           |         |        |                    |           |
| 12/2013  | 10.82818    | .2712209  | 39.92   | 0.000  | 10.2966            | 11.35977  |
| 01/2014  | 18.34483    | .2662765  | 68.89   | 0.000  | 17.82293           | 18.86672  |
| 02/2014  | 11.2674     | .2652203  | 42.48   | 0.000  | 10.74758           | 11.78722  |
| 03/2014  | 1.056151    | .2635461  | 4.01    | 0.000  | .5396102           | 1.572692  |
| 04/2014  | -6.794034   | .2621178  | -25.92  | 0.000  | -7.307776          | -6.280292 |
| 05/2014  | -13.44633   | .2607022  | -51.58  | 0.000  | -13.95729          | -12.93536 |
| 06/2014  | 5.899975    | .2591258  | 22.77   | 0.000  | 5.392098           | 6.407853  |
| 07/2014  | 4.434636    | .2570903  | 17.25   | 0.000  | 3.930748           | 4.938524  |
| 08/2014  | -5.645866   | .2546092  | -22.17  | 0.000  | -6.144891          | -5.146841 |
| 09/2014  | -8.477301   | .252634   | -33.56  | 0.000  | -8.972454          | -7.982147 |
| 10/2014  | -13.62876   | .2503069  | -54.45  | 0.000  | -14.11935          | -13.13817 |
| 11/2014  | 1.833326    | .2473004  | 7.41    | 0.000  | 1.348626           | 2.318026  |
| 12/2014  | 7.201564    | .2141278  | 33.63   | 0.000  | 6.781881           | 7.621247  |
| 01/2015  | 8.699186    | .1891209  | 46.00   | 0.000  | 8.328515           | 9.069856  |
| 02/2015  | 11.62882    | .1760723  | 66.05   | 0.000  | 11.28373           | 11.97392  |
| 03/2015  | -10.73633   | .1675336  | -64.08  | 0.000  | -11.0647           | -10.40797 |
| 04/2015  | -17.14845   | .1621513  | -105.76 | 0.000  | -17.46626          | -16.83064 |
| 05/2015  | -10.3839    | .1579611  | -65.74  | 0.000  | -10.6935           | -10.0743  |
| 06/2015  | 1.264688    | .1549842  | 8.16    | 0.000  | .9609247           | 1.568452  |
| 07/2015  | 3.672569    | .1536792  | 23.90   | 0.000  | 3.371363           | 3.973775  |
| 08/2015  | -.4947735   | .1536774  | -3.22   | 0.001  | -.7959758          | -.1935712 |
| 09/2015  | -8.55043    | .1536764  | -55.64  | 0.000  | -8.851631          | -8.24923  |
| 10/2015  | -14.85945   | .1536758  | -96.69  | 0.000  | -15.16065          | -14.55825 |
| 11/2015  | -10.77076   | .153676   | -70.09  | 0.000  | -11.07196          | -10.46956 |
| 12/2015  | -4.687162   | .1536744  | -30.50  | 0.000  | -4.988359          | -4.385966 |
| 01/2016  | 6.938365    | .1536736  | 45.15   | 0.000  | 6.63717            | 7.23956   |
| 02/2016  | 4.435331    | .1536731  | 28.86   | 0.000  | 4.134137           | 4.736525  |
| 03/2016  | -9.808236   | .1536719  | -63.83  | 0.000  | -10.10943          | -9.507044 |
| 04/2016  | -14.08789   | .1536704  | -91.68  | 0.000  | -14.38908          | -13.7867  |
| 05/2016  | -10.66267   | .1536698  | -69.39  | 0.000  | -10.96386          | -10.36148 |
| 07/2016  | 9.336595    | .1778265  | 52.50   | 0.000  | 8.988062           | 9.685129  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |        |       |           |           |
|------------------|-----------|----------|--------|-------|-----------|-----------|
| 08/2016          | 8.777054  | .178728  | 49.11  | 0.000 | 8.426754  | 9.127355  |
| 09/2016          | -3.221495 | .1797014 | -17.93 | 0.000 | -3.573704 | -2.869287 |
| 10/2016          | -12.94114 | .1804582 | -71.71 | 0.000 | -13.29483 | -12.58745 |
| 11/2016          | -7.751709 | .1810579 | -42.81 | 0.000 | -8.106576 | -7.396842 |
| 12/2016          | 2.048704  | .1816174 | 11.28  | 0.000 | 1.692741  | 2.404668  |
| 01/2017          | .3949252  | .1823009 | 2.17   | 0.030 | .0376217  | .7522286  |
| 02/2017          | -5.390989 | .182895  | -29.48 | 0.000 | -5.749457 | -5.032521 |
| 03/2017          | -7.458004 | .1835123 | -40.64 | 0.000 | -7.817681 | -7.098326 |
| 04/2017          | -10.65468 | .1842414 | -57.83 | 0.000 | -11.01579 | -10.29358 |
| 05/2017          | -6.517875 | .1849133 | -35.25 | 0.000 | -6.880298 | -6.155451 |
| 06/2017          | .4418084  | .1857929 | 2.38   | 0.017 | .0776607  | .805956   |
| 07/2017          | 6.906229  | .1868015 | 36.97  | 0.000 | 6.540104  | 7.272353  |
| 08/2017          | 1.924281  | .1877588 | 10.25  | 0.000 | 1.55628   | 2.292282  |
| 09/2017          | -5.264901 | .1886116 | -27.91 | 0.000 | -5.634574 | -4.895229 |
| 10/2017          | -9.717548 | .1892761 | -51.34 | 0.000 | -10.08852 | -9.346573 |
| 11/2017          | -6.194776 | .1900108 | -32.60 | 0.000 | -6.567191 | -5.822362 |
| 12/2017          | 9.584095  | .1906094 | 50.28  | 0.000 | 9.210507  | 9.957683  |
| 01/2018          | 14.15336  | .191097  | 74.06  | 0.000 | 13.77882  | 14.52791  |
| 02/2018          | -2.432517 | .1916147 | -12.69 | 0.000 | -2.808076 | -2.056959 |
| 03/2018          | -5.172238 | .1921078 | -26.92 | 0.000 | -5.548763 | -4.795714 |
| 04/2018          | -11.03074 | .1928141 | -57.21 | 0.000 | -11.40865 | -10.65283 |
| 05/2018          | -5.66916  | .1936228 | -29.28 | 0.000 | -6.048654 | -5.289666 |
| i.ym#c.treatment |           |          |        |       |           |           |
| 07/2016          | -.2364876 | .1381473 | -1.71  | 0.087 | -.5072516 | .0342764  |
| 08/2016          | -.3991652 | .1399745 | -2.85  | 0.004 | -.6735103 | -.1248201 |
| 09/2016          | -.3619444 | .1419405 | -2.55  | 0.011 | -.6401429 | -.0837459 |
| 10/2016          | -.2975852 | .1434501 | -2.07  | 0.038 | -.5787425 | -.0164279 |
| 11/2016          | -.0660174 | .1446492 | -0.46  | 0.648 | -.3495248 | .21749    |
| 12/2016          | .0485513  | .1457605 | 0.33   | 0.739 | -.2371342 | .3342368  |
| 01/2017          | .0044539  | .1470077 | 0.03   | 0.976 | -.2836761 | .2925838  |
| 02/2017          | -.2270715 | .14815   | -1.53  | 0.125 | -.5174404 | .0632974  |
| 03/2017          | -.2801664 | .1493279 | -1.88  | 0.061 | -.5728438 | .012511   |
| 04/2017          | -.3360605 | .1507459 | -2.23  | 0.026 | -.6315172 | -.0406038 |
| 05/2017          | -.3775782 | .1520177 | -2.48  | 0.013 | -.6755276 | -.0796289 |
| 06/2017          | -.5042509 | .153686  | -3.28  | 0.001 | -.8054702 | -.2030316 |
| 07/2017          | -.6311936 | .1555855 | -4.06  | 0.000 | -.9361358 | -.3262514 |
| 08/2017          | -.5327004 | .1573394 | -3.39  | 0.001 | -.8410802 | -.2243207 |
| 09/2017          | -.5532146 | .1589    | -3.48  | 0.000 | -.8646531 | -.2417761 |
| 10/2017          | -.5722229 | .1600786 | -3.57  | 0.000 | -.8859713 | -.2584744 |
| 11/2017          | -.3548008 | .1613668 | -2.20  | 0.028 | -.6710741 | -.0385276 |
| 12/2017          | -.0669128 | .1624294 | -0.41  | 0.680 | -.3852689 | .2514432  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |        |       |           |           |
|---------|-----------|----------|--------|-------|-----------|-----------|
| 01/2018 | -.070757  | .1633214 | -0.43  | 0.665 | -.3908613 | .2493473  |
| 02/2018 | -.5025356 | .1642171 | -3.06  | 0.002 | -.8243954 | -.1806758 |
| 03/2018 | -.4768844 | .1651377 | -2.89  | 0.004 | -.8005486 | -.1532202 |
| 04/2018 | -.6556493 | .1663534 | -3.94  | 0.000 | -.9816961 | -.3296024 |
| 05/2018 | -.7246817 | .1677257 | -4.32  | 0.000 | -1.053418 | -.3959451 |
| 06/2018 | -.7034253 | .1699905 | -4.14  | 0.000 | -1.036601 | -.3702498 |
|         |           |          |        |       |           |           |
| cons    | 43.09341  | .1406951 | 306.29 | 0.000 | 42.81765  | 43.36917  |

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Table F-12: Regression Coefficients for DEP Cohort 4

Number of obs = 3127601  
 F(53,3025223) = 18311.52  
 Prob>F = 0.0000  
 R-squared = 0.6566  
 AdjR-squared = 0.6450  
 Root MSE = 16.0197

| Variable | Coefficient | Std. Err. | t      | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|--------|--------|--------------------|-----------|
| i.ym     |             |           |        |        |                    |           |
| 01/2015  | 42.0015     | .3640951  | 115.36 | 0.000  | 41.28789           | 42.71511  |
| 02/2015  | 25.7931     | .2910192  | 88.63  | 0.000  | 25.22271           | 26.36349  |
| 03/2015  | .0888886    | .2507836  | 0.35   | 0.723  | -.4026383          | .5804156  |
| 04/2015  | -14.44873   | .2431523  | -59.42 | 0.000  | -14.9253           | -13.97216 |
| 05/2015  | 10.60925    | .2426207  | 43.73  | 0.000  | 10.13372           | 11.08477  |
| 06/2015  | 19.84851    | .2420862  | 81.99  | 0.000  | 19.37403           | 20.32299  |
| 07/2015  | 8.1361      | .2393017  | 34.00  | 0.000  | 7.667077           | 8.605123  |
| 08/2015  | 9.29721     | .2359954  | 39.40  | 0.000  | 8.834668           | 9.759753  |
| 09/2015  | 3.484304    | .2338265  | 14.90  | 0.000  | 3.026012           | 3.942596  |
| 10/2015  | -13.16111   | .2321962  | -56.68 | 0.000  | -13.61621          | -12.70602 |
| 11/2015  | -9.894599   | .2312317  | -42.79 | 0.000  | -10.34781          | -9.441393 |
| 12/2015  | -4.300453   | .230293   | -18.67 | 0.000  | -4.751819          | -3.849087 |
| 01/2016  | 8.334057    | .2296242  | 36.29  | 0.000  | 7.884001           | 8.784112  |
| 02/2016  | 4.889433    | .2290246  | 21.35  | 0.000  | 4.440553           | 5.338313  |
| 03/2016  | -9.80188    | .2283662  | -42.92 | 0.000  | -10.24947          | -9.35429  |
| 04/2016  | -13.17324   | .2278224  | -57.82 | 0.000  | -13.61976          | -12.72671 |
| 05/2016  | -9.909555   | .2276834  | -43.52 | 0.000  | -10.35581          | -9.463304 |
| 06/2016  | 1.198147    | .2276833  | 5.26   | 0.000  | .751896            | 1.644399  |
| 07/2016  | 17.49121    | .2276832  | 76.82  | 0.000  | 17.04496           | 17.93747  |
| 08/2016  | 17.71617    | .2276828  | 77.81  | 0.000  | 17.26992           | 18.16242  |
| 09/2016  | -.5585539   | .2276826  | -2.45  | 0.014  | -1.004804          | -.1123039 |
| 10/2016  | -11.81609   | .2276824  | -51.90 | 0.000  | -12.26234          | -11.36984 |
| 11/2016  | -6.418996   | .2276823  | -28.19 | 0.000  | -6.865245          | -5.972746 |
| 12/2016  | 4.27747     | .2276823  | 18.79  | 0.000  | 3.83122            | 4.723719  |
| 01/2017  | 2.675342    | .2276823  | 11.75  | 0.000  | 2.229093           | 3.121591  |
| 02/2017  | -3.752356   | .227682   | -16.48 | 0.000  | -4.198605          | -3.306107 |
| 03/2017  | -5.521757   | .2276941  | -24.25 | 0.000  | -5.96803           | -5.075485 |
| 04/2017  | -9.230526   | .2278002  | -40.52 | 0.000  | -9.677007          | -8.784046 |
| 06/2017  | 1.854392    | .2929733  | 6.33   | 0.000  | 1.280175           | 2.42861   |
| 07/2017  | 8.380718    | .2942959  | 28.48  | 0.000  | 7.803908           | 8.957527  |
| 08/2017  | 3.328861    | .2957553  | 11.26  | 0.000  | 2.749191           | 3.908531  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |        |       |           |           |
|------------------|-----------|----------|--------|-------|-----------|-----------|
| 09/2017          | -.3274947 | .2971527 | -1.10  | 0.270 | -.9099035 | .2549142  |
| 10/2017          | -3.762946 | .2981534 | -12.62 | 0.000 | -4.347316 | -3.178576 |
| 11/2017          | -4.289536 | .2992498 | -14.33 | 0.000 | -4.876055 | -3.703017 |
| 12/2017          | 11.58691  | .3003237 | 38.58  | 0.000 | 10.99829  | 12.17553  |
| 01/2018          | 16.63571  | .301101  | 55.25  | 0.000 | 16.04556  | 17.22586  |
| 02/2018          | -1.299607 | .3019557 | -4.30  | 0.000 | -1.891429 | -.707784  |
| 03/2018          | -3.266138 | .3028899 | -10.78 | 0.000 | -3.859791 | -2.672484 |
| 04/2018          | -10.0344  | .3040123 | -33.01 | 0.000 | -10.63025 | -9.438546 |
| 05/2018          | -4.759072 | .3050362 | -15.60 | 0.000 | -5.356933 | -4.161212 |
| i.ym#c.treatment |           |          |        |       |           |           |
| 06/2017          | -.2840964 | .2083152 | -1.36  | 0.173 | -.6923868 | .1241941  |
| 07/2017          | -.1798442 | .2105184 | -0.85  | 0.393 | -.5924529 | .2327645  |
| 08/2017          | -.1314894 | .2128982 | -0.62  | 0.537 | -.5487623 | .2857835  |
| 09/2017          | -.1687879 | .2151689 | -0.78  | 0.433 | -.5905113 | .2529356  |
| 10/2017          | -.0873951 | .2167886 | -0.40  | 0.687 | -.5122931 | .337503   |
| 11/2017          | -.283198  | .2185507 | -1.30  | 0.195 | -.7115497 | .1451537  |
| 12/2017          | -.4871267 | .2202422 | -2.21  | 0.027 | -.9187937 | -.0554597 |
| 01/2018          | -.4412774 | .2214845 | -1.99  | 0.046 | -.8753793 | -.0071755 |
| 02/2018          | -.4264186 | .2228336 | -1.91  | 0.056 | -.8631647 | .0103275  |
| 03/2018          | -.2953128 | .2242871 | -1.32  | 0.188 | -.7349076 | .1442821  |
| 04/2018          | -.2095437 | .2260123 | -0.93  | 0.354 | -.6525198 | .2334324  |
| 05/2018          | -.030492  | .2276016 | -0.13  | 0.893 | -.4765831 | .4155991  |
| 06/2018          | -.1604255 | .2305315 | -0.70  | 0.486 | -.6122591 | .2914082  |
|                  |           |          |        |       |           |           |
| cons             | 42.04246  | .2220709 | 189.32 | 0.000 | 41.60721  | 42.47772  |

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**Table F-13: Regression Coefficients for DEP Cohort 5**

Number of obs = 1042278  
F(46,995879) = 5675.15  
Prob>F = 0.0000  
R-squared = 0.6913  
AdjR-squared = 0.6769  
Root MSE = 13.8521

| Variable | Coefficient | Std. Err. | t      | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|--------|--------|--------------------|-----------|
| i.ym     |             |           |        |        |                    |           |
| 02/2015  | 7.859332    | 1.03145   | 7.62   | 0.000  | 5.837724           | 9.880939  |
| 03/2015  | -14.72819   | .5009908  | -29.40 | 0.000  | -15.71012          | -13.74627 |
| 04/2015  | -19.22476   | .4593114  | -41.86 | 0.000  | -20.12499          | -18.32452 |
| 05/2015  | -12.46654   | .4538566  | -27.47 | 0.000  | -13.35609          | -11.577   |
| 06/2015  | -2.073978   | .4480566  | -4.63  | 0.000  | -2.952154          | -1.195802 |
| 07/2015  | -.6775616   | .4404268  | -1.54  | 0.124  | -1.540783          | .1856601  |
| 08/2015  | -4.209871   | .4292188  | -9.81  | 0.000  | -5.051125          | -3.368616 |
| 09/2015  | -11.54887   | .4149626  | -27.83 | 0.000  | -12.36218          | -10.73555 |
| 11/2015  | -14.48223   | .3958936  | -36.58 | 0.000  | -15.25817          | -13.70629 |
| 12/2015  | -9.743026   | .3854937  | -25.27 | 0.000  | -10.49858          | -8.987471 |
| 01/2016  | -.4357276   | .375123   | -1.16  | 0.245  | -1.170956          | .2995008  |
| 02/2016  | -3.248327   | .3616983  | -8.98  | 0.000  | -3.957243          | -2.53941  |
| 03/2016  | -16.40977   | .3412315  | -48.09 | 0.000  | -17.07857          | -15.74096 |
| 04/2016  | -20.83725   | .2979269  | -69.94 | 0.000  | -21.42118          | -20.25332 |
| 05/2016  | -14.20739   | .2083906  | -68.18 | 0.000  | -14.61583          | -13.79895 |
| 06/2016  | -3.413052   | .175071   | -19.50 | 0.000  | -3.756185          | -3.069919 |
| 07/2016  | 6.838243    | .1635854  | 41.80  | 0.000  | 6.517621           | 7.158865  |
| 08/2016  | 5.001092    | .1577112  | 31.71  | 0.000  | 4.691983           | 5.310201  |
| 09/2016  | -4.802548   | .1547891  | -31.03 | 0.000  | -5.105929          | -4.499166 |
| 10/2016  | -14.16475   | .1541552  | -91.89 | 0.000  | -14.46689          | -13.86261 |
| 11/2016  | -9.006045   | .154155   | -58.42 | 0.000  | -9.308183          | -8.703906 |
| 12/2016  | 1.722556    | .1541532  | 11.17  | 0.000  | 1.420421           | 2.024691  |
| 01/2017  | .118167     | .1541529  | 0.77   | 0.443  | -.1839676          | .4203015  |
| 02/2017  | -6.008087   | .1541516  | -38.98 | 0.000  | -6.310219          | -5.705955 |
| 03/2017  | -7.882833   | .1541514  | -51.14 | 0.000  | -8.184965          | -7.580702 |
| 04/2017  | -11.17579   | .1541501  | -72.50 | 0.000  | -11.47792          | -10.87366 |
| 05/2017  | -7.152663   | .1541477  | -46.40 | 0.000  | -7.454788          | -6.850539 |
| 06/2017  | -.2981455   | .1541465  | -1.93  | 0.053  | -.6002675          | .0039764  |
| 07/2017  | 5.948751    | .1541447  | 38.59  | 0.000  | 5.646632           | 6.250869  |
| 08/2017  | 1.368454    | .1541421  | 8.88   | 0.000  | 1.066341           | 1.670568  |
| 09/2017  | -4.875907   | .1542055  | -31.62 | 0.000  | -5.178145          | -4.57367  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |        |       |           |           |
|------------------|-----------|----------|--------|-------|-----------|-----------|
| 11/2017          | -6.410534 | .1874958 | -34.19 | 0.000 | -6.77802  | -6.043049 |
| 12/2017          | 8.676972  | .1881879 | 46.11  | 0.000 | 8.30813   | 9.045814  |
| 01/2018          | 13.12556  | .1888482 | 69.50  | 0.000 | 12.75542  | 13.4957   |
| 02/2018          | -3.244625 | .1895723 | -17.12 | 0.000 | -3.61618  | -2.873069 |
| 03/2018          | -5.659177 | .1902589 | -29.74 | 0.000 | -6.032078 | -5.286276 |
| 04/2018          | -10.97504 | .1910124 | -57.46 | 0.000 | -11.34941 | -10.60066 |
| 05/2018          | -5.355889 | .1918697 | -27.91 | 0.000 | -5.731947 | -4.979831 |
| i.ym#c.treatment |           |          |        |       |           |           |
| 11/2017          | .3283646  | .1541795 | 2.13   | 0.033 | .0261781  | .6305512  |
| 12/2017          | .9927588  | .1554924 | 6.38   | 0.000 | .687999   | 1.297519  |
| 01/2018          | 1.069641  | .1566775 | 6.83   | 0.000 | .7625586  | 1.376724  |
| 02/2018          | .4895946  | .1579523 | 3.10   | 0.002 | .1800135  | .7991757  |
| 03/2018          | .3649788  | .1591562 | 2.29   | 0.022 | .053038   | .6769196  |
| 04/2018          | -.1933651 | .1604854 | -1.20  | 0.228 | -.507911  | .1211808  |
| 05/2018          | -.5897201 | .161981  | -3.64  | 0.000 | -.9071974 | -.2722427 |
| 06/2018          | -.7145588 | .1645078 | -4.34  | 0.000 | -1.036989 | -.3921291 |
|                  |           |          |        |       |           |           |
| cons             | 42.01288  | .1400189 | 300.05 | 0.000 | 41.73845  | 42.28731  |

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**Table F-14: Regression Coefficients for DEP Cohort 6**

Number of obs = 5818963  
 F(75,5679812) = 25017.65  
 Prob>F = 0.0000  
 R-squared = 0.7158  
 AdjR-squared = 0.7089  
 Root MSE = 14.2181

| Variable | Coefficient | Std. Err. | t       | P >  t | 95% Conf. Interval |           |
|----------|-------------|-----------|---------|--------|--------------------|-----------|
| i.ym     |             |           |         |        |                    |           |
| 12/2013  | 11.70871    | .070371   | 166.39  | 0.000  | 11.57079           | 11.84663  |
| 01/2014  | 15.49768    | .0697846  | 222.08  | 0.000  | 15.3609            | 15.63445  |
| 02/2014  | 12.08945    | .0697845  | 173.24  | 0.000  | 11.95267           | 12.22622  |
| 03/2014  | -.1279688   | .0697845  | -1.83   | 0.067  | -.2647439          | .0088064  |
| 04/2014  | -10.09903   | .0697843  | -144.72 | 0.000  | -10.2358           | -9.962251 |
| 05/2014  | -6.837694   | .0697841  | -97.98  | 0.000  | -6.974468          | -6.70092  |
| 06/2014  | 3.284255    | .0697841  | 47.06   | 0.000  | 3.147481           | 3.42103   |
| 07/2014  | 4.081132    | .069784   | 58.48   | 0.000  | 3.944358           | 4.217906  |
| 08/2014  | 1.764097    | .0697838  | 25.28   | 0.000  | 1.627324           | 1.900871  |
| 09/2014  | -3.757227   | .069784   | -53.84  | 0.000  | -3.894001          | -3.620452 |
| 10/2014  | -10.33492   | .0697845  | -148.10 | 0.000  | -10.4717           | -10.19815 |
| 11/2014  | -1.688237   | .0697846  | -24.19  | 0.000  | -1.825012          | -1.551461 |
| 11/2015  | -9.232248   | .0779718  | -118.40 | 0.000  | -9.38507           | -9.079426 |
| 12/2015  | -2.661476   | .0779701  | -34.13  | 0.000  | -2.814295          | -2.508657 |
| 01/2016  | 8.674027    | .077972   | 111.25  | 0.000  | 8.521205           | 8.82685   |
| 02/2016  | 5.9907      | .077972   | 76.83   | 0.000  | 5.837878           | 6.143522  |
| 03/2016  | -8.838062   | .0779925  | -113.32 | 0.000  | -8.990925          | -8.6852   |
| 04/2016  | -13.30352   | .0780119  | -170.53 | 0.000  | -13.45643          | -13.15062 |
| 05/2016  | -9.44699    | .0780375  | -121.06 | 0.000  | -9.599941          | -9.294039 |
| 06/2016  | 2.194711    | .0781436  | 28.09   | 0.000  | 2.041552           | 2.34787   |
| 07/2016  | 11.77389    | .0782866  | 150.39  | 0.000  | 11.62045           | 11.92733  |
| 08/2016  | 10.30823    | .0784133  | 131.46  | 0.000  | 10.15454           | 10.46192  |
| 09/2016  | -2.183175   | .0785551  | -27.79  | 0.000  | -2.33714           | -2.029209 |
| 10/2016  | -13.0053    | .078674   | -165.31 | 0.000  | -13.1595           | -12.8511  |
| 11/2016  | -6.980919   | .0787958  | -88.60  | 0.000  | -7.135356          | -6.826482 |
| 12/2016  | 3.439117    | .0788971  | 43.59   | 0.000  | 3.284481           | 3.593752  |
| 01/2017  | 1.318201    | .0789975  | 16.69   | 0.000  | 1.163369           | 1.473033  |
| 02/2017  | -5.036775   | .0790875  | -63.69  | 0.000  | -5.191783          | -4.881766 |
| 03/2017  | -7.376649   | .0791736  | -93.17  | 0.000  | -7.531826          | -7.221471 |
| 04/2017  | -10.63689   | .0792945  | -134.14 | 0.000  | -10.7923           | -10.48147 |
| 05/2017  | -6.112698   | .0793975  | -76.99  | 0.000  | -6.268314          | -5.957082 |



APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|                  |           |          |         |       |           |           |
|------------------|-----------|----------|---------|-------|-----------|-----------|
| 06/2017          | 1.366243  | .079523  | 17.18   | 0.000 | 1.210381  | 1.522105  |
| 07/2017          | 8.161536  | .0796641 | 102.45  | 0.000 | 8.005397  | 8.317675  |
| 08/2017          | 2.668037  | .0798028 | 33.43   | 0.000 | 2.511626  | 2.824448  |
| 09/2017          | -5.734664 | .0799342 | -71.74  | 0.000 | -5.891332 | -5.577996 |
| 10/2017          | -10.82592 | .0800463 | -135.25 | 0.000 | -10.98281 | -10.66903 |
| 11/2017          | -5.79847  | .0801673 | -72.33  | 0.000 | -5.955595 | -5.641345 |
| 12/2017          | 11.03428  | .0802677 | 137.47  | 0.000 | 10.87696  | 11.1916   |
| 01/2018          | 15.14574  | .0803662 | 188.46  | 0.000 | 14.98822  | 15.30325  |
| 02/2018          | -2.586148 | .0804608 | -32.14  | 0.000 | -2.743848 | -2.428448 |
| 03/2018          | -5.476302 | .0805527 | -67.98  | 0.000 | -5.634182 | -5.318422 |
| 04/2018          | -11.58772 | .0806566 | -143.67 | 0.000 | -11.7458  | -11.42963 |
| 05/2018          | -6.145941 | .0807687 | -76.09  | 0.000 | -6.304244 | -5.987637 |
| i.ym#c.treatment |           |          |         |       |           |           |
| 11/2015          | -.1657308 | .0794857 | -2.09   | 0.037 | -.32152   | -.0099416 |
| 12/2015          | -.2809974 | .0794828 | -3.54   | 0.000 | -.4367809 | -.1252139 |
| 01/2016          | -.4857805 | .0794845 | -6.11   | 0.000 | -.6415674 | -.3299937 |
| 02/2016          | -.5875254 | .0794857 | -7.39   | 0.000 | -.7433146 | -.4317362 |
| 03/2016          | -.3260493 | .079533  | -4.10   | 0.000 | -.4819312 | -.1701674 |
| 04/2016          | -.1940438 | .0795805 | -2.44   | 0.015 | -.3500187 | -.0380688 |
| 05/2016          | -.1250364 | .0796366 | -1.57   | 0.116 | -.2811213 | .0310485  |
| 06/2016          | -.0957303 | .0798921 | -1.20   | 0.231 | -.252316  | .0608554  |
| 07/2016          | -.0052869 | .0802199 | -0.07   | 0.947 | -.162515  | .1519411  |
| 08/2016          | -.0813614 | .0805005 | -1.01   | 0.312 | -.2391395 | .0764166  |
| 09/2016          | -.1006956 | .0808235 | -1.25   | 0.213 | -.2591068 | .0577156  |
| 10/2016          | -.197732  | .0810956 | -2.44   | 0.015 | -.3566765 | -.0387876 |
| 11/2016          | -.324476  | .0813496 | -3.99   | 0.000 | -.4839184 | -.1650337 |
| 12/2016          | -.3983929 | .0815737 | -4.88   | 0.000 | -.5582744 | -.2385113 |
| 01/2017          | -.3999776 | .0817827 | -4.89   | 0.000 | -.5602688 | -.2396864 |
| 02/2017          | -.3528999 | .0819735 | -4.31   | 0.000 | -.513565  | -.1922349 |
| 03/2017          | -.326023  | .0821581 | -3.97   | 0.000 | -.4870499 | -.1649961 |
| 04/2017          | -.2227447 | .0824171 | -2.70   | 0.007 | -.3842792 | -.0612102 |
| 05/2017          | -.1700432 | .082627  | -2.06   | 0.040 | -.3319892 | -.0080972 |
| 06/2017          | -.097265  | .0829011 | -1.17   | 0.241 | -.2597482 | .0652182  |
| 07/2017          | -.0851771 | .0831946 | -1.02   | 0.306 | -.2482355 | .0778814  |
| 08/2017          | -.1316635 | .0834652 | -1.58   | 0.115 | -.2952524 | .0319254  |
| 09/2017          | -.1896956 | .0837418 | -2.27   | 0.023 | -.3538266 | -.0255646 |
| 10/2017          | -.2170639 | .0839737 | -2.58   | 0.010 | -.3816494 | -.0524785 |
| 11/2017          | -.4155898 | .0842191 | -4.93   | 0.000 | -.5806562 | -.2505234 |
| 12/2017          | -.7004644 | .084429  | -8.30   | 0.000 | -.8659422 | -.5349866 |
| 01/2018          | -.6509102 | .0846283 | -7.69   | 0.000 | -.8167788 | -.4850417 |
| 02/2018          | -.4346815 | .0848319 | -5.12   | 0.000 | -.600949  | -.268414  |

APPENDIX F

DETAILED REGRESSION OUTPUTS/MODELS

|         |           |          |        |       |           |           |
|---------|-----------|----------|--------|-------|-----------|-----------|
| 03/2018 | -.4591289 | .0850171 | -5.40  | 0.000 | -.6257594 | -.2924984 |
| 04/2018 | -.3998165 | .0852301 | -4.69  | 0.000 | -.5668645 | -.2327686 |
| 05/2018 | -.2731368 | .0854661 | -3.20  | 0.001 | -.4406473 | -.1056262 |
| 06/2018 | -.2636914 | .0861242 | -3.06  | 0.002 | -.4324918 | -.0948909 |
|         |           |          |        |       |           |           |
| cons    | 45.07433  | .058409  | 771.70 | 0.000 | 44.95985  | 45.18881  |

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## Appendix G Awareness and Engagement

The increased engagement and awareness generated by the MyHER program can be difficult to measure. Nexant designed a survey approach that measures different aspects of the MyHER effect, but no one survey question can fully capture the numerous and subtle effects of MyHER that ultimately resulted in the observed energy impacts. Instead, one might expect the overall pattern of survey responses to signal a difference in behavior and attitudes between the MyHER treatment and control group.

Nexant developed a framework for measuring this pattern of MyHER influence by applying straightforward statistical concepts to develop a holistic look at the program's influence on customer behavior. While a single survey question may not result in statistically significant differences between the treatment and control group, if the treatment group responds more favorably than the control group to a set of survey questions, then we can estimate the probability that the collection of responses fits a hypothesis of MyHER influence.

Nexant assigned each survey question a category. [Table G-1](#) and [Table G-2](#) shows the categories, the count of questions in each category for which the treatment group provided a more favorable response than the control group, and the number of questions in each category, for each jurisdiction. A response is considered “favorable” if the treatment group gave a response that is consistent with the program objectives of MyHER.

**Table G-1: Classification of Survey Responses and Treatment Group “Success Rate” - DEC**

| Question Category  | Count of Questions where T>C | Number of Questions in Topic Area | Portion of Questions where T>C |
|--|------------------------------|-----------------------------------|--------------------------------|
| Duke Energy's Public Stance on Energy Efficiency                 | 3                            | 3                                 | 100%                           |
| Customer Engagement with Duke Energy Website                     | 2                            | 5                                 | 40%                            |
| Customers' Reported Energy-savings Behaviors                     | 10                           | 11                                | 91%                            |
| Customer's Reported Energy Efficiency Improvements Made          | 9                            | 9                                 | 100%                           |
| Customer Motivation, Engagement & Awareness of Energy Efficiency | 4                            | 11                                | 36%                            |
| Barriers of Customer Not Undertaking Energy Savings Actions      | 3                            | 6                                 | 50%                            |
| Customer Satisfaction with Duke Energy                           | 0                            | 4                                 | 0%                             |
| <b>Total</b>   | <b>31</b>                    | <b>49</b>                         | <b>63%</b>                     |

**Table G-2: Classification of Survey Responses and Treatment Group “Success Rate” - DEP**

| Question Category  | Count of Questions where T>C | Number of Questions in Topic Area | Portion of Questions where T>C |
|--|------------------------------|-----------------------------------|--------------------------------|
| Duke Energy's Public Stance on Energy Efficiency                 | 3                            | 3                                 | 100%                           |
| Customer Engagement with Duke Energy Website                     | 2                            | 5                                 | 40%                            |
| Customers' Reported Energy-saving Behaviors                      | 10                           | 11                                | 91%                            |
| Customer's Reported Energy Efficiency Improvements Made          | 9                            | 9                                 | 100%                           |
| Customer Motivation, Engagement & Awareness of Energy Efficiency | 10                           | 11                                | 91%                            |
| Barriers of Customer Not Undertaking Energy Savings Actions      | 4                            | 6                                 | 67%                            |
| Customer Satisfaction with Duke Energy                           | 2                            | 4                                 | 50%                            |
| <b>Total</b>   | <b>40</b>                    | <b>49</b>                         | <b>82%</b>                     |

If the MyHER program had no effect on participants' awareness, attitudes, and opinions, then we would expect the control group to score better than the treatment group on approximately half of the survey questions. The DEC treatment group provided answers consistent with a MyHER treatment effect in approximately 63% of the survey questions, and 82% in the case of DEP, which represents an uplift from the expected percentage of 50% if the null hypothesis were true. Thus we cannot make the case that MyHER had wide-ranging enhancing effects across all the various engagement and attitudinal areas probed by the survey. Using standard statistical techniques (the non-parametric sign test), Nexant calculates the probability of randomly obtaining this result in the case of DEC is 2% and in the case of DEP essentially 0%.

What do those 2% and 0% probabilities mean? Consider a series of coin flips. What is the probability of obtaining 40 heads in 49 coin flips if there is a 50/50 chance of obtaining a heads or tails on any one coin flip? This same principle can be applied to the survey: what is the probability that the treatment group gives a more favorable response to 40 out of 49 survey questions if MyHER has no influence on customer engagement and energy usage behavior? The answer, 0%, is “exceedingly low”. The same logic applies to the 2% probability we calculate for DEC. Thus we conclude that the survey responses in these two jurisdictions favorably affects DEC and DEP customer attitudes and actions related to energy-saving behavior.<sup>16</sup>

<sup>16</sup> The technical way of putting this is to say that we reject the hypothesis that MyHERs have no effect on customer engagement with energy-saving behaviors.



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# Duke Energy PowerShare Program

## 2018 Evaluation Report for Duke Energy Carolinas

**Prepared for:**

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## Duke Energy PowerShare Program PY2018 Evaluation Report

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## Duke Energy PowerShare Program PY2018 Evaluation Report

### 1. DUKE ENERGY POWERSHARE PROGRAM DESIGN

This document presents Navigant's evaluation of the Duke Energy Carolinas (DEC) PowerShare® program for program year (PY) 2018. The PowerShare Program is a demand response (DR) program offered to commercial and industrial (C&I) customers that is part of Duke Energy's portfolio of demand-side management (DSM) programs. PowerShare offers participating C&I customers a financial incentive to reduce their electricity consumption when called upon by Duke Energy.

The DEC PowerShare program has approximately 160 customers with a contracted curtailment load of 337 MW. The DEC program offers customers different participation options to choose from:

- **Mandatory Curtailment:** In exchange for a monthly availability payment and event performance payments, participants must reduce load during each Mandatory Curtailment Period to a contracted firm level.
- **Voluntary Curtailment:** In exchange for an event performance payment, participants may reduce load to a pre-nominated level during Voluntary Curtailment Periods.
- **Generator Curtailment:** In exchange for a monthly availability payment and event performance payments, participants must transfer load from a Duke Energy source to a private generation source during Generator Curtailment Periods.

There are many factors that affect the curtailment potential. For example, as customers install large-scale energy efficiency projects, such as a LED lighting retrofits, their demand is lowered, reducing the potential of curtailable load. The persistence of the contracted curtailable load also fluctuates as DEC participants may leave the program due to business closure.

The curtailment potential is also affected by other factors, such as jurisdictional tariffs and federal US Environmental Protection Agency (EPA) emissions guidelines for onsite backup generators. In the DEC jurisdiction, program staff report that enrollment dropped from a high of about 400 MW in 2014, largely due to customer backup generators not meeting new EPA emissions guidelines.

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## 2. PROGRAM EVALUATION METHODS

This report summarizes the findings from Navigant's process evaluation of the PowerShare program for PY2018, as well as a brief summary of Navigant's review of program impacts as determined by Duke Energy's Energy Profiler Online (EPO) software developed by Schneider Electric. Navigant used the following questions to guide the evaluation.

- What is the status of the program?
- What are the strengths of the program, and what are areas for improvement?
- What are the barriers to program participation? How can these barriers be addressed?
- In what ways can the program potentially increase kilowatt (kW) impacts?
- What actions can be taken, if any, to increase the efficiency of program implementation?
- Are there opportunities for implementation of the program?
- Why do customers desire to continue with or leave the program?

The research methods used in this evaluation include program materials review, program staff interviews, an implementer interview, surveys and interviews with Duke Energy Account Executives who implement the program, and a survey of participating customers. The evaluation team synthesized the results of the materials review, interviews, and surveys to identify trends, findings, and recommendations. All findings were mapped to the research questions outlined in the evaluation plan.

### 2.1 Program Impact Evaluation

Process evaluation activities were the primary focus of this evaluation cycle. The impact evaluation for the 2018 program year included a review and summary of the EPO event settlement data provided by Duke Energy. Navigant reviewed the settlement results to check for relative consistency with previous program years, and this report includes a summary of those results.

### 2.2 Program Staff Interviews

Navigant conducted a telephone interview with the DEC jurisdiction program manager on May 9, 2018. The interview identified strengths and opportunities to improve Duke Energy's PowerShare Program. Interview findings are incorporated into this report to support the evaluation.

### 2.3 PowerShare Implementer Interview

Navigant interviewed implementation contractor personnel from Schneider Electric over the phone on June 27, 2018. The interview identified strengths and opportunities to improve Duke Energy's PowerShare Program. As with the program manager interview, interview findings are incorporated into this report to support the evaluation.

### 2.4 Duke Energy Account Executive Interviews and Surveys

Navigant interviewed five DEC Account Executives over the phone from May 29 through June 28, 2018. These interviews identified how Duke Energy's PowerShare Program is currently operating, how the



## Duke Energy PowerShare Program PY2018 Evaluation Report

process has changed over the past few years, and the effect of those changes on the program and participants to identify improvements to the program.

### 2.5 PowerShare Participant Surveys

Navigant targeted 10-20 online participant surveys for the DEC jurisdiction. Navigant sent survey invitations to DEC participants in October-November 2018, receiving 30 usable and completed surveys.

### 2.6 Process Evaluation Analysis Methods

The evaluation team used multiple analysis methods for the various modes of research, which included program materials review, interviews, email surveys with Account Executives, and online participant surveys. The transcription notes from the program manager and implementation contractor interviews and the email survey results were reviewed for consistency of issues and concerns. For the participant surveys, an SPSS analysis of the surveys categorized and summarized the responses. In some cases, the participant contact list contained multiple contacts at a given participant site. When more than one member of a participant's staff responded, those responses were weighted to prevent skewing of the results.

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### 3. POWERSHARE PROGRAM EVALUATION FINDINGS

The following section presents the program evaluation findings, split into several categories:

- Program impacts
- Program strengths
- Areas for improvement
- Barriers to participation
- Opportunities to increase enrolled capacity
- Opportunities to improve program implementation

#### 3.1 Program Impacts

Duke Energy called two DR events in 2018, one on January 2<sup>nd</sup> and the other on January 7<sup>th</sup>. The event on January 2<sup>nd</sup> began at 7:00 a.m. and concluded at 10:00 a.m. The event on January 7<sup>th</sup> began at 7:30 a.m. and concluded at 10:30 a.m. Table 1 shows a summary of the capacity impacts by program option for each of these events. Table 2 shows a summary of the energy impacts by program option for each hour of the January 2<sup>nd</sup> event, as well as the total curtailed energy over the three-hour duration of the event. Table 3 shows a summary of the energy impacts by program option for each hour of the January 7<sup>th</sup> event, as well as the total curtailed energy over the three-hour duration of the event.

**Table 1. Summary of 2018 Event Capacity Impacts (MW)**

| Program Name          | January 2, 2018 | January 7, 2018 |
|-----------------------|-----------------|-----------------|
| Mandatory Curtailment | 258             | 190             |
| Generator Curtailment | 8               | 8               |

*Source: Navigant summary of Duke Energy EPO Event Settlement Data, results subject to rounding*

**Table 2. Summary of January 2, 2018 Event Energy Impacts by Hour of Event (MWh)**

| Program Name          | 7:00-8:00 | 8:00-9:00 | 9:00-10:00 | Total      |
|-----------------------|-----------|-----------|------------|------------|
| Mandatory Curtailment | 258       | 258       | 258        | <b>773</b> |
| Generator Curtailment | 8         | 8         | 8          | <b>24</b>  |

*Source: Navigant summary of Duke Energy EPO Event Settlement Data, results subject to rounding*

**Table 3. Summary of January 7, 2018 Event Energy Impacts by Hour of Event (MWh)**

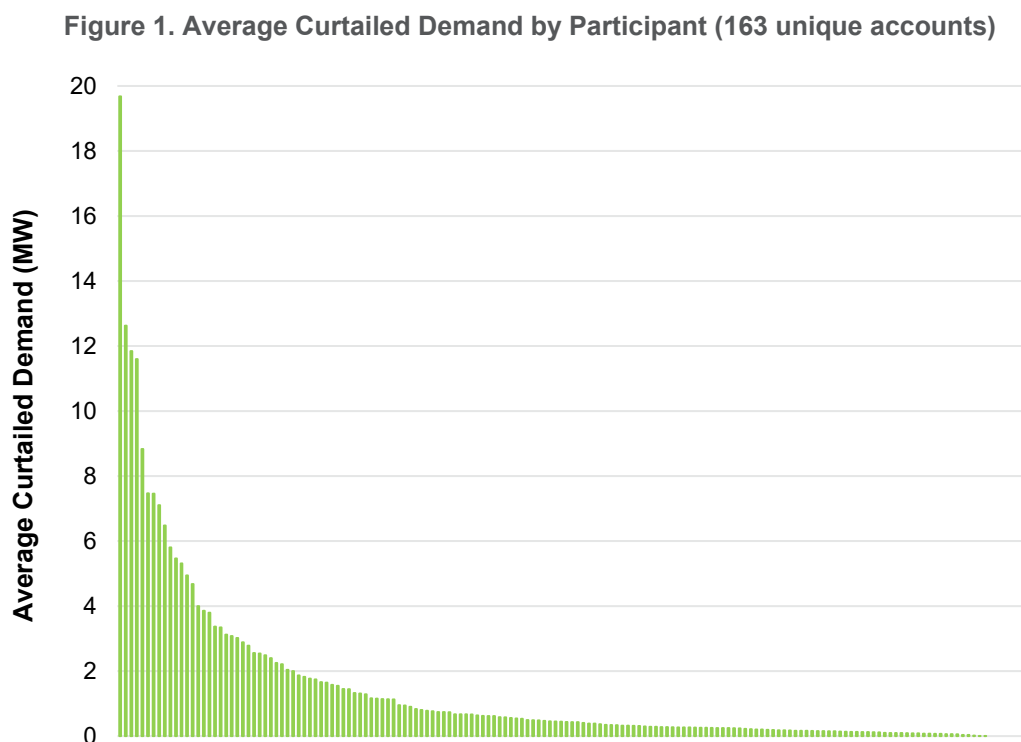
| Program Name          | 7:30-8:30 | 8:30-9:30 | 9:30-10:30 | Total      |
|-----------------------|-----------|-----------|------------|------------|
| Mandatory Curtailment | 190       | 190       | 190        | <b>569</b> |
| Generator Curtailment | 8         | 8         | 8          | <b>24</b>  |

*Source: Navigant summary of Duke Energy EPO Event Settlement Data, results subject to rounding*



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Figure 1 shows the average curtailed demand for each participant across the two 2018 events. The largest participant curtailed an average of nearly 20 MW during each event. Figure 2 shows the average energy curtailment for each participant across both events.

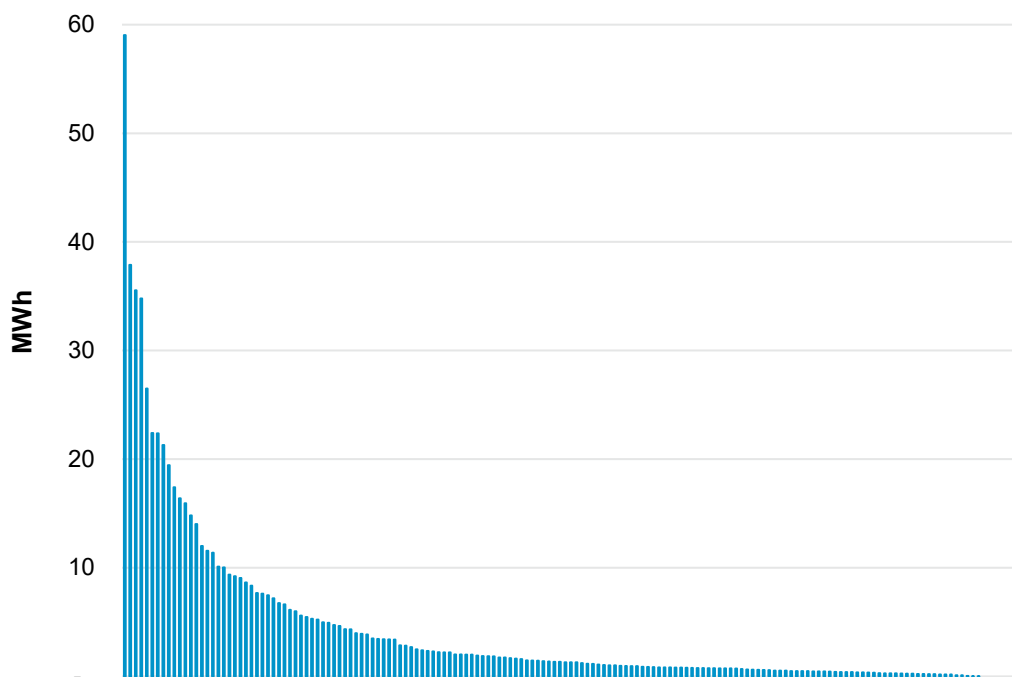


Source: Navigant summary of Duke Energy EPO Event Settlement Data

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Figure 2. Average Event Energy Curtailment by Participant (163 unique accounts)



Source: Navigant summary of Duke Energy EPO Event Settlement Data

## 3.2 Program Strengths

Through the participant surveys, many respondents provided positive feedback about the program. Customers reported overall satisfaction with the program, finding the incentives, the notification time before events, and the frequency and duration of events to be acceptable.

Most DEC customers were satisfied with the program, with 62% of survey respondents ranking their satisfaction 8-10 (on a 10-point scale), as shown in Figure 3. Of those who rated their satisfaction as 5 or below, three respondents provided additional insight:

- I would rate it close to neutral, at times we are given very little notice when we need to curtail load which can be tight with our limited staffing.”
- “[I am] unable to understand how our bill is figured.”
- “Winter power sharing has greater impact due to when it is called and the cold weather making it harder to justify.”

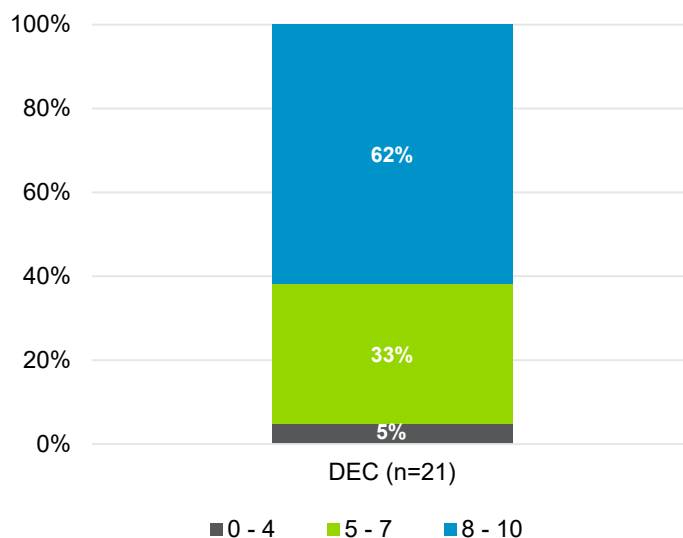


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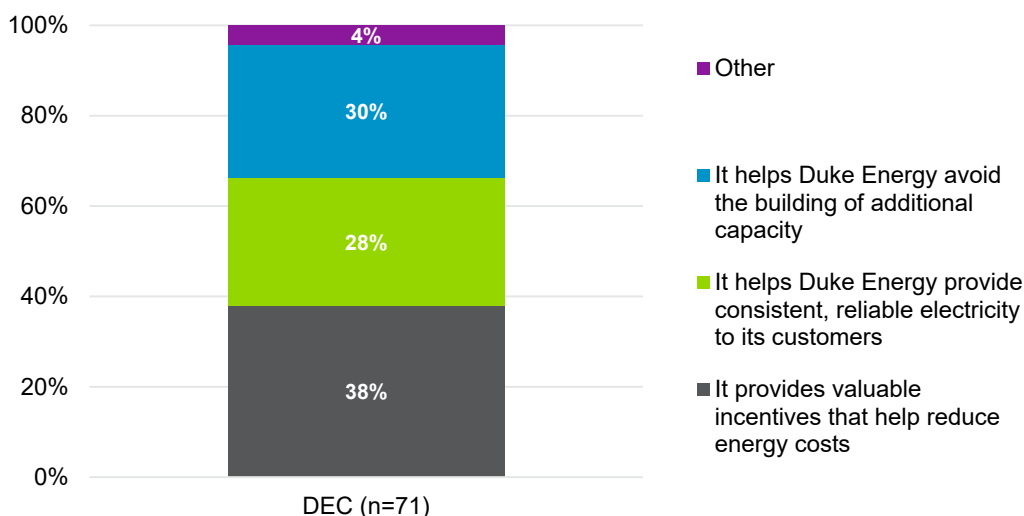
Figure 3. PowerShare Program Satisfaction Scores (0-10 Scale)



Source: Navigant analysis

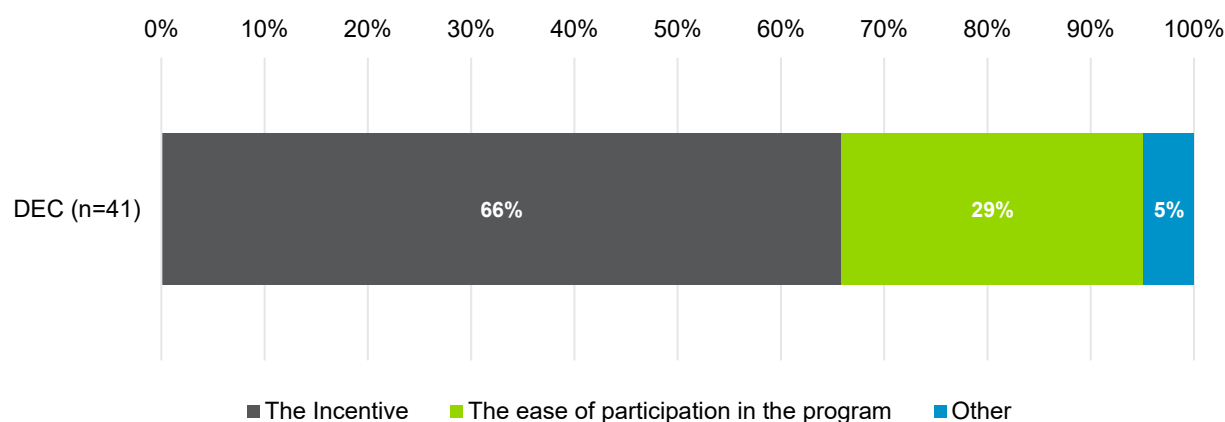
The incentive is a major factor for respondent participation in the PowerShare program. Of DEC survey respondents, 75% reported that incentives helping lower their overall energy bill was the main *motivation* to participate in the program. As shown in Figure 4, participants also report the incentive as a *strength* of the program. Of DEC respondents, 38% indicated that a primary strength of the program is that it provides valuable incentives that help reduce energy costs. Furthermore, the incentive was the main reason 66% of DEC respondents choose to continue in the program, as seen in Figure 5. These respondents also felt that their participation allowed Duke Energy to provide consistent, reliable energy to its customers while avoiding building additional capacity.

Figure 4. What do you think are the program strengths? (multiple response)



Source: Navigant analysis

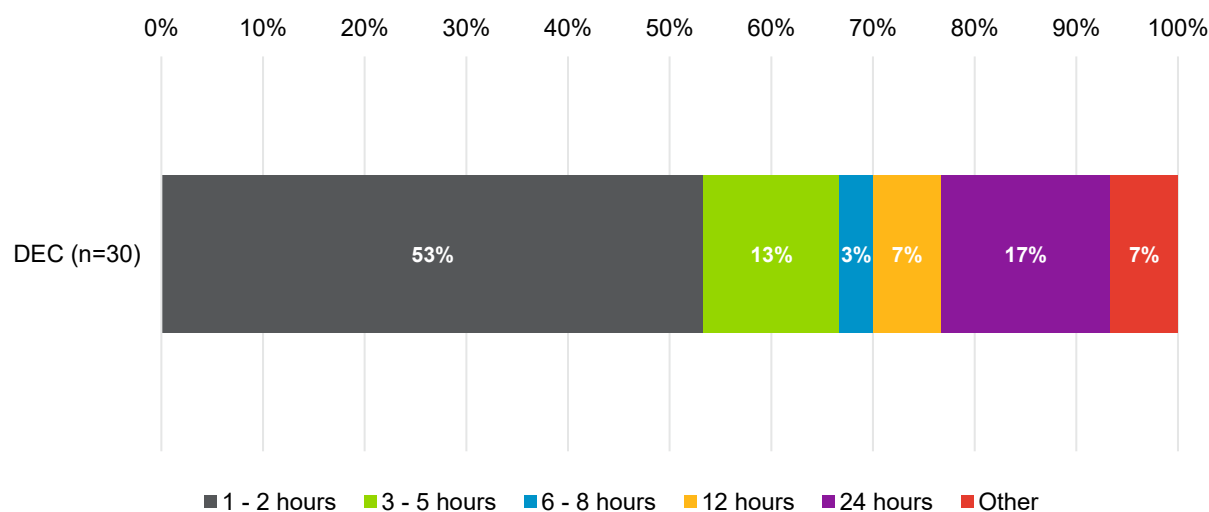
Figure 5. What aspects of the program encourage a customer to continue in the program?  
(multiple response)



Source: Navigant analysis

Figure 6 shows that 53% of the DEC survey respondents thought a 1- to 2-hour notification prior to a DR event was reasonable, while 17% thought a 24-hour notice was the minimum they needed.

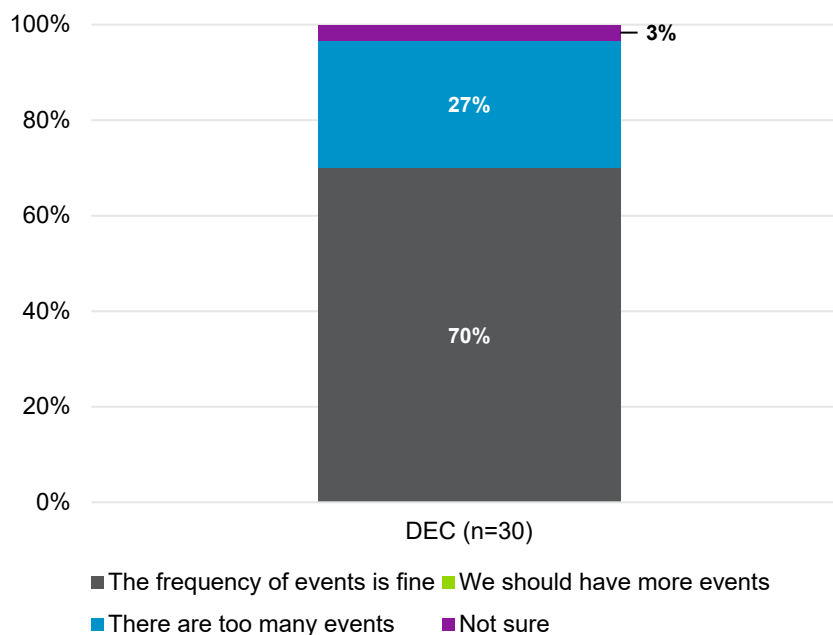
Figure 6. What is the minimum amount of time you would like to be notified ahead of a curtailment event?



Source: Navigant analysis

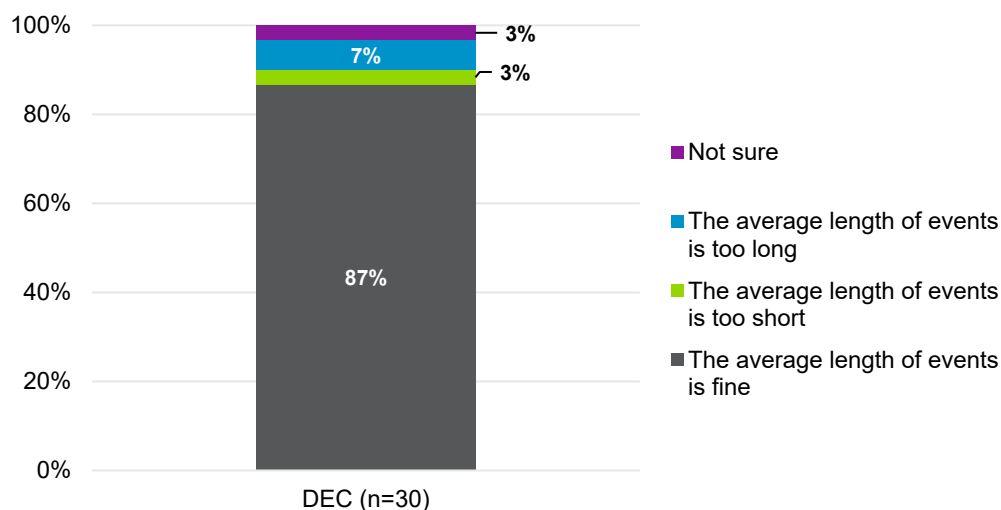
As seen in Figure 7 and Figure 8, 70% of DEC participants thought the frequency of events was reasonable, and 87% felt the length of the events was acceptable as well.

Figure 7. What are your thoughts on the frequency of events?



Source: Navigant analysis

Figure 8. What are your thoughts on the duration of events?

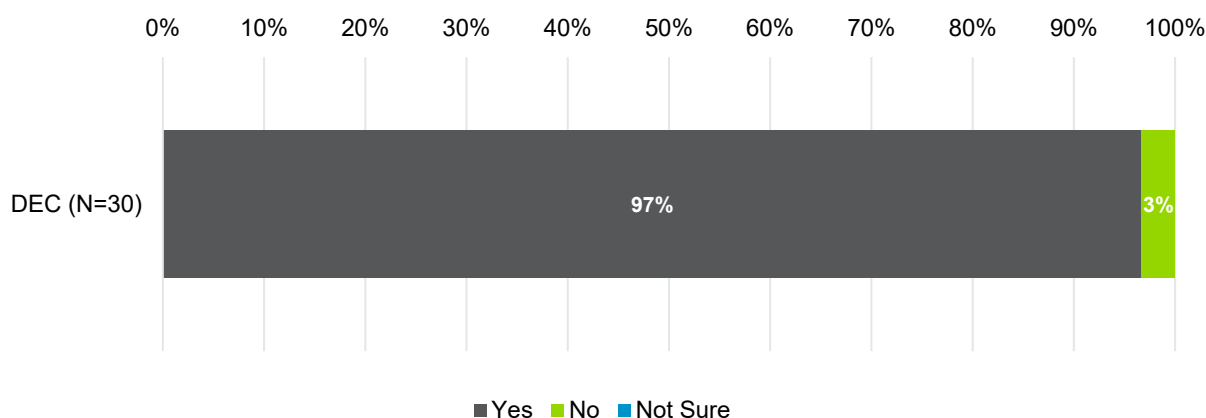


Source: Navigant analysis

Most DEC survey respondents (97%) could meet their curtailment load during an event, as shown in Figure 9. For those participants not able to reduce their load to contracted levels, the timing of the event came at critical production times.



Figure 9. Are you able to meet curtailment?



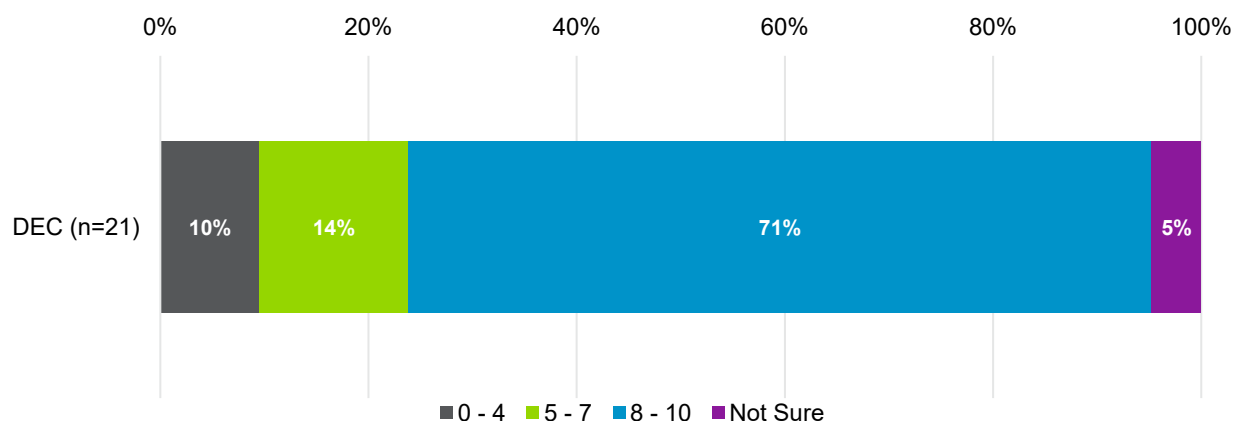
Source: Navigant analysis

### 3.3 Areas for Improvement

While the PowerShare program is well-liked by participants, there are some opportunities for improvement.

Even though the incentive is the main reason for participation, 29% of DEC respondents do not have a strong understanding of how the incentive is calculated, as shown in Figure 10 as the sum of responses of 7 or less and those who reported “not sure”.

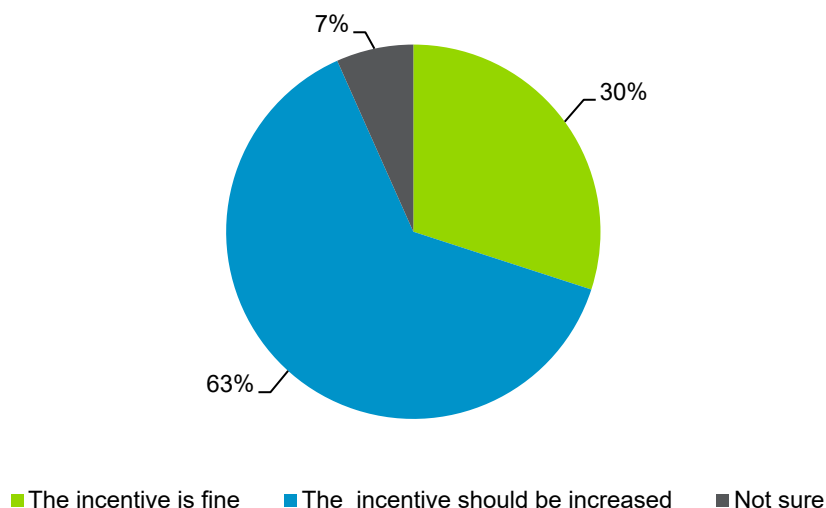
Figure 10. How well do you understand the incentive you receive for the load curtailed?



Source: Navigant analysis

As seen in Figure 11, the majority of DEC PowerShare respondents (63%) thought the incentive level should be increased.

Figure 11. What are your thoughts on the PowerShare incentives? (n=30)



Source: Navigant analysis

The program staff and Account Executive interviews also found that PowerShare participants do not receive communication at the end of the season thanking them for participating and ensuring they understand the results of the program. While most Account Executives do conduct an annual DR review with their customers, Duke Energy could increase its efforts to acknowledge/thank participants for contributing to load management and ensuring that participants fully understand their performance and credits. This acknowledgement might go a long way toward participants feeling appreciated and a part of a larger initiative to manage peak demand.

### 3.4 Barriers to Program Participation

As mentioned in the discussion above Figure 4, the monthly incentive is one of the main motivators for respondent participation in the program. However, the financial benefit of participating is offset by the following costs to the participant:

- Loss of production
- Not meeting manufacturing deadlines
- Impact to employee wages

Duke Energy must continue to review the benefit of the incentive levels to ensure they help offset these costs while remaining a cost-effective program.

The evaluation team also identified the following other barriers to participation:

- If the cost of electricity is a small percentage of overall business costs, a customer will likely not participate.
- While the concept of how to participate in the PowerShare program is easy to understand, understanding the specifics of the performance report can be confusing.

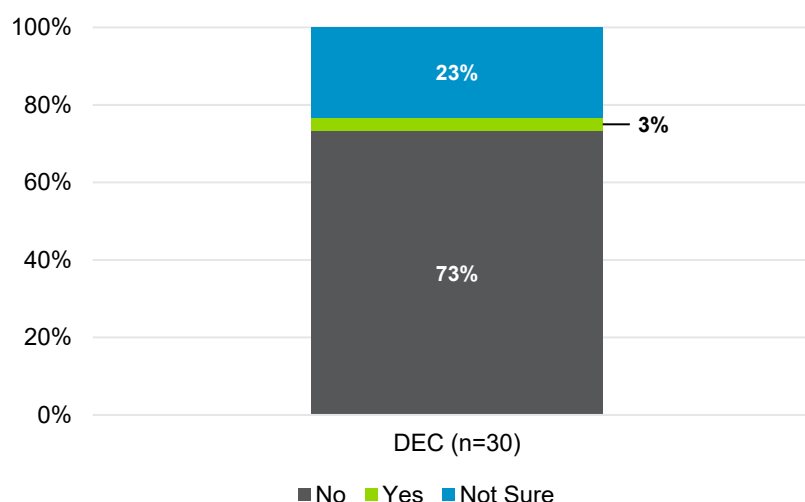
### 3.5 Opportunities to Increase Enrolled Capacity

Only 3% of DEC respondents were planning on increasing their curtailable load, as shown in Figure 12. This is interesting when 97% of these same respondents were able to meet their curtailment load.

There is also potential to increase the curtailment load by customers in certain segments:

- Customers with EPA-compliant onsite backup generators such as hospitals
- Customers who have a tight profit margin and may benefit from the monthly incentives

**Figure 12. Do you have plans to increase the kW enrolled for curtailment?**



Source: Navigant analysis

### 3.6 Opportunities to Improve Program Implementation

Both Duke Energy Account Executives and the survey respondents reported that participants would benefit from near real-time usage data on their load reductions. The ability to monitor the status of their actual curtailment compared to their contracted curtailment at the time of the event will provide participants the information needed to know if additional equipment should be shut down. If Duke Energy could create a web portal, app, or other means of accessing performance data quicker than waiting for their next bill or reviewing EPO the day following an event, participants would be more highly satisfied and could potentially also improve their overall curtailment capabilities. Providing near real-time usage data to the customer may help Duke Energy increase its curtailed load if the participant is able to identify other lines or processes that could be shut down during the event.

As mentioned in Section 3.4, respondents weighed the benefits of participating in a curtailment event against negative impacts to their business such as lost production, lost wages, and missing deadlines. Having the most current information on curtailment schedule changes helps the participant determine if they need to notify their employees of schedule or production changes. It should be noted that Duke Energy does provide participants with the ability to view curtailment schedules for each event through EPO, but some survey respondents indicated a need for additional notification of events. Official event notification occurs via the participant's preferred communication channel (e.g. email, text, phone). But Duke Energy may be able to improve participant understanding by providing further communication with



## Duke Energy PowerShare Program PY2018 Evaluation Report

participants to ensure they know where to look for event schedules and/or to provide additional notifications via the preferred notification channels.

Supporting the PowerShare program is one of the many responsibilities of an Account Executive. Helping to minimize their workload will improve the efficiency and implementation of the program. The following program delivery considerations can help the Account Executives sell and administer the PowerShare program more efficiently:

- During curtailment season, provide a daily status update email to all Account Executives that they can edit and send out to their specific customers. One Account Executive indicated that it would be helpful for this email to contain information about weather, generation status, and the likelihood of an event being called during a given day.
- Similar to other energy efficiency programs, have a team to support the Account Executives in enrolling customers in the program and writing the curtailment agreements

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## 4. POWERSHARE PROGRAM EVALUATION RECOMMENDATIONS

The following tables present a summary of the findings from the PY2018 program evaluation and associated recommendations. The findings and recommendations are categorized into process improvements, curtailment improvements, and opportunities to increase the enrolled load. Navigant developed these findings and recommendations by synthesizing the information collected during the interviews and surveys performed during this evaluation cycle. This process generated the following list of *potential* program improvements. Navigant does not suggest that all should be pursued or that any one recommendation is needed to maintain an effective program with high customer satisfaction; however, they are listed here for Duke Energy to consider.

### 4.1 Process Improvements

| # | Finding  | Recommendation   | Status of Recommendation |
|---|--|--|--------------------------|
| 1 | Participants are not acknowledged/thanked for their contribution.  | Consider sending an end of season thank you as a nice goodwill gesture. Include total program impact.  | Under consideration      |
| 3 | Participants seem to understand the program in face-to-face interactions, but they report the performance report is confusing and may be a deterrent to participation. | Consider ways to simplify the performance report.  | Under consideration      |
| 4 | Some participants do not understand how their incentives are calculated.   | Consider providing a simple breakdown of the incentive structure and how the pro forma is calculated to allow Account Executives and participants to find and use existing information. Consider ways to ensure that participants know where to find this information. | Under consideration      |

### 4.2 Curtailment Improvements

| # | Finding  | Recommendation   | Status of Recommendation |
|---|--|--|--------------------------|
| 1 | Participants lack access to near real-time usage data and need faster performance feedback.        | Consider providing access to near real-time usage data through a web portal or other platform. | Under consideration      |
| 2 | Some participants would like more notification time.   | When possible, offer earlier notification.   | Under consideration      |
| 3 | Due to the difficulty of shutting down, the length of the curtailment period needs to be worth it. | Consider possibility of making all curtailments 3 hours or longer.                             | Under consideration      |



## Duke Energy PowerShare Program PY2018 Evaluation Report

### 4.3 Opportunities to Increase Enrolled Load

| # | Finding  | Recommendation  | Status of Recommendation |
|---|--|---|--------------------------|
| 1 | Certain customer segments may have higher potential for enrolled load. | Periodically revisit program participation opportunities with customers that have EPA-compliant onsite generators (such as hospitals) and those with tight profit margins (such as quarries and textiles). Existing participants may find opportunity to increase enrolled load, and there may be opportunity to recruit additional participants. | Under consideration      |

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# Energy Efficiency Education in Schools Program Year 2017 – 2018 Evaluation Report

Submitted to Duke Energy Carolinas and Progress  
in partnership with Research into Action

March 20<sup>th</sup>, 2019

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# 1 Executive Summary

## 1.1 Program Summary

The Energy Efficiency Education in Schools Program is a Duke Energy Carolinas (DEC) and Duke Energy Progress (DEP) energy efficiency program implemented by the National Theatre for Children (NTC). The program provides age-appropriate school performances by NTC's professional actors that teach students about energy and energy conservation in a humorous, engaging, and entertaining format. NTC also provides participating schools with classroom curriculum to coincide with the performance, which includes energy efficiency kit request forms that student families can use to receive free energy efficiency measures to install in their home.

## 1.2 Evaluation Objectives and Results

This report presents the results and findings of evaluation activities for the DEC and DEP NTC program conducted by the evaluation team, collectively Nexant Inc. and our subcontracting partner, Research into Action, for the school and program year of August 2017 through July 2018.

### 1.2.1 Impact Evaluation

The evaluation team conducted the evaluation as detailed in this report to estimate energy and demand savings attributable to the 2017-2018 DEC and DEP NTC programs. The evaluation was divided into two research areas - to determine gross and net savings (or impacts). Gross impacts are energy and demand savings estimated at a participant's home that are the direct result of the homeowner's installation of a measure included in the Duke Energy home kit. Net impacts reflect the degree to which the gross savings are a result of the program efforts and funds. Table 1-1 and Table 1-2 present the summarized findings of the impact evaluation.

**Table 1-1: 2017-2018 DEC Savings per Kit**

| Measurement        | Reported | Realization Rate | Gross Verified | Net-to-Gross Ratio | Net Verified |
|--------------------|----------|------------------|----------------|--------------------|--------------|
| Energy (kWh)       | 201.0    | 135.0%           | 271.3          | 0.94               | 254.1        |
| Summer Demand (kW) | 0.054    | 61.7%            | 0.034          |                    | 0.031        |
| Winter Demand (kW) | N/A      | N/A              | 0.048          |                    | 0.045        |

\*Values may appear inaccurate due to rounding errors

**Table 1-2: 2017-2018 DEC Program Level Savings**

| Measurement        | Reported  | Realization Rate | Gross Verified* | Net-to-Gross Ratio | Net Verified* |
|--------------------|-----------|------------------|-----------------|--------------------|---------------|
| Energy (kWh)       | 4,655,361 | 135.0%           | 6,283,232       | 0.94               | 5,884,250     |
| Summer Demand (kW) | 1260.7    | 61.7%            | 777.7           |                    | 723.5         |
| Winter Demand (kW) | N/A       | N/A              | 1,113.4         |                    | 1,036.4       |

\* Values may appear inaccurate due to rounding errors

Table 1-3 and Table 1-4 present the summarized findings of the DEP impact evaluation.

**Table 1-3: 2017-2018 DEP Savings per Kit**

| Measurement        | Reported | Realization Rate | Gross Verified* | Net-to-Gross Ratio | Net Verified* |
|--------------------|----------|------------------|-----------------|--------------------|---------------|
| Energy (kWh)       | 276.4    | 124.3%           | 343.5           | 0.92               | 317.5         |
| Summer Demand (kW) | 0.079    | 52.5%            | 0.041           |                    | 0.038         |
| Winter Demand (kW) | N/A      | N/A              | 0.064           |                    | 0.059         |

\* Values may appear inaccurate due to rounding errors

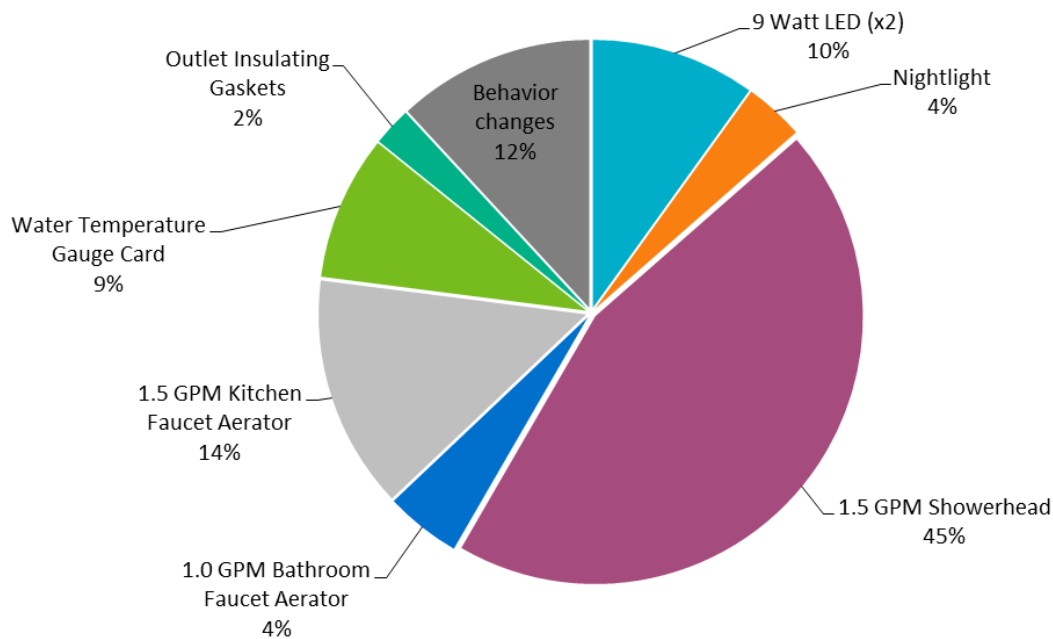
**Table 1-4: 2017-2018 DEP Program Level Savings**

| Measurement        | Reported  | Realization Rate | Gross Verified* | Net-to-Gross Ratio | Net Verified* |
|--------------------|-----------|------------------|-----------------|--------------------|---------------|
| Energy (kWh)       | 2,494,510 | 124.3%           | 3,055,293       | 0.92               | 2,865,616     |
| Summer Demand (kW) | 711.0     | 52.5%            | 373.1           |                    | 343.0         |
| Winter Demand (kW) | N/A       | N/A              | 581.0           |                    | 534.1         |

\* Values may appear inaccurate due to rounding errors

Figure 1-1 and Figure 1-2 provide the verified energy saving share by measure for DEC and DEP, respectively.

**Figure 1-1: 2017-2018 DEC NTC Gross Verified Energy Savings**



**Figure 1-2: 2017-2018 DEP NTC Gross Verified Energy Savings**

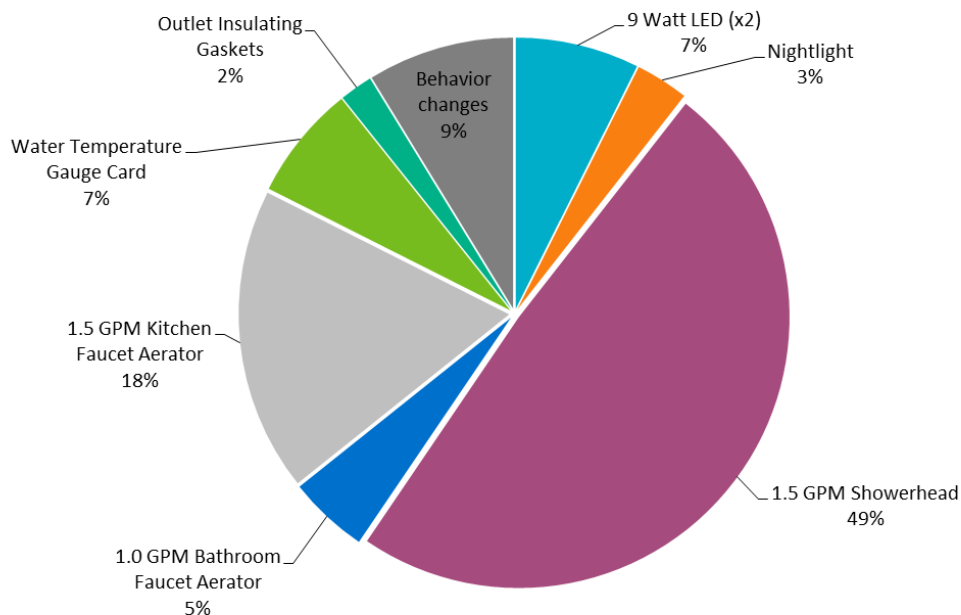


Table 1-5 and Table 1-6 provide gross verified energy and demand savings by measure and net to gross ratio details for DEC and DEP, respectively.



Table 1-5: DEC NTC Program Year 2017-2018 Verified Impacts by Measure

| Measure                                 | Gross Energy Savings per unit (kWh) | Gross Summer Demand per unit (kW) | Gross Winter Demand per unit (kW) | Free Ridership | Spillover   | Net to Gross Ratio |
|---|-------------------------------------|-----------------------------------|-----------------------------------|----------------|-------------|--------------------|
| 9 Watt LED*                             | 27.0                                | 0.005                             | 0.002                             | 0.16           | 0.09        | 0.93               |
| Nightlight                              | 9.8                                 | 0.000                             | 0.000                             |                |             |                    |
| 1.5 GPM Showerhead                      | 121.6                               | 0.010                             | 0.027                             |                |             |                    |
| 1.0 GPM Bathroom Faucet Aerator         | 12.4                                | 0.002                             | 0.003                             |                |             |                    |
| 1.5 GPM Kitchen Faucet Aerator          | 38.2                                | 0.005                             | 0.008                             |                |             |                    |
| Water Temperature Gauge Card            | 23.7                                | 0.003                             | 0.005                             |                |             |                    |
| Outlet Insulating Gaskets               | 6.3                                 | 0.008                             | 0.000                             | -              | -           | 1.00               |
| Behavioral Changes                      | 32.3                                | 0.001                             | 0.002                             |                |             |                    |
| <b>Total Kit and Behavioral Impacts</b> | <b>271.3</b>                        | <b>0.034</b>                      | <b>0.048</b>                      | <b>0.16</b>    | <b>0.09</b> | <b>0.94</b>        |

\*Reflects savings for two 9 watt LEDs bulbs

Table 1-6: DEP NTC Program Year 2017-2018 Verified Impacts by Measure

| Measure                                 | Gross Energy Savings per unit (kWh) | Gross Summer Demand per unit (kW) | Gross Winter Demand per unit (kW) | Free Ridership | Spillover   | Net to Gross Ratio |
|---|-------------------------------------|-----------------------------------|-----------------------------------|----------------|-------------|--------------------|
| 9 Watt LED*                             | 25.4                                | 0.004                             | 0.002                             | 0.13           | 0.05        | 0.92               |
| Nightlight                              | 10.9                                | 0.000                             | 0.000                             |                |             |                    |
| 1.5 GPM Showerhead                      | 168.1                               | 0.013                             | 0.038                             |                |             |                    |
| 1.0 GPM Bathroom Faucet Aerator         | 16.4                                | 0.002                             | 0.004                             |                |             |                    |
| 1.5 GPM Kitchen Faucet Aerator          | 62.3                                | 0.008                             | 0.014                             |                |             |                    |
| Water Temperature Gauge Card            | 23.5                                | 0.003                             | 0.005                             |                |             |                    |
| Outlet Insulating Gaskets               | 6.8                                 | 0.009                             | 0.000                             | -              | -           | 1.00               |
| Behavioral Changes                      | 30.1                                | 0.001                             | 0.001                             |                |             |                    |
| <b>Total Kit and Behavioral Impacts</b> | <b>343.5</b>                        | <b>0.041</b>                      | <b>0.064</b>                      | <b>0.13</b>    | <b>0.05</b> | <b>0.92</b>        |

\*Reflects savings for two 9 watt LEDs bulbs

### 1.2.2 Process Evaluation

The process evaluation assessed opportunities for improving the program's design and delivery in DEC and DEP service territories. It specifically documented teacher, student, and parent experiences by investigating: 1) teachers' assessments of the NTC performance, quality of curriculum materials, and the kit request form distribution procedure; and 2) student families' responses to the energy efficiency kits and the extent to which the kits effectively motivate families to save energy.

The evaluation team reviewed program documents and conducted phone ( $n=74$  DEC and  $n=70$  DEP) and web surveys ( $n=260$  DEC and  $n=102$  DEP) with student families that received a kit and teachers who attended the performance ( $n=44$  DEC and  $n=29$  DEP). The team also conducted in-depth interviews with utility staff, NTC staff, and ten teachers (five in DEC territory and five in DEP territory) who completed the web survey.

#### **Program Successes**

The 2017-2018 DEC and DEP NTC program evaluation's found successes in the following areas:

**Teachers and parents are aware of Duke Energy sponsorship of the kits.** Most parents (94% in DEC and 88% in DEP) and teachers (84% in DEC and 79% in DEP) knew that Duke Energy sponsored the kits. Parents became aware of Duke Energy sponsorship via the materials their children brought home (58% in DEC and 57% in DEP), or via engagement by their school or teacher (29% in DEC and 30% in DEP). DEC teachers most commonly became aware via communication from other teachers (14 of 37), whereas DEP teachers more commonly reported learning about Duke's sponsorship via marketing materials (8 of 23) and NTC staff (8 of 23).

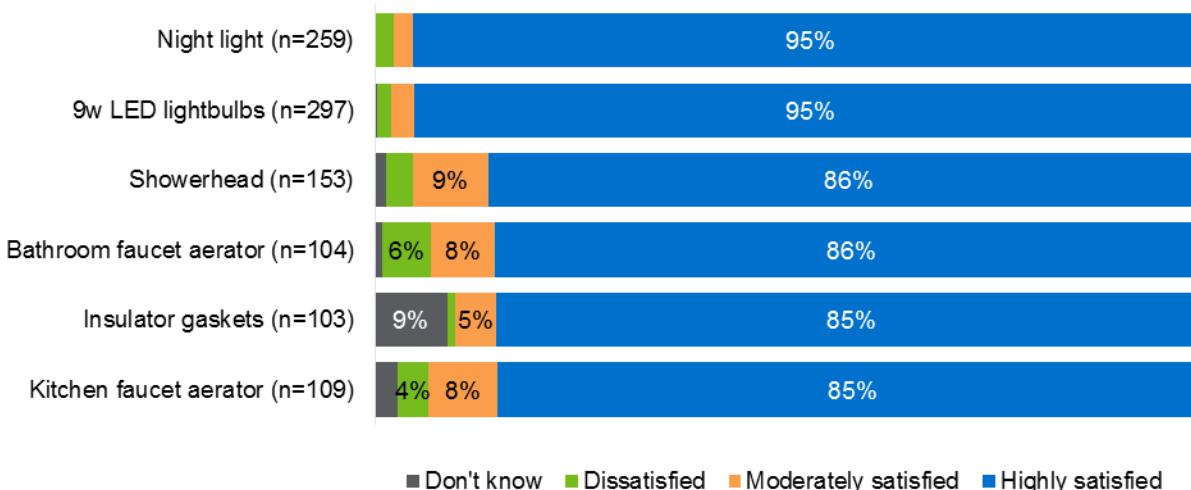
**Parents largely learned about Duke Energy kits from materials brought home by child.** About three-quarters (75% in DEC and 72% in DEP) of parents learned about the kits from program engagement materials their children brought home. Lesser reported ways included school newsletters (17% in DEC and 11% in DEP) and emails from their children's teacher or school (14% in DEC and 13% in DEP).

**Teachers were highly satisfied with the performance reporting that the performance was not missing important components, was age appropriate for most students, and engaged students.** Nearly all stated they were "highly satisfied" (39 of 44 in DEC and 25 of 29 in DEP), most noted the performance was not missing important concepts (43 of 44 in DEC and 28 of 29 in DEP), and most noted the performance was age appropriate (40 of 44 in DEC and 27 of 29 in DEP). All interviewed teachers reported the performance was engaging, humorous, and effective.

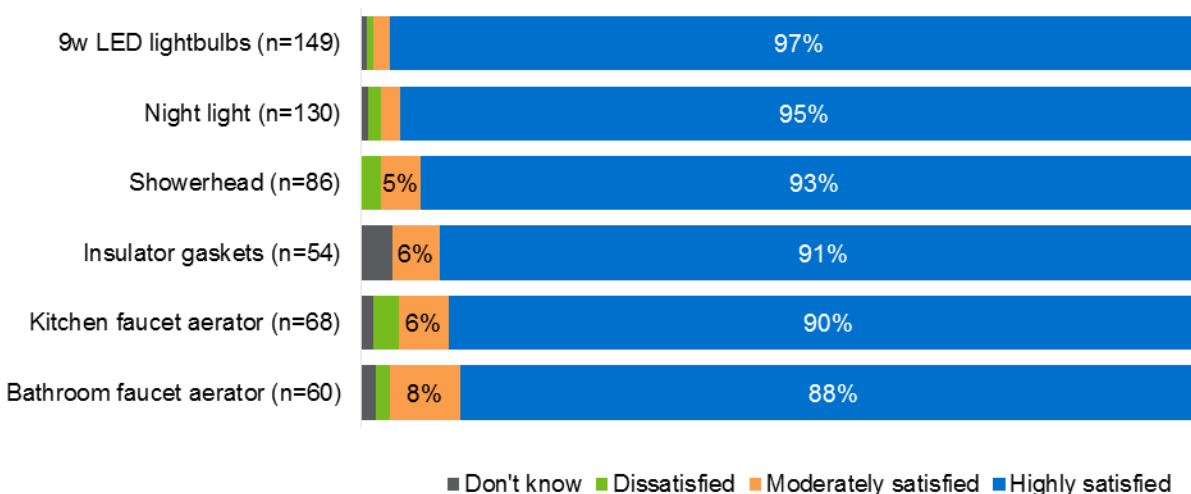
**Distribution of kit request forms goes well.** Teachers reported no problems receiving kit request forms and almost all (42 of 44 in DEC and 28 of 29 in DEP) noted they distributed the forms to their students, typically immediately after the performance.

**Student families are highly satisfied with kit items.** Respondents were highly satisfied with all measures, especially the lighting items (Figure 1-3 and Figure 1-4).

**Figure 1-3: DEC Kit Recipient Satisfaction with Installed Measures**



**Figure 1-4: DEP Kit Recipient Satisfaction with Installed Measures**



**Many kit recipients value the educational information in the kit.** About three-quarters of respondents (73% in DEC and 74% of DEP) read the energy saving educational information in the kit and most of those reported it was “highly helpful.”

**The program influenced some families to adopt energy saving behaviors.** In both the DEC and DEP territories, about half of parents and half of children adopted new energy

saving behaviors since receiving their kit. Parents most commonly said that their child now turns off lights when not using a room and parents noted they had changed their thermostat settings.

### ***Program Challenges***

The 2017-2018 NTC program evaluation met some challenges in the following areas:

**Instructional material use is limited.** Teachers reported distributing kit request forms to their students yet noted limited use of the instructional materials associated with the performance. Although about half of respondents in DEC territory (29 of 44) and DEP territory (12 of 29) reported receiving the educational materials, those that received them either did not use the materials or used them in a limited way. Of those that used the materials, teachers deemed them “somewhat useful” at best. Additionally, use of online materials was limited.

**There is variation in teacher efforts to encourage kit requests.** All teachers encouraged their students to request kits, but they varied in the tenacity of their approach. Almost all reported vocally encouraging students (40 of 44 in DEC and 24 of 29 in DEP) and to request a kit, but far fewer reported taking additional actions (e.g., sending reminders to parents or awarding prizes to students who request kits).

**There may be opportunities to get families to install more kit measures.** Most parent respondents noted they installed at least one measure in the kit, but few install all measures. Most student families installed the LED lights and the nightlights, however far fewer installed the water saving measures or the insulator gaskets.

## **1.3 Evaluation Conclusions and Recommendations**

Based on evaluation findings, the evaluation team concluded the following and provides several recommendations for program improvement:

**Conclusion 1: NTC performances satisfy teachers by engaging students. It is less clear that the performances are linked to classroom learning, awareness at home, or change in behavior.** Teachers reported high satisfaction with the performance and recalled that the performance engaged students. However, curriculum materials were not always distributed or remembered by teachers, and those who used them did so in a limited way.

Parents were often not aware the performance occurred and about half of parents reported changes in their or their children’s energy use behavior but those changes in behavior were limited.

**Recommendation:** Consider exploring ways to increase teacher receipt and use of materials, such as:

- Making sure teachers are aware that NTC aligns their materials with state science standards, and
- Requesting that teachers align energy-focused lesson plans with performance timing.

**Conclusion 2: There is an opportunity to increase parental awareness of the kits and thus get more families to request and install kits.** Currently, students bear the bulk of the burden of generating parental awareness of the kit opportunity. Although most teachers engage students on the kit request process, only about half engage parents. Parent surveys corroborate this lack of teacher to parent engagement on the kits; few parents mentioned their child's teacher or school as the source of awareness of the kit (instead, most parents learned about the kit from their child). Additionally, two-thirds of parents did not know kits were associated with a performance and instructional materials. Although about one-third of teachers follow-up with students to see if parents requested kits, there is great variation in how much emphasis teachers place on promoting the kits.

Further, the contests appear to have limited success in encouraging kit requests, as a) only one teacher mentioned using the contests to encourage kit requests, and b) the household- and school-level contests had particularly low influence on parent motivations to get a kit.

**Recommendation:** Explore ways to increase parent awareness of and motivation for requesting the kits. For example: create a household-level contest that engages both students and their parents, so students are motivated to ask their parents to sign up and so parents are motivated to participate. For example, in addition to a cash prize drawing for parents, include a prize drawing aimed at students (e.g., toys, electronics, or other items valued by students) or a guaranteed incentive such as a coupon for pizza (e.g., Book It model).

**Conclusion 3: The program influences families to save energy.** Families save energy they would not have saved without receiving the kits. Nearly all respondents installed at least one kit measure, and few would have installed the kit measures if they had not received them for free from the program (as evidenced by low free-ridership rates). About one-fifth of parent respondents reported making additional energy saving improvements, and over half of parent respondents said they or their children adopted new energy saving behaviors since receiving the kit.

**Recommendation:** Continue engaging student family households with the Education program.

**Conclusion 4: The Education program could be a good “gateway” program to generate even more energy savings in Duke Energy territories.** Kit recipients could be good targets for other Duke Energy efficiency program promotions, as they:

- Demonstrated willingness to save energy in their home

- Expressed interest in installing additional kit items or other energy saving measures (many of which Duke Energy currently incents)
- Are highly likely to read any information included with the kit
- Are commonly single family homeowners

**Recommendations:** Leverage kits to promote other Duke Energy efficiency programs, such as targeting these households for direct mail campaigns or including information on Smart \$aver in the kit.

**Conclusion 5: Energy savings could be increased by encouraging participants to install LED lamps as soon as they are received and in higher usage areas.** LED lamp in-service rates (ISR) measured just below 80% for both DEC and DEP. This included some participants who store the LED kit lamp until a similar lamp in the home burns-out. Continue to encourage participants to install the lamps as soon as the kit is received can increase LED lamp in-service rates and generate additional savings for the program.

Most kit lamps were installed in rooms with average (2 to 4 hour) daily lighting usage, while very few lamps were installed in high use locations such as kitchens or exterior fixtures (Table 1-7). Installation of lamps in high usage areas will results in higher energy savings.

**Table 1-7: Lamp HOU Installation Rates**

| Daily Lamp Use*     | DEC Installation Rate | DEP Installation Rate |
|---------------------|-----------------------|-----------------------|
| Low (< 2 hours)     | 43%                   | 44%                   |
| Average (2-4 hours) | 36%                   | 32%                   |
| High (> 4 hours)    | 21%                   | 24%                   |

\*Based on the participant survey responses

**Recommendations:** Program should continue to encourage lamp installations as soon as possible informing them where their new lamps can save the most energy. Alternatively, consider swapping out one of the A-shape LEDs with a lamp, such as an LED PAR, that may be more applicable to higher use areas like the kitchen.

**Conclusion 6: Water-related measures drive savings, but installation rates are low.** Water measures contributed the majority of verified savings (DEC 74%, DEP 80%), yet fewer than half of all participants installed an aerator or showerhead (Table 1-8).

**Table 1-8: Water Measure In-Service Rates**

| Measure                 | DEC ISR | DEP ISR |
|-------------------------|---------|---------|
| Kitchen Faucet Aerator  | 30%     | 40%     |
| Bathroom Faucet Aerator | 30%     | 34%     |
| Showerhead              | 42%     | 50%     |

\*Based on the participant survey responses

**Recommendations:** Review water savings measures' satisfaction and dislikes as well as elicit feedback from Save Energy and Water Kit Program to determine if there are ways to improve the ISR for water measures.

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## 2 Introduction and Program Description

### 2.1 Program Description

#### 2.1.1 Overview

The Energy Efficiency Education in Schools Program is an energy efficiency program sponsored by Duke Energy Carolinas (DEC) and Duke Energy Progress (DEP). The program provides free in-school performances by the National Theatre for Children (NTC) that teach elementary and middle school students about energy and conservation concepts in a humorous and engaging format. This report will hereafter refer to the program as the NTC program.

In addition to the NTC performance, NTC provides teachers with: 1) student workbooks that reinforce topics taught in the NTC performance, including a take-home form that students and parents can complete to receive an energy efficiency starter kit (kit) from Duke Energy; and 2) lesson plans associated with the content in the student workbooks. All workbooks, assignments and activities meet state curriculum requirements. The NTC performers encourage students to have their parents request the kits.

The program can achieve energy savings in two ways:

1. Through the installation of specific energy efficiency measures provided in the kit.
2. By increasing students' and their families' awareness about energy conservation and engaging them to change behaviors to reduce energy consumption.

#### 2.1.2 Energy Efficiency Kit Measures

Table 2-1 lists the kit's contents included in the evaluation scope (the kit includes additional educational items described in section 2.2.4 below).

**Table 2-1: 2017-2018 Kit Measures**

| Measures                        | Details  |
|---------------------------------|--|
| 9 Watt LED                      | 2 bulbs  |
| Nightlight                      | 1 LED plug-in nightlight                             |
| 1.5 GPM Showerhead              | 1 low-flow showerhead                                |
| 1.0 GPM Bathroom Faucet Aerator | 1 low-flow faucet aerator                            |
| 1.5 GPM Kitchen Faucet Aerator  | 1 low-flow kitchen aerator                           |
| Water Temperature Gauge Card    | 1 temperature card indicating water heat temperature |
| Outlet Insulating Gaskets       | 8 outlet and 4 light switch gaskets                  |



## 2.2 Program Implementation

### 2.2.1 School Recruitment

Duke Energy sends NTC a list of approved schools in each utility territory, which NTC uses to contact schools to schedule NTC performances. NTC ships curriculum materials to participating schools approximately two weeks prior to the performance date.

### 2.2.2 NTC Performance

NTC has two age-appropriate shows: Kilowatt Kitchen for elementary age students (Kindergarten through sixth grade) and The E-Team for middle school age students (6th through 8th grade). Two actors perform in each show, where they use an entertaining, humorous, and interactive format to educate students on four general areas:

- Sources of energy (renewable and nonrenewable sources)
- How energy is used
- How energy is wasted
- Energy efficiency and conservation

Performers also discuss how their utility offers students and their families free energy efficiency starter kits, and how the items in the kit can save energy in their homes.

### 2.2.3 Kit Form Promotion and Distribution

In the performance, the actors explain to students that they must fill out the kit request form to receive their kit. Following the performance, teachers give their students the NTC workbooks that – in addition to educational activities to reinforce the concepts from the NTC performance – include a detachable postage-prepaid postcard kit request form. Students take the form home to their parents or guardians, who complete and mail the form. Parents or guardians may also request a kit via a toll-free telephone number or by signing up at [MyEnergyKit.org](http://MyEnergyKit.org). To encourage participation, those requesting kits are automatically entered in drawings to win cash prizes for their household (\$1,000) or their school (\$2,500). The utilities use two vendors to fulfill kit requests. The participant's eligibility is confirmed by the firm R1 who sends the fulfillment request to AM Conservation who ships the kit to eligible homes that signed up for the program. The Process Flow Map in Appendix C outlines this process.

### 2.2.4 Energy Kit Eligibility

Student families can only receive a kit once every 36 months. Additionally, parents/guardians must fill out the survey included on the kit request form in order to receive a kit. Because some school districts may straddle a Duke territory and a non-Duke territory, the kit contents will differ

if a family is a Duke utility (DEP or DEC) customer versus a non-Duke Energy customer (Table 2-2).<sup>1</sup>

**Table 2-2: Measures Received by Customer Type**

| Measures                                  | Duke Energy Customer | Non-Duke Energy Customer |
|---|----------------------|--------------------------|
| 1.5 GPM Showerhead                        | ✓                    |                          |
| 1.5 GPM Kitchen Faucet Aerator            | ✓                    |                          |
| 1.0 GPM Bathroom Faucet Aerator           | ✓                    |                          |
| Water flow meter bag                      | ✓                    |                          |
| Water Temperature Gauge Card              | ✓                    | ✓                        |
| 9 Watt LEDs                               | ✓                    |                          |
| LED Nightlight                            | ✓                    | ✓                        |
| Outlet Insulating Gaskets                 | ✓                    | ✓                        |
| Energy savers booklet                     | ✓                    | ✓                        |
| Product information and instruction sheet | ✓                    |                          |
| Glow ring toy                             | ✓                    | ✓                        |

### 2.2.5 Participation

For the defined evaluation period of September 2017 through May 2018, the program recorded a total of 23,161 kit recipients in DEC and 9,025 kit recipients in DEP. During survey recruitment, no participants notified the evaluation team that their kits never arrived.

## 2.3 Key Research Objectives

Over-arching project goals will follow the definition of impact evaluation established in the “Model Energy-Efficiency Program Impact Evaluation Guide – A Resource of the National Action Plan for Energy Efficiency,” November 2007:

*“Evaluation is the process of determining and documenting the results, benefits, and lessons learned from an energy-efficiency program. Evaluation results can be used in planning future programs and determining the value and potential of a portfolio of energy-efficiency programs in an integrated resource planning process. It can also be used in retrospectively determining the performance (and resulting payments, incentives, or penalties) of contractors and administrators responsible for implementing efficiency programs.”*

Evaluation has two key objectives:

<sup>1</sup> Only Duke customers were surveyed for the evaluation

- 1) To document and measure the effects of a program and determine whether it met its goals with respect to being a reliable energy resource.
- 2) To help understand why those effects occurred and identify ways to improve the program.

### 2.3.1 Impact

As part of evaluation planning, the evaluation team outlined the following activities to assess the impacts of the DEC and DEP NTC programs:

- Quantify accurate and supportable energy (kWh) and demand (kW) savings<sup>2</sup> for energy efficient measures implemented in participants' homes;
- Assess the rate of free riders from the participants' perspective and determine spillover effects;
- Benchmark verified measure-level energy impacts to applicable technical reference manual(s) and other Duke similar programs in other jurisdictions.

### 2.3.2 Process

The process evaluation assessed opportunities for improving the design and delivery of the program in DEC and DEP service territory. It specifically documented teacher, student, and parent experiences by investigating: 1) teachers' assessments of the NTC performance, program materials, and curriculum in terms of quality of content, and ability to engage and motivate students to save energy; and 2) student families' responses to the energy efficiency kits and the extent to which the kits effectively motivate families to save energy.

The evaluation team assessed several elements of the program delivery and customer experience, including:

- **Awareness:**
  - How aware are teachers and student families of the DEC or DEP sponsorship of the program?
  - Is there a need to increase this awareness?
- **Program experience and satisfaction:**
  - How satisfied are teachers with the NTC performance and program curriculum in terms of ease of use ability to engage and motivate students to conserve energy at home?
  - How satisfied are student families with the measures in the kit and to what extent do the kits motivate families to save energy?

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<sup>2</sup> The quantification of program impacts was initially attempted through a utility bill regression analysis. However, the program impacts could not be isolated due to the small size of the impact relative to annual consumption. Therefore, the impact analysis relied on engineering algorithms to assess the program's savings impacts. Please see section 3.5 for additional detail.

- **Challenges and opportunities for improvement:**
  - Are there any inefficiencies or challenges associated with program delivery?
  - How engaged are teachers in implementing the curriculum and motivating student families to request program kits?
  - What are teachers' assessments of the NTC performance, program information, and curriculum?
- **Student family characteristics:**
  - What are the demographic characteristics of kit recipients?

## 2.4 Evaluation Overview

The evaluation team divided its approach into key tasks to meet the outlined goals:

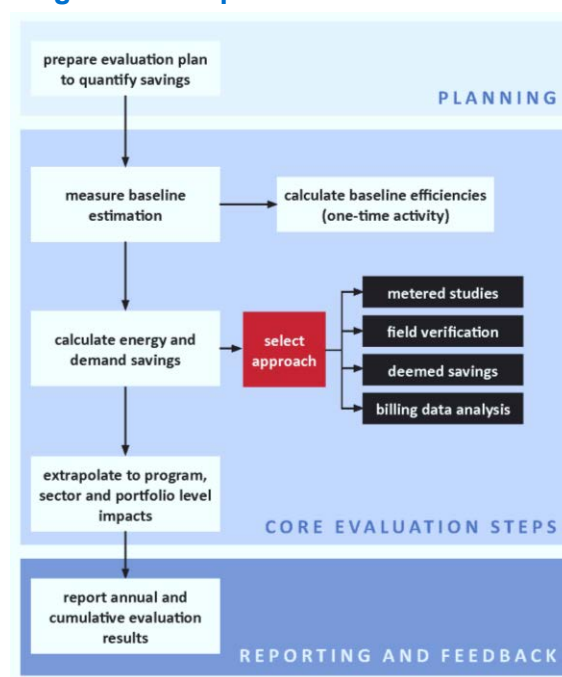
- **Task 1** – Develop and manage evaluation work plan to describe the processes that will be followed to complete the evaluation tasks outlined in this project;
- **Task 2** – Conduct a process review to determine how successfully the programs are being delivered to participants and to identify opportunities for improvement;
- **Task 3** – Verify gross and net energy and peak demand savings resulting from the NTC program through verification activities of a sample of 2017 - 2018 program participants.

### 2.4.1 Impact Evaluation

The primary determinants of impact evaluation costs are the sample size and the level of rigor employed in collecting the data used in the impact analysis. The accuracy of the study findings is in turn dependent on these parameters. Techniques applied to conduct our evaluation, measurement, and verification (EM&V) activities, and to meet the goals for this evaluation, included telephone and web-based surveys with program participants, best practice review, and interviews with implementation and program staff.

Figure 2-1 demonstrates the principal evaluation team steps organized through planning, core evaluation activities, and final reporting.

Figure 2-1: Impact Evaluation Process



The evaluation is generally comprised of the following steps, which are described in further detail throughout this report:

- **Participant Surveys:** The file review for all sampled and reviewed program participation concluded with a telephone and web-based survey with the participating families. Table 2-3 below summarizes the number of surveys and on-site inspections completed. The samples were drawn to meet a 90% confidence and 10% precision level based upon the expected and actual significance (or magnitude) of program participation, the level of certainty of savings, and the variety of measures.
- **Calculate Impacts and Analyze Load Shapes:** Data collected via surveys enabled the evaluation team to calculate gross verified energy and demand savings for each measure.
- **Estimate Net Savings:** Net impacts are a reflection of the degree to which the gross savings are a result of the program efforts and incentives. The evaluation team estimated free-ridership and spillover based on self-report methods through surveys with program participants. The ratio of net verified savings to gross verified savings is the net-to-gross ratio as an adjustment factor to the reported savings.

#### 2.4.2 Process Evaluation

Process evaluation examines and documents:

- Program operations
- Stakeholder satisfaction
- Opportunities to improve the efficiency and effectiveness of program delivery

To satisfy the evaluation, measurement, and verification (EM&V) objectives for this research effort, the evaluation team reviewed program documents and conducted telephone and web surveys with participating student families and teachers who attended the performance. These surveys served both the process and impact evaluation work.

The team also held in-depth interviews (IDI) with utility staff, implementation staff, and teachers. Table 2-3 provides a summary of the evaluation team activities.

**Table 2-3: DEC and DEP NTC Summary of Evaluation Activities**

| Target Group  | Method           | Duke Energy Carolinas (DEC) |                 |       | Duke Energy Progress (DEP) |                 |       |
|---|------------------|-----------------------------|-----------------|-------|----------------------------|-----------------|-------|
|   |                  | Population                  | Sample          | C/P   | Population                 | Sample          | C/P   |
| Impact Activities   |                  |                             |                 |       |                            |                 |       |
| Participants  | Phone/Web Survey | 23,161                      | 334             | 90/5  | 9,025                      | 172             | 90/6  |
| Process Activities  |                  |                             |                 |       |                            |                 |       |
| Duke Energy Program Staff   | Phone IDI        | n/a                         | 1               | n/a   | n/a                        | 1               | n/a   |
| Implementer Staff: NTC  | Phone IDI        | n/a                         | 1               | n/a   | n/a                        | 1               | n/a   |
| Implementer Staff: R1   | Phone IDI        | n/a                         | 1               | n/a   | n/a                        | 1               | n/a   |
| Teachers who attended a NTC workshop                                      | Web Survey       | Unknown                     | 44 <sup>a</sup> | 90/12 | Unknown                    | 29 <sup>b</sup> | 90/17 |
| Participating teacher follow-up interviews                                | Phone IDI        | Unknown                     | 5               | n/a   | Unknown                    | 5               | n/a   |
| Participants – student families who received a kit and are Duke customers | Phone/Web Survey | 23,161                      | 334             | 95/5  | 9,025                      | 172             | 90/6  |

<sup>a</sup> 34 elementary teachers and 10 middle school teachers

<sup>b</sup> 19 elementary teachers and 10 middle school teachers

## 3 Impact Evaluation

### 3.1 Methodology

The evaluation team's impact analysis focused on the energy and demand savings attributable to the NTC program for the period of August 2017 through July 2018. The evaluation was divided into two research areas: to determine gross and net savings (or impacts). Gross impacts are energy and demand savings estimated at a participant's home that are the direct result of the homeowner's installation of a measure included in the program-provided energy saving kit. Net impacts are a reflection of the degree to which the gross savings are a result of the program efforts and funds. The evaluation team verified energy and demand savings attributable to the program by conducting the following impact evaluation activities:

- Review of DEC and DEP participant databases.
- Completion of telephone and web-based surveys to verify key inputs into savings calculations.
- Estimation of gross verified savings using primary data collected from participants.
- Comparison of the gross-verified savings to program-evaluated results to determine kit-level realization rates.
- Application of attribution survey data to estimate net-to-gross ratios and net-verified savings at the program level.

### 3.2 Database and Historical Evaluation Review

DEC and DEP provided the evaluation team with a program database for the NTC program participation. The program database provided participant contact information including account number, address, phone number, and email address, if available, and whether or not the participant was willing to be contacted. Since DEC and DEP were able to provide both phone numbers and email addresses, we were able to design a sampling approach that could take advantage of both phone and web-based surveying.

DEC and DEP provided ex-ante, or deemed, energy and summer demand savings values at the kit-level; however, they did not have measure-level ex-ante energy savings available nor winter demand savings at the kit-level. Because measure-level energy and demand savings and kit-level winter demand savings were not provided, realization rates could only be calculated at the kit-level for energy and summer demand savings.

Despite the unavailability of measure-level ex-ante savings, the evaluation team conducted a benchmarking review of the uncertainty of ex-ante savings estimates by comparing multiple technical reference manuals (TRMs) and a prior Energy Efficiency Education in Schools evaluation conducted in Duke Energy Carolinas. The benchmarking review

illustrated variations in deemed savings among each source for each given measure, with much of the variation reflecting different baseline, household size, or water temperature assumptions. The evaluation team ultimately used assumptions outlined by the Mid-Atlantic and Pennsylvania TRMs (see section 3.4.4) to better capture region-specific assumptions such as water temperature.

### 3.3 Sampling Plan and Achievement

To provide representative results and meet program evaluation goals, a sampling plan was created to guide all evaluation activity. A random sample was created to target 90/10 confidence and precision at the program level, assuming a coefficient of variation ( $C_v$ ) equal to 0.5. After reviewing the program database, the evaluation team identified a population of 23,161 participants for DEC and 9,025 participants for DEP within our defined evaluation period.

Based on the populations of 23,161 and 9,025 participants, the evaluation team established sub-sample frames for phone and web-based survey administration. As illustrated in Table 3-1 and Table 3-2 below, we completed a total of 334 DEC and 172 DEP surveys. This sample size resulted in an achieved confidence and precision of 90/4.5 and 90/6.2 for DEC and DEP, respectively.

**Table 3-1: DEC NTC Impact Sampling**

| Survey Mode  | Population*   | Sampled Participants | Achieved Confidence/<br>Precisions** |
|--------------|---------------|----------------------|--------------------------------------|
| Phone        | 7,953         | 74                   | 90/4.5                               |
| Web-based    | 11,629        | 260                  |                                      |
| <b>Total</b> | <b>19,582</b> | <b>334</b>           |                                      |

\*Sampling population excludes participants flagged as "do not contact"

\*\*Based on full population of 23,161 participants

**Table 3-2: DEP NTC Impact Sampling**

| Survey Mode  | Population*  | Sampled Participants | Achieved Confidence/<br>Precisions** |
|--------------|--------------|----------------------|--------------------------------------|
| Phone        | 2,406        | 70                   | 90/6.2                               |
| Web-based    | 4,037        | 102                  |                                      |
| <b>Total</b> | <b>6,443</b> | <b>172</b>           |                                      |

\*Sampling population excludes participants flagged as "do not contact"

\*\*Based on full population of 9,025 participants



## 3.4 Description of Analysis

### 3.4.1 Telephone and web-based surveys

The evaluation team performed telephone and web-based surveys to gain key pieces of information used in the savings calculations. Results from the completed surveys were used to inform our program-wide assumptions as detailed in Table 3-3.

**Table 3-3: Participant Data Collected and Used for Analysis**

| Measure   | Data Collected        | Assumption       |
|---|-----------------------|------------------|
| 9 Watt LEDs<br>Nightlight   | Units Installed       | In-Service Rate  |
|   | Units Later Removed   |                  |
|   | Room Where Installed  | Hours of Use     |
|   | Original Lamp Removed | Baseline Wattage |
| 1.5 GPM Showerhead<br>1.0 GPM Bathroom Faucet Aerator<br>1.5 GPM Kitchen Faucet Aerator | Units Installed       | In-Service Rate  |
|   | Units Later Removed   |                  |
|   | Hot Water Fuel Type   | % Electric DHW   |
| Water Temperature Gauge Card  | Gauge Cards Used      | In-Service Rate  |
|   | Thermostats Reverted  |                  |
|   | Hot Water Fuel Type   | % Electric DHW   |
| Outlet Insulating Gaskets   | Units Installed       | In-Service Rate  |
|   | Units Later Removed   |                  |

### 3.4.2 In-Service Rate

The in-service rate (ISR) represents the ratio of equipment installed and operable to the total pieces of equipment distributed and eligible for installation. For example, if 15 telephone surveys were completed for customers receiving 1 LED each, and five customers reported to still have the LED installed and operable, the ISR for this measure would be five out of 15 or 33%. In some instances equipment was installed but may have been removed later due to homeowner preferences. In these cases the equipment is no longer operable and therefore contributes negatively to the ISR. In-service rates for each measure from all eligible survey respondents are detailed in Table 3-4 and Table 3-5 for DEC and DEP, respectively.

Table 3-4: DEC NTC In-Service Rates

| Measure                                | Distributed | Installed | Removed | ISR |
|--|-------------|-----------|---------|-----|
| 9 Watt LEDs <sup>1</sup>               | 668         | 528       | 10      | 78% |
| Nightlight                             | 334         | 259       | 8       | 75% |
| 1.5 GPM Showerhead                     | 334         | 153       | 13      | 42% |
| 1.0 GPM Bathroom Faucet Aerator        | 334         | 104       | 4       | 30% |
| 1.5 GPM Kitchen Faucet Aerator         | 334         | 109       | 10      | 30% |
| Water Temperature Gauge Card           | 334         | 57        | 2       | 16% |
| Outlet Insulating Gaskets <sup>2</sup> | 4,008       | 620       | 2       | 15% |

<sup>1</sup>Note that two 9 watt LEDs were included in each kit.

<sup>2</sup>Note that 12 outlet insulating gaskets were included in each kit. The evaluation team calculated the ISR based on the total count of equipment distributed and installed.

Table 3-5: DEP NTC In-Service Rates

| Measure                                | Distributed | Installed | Removed | ISR |
|--|-------------|-----------|---------|-----|
| 9 Watt LEDs <sup>1</sup>               | 344         | 266       | 1       | 77% |
| Nightlight                             | 172         | 130       | 1       | 75% |
| 1.5 GPM Showerhead                     | 172         | 86        | 0       | 50% |
| 1.0 GPM Bathroom Faucet Aerator        | 172         | 60        | 1       | 34% |
| 1.5 GPM Kitchen Faucet Aerator         | 172         | 68        | 0       | 40% |
| Water Temperature Gauge Card           | 172         | 25        | 2       | 13% |
| Outlet Insulating Gaskets <sup>2</sup> | 2,064       | 345       | 0       | 17% |

<sup>1</sup>Note that two 9 watt LEDs were included in each kit.

<sup>2</sup>Note that 12 outlet insulating gaskets were included in each kit. The evaluation team calculated the ISR based on the total count of equipment distributed and installed.

### 3.4.3 Lighting

The two lighting measures in the kit include two 9W LEDs and an LED nightlight. Equation 3-1, Equation 3-2, and Equation 3-3 outline the algorithms utilized to estimate savings accrued by the lighting measures, with key parameters defined in Table 3-6.

Equation 3-1: LED Bulb Energy Savings

$$\Delta kWh = \frac{Watts_{BASE} - Watts_{EE}}{1000 \frac{W}{kW}} \times (1 + IE_{kWh}) \times 365.25 \frac{days}{year} \times ISR$$

Equation 3-2: LED Nightlight Energy Savings

$$\Delta kWh = \frac{Watts_{BASE} \times HOU_{BASE} - Watts_{EE} \times HOU_{EE}}{1000 \frac{W}{kW}} \times (1 + IE_{kWh}) \times 365.25 \frac{days}{year} \times ISR$$

### Equation 3-3: LED Bulb Demand Savings

$$\Delta kW = \frac{Watts_{BASE} - Watts_{EE}}{1000 \frac{W}{kW}} \times CF \times (1 + IE_{kW}) \times IS$$

**Table 3-6: Inputs for Lighting Measures Savings Calculations**

| Input                   | Units | DEC Value                         | DEP Value                        | Source  |
|-------------------------|-------|-----------------------------------|----------------------------------|---|
| Watts <sub>BASE</sub>   | Watts | LED: 27.7<br>Nightlight: 3.2      | LED: 26.8<br>Nightlight: 3.6     | LED: Federal minimum standards; Survey responses<br>Nightlight: Survey responses  |
| Watts <sub>EE</sub>     | Watts | LED: 9<br>Nightlight: 0.03        |                                  | Equipment specifications  |
| HOU                     | Hours | LED: 2.71<br>Nightlight: 12 / 24  | LED: 2.69<br>Nightlight: 12 / 24 | LED: Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018; Survey responses;<br>Nightlight (HOU <sub>BASE</sub> / HOU <sub>EE</sub> ): Pennsylvania 2016 TRM |
| CF <sub>SUMMER</sub>    | N/A   | LED: 0.1283<br>Nightlight: 0.0000 |                                  | LED: Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018<br>Nightlight: Pennsylvania 2016 TRM   |
| CF <sub>WINTER</sub>    | N/A   | LED: 0.1454<br>Nightlight: 0.0000 |                                  | LED: Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018<br>Nightlight: Pennsylvania 2016 TRM   |
| IE <sub>kWh</sub>       | N/A   | -6%                               |                                  | Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018   |
| IE <sub>kW-SUMMER</sub> | N/A   | +27%                              |                                  | Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018   |
| IE <sub>kW-WINTER</sub> | N/A   | -50%                              |                                  | Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018   |
| ISR                     | N/A   | LED: 78%<br>Nightlight: 75%       | LED: 77%<br>Nightlight: 75%      | Survey responses  |

The evaluation team paid careful attention to the effects of the Energy Independence and Security Act (EISA), which mandated higher-efficiency technologies for incandescent bulbs. In the analysis of LED bulbs, the evaluation team used participant-reported lamp types (e.g., incandescent or CFL) and assigned the EISA-compliant bulb that would produce the same lumen output as the 9W LEDs from the kits. This resulted in the use of a 53W baseline for halogen lamps, a 43W baseline for incandescents, a 13W baseline for CFLs, and a 9W baseline for LEDs. The final baseline wattage applied in the evaluation is a blended average of all the

reported lamp technologies, which resulted in a lower wattage than would be assumed if we relied on the Uniform Methods Project least efficient baseline approach. Using a blended average baseline wattage based on the participant survey results more accurately captures the diversity of bulbs replaced by the program participants and provides greater confidence in our savings estimates. Nightlights, which are not affected by EISA, were evaluated using a baseline wattage dependent on what the participant specified as the removed lamp.

Hours of use (HOU) for LED lighting was based on the 2018 Duke Energy Progress & Duke Energy Carolinas Energy Efficient Lighting & Retail LED Programs Evaluation Report, which estimated hours of use for 7 different room types. Based on installation locations from survey responses the evaluation estimated an average lighting hours of use of 2.71 for DEC and 2.69 for DEP.

Using the engineering algorithm and assumptions described above, we determined the gross energy and demand savings value for each lighting measure provided in the kit as summarized in Table 3-7 and Table 3-8.

**Table 3-7: DEC NTC Energy and Demand Savings, Lighting Measures**

| Kit Measure | Gross per bulb energy savings (kWh) | Gross per bulb summer demand savings (kW) | Gross per bulb winter demand savings (kW) |
|-------------|-------------------------------------|---|---|
| 9W LED*     | 13.5                                | 0.002                                     | 0.001                                     |
| Nightlight  | 9.8                                 | 0.000                                     | 0.000                                     |

\*Reflects savings per 9 watt LED bulb

**Table 3-8: DEP NTC Energy and Demand Savings, Lighting Measures**

| Kit Measure | Gross per bulb energy savings (kWh) | Gross per bulb demand savings (kW) | Gross per bulb winter demand savings (kW) |
|-------------|-------------------------------------|------------------------------------|---|
| 9W LED*     | 12.7                                | 0.002                              | 0.001                                     |
| Nightlight  | 10.9                                | 0.000                              | 0.000                                     |

\*Reflects savings per 9 watt LED bulb

### 3.4.4 Water Heating

The four water heating measures in the kit include a low-flow kitchen faucet aerator, a low-flow bathroom faucet aerator, a low-flow showerhead, and a water temperature gauge card which encouraged participants to set back their hot water heater thermostats. The equations below outline the algorithms utilized to estimate savings accrued by the domestic water heating measures with parameters defined in Table 3-9.

### Equation 3-4: Aerator Energy Savings

$$\Delta kWh = ISR \times ELEC \times \left[ \frac{\Delta GPM \times T_{person/day} \times N_{persons} \times 365 \frac{days}{year} \times DF \times \Delta T \times 8.3 \frac{BTU}{gal \cdot ^\circ F}}{\#_{faucets} \times 3,412 \frac{BTU}{kWh} \times RE} \right]$$

### Equation 3-5: Showerhead Energy Savings

$$\Delta kWh = ISR \times ELEC \times \left[ \frac{\Delta GPM \times T_{person/day} \times N_{persons} \times 365 \frac{days}{year} \times N_{showers-day} \times \Delta T \times 8.3 \frac{BTU}{gal \cdot ^\circ F}}{\#_{showers} \times 3,412 \frac{BTU}{kWh} \times RE} \right]$$

### Equation 3-6: Water Heater Setback Energy Savings

$$\Delta kWh = ISR \times ELEC \times \left[ \frac{A_{tank} \times \Delta T \times 8760 \frac{hrs}{yr}}{R_{tank} \times RE \times 3,412 \frac{Btu}{kWh}} + \frac{V_{HW} \times \left( 8.3 \frac{lb}{gal} \right) \times \left( 365 \frac{days}{yr} \right) \times \left( 1 \frac{Btu}{F \cdot lb} \right) \times \Delta T}{\left( 3412 \frac{Btu}{kWh} \right) \times EF_{WH}} \right]$$

### Equation 3-7: Water Heating Measures Demand Savings

$$\Delta kW = ETDF \times \Delta kWh$$

**Table 3-9: Inputs for Water Heating Measures Savings Calculations**

| Input                    | Units                      | DEC Value  | DEP Value  | Source  |
|--------------------------|----------------------------|--|--|---|
| ISR                      | N/A                        | Bath: 30%<br>Kitchen: 30%<br>Shower: 42%<br>Setback: 16%     | Bath: 34%<br>Kitchen: 40%<br>Shower: 50%<br>Setback: 13% | Survey responses  |
| ELEC                     | N/A                        | Bath: 76%<br>Kitchen: 75%<br>Shower: 73%<br>Setback: 64%     | Bath: 90%<br>Kitchen: 92%<br>Shower: 87%<br>Setback: 78% | Survey responses  |
| $\Delta$ GPM             | GPM                        | Bath: 1.2<br>Kitchen: 0.7<br>Shower: 1.0                     |  | Product specification sheet compared against federal code minimum   |
| T <sub>person/day</sub>  | Minutes                    | Bath: 1.6<br>Kitchen: 4.5<br>Shower: 7.8                     |  | Mid-Atlantic 2018 TRM   |
| N <sub>persons</sub>     | Persons                    | Bath: 3.8<br>Kitchen: 3.8<br>Shower: 3.8                     | Bath: 3.7<br>Kitchen: 3.7<br>Shower: 3.7                 | Survey responses  |
| N <sub>showers-day</sub> | Showers per Day            | Shower: 0.6  |  | Mid-Atlantic 2018 TRM   |
| DF                       | N/A                        | Bath: 70%<br>Kitchen: 50%                                    |  | Mid-Atlantic 2018 TRM   |
| $\Delta$ T               | °F                         | Bath: 25.1<br>Kitchen: 32.1<br>Shower: 44.1<br>Setback: 15.0 |  | Mid-Atlantic 2018 TRM   |
| #faucets                 | Units                      | Bath: 2.28<br>Kitchen: 1.0<br>Shower: 1.8                    |  | Bathroom: 2013 RASS Data <sup>1</sup><br>Kitchen: Pennsylvania 2016 TRM<br>Showerhead: 2015 Residential Energy Consumption Survey - South Atlantic Region |
| ETDF <sub>SUMMER</sub>   | N/A                        | Bath: 0.00013<br>Kitchen: 0.00013<br>Shower: 0.00008         |  | Pennsylvania 2016 TRM; Ratio of calculated measure demand to energy savings   |
| ETDF <sub>WINTER</sub>   | N/A                        | Bath: 0.00022<br>Kitchen: 0.00022<br>Shower: 0.00022         |  | TVA 2017 TRM; Ratio of calculated measure demand to energy savings  |
| RE                       | N/A                        | 98%  |  | Mid-Atlantic 2018 TRM   |
| A <sub>tank</sub>        | Ft <sup>2</sup>            | 24.99  |  | Mid-Atlantic 2018 TRM   |
| R <sub>tank</sub>        | °F·ft <sup>2</sup> ·hr/BTU | 8.0  |  | Mid-Atlantic 2018 TRM   |
| V <sub>HW</sub>          | GPD                        | 7.3  |  | Pennsylvania 2016 TRM   |
| EF <sub>WH</sub>         | N/A                        | 0.945  |  | Mid-Atlantic 2018 TRM   |

<sup>1</sup> Duke Energy 2013 Residential Appliance Saturation Survey. North and South Carolina respondents.

The evaluation team determined that the 2018 Mid-Atlantic and 2016 Pennsylvania's TRM provided the most applicable and rigorous algorithm by including factors such as standby losses and water volume savings, differentiating between kitchen and bathroom water use, and more comprehensive algorithms. Neither the Mid-Atlantic nor Pennsylvania TRM provide information on winter demand savings, therefore the evaluation team used assumptions from the 2017 Tennessee Valley Authority TRM to calculate winter demand savings.

Using the applicable engineering algorithm and assumptions described above, the gross energy and demand savings value were estimated for each domestic hot water measure provided in the kit as summarized in Table 3-10 and Table 3-11.

**Table 3-10: DEC NTC Gross Energy Savings, Water Heating Measures**

| Kit Measure                     | Gross per unit energy savings (kWh) | Gross per unit summer demand savings (kW) | Gross per unit winter demand savings (kW) |
|---------------------------------|-------------------------------------|---|---|
| 1.5 GPM Showerhead              | 121.6                               | 0.010                                     | 0.027                                     |
| 1.0 GPM Bathroom Faucet Aerator | 12.4                                | 0.002                                     | 0.003                                     |
| 1.5 GPM Kitchen Faucet Aerator  | 38.2                                | 0.005                                     | 0.008                                     |
| Water Temperature Gauge Card    | 23.7                                | 0.003                                     | 0.005                                     |

**Table 3-11: DEP NTC Gross Energy Savings, Water Heating Measures**

| Kit Measure                     | Gross per unit energy savings (kWh) | Gross per unit summer demand savings (kW) | Gross per unit winter demand savings (kW) |
|---------------------------------|-------------------------------------|---|---|
| 1.5 GPM Showerhead              | 168.1                               | 0.013                                     | 0.038                                     |
| 1.0 GPM Bathroom Faucet Aerator | 16.4                                | 0.002                                     | 0.004                                     |
| 1.5 GPM Kitchen Faucet Aerator  | 62.3                                | 0.008                                     | 0.014                                     |
| Water Temperature Gauge Card    | 23.5                                | 0.003                                     | 0.005                                     |

### 3.4.5 Air Infiltration

Equation 3-8 and Equation 3-9 outline the algorithms utilized to estimate savings accrued by the outlet insulating gaskets. The parameters are defined in Table 3-12.

#### Equation 3-8: Air Infiltration Energy Savings

$$\Delta kWh = ISR \times gaskets \times \frac{\Delta CFM}{gasket} \times \frac{kWh}{CFM}$$

#### Equation 3-9: Air Infiltration Demand Savings

$$\Delta kW = ETDF \times \Delta kWh$$

**Table 3-12: Inputs for Air Infiltration Measures Savings Calculations**

| Input                  | Units   | DEC Value | DEP Value | Source  |
|------------------------|---------|-----------|-----------|---|
| ISR                    | N/A     | 17.4%     | 16.7%     | Survey responses  |
| Gaskets per kit        | N/A     | 12        |           | Duke Energy Kit Materials   |
| $\Delta$ CFM/gasket    | CFM     | 0.23      |           | 2015 DEC Energy Efficiency Education Program Evaluation Final Report  |
| kWh/CFM                | kWh/CFM | 14.64     | 14.46     | 2016 Duke Energy RASS Data <sup>1</sup> ,<br>2015 DEC Energy Efficiency Education Program Evaluation Final Report |
| ETDF <sub>SUMMER</sub> | N/A     | 0.00127   |           | Pennsylvania 2016 TRM; Ratio of calculated measure demand to energy savings                                       |
| ETDF <sub>WINTER</sub> | N/A     | 0.00005   |           | TVA 2017 TRM; Ratio of calculated measure demand to energy savings  |

<sup>1</sup>Duke Energy 2016 Residential Appliance Saturation Survey. DEC and DEP respondents.

Since very few regional or national studies exist that document outlet gasket savings this analysis used parameters estimated from a prior evaluation of the Energy Efficiency Education in Schools program conducted in the Duke Energy Carolinas service territory<sup>3</sup>. This previous evaluation estimated reduction in infiltration as a factor of cubic feet per minute (CFM) due to the installation of a gasket. We also considered the previous evaluation's modeled energy savings for reduced infiltration and calibrated the savings value based on the saturation of heating and cooling equipment technologies reported in Duke Energy's 2016 residential appliance saturation study to ensure the savings value represented the NTC program participants. All DEC and DEP responses recorded in the saturation study were used for model calibration.

Using the engineering algorithm described above, we determined the gross energy and demand savings value for outlet insulating gaskets provided in the kit as summarized in Table 3-13 and Table 3-14.

**Table 3-13: DEC NTC Gross Energy Savings, Air Infiltration Measures**

| Kit Measure     | Gross per kit energy savings (kWh) | Gross per kit summer demand savings (kW) | Gross per kit winter demand savings (kW) |
|-----------------|------------------------------------|--|--|
| Outlet Gaskets* | 6.3                                | 0.0081                                   | 0.0003                                   |

\*Reflects savings for the 12 outlet gaskets per kit

<sup>3</sup> The Cadmus Group (2015). *Duke Energy Carolinas' Energy Efficiency Education for Schools Program Evaluation*. Retrieved December 18, 2018 from <https://dms.psc.sc.gov/Attachments/Matter/ab859368-1ab3-44e5-ad5d-d6a9fb6ba2f5>



**Table 3-14: DEP NTC Gross Energy Savings, Air Infiltration Measures**

| Kit Measure     | Gross per kit energy savings (kWh) | Gross per kit summer demand savings (kW) | Gross per kit winter demand savings (kW) |
|-----------------|------------------------------------|--|--|
| Outlet Gaskets* | 6.8                                | 0.0086                                   | 0.0003                                   |

\*Reflects savings for the 12 outlet gaskets per kit

### 3.4.6 Behavioral Analysis

Similarly to how we conducted the impact evaluation of the actual kit measures, the evaluation team estimated the behavioral impacts using the results of the completed surveys in conjunction with engineering algorithms. The survey contained the following questions from which we gauged what sort of behavioral changes were induced by the kit:

- Since your child learned about energy conservation at school and signed up for your energy kit from Duke Energy, what new behaviors has your child adopted to help save energy in your home?
- Since receiving your energy kit from Duke Energy, what new behaviors have you adopted to help save energy in your home?

Survey participants were encouraged to answer as an open-response, rather than choosing behaviors from a list. The typical responses included turning off lights when not in a room, turning off electronics when not in use, taking shorter showers, turning off water when brushing teeth or washing hands, turning off heating and air conditioning when not home, changing thermostat settings, and using fans instead of air conditioning.

The evaluation team estimated the initial impacts of these behavioral changes for the proportion of participants who confirmed taking action (i.e., the in-service rate for the behavioral change) using engineering algorithms similar to those algorithms used to estimate the impacts of the kit measures. We then adjusted these initial savings according to the results of some key survey questions such as:

- On a scale of 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential”, how much influence did Duke Energy’s kit and materials on saving energy have on your decision to make changes in your energy using behaviors?
- Did you read the information about how to save energy in the booklet that came in the kit?
- During the school year, did you receive any Home Energy Reports from Duke Energy?

The savings calculation methodologies and adjustment factors are detailed in the following subsections.

**3.4.6.1 Adjustment factors**

Several adjustments were made to the initial calculated savings associated with each behavior to more accurately reflect the extent to which the behaviors were a result of the energy saving kit.

***In-Service Rate (ISR)***

Similar to kit measure ISRs, the behavioral ISR reflects what percentage of the known population is expected to have adopted this behavior. Separate ISR values were calculated for parent and children adoption rates, which are summarized in Table 3-15 and Table 3-16 for DEC and DEP, respectively.

**Table 3-15: DEC Behavioral Savings In-Service Rates**

| Behavior                   | Child Adoption Rate | Parent Adoption Rate |
|----------------------------|---------------------|----------------------|
| Turn off lights            | 37%                 | 10%                  |
| Turn off electronics       | 25%                 | 16%                  |
| Take shorter showers       | 19%                 | 16%                  |
| Turn off heat / CAC        | N/A                 | 5% / 12%             |
| Change thermostat settings | N/A                 | 22%                  |
| Use fans instead of CAC    | N/A                 | 15%                  |

**Table 3-16: DEP Behavioral Savings In-Service Rates**

| Behavior                   | Child Adoption Rate | Parent Adoption Rate |
|----------------------------|---------------------|----------------------|
| Turn off lights            | 32%                 | 13%                  |
| Turn off electronics       | 27%                 | 19%                  |
| Take shorter showers       | 16%                 | 9%                   |
| Turn off heat / CAC        | N/A                 | 5% / 9%              |
| Change thermostat settings | N/A                 | 22%                  |
| Use fans instead of CAC    | N/A                 | 12%                  |

***Kit Influence***

We then adjusted the savings by how the level of reported influence the kit had on each respondent's behavioral changes. Participants were asked to rate how heavily the kit influenced their behavioral changes on a scale of 0 to 10. The kit influence adjustment factor was set at the weighted average of participant responses as shown in Table 3-17.

**Table 3-17: Behavioral Savings Kit Influence Adjustment Factor**

| Influence Score | DEC Response Rate | DEP Response Rate |
|-----------------|-------------------|-------------------|
| 0               | 2.0%              | 3.2%              |
| 1               | 0.4%              | 0.0%              |
| 2               | 0.0%              | 0.8%              |
| 3               | 0.4%              | 1.6%              |
| 4               | 1.2%              | 0.0%              |
| 5               | 5.6%              | 5.6%              |
| 6               | 8.8%              | 2.4%              |
| 7               | 16.3%             | 16.8%             |
| 8               | 19.5%             | 13.6%             |
| 9               | 7.2%              | 8.0%              |
| 10              | 38.6%             | 51.3%             |
| <b>Weighted</b> | <b>81%</b>        | <b>83%</b>        |

***Kit Informational Materials***

The energy saving kit came with some literature on various other ways participants could save energy in their homes. While participants did self-report the level of influence the kit had on their decision, many respondents who claimed to be influenced by the program also responded that they did not read the kit informational materials, which seems counterintuitive. Nexant used the kit informational materials adjustment factor to correct for apparent bias in the self-reported answers on kit influence. Nexant found that 245 out of 334 respondents read the provided literature and set the adjustment factor at 73% for DEC and 128 out of 172 respondents read the provided literature and set the adjustment factor at 74% for DEP.

***Persistence***

While behavioral changes designed to increase energy efficiency or conservation can result in immediate impacts, the initial activity is expected to wane in the absence of consistent intervention. This decay of energy savings resulting from a change in behavior has been carefully documented through random control trials of Home Energy Report programs such as Duke Energy's MyHER program or program's implemented in other jurisdictions by Oracle (formally Opower). The rate at which energy savings persists after a customer receives a report depends on the frequency and longevity that a customer receives follow-up reports.

Because the kit provides information to educate and encourage participants to reduce their energy impacts, the evaluation team felt it was prudent to estimate a persistence rate based on this one-time exposure. We relied on a literature review to estimate how savings may persist based on the NTC program design. Typical persistence rates for Home Energy Report programs ranges from 80% - 90%, i.e., a participant's estimated savings from behavioral changes is expected to decay approximately 10% - 20% per year if no more Home Energy

Reports are provided. This persistence rate is based on two consecutive years of receiving monthly reports. However, if a participant receives minimal follow-up after the initial report, the persistence of any initial behavioral impacts is expected to dissipate rapidly. Because participants in the NTC program are treated only once with regard to behavioral changes, the evaluation team estimated a persistence rate of 28%<sup>4</sup>. This estimate is based on research which modeled the persistence of customers who received four quarterly Home Energy Reports after which treatment was ceased<sup>5</sup>. For this evaluation, we calculated the persistence rate as the ratio of the expected average behavioral savings per day (0.257 kWh DEC and 0.255 kWh DEP) to the decay coefficient (0.924 kWh DEC and 0.916 kWh DEP) associated with customers receiving four quarterly reports. Therefore, it is expected the initial impact generated from behavioral changes in the NTC program would fully dissipate approximately three to four months after receiving the kit.

### **Adjustment Factor Summary**

Table 3-18 below provides the adjustment factors which are applied to the behavioral savings described in Section 3.4.6.2.

**Table 3-18: Behavioral Savings Adjustment Factors**

| Adjustment Factor           | DEC               | DEP               |
|-----------------------------|-------------------|-------------------|
| In-service rate             | Varies by measure | Varies by measure |
| Kit influence               | 81%               | 83%               |
| Kit informational materials | 73%               | 74%               |
| Persistence                 | 28%               | 28%               |

### **3.4.6.2 Behavioral Savings Calculations**

#### ***Turn off lights***

The evaluation team calculated the savings associated with the behavior of turning off lights after exiting a room by estimating the likely reduction in lighting operating hours. The reduction in hours was used in lieu of the hours of use term in the standard lighting equations (Equation 3-1, Equation 3-2, and Equation 3-3) as illustrated in Equation 3-10 and Equation 3-11.

<sup>4</sup> The persistence rate is calculated based on the ratio of the daily estimated savings impact (0.257 kWh DEC and 0.255 kWh DEP) to the the daily rate of decay of savings (0.924 kWh DEC and 0.916 kWh DEP). For both DEC and DEP this ratio is 28%.

<sup>5</sup> Allcott, H, Rogers, T., The Short-Run and Long-Run Effects of Behavioral Interventions: Experimental Evidence from Energy Conservation. American Economic Review 2014, 104(10): 3003-3037.

**Equation 3-10: Turn Off Lights Energy Savings**

$$\Delta kWh = \frac{Watts_{BASE}}{1000 \frac{W}{kW}} \times HOU_{reduced} \times (1 + IE_{kWh}) \times 365.25 \frac{days}{year} \times Adj. Factors$$

**Equation 3-11: Turn Off Lights Demand Savings**

$$\Delta kW = ETDF * kWh savings \times Adj. Factors$$

The calculations assumed the wattage of the lamps associated with the reported behavioral change was equivalent to the average reported baseline lamp wattage found in the lighting analysis of 27.7 watts for DEC and 26.8 watts for DEP. The hours of use term in the standard lighting equations relied on survey responses as to where the light bulbs were installed. Each possible room within the home had an associated daily hours of use as provided by the 2018 DEP and DEC Energy Efficient Lighting and Retail LED Program Evaluation Report. The likely reduction in operating hours was determined by calculating each possible difference in lighting hours between room types (e.g. the difference in the living room HOU and the dining room HOU) as shown below in Figure 3-1.

**Figure 3-1: Calculation of Likely Lighting HOU Reduction**

| Possible Reduction in Hours |             | Living Room | Dining Room | Bedroom     | Kitchen     | Bathroom    | Basement    | Outdoors    | Don't Know  |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                             |             | <b>3.23</b> | <b>4.27</b> | <b>1.83</b> | <b>4.26</b> | <b>1.51</b> | <b>3.75</b> | <b>4.25</b> | <b>1.97</b> |
| Living Room                 | <b>3.23</b> | 0.00        | 1.04        | 0.00        | 1.03        | 0.00        | 0.52        | 1.02        | 0.00        |
| Dining Room                 | <b>4.27</b> | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |
| Bedroom                     | <b>1.83</b> | 1.40        | 2.44        | 0.00        | 2.43        | 0.00        | 1.92        | 2.42        | 0.14        |
| Kitchen                     | <b>4.26</b> | 0.00        | 0.01        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |
| Bathroom                    | <b>1.51</b> | 1.72        | 2.76        | 0.32        | 2.75        | 0.00        | 2.24        | 2.74        | 0.46        |
| Basement                    | <b>3.75</b> | 0.00        | 0.52        | 0.00        | 0.51        | 0.00        | 0.00        | 0.50        | 0.00        |
| Outdoors                    | <b>4.25</b> | 0.00        | 0.02        | 0.00        | 0.01        | 0.00        | 0.00        | 0.00        | 0.00        |
| Don't Know                  | <b>1.97</b> | 1.26        | 2.30        | 0.00        | 2.29        | 0.00        | 1.78        | 2.28        | 0.00        |

The evaluation team calculated the likely reduction in daily runtime to be 0.61 hours, or 222 hours annually. The savings were calculated and adjusted based on this key assumption.

Energy savings were calculated at 5.8 kWh for DEC and 5.6 kWh for DEP (before applying adjustment factors). Because this behavioral change was completed by both children and parents, we applied adjustment factors and calculated adjusted savings separately for children and parents using their respective ISR. The parameter inputs and final savings are detailed in Table 3-19 and Table 3-20.

**Table 3-19: DEC Behavioral Savings Achieved by Turning off Lights (per home)**

| Input  | Units      | Value         | Source  |
|--|------------|---------------|---|
| Watts  | Watts      | 27.7          | Federal minimum standards   |
| HOU <sub>Reduced</sub>                                   | Hours      | 0.61          | Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018;  |
| IE <sub>kWh</sub>  | N/A        | -6%           | Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018;  |
| Summer Energy to Demand Factor (ETDF <sub>SUMMER</sub> ) | N/A        | 0.00017       | Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018; Ratio of evaluated lighting measure demand to energy savings |
| Winter Energy to Demand Factor (ETDF <sub>WINTER</sub> ) | N/A        | 0.00008       | Tennessee Valley Authority 2017 TRM; Ratio of evaluated lighting measure demand to energy savings   |
| <b>Energy Savings</b>                                    | <b>kWh</b> | <b>5.8</b>    | <b>Calculated from algorithm</b>  |
| <b>Summer Demand Savings</b>                             | <b>kW</b>  | <b>0.001</b>  | <b>Calculated from algorithm</b>  |
| <b>Winter Demand Savings</b>                             | <b>kW</b>  | <b>0.0004</b> | <b>Calculated from algorithm</b>  |
| Adjustment Factors                                       |            |               |   |
| ISR  | Influence  | Kit Info.     | Persistence   |
| Child: 37%<br>Parent: 10%                                | 81%        | 73%           | 28%   |
| Savings from child behavior (Energy and Summer Demand):  |            |               | <b>0.4 kWh; 0.0001 kW</b>   |
| Savings from parent behavior (Energy and Summer Demand): |            |               | <b>0.1 kWh; 0.0000 kW</b>   |
| <b>Total Energy Savings:</b>                             |            |               | <b>0.4 kWh</b>  |
| <b>Total Summer Demand Savings:</b>                      |            |               | <b>0.0001 kW</b>  |
| <b>Total Winter Demand Savings:</b>                      |            |               | <b>0.0000 kW</b>  |

\*Totals may not sum to due to rounding

**Table 3-20: DEP Behavioral Savings Achieved by Turning off Lights (per home)**

| Input  | Units      | Value         | Source  |
|--|------------|---------------|---|
| Watts  | Watts      | 26.8          | Federal minimum standards   |
| HOU <sub>Reduced</sub>                                   | Hours      | 0.61          | Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018   |
| IE <sub>kWh</sub>  | N/A        | -6%           | Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018   |
| Summer Energy to Demand Factor (ETDF <sub>SUMMER</sub> ) | N/A        | 0.00018       | Opinion Dynamics - Energy Efficient Lighting & Retail LED Programs for Duke Energy Progress and Carolinas, April 2018; Ratio of evaluated lighting measure demand to energy savings |
| Winter Energy to Demand Factor (ETDF <sub>WINTER</sub> ) | N/A        | 0.00008       | Tennessee Valley Authority 2017 TRM; Ratio of evaluated lighting measure demand to energy savings   |
| <b>Energy Savings</b>                                    | <b>kWh</b> | <b>5.6</b>    | <b>Calculated from algorithm</b>  |
| <b>Summer Demand Savings</b>                             | <b>kW</b>  | <b>0.001</b>  | <b>Calculated from algorithm</b>  |
| <b>Winter Demand Savings</b>                             | <b>kW</b>  | <b>0.0004</b> | <b>Calculated from algorithm</b>  |
| Adjustment Factors                                       |            |               |   |
| ISR  | Influence  | Kit Info.     | Persistence   |
| Child: 32%<br>Parent: 13%                                | 83%        | 74%           | 28%   |
| Savings from child behavior (Energy and Summer Demand):  |            |               | <b>0.3 kWh; 0.0001 kW</b>   |
| Savings from parent behavior (Energy and Summer Demand): |            |               | <b>0.1 kWh; 0.0000 kW</b>   |
| <b>Total Energy Savings:</b>                             |            |               | <b>0.4 kWh</b>  |
| <b>Total Summer Demand Savings:</b>                      |            |               | <b>0.0001 kW</b>  |
| <b>Total Winter Demand Savings:</b>                      |            |               | <b>0.0000 kW</b>  |

\*Totals may not sum to due to rounding

### **Turn off electronics**

The evaluation team used evaluations for “Smart Strips” or “Controlled Power Strips” in order to estimate savings achieved by turning off electronics when not in use. Smart strips are multi-plug power strips with the ability to automatically disconnect specific connected loads depending upon the power draw of a control load which is also plugged into the strip. Power is disconnected from the controlled outlets when the control load power draw is reduced below a certain adjustable threshold, thus turning off all accompanying appliances plugged into the strip.

We researched current studies on smart strip savings (summarized in Table 3-21) and used the average value as the calculated savings amount for this behavioral change.



**Table 3-21: Smart Strip Savings**

| Source                          | Savings (kWh) |
|---------------------------------|---------------|
| 2016 Ameren Missouri Evaluation | 54.0          |
| Duke Energy Potential Study     | 74.5          |
| Illinois 2018 TRM               | 55.0          |
| Mid-Atlantic 2018 TRM           | 50.7          |
| Pennsylvania 2016 TRM           | 61.1          |
| <b>Average</b>                  | <b>59.0</b>   |

The demand savings were calculated from the energy savings using an assumed hours of use value of 6,351 and an assumed coincidence factor of 80%, both from the 2018 Mid-Atlantic TRM. Equation 3-12 and Equation 3-13 present the algorithms used to calculate energy and demand savings for the behavior change of turning off electronics.

**Equation 3-12: Turn Off Electronics Energy Savings**

$$\Delta kWh = \text{Average of deemed savings} \times \text{Adj. Factors}$$

**Equation 3-13: Turn Off Electronics Demand Savings**

$$\Delta kW = kWh \text{ savings} / HOU \times CF \times \text{Adj. Factors}$$

Energy savings (before applying adjustment factors) were calculated at 59.0 kWh. Because this behavioral change was completed by both children and parents, we applied adjustment factors and calculated adjusted savings separately for children and parents using their respective ISR. The final savings are detailed in Table 3-22 and Table 3-35.

**Table 3-22: DEC Behavioral Savings Achieved by Turning off Electronics**

| Input  | Units      | Value        | Source  |
|--|------------|--------------|---|
| Summer Coincidence factor (CF)                           | N/A        | 0.8          | Mid-Atlantic 2018 TRM                                     |
| Winter Coincidence factor (CF)                           | N/A        | 0.8          | Engineering Judgment                                      |
| HOU  | hours      | 6,351        | Mid-Atlantic 2018 TRM                                     |
| <b>Energy Savings</b>                                    | <b>kWh</b> | <b>59.0</b>  | <b>Average of TRMs and prior studies (see Table 3-21)</b> |
| <b>Summer Demand Savings</b>                             | <b>kW</b>  | <b>0.007</b> | <b>Calculated from algorithm</b>                          |
| <b>Winter Demand Savings</b>                             | <b>kW</b>  | <b>0.007</b> | <b>Calculated from algorithm</b>                          |
| ISR  | Influence  | Kit Info.    | Persistence   |
| Child: 25%<br>Parent: 16%                                | 81%        | 73%          | 28%   |
| Savings from child behavior (Energy and Summer Demand):  |            |              | <b>2.5 kWh; 0.0003 kW</b>                                 |
| Savings from parent behavior (Energy and Summer Demand): |            |              | <b>1.6 kWh; 0.0002 kW</b>                                 |
| <b>Total Energy Savings:</b>                             |            |              | <b>4.1 kWh</b>  |
| <b>Total Summer Demand Savings:</b>                      |            |              | <b>0.0005 kW</b>  |
| <b>Total Winter Demand Savings:</b>                      |            |              | <b>0.0005 kW</b>  |

\*Totals may not sum to due to rounding

**Table 3-23: DEP Behavioral Savings Achieved by Turning off Electronics**

| Input  | Units      | Value        | Source  |
|--|------------|--------------|---|
| Summer Coincidence factor (CF)                           | N/A        | 0.8          | Pennsylvania 2016 TRM                                     |
| Winter Coincidence factor (CF)                           | N/A        | 0.8          | Engineering Judgment                                      |
| HOU  | hours      | 6,351        | Pennsylvania 2016 TRM                                     |
| <b>Energy Savings</b>                                    | <b>kWh</b> | <b>59.0</b>  | <b>Average of TRMs and prior studies (see Table 3-21)</b> |
| <b>Summer Demand Savings</b>                             | <b>kW</b>  | <b>0.007</b> | <b>Calculated from algorithm</b>                          |
| <b>Winter Demand Savings</b>                             | <b>kW</b>  | <b>0.007</b> | <b>Calculated from algorithm</b>                          |
| ISR  | Influence  | Kit Info.    | Persistence   |
| Child: 27%<br>Parent: 19%                                | 83%        | 74%          | 28%   |
| Savings from child behavior (Energy and Summer Demand):  |            |              | <b>2.8 kWh; 0.0003 kW</b>                                 |
| Savings from parent behavior (Energy and Summer Demand): |            |              | <b>1.9 kWh; 0.0002 kW</b>                                 |
| <b>Total Energy Savings:</b>                             |            |              | <b>4.6 kWh</b>  |
| <b>Total Summer Demand Savings:</b>                      |            |              | <b>0.0006 kW</b>  |
| <b>Total Winter Demand Savings:</b>                      |            |              | <b>0.0000 kW</b>  |

\*Totals may not sum to due to rounding

**Take shorter showers**

To determine savings achieved by a reduction in shower time, the evaluation team estimated how much time could be reduced based on actual shower length data. To do this, we utilized data provided by Aquacraft's 2011 Analysis of Water Use in New Single-Family Homes<sup>6</sup> (summarized in left two columns of Table 3-24).

We set the target shower length equal to the typical length used in national energy efficiency evaluations (7.8 to 8.4 minutes<sup>7</sup>) and calculated how much opportunity existed in the data for people to reduce their shower times to the national average. Energy and demand savings were calculated based on Equation 3-14 and Equation 3-15, respectively.

**Equation 3-14: Take Shorter Shower Energy Savings**

$$\Delta kWh = ELEC \times GPM_{retrofit} \times T_{person/day} \times N_{showers-day} \times 365 \frac{days}{year} \times \left[ \frac{\Delta T \times 8.33 \frac{BTU}{gal \cdot ^\circ F}}{3,412 \frac{BTU}{kWh} \times RE} \right] \times Adj. Factors$$

**Equation 3-15: Take Shorter Shower Demand Savings**

$$\Delta kW = ETDF \times Energy Savings \times Adj. Factors$$

**Table 3-24: Reduction in Shower Time Data and Calculation**

| Shower Length (minutes) | Responses | Possible Reduction (minutes) |
|-------------------------|-----------|------------------------------|
| 2                       | 0%        | -                            |
| 4                       | 2%        | -                            |
| 6                       | 17%       | -                            |
| 8                       | 35%       | GOAL                         |
| 10                      | 24%       | 2                            |
| 12                      | 14%       | 4                            |
| 14                      | 4%        | 6                            |
| 16                      | 2%        | 8                            |
| 18                      | 0%        | 10                           |
| 20                      | 1%        | 12                           |
| <b>Weighted Average</b> |           | <b>3.47</b>                  |

<sup>6</sup> <http://www.aquacraft.com/wp-content/uploads/2015/10/Analysis-of-Water-Use-in-New-Single-Family-Homes.pdf>

<sup>7</sup> Based on reported shower times from 2016 Indiana TRM, 2015 Illinois TRM, 2012 TVA Saturation Survey, 2015 Maine TRM, and the 2016 Pennsylvania TRM.

We calculated the likely reduction in shower length to be 3.47 minutes per shower, or 12.7 hours per person annually. The savings were calculated and adjusted based on this key assumption as detailed in Table 3-25 and Table 3-26.

**Table 3-25: DEC Behavioral Savings Achieved by Taking Shorter Showers**

| Input  | Units              | Value        | Source   |
|--|--------------------|--------------|--|
| GPM  | GPM                | 1.96         | Survey responses, Federal minimum standards                    |
| T <sub>person/day</sub>                                  | Minutes            | 3.47         | Aquacraft 2011 Report  |
| N <sub>persons/day</sub>                                 | Showers/Person/Day | 0.6          | Mid-Atlantic 2018 TRM  |
| 365  | Days/Year          | 365          | -  |
| ΔT   | °F                 | 44.1         | Mid-Atlantic 2018 TRM  |
| ELEC   | %                  | 66.9         | Duke Energy 2016 RASS Data (DEC Respondents)                   |
| RE   | %                  | 98           | Mid-Atlantic 2018 TRM  |
| Summer Energy to Demand Factor (ETDF)                    | N/A                | 0.000008     | Ratio of evaluated showerhead measure demand to energy savings |
| Winter Energy to Demand Factor (ETDF)                    | N/A                | 0.00022      | Ratio of evaluated showerhead measure demand to energy savings |
| <b>Energy Savings</b>                                    | <b>kWh</b>         | <b>109.3</b> | <b>Calculated</b>  |
| <b>Summer Demand Savings</b>                             | <b>kW</b>          | <b>0.009</b> | <b>Calculated</b>  |
| <b>Winter Demand Savings</b>                             | <b>kW</b>          | <b>0.025</b> | <b>Calculated</b>  |
| ISR  | Influence          | Kit Info.    | Persistence  |
| Child: 19%<br>Parent: 16%                                | 81%                | 73%          | 28%  |
| Savings from child behavior (Energy and Summer Demand):  |                    |              | <b>3.5 kWh; 0.0003 kW</b>                                      |
| Savings from parent behavior (Energy and Summer Demand): |                    |              | <b>2.8 kWh; 0.0002 kW</b>                                      |
| <b>Total Energy Savings:</b>                             |                    |              | <b>6.3 kWh</b>   |
| <b>Total Summer Demand Savings:</b>                      |                    |              | <b>0.0005 kW</b>   |
| <b>Total Winter Demand Savings:</b>                      |                    |              | <b>0.0014 kW</b>   |

\*Totals may not sum to due to rounding

**Table 3-26: DEP Behavioral Savings Achieved by Taking Shorter Showers**

| Input  | Units              | Value            | Source   |
|--|--------------------|------------------|--|
| GPM  | GPM                | 1.89             | Survey responses, Federal minimum standards                    |
| T <sub>person/day</sub>                                  | Minutes            | 3.47             | Aquacraft 2011 Report  |
| N <sub>persons/day</sub>                                 | Showers/Person/Day | 0.6              | Mid-Atlantic 2018 TRM  |
| 365  | Days/Year          | 365              | -  |
| ΔT   | °F                 | 44.1             | Mid-Atlantic 2018 TRM  |
| ELEC   | %                  | 74               | Duke Energy 2016 RASS Data (DEP Respondents)                   |
| RE   | %                  | 98               | Mid-Atlantic 2018 TRM  |
| Summer Energy to Demand Factor (ETDF)                    | N/A                | 0.000008         | Ratio of evaluated showerhead measure demand to energy savings |
| Winter Energy to Demand Factor (ETDF)                    | N/A                | 0.00022          | Ratio of evaluated showerhead measure demand to energy savings |
| <b>Energy Savings</b>                                    | <b>kWh</b>         | <b>117.3</b>     | <b>Calculated</b>  |
| <b>Summer Demand Savings</b>                             | <b>kW</b>          | <b>0.009</b>     | <b>Calculated</b>  |
| <b>Winter Demand Savings</b>                             | <b>kW</b>          | <b>0.026</b>     | <b>Calculated</b>  |
| <b>ISR</b>   | <b>Influence</b>   | <b>Kit Info.</b> | <b>Persistence</b>   |
| Child: 16%<br>Parent: 9%                                 | 83%                | 74%              | 28%  |
| Savings from child behavior (Energy and Summer Demand):  |                    |                  | <b>3.1 kWh; 0.0003 kW</b>                                      |
| Savings from parent behavior (Energy and Summer Demand): |                    |                  | <b>1.9 kWh; 0.0001 kW</b>                                      |
| <b>Total Energy Savings:</b>                             |                    |                  | <b>5.0 kWh</b>   |
| <b>Total Summer Demand Savings:</b>                      |                    |                  | <b>0.0004 kW</b>   |
| <b>Total Winter Demand Savings:</b>                      |                    |                  | <b>0.0011 kW</b>   |

\*Totals may not sum to due to rounding

**Turn off furnace or central air conditioner (CAC) or use fan instead of CAC**

To emulate the impacts of the behavior of customers who turned off the heating or cooling mode of their HVAC system, the evaluation team used the effects of a smart thermostat as a proxy. A smart thermostat is a Wi-Fi enabled programmable thermostat that typically includes multiple functionalities that allow for a reduction in energy use. Most notably the devices are a part of the home's network and regularly check to see what other items are connected to the network as well as utilize motion detectors. In the event that no users are actively connected to the home's network and minimal movement is detected, the thermostat will go into auto away mode. Given this functionality, the evaluation team believes this measure to be an appropriate proxy for the behavior observed by participants of turning off their furnace or air conditioner.

Equation 3-16 and Equation 3-17 present the algorithms used to calculate energy savings for reduced cooling and heating loads. Demand savings were deemed as zero based on

assumptions provided in multiple TRMs including the 2018 Mid-Atlantic TRM and 2016 Pennsylvania.

**Equation 3-16: Turn off CAC or use fan mode energy savings algorithm**

$$\Delta kWh_{cool} = EUI_{cool} \times Area \times Tstat_{cool} \times Adj. Factors$$

**Equation 3-17: Turn off furnace energy savings algorithm**

$$\Delta kWh_{heat} = EUI_{heat} \times Area \times Tstat_{heat} \times ELEC \times Adj. Factors$$

The evaluation team researched current studies on smart thermostat savings (summarized in Table 3-27). The baseline for all selected studies was a manual mercury thermostat. The median savings observed in the data was then applied to the annual electric heating and cooling consumption for homes in North and South Carolina as provided in the US Energy Information Administration's 2009 Residential Energy Consumption Survey (RECS).

**Table 3-27: Smart Thermostat Savings**

| Study Location               | Cooling Savings | Heating Savings |
|------------------------------|-----------------|-----------------|
| Vectren Indiana <sup>8</sup> | 13.9%           | 12.5%           |
| NIPSCO <sup>9</sup>          | 16.1%           | 13.4%           |
| National Grid <sup>10</sup>  | 10.0%           | N/A             |
| <b>Median</b>                | <b>13.9%</b>    | <b>13.0%</b>    |

The calculated savings for turning off the air conditioning and for using fans instead of air conditioning are based on the cooling savings only, while the calculated savings for turning off the furnace is based on the heating savings only. We calculated and adjusted savings based on the key assumptions as detailed in Table 3-28 and Table 3-30 for DEC and Table 3-29 and Table 3-31 for DEP.

<sup>8</sup> Evaluation of 2013–2014 Programmable and Smart Thermostat Program for Vectren Corporation. The Cadmus Group, January 2015

<sup>9</sup> Evaluation of the 2013–2014 Programmable and Smart Thermostat Program for Northern Indiana Public Service Company. The Cadmus Group, January 2015

<sup>10</sup> Evaluation of 2013–2014 Smart Thermostat Pilots: Home Energy Monitoring, Automatic Temperature Control, Demand Response. The Cadmus Group, July 2015

**Table 3-28: DEC Behavioral Savings Achieved by Changing AC Use Patterns**

| Input   | Units               | Value            | Source   |
|---|---------------------|------------------|--|
| Cooling Energy Use Intensity (EUI <sub>cool</sub> ) | kWh/ft <sup>2</sup> | 1.4522           | 2009 RECS Data, North and South Carolina         |
| Average Cooled Area (Area <sub>cool</sub> )         | ft <sup>2</sup>     | 1,495            | 2009 RECS Data, North and South Carolina         |
| T-stat savings <sub>cool</sub>                      | %                   | 13.9%            | Multiple Smart Thermostat Studies as noted above |
| <b>Energy Savings</b>                               | <b>kWh</b>          | <b>301.8</b>     | <b>Calculated</b>                                |
| <b>Summer Demand Savings</b>                        | <b>kW</b>           | <b>0.000</b>     | <b>Deemed</b>                                    |
| <b>Winter Demand Savings</b>                        | <b>kW</b>           | <b>0.000</b>     | <b>Deemed</b>                                    |
| <b>Turning off Air Conditioning when Not Home</b>   |                     |                  |  |
| <b>ISR</b>  | <b>Influence</b>    | <b>Kit Info.</b> | <b>Persistence</b>                               |
| 12%   | 81%                 | 73%              | 28%  |
| <b>Total Energy Savings:</b>                        |                     |                  | <b>6.0 kWh</b>                                   |
| <b>Total Demand Savings:</b>                        |                     |                  | <b>0.000 kW</b>                                  |
| <b>Total Winter Demand Savings:</b>                 |                     |                  | <b>0.000 kW</b>                                  |
| <b>Using Fans Instead of Air Conditioning</b>       |                     |                  |  |
| <b>ISR</b>  | <b>Influence</b>    | <b>Kit Info.</b> | <b>Persistence</b>                               |
| 15%   | 81%                 | 73%              | 28%  |
| <b>Total Energy Savings:</b>                        |                     |                  | <b>7.3 kWh</b>                                   |
| <b>Total Summer Demand Savings:</b>                 |                     |                  | <b>0.000 kW</b>                                  |
| <b>Total Winter Demand Savings:</b>                 |                     |                  | <b>0.000 kW</b>                                  |

\*Totals may not sum to due to rounding

**Table 3-29: DEP Behavioral Savings Achieved by Changing AC Use Patterns**

| Input   | Units               | Value            | Source   |
|---|---------------------|------------------|--|
| Cooling Energy Use Intensity (EUI <sub>cool</sub> ) | kWh/ft <sup>2</sup> | 1.4522           | 2009 RECS Data, North and South Carolina         |
| Average Cooled Area (Area <sub>cool</sub> )         | ft <sup>2</sup>     | 1,495            | 2009 RECS Data, North and South Carolina         |
| T-stat savings <sub>cool</sub>                      | %                   | 13.9%            | Multiple Smart Thermostat Studies as noted above |
| <b>Energy Savings</b>                               | <b>kWh</b>          | <b>301.8</b>     | <b>Calculated</b>                                |
| <b>Summer Demand Savings</b>                        | <b>kW</b>           | <b>0.000</b>     | <b>Deemed</b>                                    |
| <b>Winter Demand Savings</b>                        | <b>kW</b>           | <b>0.000</b>     | <b>Deemed</b>                                    |
| <b>Turning off Air Conditioning when Not Home</b>   |                     |                  |  |
| <b>ISR</b>  | <b>Influence</b>    | <b>Kit Info.</b> | <b>Persistence</b>                               |
| 9%  | 83%                 | 74%              | 28%  |
| <b>Total Energy Savings:</b>                        |                     |                  | <b>4.8 kWh</b>                                   |
| <b>Total Summer Demand Savings:</b>                 |                     |                  | <b>0.000 kW</b>                                  |
| <b>Total Winter Demand Savings:</b>                 |                     |                  | <b>0.000 kW</b>                                  |
| <b>Using Fans Instead of Air Conditioning</b>       |                     |                  |  |
| <b>ISR</b>  | <b>Influence</b>    | <b>Kit Info.</b> | <b>Persistence</b>                               |
| 12%   | 83%                 | 74%              | 28%  |
| <b>Total Energy Savings:</b>                        |                     |                  | <b>6.0 kWh</b>                                   |
| <b>Total Summer Demand Savings:</b>                 |                     |                  | <b>0.000 kW</b>                                  |
| <b>Total Winter Demand Savings:</b>                 |                     |                  | <b>0.000 kW</b>                                  |

\*Totals may not sum to due to rounding



**Table 3-30: DEC Behavioral Savings Achieved by Changing Heating Use Patterns**

| Input                               | Units               | Value        | Source   |
|-------------------------------------|---------------------|--------------|--|
| Heating Energy Use Intensity        | kWh/ft <sup>2</sup> | 1.1724       | 2009 RECS Data, North and South Carolina         |
| Average Heated Area                 | ft <sup>2</sup>     | 1,574        | 2009 RECS Data, North and South Carolina         |
| Savings                             | %                   | 13.0%        | Multiple Smart Thermostat Studies as noted above |
| <b>ELEC</b>                         | %                   | 63.1%        | Duke Energy 2016 RASS Data (DEC Respondents)     |
| <b>Energy Savings</b>               | <b>kWh</b>          | <b>150.7</b> | <b>Calculated</b>                                |
| <b>Summer Demand Savings</b>        | <b>kW</b>           | <b>0.000</b> | <b>Deemed</b>                                    |
| <b>Winter Demand Savings</b>        | <b>kW</b>           | <b>0.000</b> | <b>Deemed</b>                                    |
| ISR                                 | Influence           | Kit Info.    | Persistence                                      |
| 5%                                  | 81%                 | 73%          | 28%  |
| <b>Total Energy Savings:</b>        |                     |              | <b>1.2 kWh</b>                                   |
| <b>Total Summer Demand Savings:</b> |                     |              | <b>0.000 kW</b>                                  |
| <b>Total Winter Demand Savings:</b> |                     |              | <b>0.000 kW</b>                                  |

\*Totals may not sum to due to rounding

**Table 3-31: DEP Behavioral Savings Achieved by Changing Heating Use Patterns**

| Input                               | Units               | Value        | Source   |
|-------------------------------------|---------------------|--------------|--|
| Heating Energy Use Intensity        | kWh/ft <sup>2</sup> | 1.1724       | 2009 RECS Data, North and South Carolina         |
| Average Heated Area                 | ft <sup>2</sup>     | 1,574        | 2009 RECS Data, North and South Carolina         |
| Savings                             | %                   | 13.0%        | Multiple Smart Thermostat Studies as noted above |
| <b>ELEC</b>                         | %                   | 74.8%        | Duke Energy 2016 RASS Data (DEP Respondents)     |
| <b>Energy Savings</b>               | <b>kWh</b>          | <b>178.9</b> | <b>Calculated</b>                                |
| <b>Summer Demand Savings</b>        | <b>kW</b>           | <b>0.000</b> | <b>Deemed</b>                                    |
| <b>Winter Demand Savings</b>        | <b>kW</b>           | <b>0.000</b> | <b>Deemed</b>                                    |
| ISR                                 | Influence           | Kit Info.    | Persistence                                      |
| 5%                                  | 83%                 | 74%          | 28%  |
| <b>Total Energy Savings:</b>        |                     |              | <b>1.4 kWh</b>                                   |
| <b>Total Summer Demand Savings:</b> |                     |              | <b>0.000 kW</b>                                  |
| <b>Total Winter Demand Savings:</b> |                     |              | <b>0.000 kW</b>                                  |

\*Totals may not sum to due to rounding

**Adjust thermostat set points**

The evaluation team again relied on current smart thermostat studies to estimate the savings achieved by adjusting thermostat set points. An additional function of smart thermostats is their ability to learn set points by trending regular changes made by the user in a trial period following installation. The evaluation team believes this increased precision in thermostat set points to be analogous to the behavioral change analyzed here.

Equation 3-18 presents the algorithm used to calculate energy savings for reduced cooling and heating loads. Demand savings were deemed as zero based on assumptions provided in multiple TRMs including the 2018 Mid-Atlantic TRM and 2016 Pennsylvania.

**Equation 3-18: Adjust thermostat set points energy savings algorithm**

$$\Delta kWh_{cool} = (EUI_{cool} \times Area \times Tstat_{cool}) + (EUI_{heat} \times Area \times Tstat_{heat} \times ELEC) \times Adj. Factors$$

In our review of smart thermostat data, we also explored studies with mixed baselines (manual and programmable thermostats) in order to better isolate the impact of set point adjustments as opposed to the auto-away function. The sources and their associated savings are detailed in Table 3-32.

**Table 3-32: Smart Thermostat Savings**

| Study Location                    | Cooling Savings | Heating Savings |
|-----------------------------------|-----------------|-----------------|
| Vectren Corporation <sup>11</sup> | N/A             | 5.0%            |
| NIPSCO <sup>12</sup>              | N/A             | 7.8%            |
| Xcel Energy <sup>13</sup>         | 4.6%            | N/A             |
| Commonwealth Edison <sup>14</sup> | 4.8%            | 6.7%            |
| <b>Median</b>                     | <b>4.7%</b>     | <b>6.7%</b>     |

The savings were calculated and adjusted based on these key assumptions as detailed in Table 3-33 and Table 3-34.

<sup>11</sup> Evaluation of 2013–2014 Programmable and Smart Thermostat Program for Vectren Corporation. The Cadmus Group, January 2015

<sup>12</sup> Evaluation of the 2013–2014 Programmable and Smart Thermostat Program for Northern Indiana Public Service Company. The Cadmus Group, November 2014

<sup>13</sup> In-Home Smart Device Pilot. Public Service Company of Colorado. EnerNOC, Inc., April, 2014

<sup>14</sup> Commonwealth Edison Residential Smart Thermostats. Navigant Consulting, February 2016

**Table 3-33: DEC Behavioral Savings Achieved by Changing Thermostat Settings**

| Input                               | Units               | Value        | Source   |
|-------------------------------------|---------------------|--------------|--|
| Heating Energy Use Intensity        | kWh/ft <sup>2</sup> | 1.1724       | 2009 RECS Data, North and South Carolina         |
| Average Heated Area                 | ft <sup>2</sup>     | 1,574        | 2009 RECS Data, North and South Carolina         |
| <b>ELEC</b>                         | %                   | 63.1%        | Duke Energy 2016 RASS Data (DEC Respondents)     |
| Heating Savings                     | %                   | 6.7%         | Multiple Smart Thermostat Studies as noted above |
| Cooling Energy Use Intensity        | kWh/ft <sup>2</sup> | 1.4522       | 2009 RECS Data, North and South Carolina         |
| Average Cooled Area                 | ft <sup>2</sup>     | 1,495        | 2009 RECS Data, North and South Carolina         |
| Savings                             | %                   | 4.7%         | Multiple Smart Thermostat Studies as noted above |
| <b>Energy Savings</b>               | <b>kWh</b>          | <b>189.7</b> | <b>Calculated</b>                                |
| <b>Summer Demand Savings</b>        | <b>kW</b>           | <b>0.000</b> | <b>Deemed</b>                                    |
| <b>Winter Demand Savings</b>        | <b>kW</b>           | <b>0.000</b> | <b>Deemed</b>                                    |
| ISR                                 | Influence           | Kit Info.    | Persistence                                      |
| 22%                                 | 81%                 | 73%          | 28%  |
| <b>Total Energy Savings:</b>        |                     |              | <b>7.0 kWh</b>                                   |
| <b>Total Summer Demand Savings:</b> |                     |              | <b>0.000 kW</b>                                  |
| <b>Total Winter Demand Savings:</b> |                     |              | <b>0.000 kW</b>                                  |

\*Totals may not sum to due to rounding

**Table 3-34: DEP Behavioral Savings Achieved by Changing Thermostat Settings**

| Input                               | Units               | Value            | Source   |
|-------------------------------------|---------------------|------------------|--|
| Heating Energy Use Intensity        | kWh/ft <sup>2</sup> | 1.1724           | 2009 RECS Data, North and South Carolina         |
| Average Heated Area                 | ft <sup>2</sup>     | 1,574            | 2009 RECS Data, North and South Carolina         |
| <b>ELEC</b>                         | %                   | 74.8%            | Duke Energy 2016 RASS Data (DEP Respondents)     |
| Heating Savings                     | %                   | 6.7%             | Multiple Smart Thermostat Studies as noted above |
| Cooling Energy Use Intensity        | kWh/ft <sup>2</sup> | 1.4522           | 2009 RECS Data, North and South Carolina         |
| Average Cooled Area                 | ft <sup>2</sup>     | 1,495            | 2009 RECS Data, North and South Carolina         |
| Savings                             | %                   | 4.7%             | Multiple Smart Thermostat Studies as noted above |
| <b>Energy Savings</b>               | <b>kWh</b>          | <b>205.7</b>     | <b>Calculated</b>                                |
| <b>Summer Demand Savings</b>        | <b>kW</b>           | <b>0.000</b>     | <b>Deemed</b>                                    |
| <b>Winter Demand Savings</b>        | <b>kW</b>           | <b>0.000</b>     | <b>Deemed</b>                                    |
| <b>ISR</b>                          | <b>Influence</b>    | <b>Kit Info.</b> | <b>Persistence</b>                               |
| 22%                                 | 83%                 | 74%              | 28%  |
| <b>Total Energy Savings:</b>        |                     |                  | <b>7.8 kWh</b>                                   |
| <b>Total Summer Demand Savings:</b> |                     |                  | <b>0.000 kW</b>                                  |
| <b>Total Winter Demand Savings:</b> |                     |                  | <b>0.000 kW</b>                                  |

\*Totals may not sum to due to rounding

### Summary of behavioral impacts

Table 3-35 below presents the total energy savings derived from the behavioral component of the program.

**Table 3-35: Energy savings from behavioral impacts**

| Behavior                     | DEC kWh savings | DEP kWh savings |
|------------------------------|-----------------|-----------------|
| Turn off lights              | 0.4             | 0.4             |
| Turn off electronics         | 4.1             | 4.6             |
| Take shorter showers         | 6.3             | 5.0             |
| Turn off furnace             | 1.2             | 1.4             |
| Turn off AC                  | 6.0             | 4.8             |
| Use fan mode                 | 7.3             | 6.0             |
| Adjust thermostat set points | 7.0             | 7.8             |
| <b>Total</b>                 | <b>32.3</b>     | <b>30.1</b>     |

\*Total may not sum to due to rounding

### 3.5 Billing Regression Analysis

In addition to engineering analysis, the evaluation team attempted to estimate energy savings by analyzing energy use patterns before and after participation in the NTC program using an approach commonly referred to as billing analysis. After a thorough investigation, we concluded that, absent a randomized control trial (RCT), billing analysis was unable to reliably detect energy savings resulting from participation in the program. When the percent change in household energy use is small, as it is with the NTC program education and kit, the only reliable way to estimate energy savings using billing analysis is through a randomized control trial using large treatment and control groups and pre- and post-enrollment billing data. The most critical component of a well-designed RCT is to guarantee there are no differences between the treatment and control groups, other than the treatment of the program. This is a critical step to ensure that the analysis is able to accurately estimate the counterfactual – or what would have happened absent the treatment. If inherent differences exist between the treatment group and control group, any changes in the post-treatment period could be due to these differences, rather than the treatment itself. In order to verify that effects are purely the result of the treatment intervention, the two groups must be ostensibly identical in every way except for the intervention.

Guaranteeing homogeneity between treatment and control groups is not achievable with an opt-in enrollment. The fact that one group of customers chose to enroll in the program while the other did not implies that some intrinsic difference between them does exist. These differences may include:

- Behavioral preferences or predispositions for energy efficiency measures
- Information about the program that is not accessible to non-enrollees
- Higher energy needs and therefore a greater incentive to curb their consumption

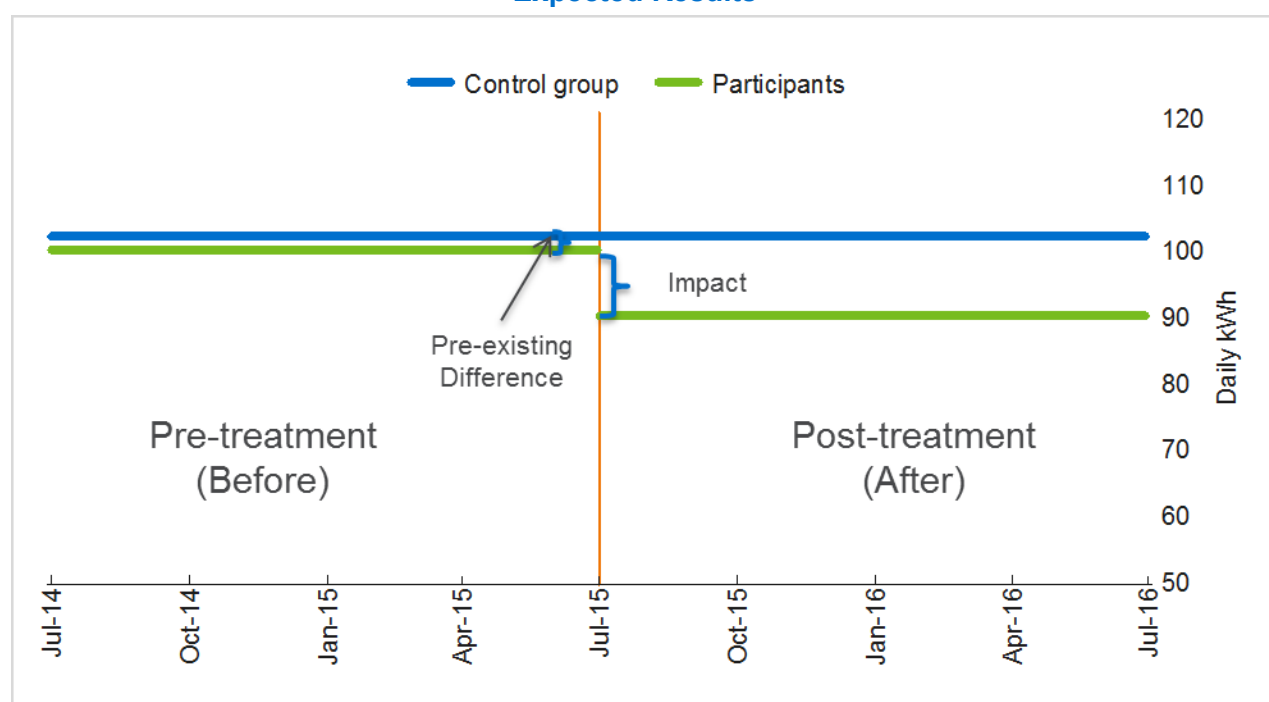
Any of these characteristics are likely to contribute to consumption responses or patterns that cannot be attributable to the program intervention. A well-designed RCT includes randomly selected customers in the treatment and control groups, thereby ensuring that the analysis avoids adverse effects of selection bias and/or lurking confounding variables. Due to these variables, RCTs are impracticable for opt-in programs. Thus, the evaluation team's recommendation is to rely on findings of the engineering analysis as the source of the verified gross and net savings for the program. Below we discuss how we attempted to complete a billing analysis and how we ultimately determined such an analysis was not feasible.

To estimate energy savings with billing data, it is necessary to estimate what energy consumption would have occurred in the absence of NTC program – the counterfactual or baseline. To infer that the program led to energy savings, it is necessary to systematically eliminate plausible alternative explanations for differences in electricity use patterns.

The basic framework for the analysis is illustrated in Figure 3-2 and relies on both a control group and pre- and post-enrollment billing data. The analysis is implemented via a difference-in-differences technique, which removes any pre-existing differences between the treatment and control groups. If the program's kit and behavioral changes lead to reductions in consumption, we should observe:

- A change in consumption for households that participated in the NTC program
- No similar change in consumption for the control group
- The timing of the change should coincide with the receipt of kits

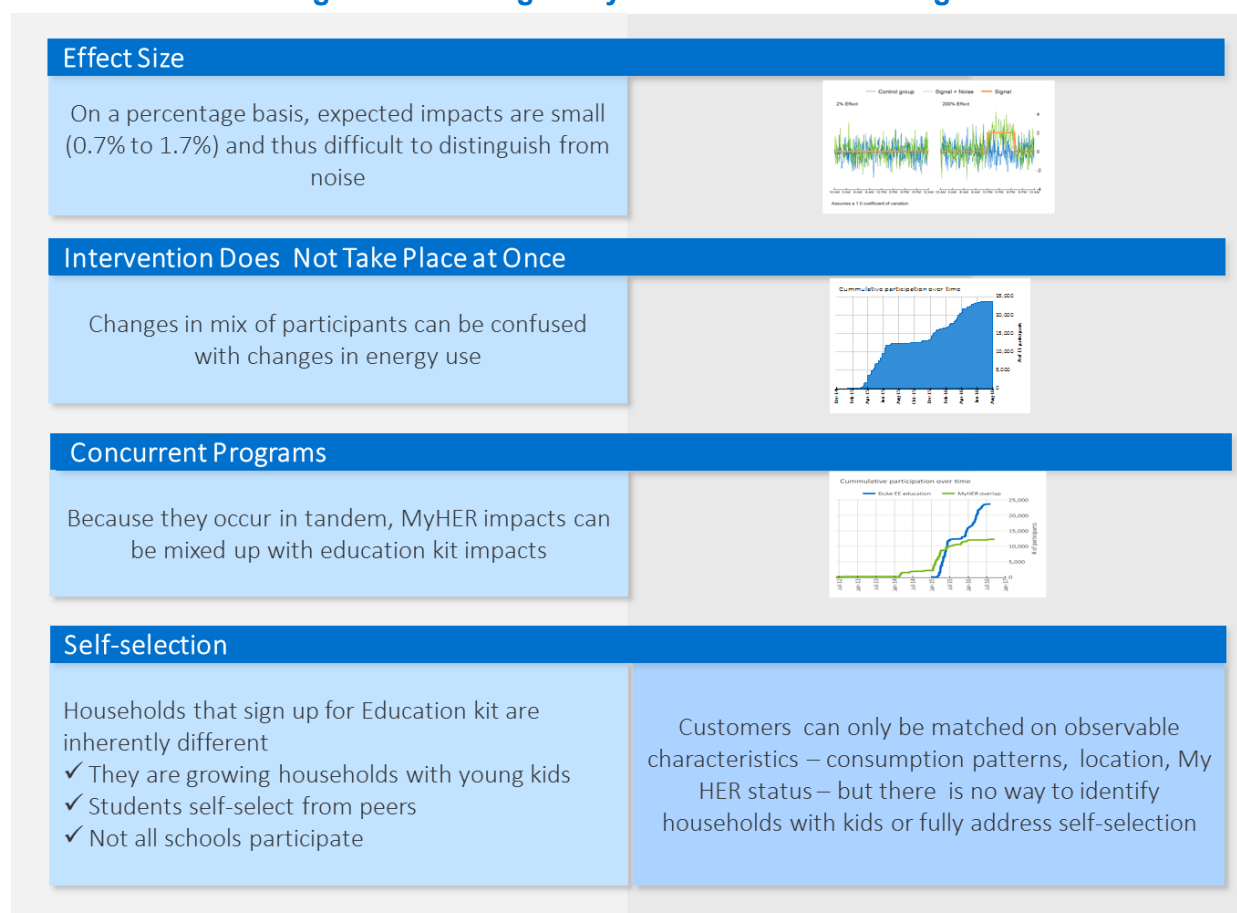
**Figure 3-2: Framework for Billing Analysis with Control Group, Pre-Post Data and Expected Results**



While the NTC program did not have a randomly assigned control group, the evaluation team did develop a comparison group to use in its analysis. However, there were several key challenges to producing reliable energy savings estimates using billing analysis, which are summarized in Figure 3-3. The two challenges that could not be addressed despite the use of a comparison group were the small effect size and selection bias. On a percentage basis, the expected energy savings from each kit were less than 2% of annual household energy consumption, and therefore it proved difficult to isolate the impacts of the program from other potential explanations, including random chance. Second, households that signed up for the kit had young children that self-selected from their peers. Households with young children are typically in the growth period of a household life cycle and, thus, may have higher year-to-year energy consumption. Despite using a comparison group, it could only account for observable characteristics – pre-treatment energy use patterns, geographic location, and concurrent

participation in the My Home Energy Report (MyHER) program. There was no way to identify households with young children in the comparison group without postponing the evaluation to identify future participating schools from which a comparison group could be developed. As a result, while the participant and comparison group may have had similar energy use patterns in the pre-treatment period, their energy use trajectories absent program participation were not necessarily the same due to differences in the household life cycles.

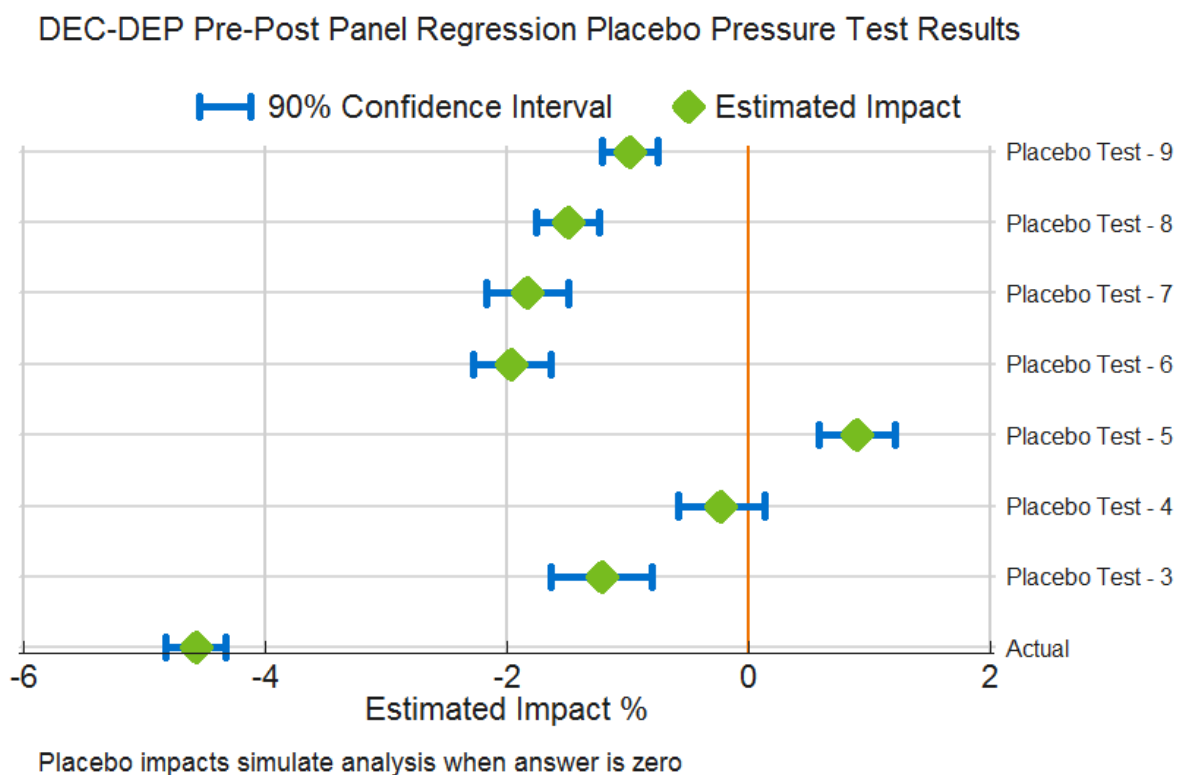
**Figure 3-3: Billing Analysis Evaluation Challenges**



In order to assess if the billing analysis produced reliable results, we implemented a series of placebo pressure tests. The approach consisted of simulating fake enrollments prior to actual participation in the program and assessing if the models detected an effect when using data from the false “pre” period to estimate the counterfactual for the false “post” period. Because enrollment dates were fictitious and actual post periods were excluded, we knew impacts were actually zero and any estimated impacts were due to modeling error. The evaluation team used two years of pre-treatment data for the placebo tests and each participant’s enrollment date was simulated to have occurred between three to nine months prior to actual participation, in increments of one month. The placebo tests were implemented using both a fixed-effects pre-post panel regression model (using only treatment group data) and a difference-in-differences panel regression that made use of the matched comparison group.

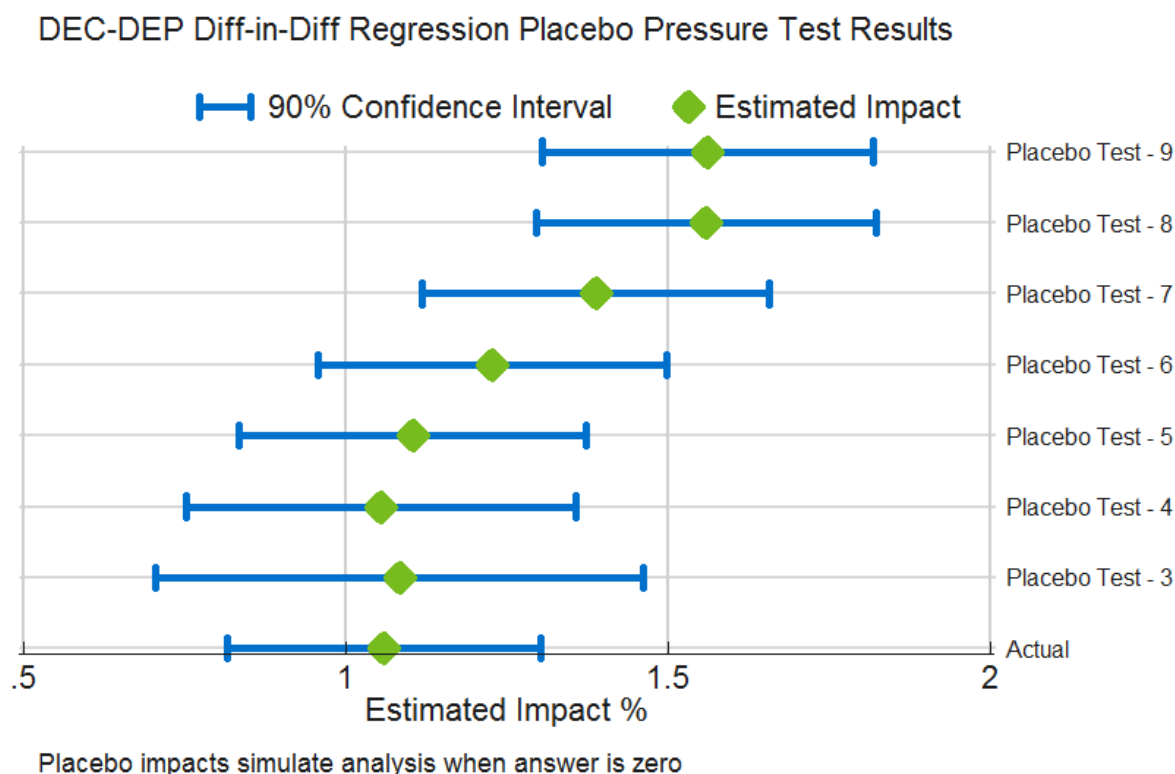
Figure 3-4 shows the results from the pre-post placebo tests. Rather than produce zero impacts, the models estimated that the simulated enrollments led to changes in energy use when in fact no intervention had taken place. Moreover, the models incorrectly concluded that the erroneous impacts were statistically significant in several instances – an example of false precision. The pre-post model without a comparison group consistently estimated energy savings when impacts were in fact zero. The difference-in-differences model that made use of the comparison group had less variable results, but it estimated energy increases in the range of roughly 1% to 1.5% when no intervention had taken place. Hence, neither method produced reliable energy savings estimates.

**Figure 3-4: Placebo Pressure Test Results (Pre-Post)**





**Figure 3-5: Placebo Pressure Test Results (Difference in Differences)**



Appendix E provides additional detail including comparison of the program participants and comparison group.

The evaluation team's conclusion is not that there were no energy savings generated by the NTC program, but rather that billing analysis was not the correct tool for estimating the small percent energy savings from the program. Thus, the evaluation team's recommendation is to rely on the engineering analysis and findings as the source of our verified gross and net savings for the programs.

### 3.6 Targeted and Achieved Confidence and Precision

We developed the NTC program evaluation plan with the goal of achieving a target of 10% relative precision at the 90% confidence interval for the program as a whole. The evaluation team was able to achieve this target through the combination of web-based and phone surveys to ultimately achieve a precision of +/- 4.5% and +/-6.2% at the 90% confidence level for DEC and DEP, respectively (Table 3-36).

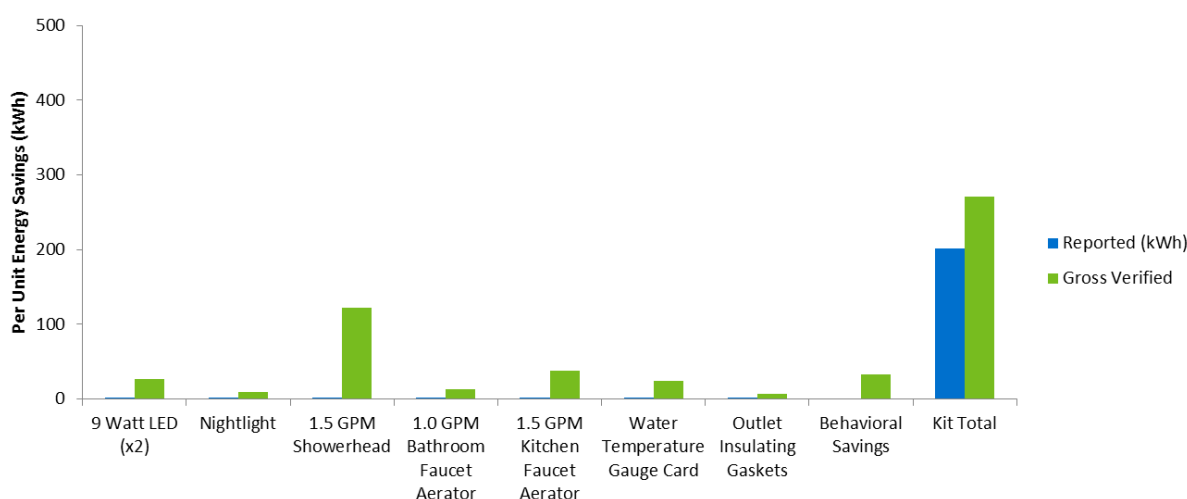
**Table 3-36: Targeted and Achieved Confidence and Precision**

| Program | Targeted Confidence/Precision | Achieved Confidence/Precision |
|---------|-------------------------------|-------------------------------|
| DEC NTC | 90/10.0                       | 90/4.5                        |
| DEP NTC | 90/10.0                       | 90/6.2                        |

## 3.7 Results

DEC measure-level and kit-level energy savings values are detailed in Figure 3-6 and Table 3-37.

**Figure 3-6: 2017-2018 DEC NTC Gross Verified Energy Savings**



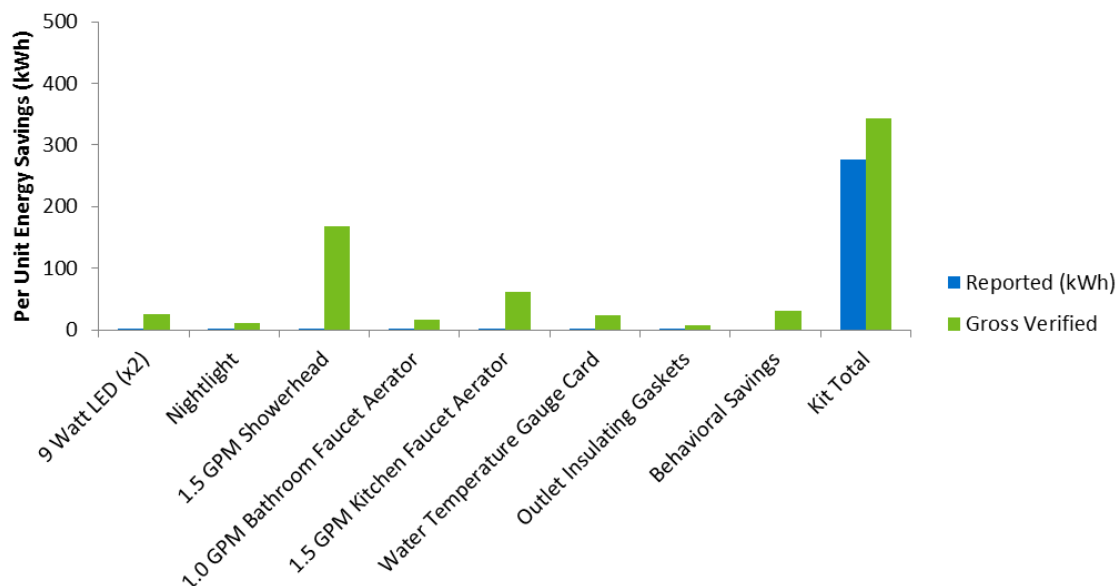
**Table 3-37: DEC Measure-Level Reported and Verified Gross Energy Savings**

| Measure                   | Reported Gross Energy Savings, per unit (kWh) | Realization Rate | Verified Gross Energy Savings, per unit (kWh) | Total Verified Gross Energy Savings (kWh) |
|---------------------------|---|------------------|---|---|
| 9 Watt LED*               | N/A   | N/A              | 27.0  | 624,555                                   |
| Nightlight                |   |                  | 9.8   | 226,717                                   |
| Low-flow Showerhead       |   |                  | 121.6   | 2,815,409                                 |
| Low-flow Bathroom Aerator |   |                  | 12.4  | 287,880                                   |
| Low-flow Kitchen Aerator  |   |                  | 38.2  | 885,316                                   |
| Water Heater Setback      |   |                  | 23.7  | 549,490                                   |
| Outlet Gaskets            |   |                  | 6.3   | 146,847                                   |
| Behavioral Changes        |   |                  | 32.3  | 747,018                                   |
| <b>Total</b>              | <b>201.0</b>                                  | <b>135.0%</b>    | <b>271.3</b>                                  | <b>6,283,232</b>                          |

\*Reflects savings for two 9 watt LEDs bulbs

DEP measure-level and kit-level energy savings values are detailed in and Figure 3-7 and Table 3-38.

**Figure 3-7: 2017-2018 DEP NTC Gross Verified Energy Savings**



**Table 3-38: DEP Measure-Level Reported and Verified Gross Energy Savings**

| Measure                   | Reported Gross Energy Savings, per unit (kWh) | Realization Rate | Verified Gross Energy Savings, per unit (kWh) | Total Verified Gross Energy Savings (kWh) |
|---------------------------|---|------------------|---|---|
| 9 Watt LED*               | N/A   | N/A              | 25.4  | 229,261                                   |
| Nightlight                |   |                  | 10.9  | 98,409                                    |
| Low-flow Showerhead       |   |                  | 168.1   | 1,516,833                                 |
| Low-flow Bathroom Aerator |   |                  | 16.4  | 148,343                                   |
| Low-flow Kitchen Aerator  |   |                  | 62.3  | 561,971                                   |
| Water Heater Setback      |   |                  | 23.5  | 212,411                                   |
| Outlet Gaskets            |   |                  | 6.8   | 61,268                                    |
| Behavioral Changes        |   |                  | 30.1  | 271,521                                   |
| <b>Total</b>              | <b>276.4</b>                                  | <b>124.3%</b>    | <b>343.5</b>                                  | <b>3,100,016</b>                          |

\*Reflects savings for two 9 watt LEDs bulbs

Measure-level and kit-level summer demand savings are detailed in Table 3-39 and Table 3-40 for DEC and DEP, respectively.

**Table 3-39: DEC Measure-Level Reported and Verified Summer Demand Gross Savings**

| Measure                   | Reported Gross Demand Savings, per unit (kW) | Realization Rate | Verified Gross Demand Savings, per unit (kW) | Total Verified Gross Demand Savings (kW) |
|---------------------------|--|------------------|--|--|
| 9 Watt LED*               | N/A  | N/A              | 0.005  | 109.2                                    |
| Nightlight                |  |                  | 0.000  | 0.0                                      |
| Low-flow Showerhead       |  |                  | 0.010  | 225.6                                    |
| Low-flow Bathroom Aerator |  |                  | 0.002  | 38.6                                     |
| Low-flow Kitchen Aerator  |  |                  | 0.005  | 118.6                                    |
| Water Heater Setback      |  |                  | 0.003  | 73.6                                     |
| Outlet Gaskets            |  |                  | 0.008  | 186.8                                    |
| Behavioral Changes        |  |                  | 0.001  | 25.3                                     |
| <b>Total</b>              | <b>0.054</b>                                 | <b>61.7%</b>     | <b>0.034</b>                                 | <b>777.7</b>                             |

\*Reflects savings for two 9 watt LEDs bulbs

**Table 3-40: DEP Measure-Level Reported and Verified Summer Demand Gross Savings**

| Measure                   | Reported Gross Demand Savings, per unit (kW) | Realization Rate | Verified Gross Demand Savings, per unit (kW) | Total Verified Gross Demand Savings (kW) |
|---------------------------|--|------------------|--|--|
| 9 Watt LED*               | N/A  | N/A              | 0.004  | 40.4                                     |
| Nightlight                |  |                  | 0.000  | 0.0                                      |
| Low-flow Showerhead       |  |                  | 0.013  | 121.5                                    |
| Low-flow Bathroom Aerator |  |                  | 0.002  | 19.9                                     |
| Low-flow Kitchen Aerator  |  |                  | 0.008  | 75.3                                     |
| Water Heater Setback      |  |                  | 0.003  | 28.5                                     |
| Outlet Gaskets            |  |                  | 0.009  | 77.9                                     |
| Behavioral Changes        |  |                  | 0.001  | 9.6                                      |
| <b>Total</b>              | <b>0.079</b>                                 | <b>52.5%</b>     | <b>0.041</b>                                 | <b>373.1</b>                             |

\*Reflects savings for two 9 watt LEDs bulbs

Measure-level and kit-level winter demand savings are detailed in Table 3-41 and Table 3-42 for DEC and DEP, respectively.

**Table 3-41: DEC Measure-Level Reported and Verified Winter Demand Gross Savings**

| Measure                   | Reported Gross Demand Savings, per unit (kW) | Realization Rate | Verified Gross Demand Savings, per unit (kW) | Total Verified Gross Demand Savings (kW) |
|---------------------------|--|------------------|--|--|
| 9 Watt LED*               | N/A  | N/A              | 0.002  | 48.7                                     |
| Nightlight                |  |                  | 0.000  | 0.0                                      |
| Low-flow Showerhead       |  |                  | 0.027  | 631.9                                    |
| Low-flow Bathroom Aerator |  |                  | 0.003  | 63.6                                     |
| Low-flow Kitchen Aerator  |  |                  | 0.008  | 195.5                                    |
| Water Heater Setback      |  |                  | 0.005  | 121.3                                    |
| Outlet Gaskets            |  |                  | 0.000  | 7.1                                      |
| Behavioral Changes        |  |                  | 0.002  | 45.2                                     |
| <b>Total</b>              | <b>N/A</b>                                   | <b>N/A</b>       | <b>0.048</b>                                 | <b>1,113.4</b>                           |

\*Reflects savings for two 9 watt LEDs bulbs

**Table 3-42: DEP Measure-Level Reported and Verified Winter Demand Gross Savings**

| Measure                   | Reported Gross Demand Savings, per unit (kW) | Realization Rate | Verified Gross Demand Savings, per unit (kW) | Total Verified Gross Demand Savings (kW) |
|---------------------------|--|------------------|--|--|
| 9 Watt LED*               | N/A  | N/A              | 0.002  | 18.0                                     |
| Nightlight                |  |                  | 0.000  | 0.0                                      |
| Low-flow Showerhead       |  |                  | 0.038  | 340.4                                    |
| Low-flow Bathroom Aerator |  |                  | 0.004  | 32.8                                     |
| Low-flow Kitchen Aerator  |  |                  | 0.014  | 124.1                                    |
| Water Heater Setback      |  |                  | 0.005  | 46.9                                     |
| Outlet Gaskets            |  |                  | 0.000  | 3.0                                      |
| Behavioral Changes        |  |                  | 0.002  | 15.7                                     |
| <b>Total</b>              | <b>N/A</b>                                   | <b>N/A</b>       | <b>0.064</b>                                 | <b>581.0</b>                             |

\*Reflects savings for two 9 watt LEDs bulbs

The impact evaluation for the DEC 2017-2018 program resulted in a program energy realization rate of 135% and a demand realization rate of 62% as presented in Table 3-43.

**Table 3-43: 2017-2018 DEC Energy Savings per Kit**

| Measurement        | Reported | Realization Rate | Gross Verified* |
|--------------------|----------|------------------|-----------------|
| Energy (kWh)       | 201.0    | 135.0%           | 271.3           |
| Demand (kW)        | 0.054    | 61.7%            | 0.034           |
| Winter Demand (kW) | N/A      | N/A              | 0.048           |

\*Values may appear inaccurate due to rounding errors

The impact evaluation for the DEP 2017-2018 program resulted in a program energy realization rate of 124% and a demand realization rate of 52% as presented in Table 3-44.

**Table 3-44: 2017-2018 DEP Energy Savings per Kit**

| Measurement        | Reported | Realization Rate | Gross Verified* |
|--------------------|----------|------------------|-----------------|
| Energy (kWh)       | 276.4    | 124.3%           | 343.5           |
| Summer Demand (kW) | 0.079    | 52.5%            | 0.041           |
| Winter Demand (kW) | N/A      | N/A              | 0.064           |

\*Values may appear inaccurate due to rounding errors

Table 3-45 and Table 3-46 present the reported and verified energy and demand savings for the 2017-2018 program year for DEC and DEP, respectively.

**Table 3-45: 2017-2018 DEC Program Level Savings**

| Measurement        | Reported per Kit | Kits Distributed | Program Reported* | Realization Rate | Program Gross Verified* |
|--------------------|------------------|------------------|-------------------|------------------|-------------------------|
| Energy (kWh)       | 201.0            | 23,161           | 4,655,361         | 135.0%           | 6,283,232               |
| Summer Demand (kW) | 0.054            |                  | 1,260.7*          | 61.7%            | 777.7                   |
| Winter Demand (kW) | N/A              |                  | N/A               | N/A              | 1,113.4                 |

\*Values may appear inaccurate due to rounding errors

**Table 3-46: 2017-2018 DEP Program Level Savings\***

| Measurement        | Reported per Kit | Kits Distributed | Program Reported* | Realization Rate | Program Gross Verified* |
|--------------------|------------------|------------------|-------------------|------------------|-------------------------|
| Energy (kWh)       | 276.4            | 9,025            | 2,494,510         | 124.3%           | 3,100,016               |
| Summer Demand (kW) | 0.079            |                  | 711.0*            | 52.5%            | 373.1                   |
| Winter Demand (kW) | N/A              |                  | N/A               | N/A              | 581.0                   |

\*Values may appear inaccurate due to rounding errors

## 4 Net-to-Gross Methodology and Results

The evaluation team used student family survey data to calculate a net-to-gross (NTG) ratio for the NTC program. NTG reflects the effects of free ridership (FR) and spillover (SO) on gross savings. Free ridership refers to the portion of energy savings that participants would have achieved in the absence of the program through their own initiatives and expenditures (U.S. DOE, 2014).<sup>15</sup> Spillover refers to the program-induced adoption of additional energy-saving measures by participants who did not receive financial incentives or technical assistance for the additional measures installed (U.S. DOE, 2014). The evaluation team used the following formula to calculate the NTG ratio:

$$NTG = 1 - FR + SO$$

The evaluation team calculated the mean FR separately for water end-use measures, infiltration measures, and light bulbs, and aggregated those values to the program level. The team calculated spillover at the program level only.

### 4.1 Free Ridership

Free ridership estimates how much the program influenced participants to install the energy-saving items included in the energy efficiency kit. Free ridership ranges from 0 to 1, 0 being no free ridership and 1 being total free ridership, with values in between representing varying degrees of partial free ridership.

The evaluation team used participant survey data to estimate free ridership. The survey used several questions to identify items that a given participant installed and did not later uninstall:

- For items that came one to a kit (showerhead, kitchen and bathroom faucet aerators, and night light), the survey asked whether the participant installed the item and, if so, whether the participant later uninstalled the item.
- For insulator gaskets, which came 12 to a kit, the survey asked how many the participant installed and if the participant later uninstalled them.
- For the LEDs, the survey first asked whether the participant installed one, both, or neither. The survey then asked whether the participant uninstalled the bulbs.

The evaluation team's methodology for calculating free ridership consists of two components, free ridership change (FRC) and free ridership influence (FRI), both of which range from 0 to .5 in value.

$$FR = FRC + FRI$$

<sup>15</sup> The U.S. Department of Energy (DOE) (2014). *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures. Chapter 23: Estimating Net Savings: Common Practices*. Retrieved August 29, 2016 from [http://energy.gov/sites/prod/files/2015/02/f19/UMChapter23-estimating-net-savings\\_0.pdf](http://energy.gov/sites/prod/files/2015/02/f19/UMChapter23-estimating-net-savings_0.pdf).

#### 4.1.1 Free Ridership Change

FRC reflects what participants reported they would have done if the program had not provided the items in the kit. For each respondent, the survey assessed FRC for each measure that the respondent installed and did not later uninstall.

Specifically, the survey asked respondents which, if any, of the currently installed items they would have purchased and installed on their own within the next year if Duke Energy had not provided them. For each measure, the evaluation team assigned one of the FRC values shown in the Table 4-1, based on the respondents' responses.

**Table 4-1: Free Ridership Change Values**

| What Respondent Would Have Done Absent the Program*                         | FRC Value |
|---|-----------|
| Would <b>not</b> have purchased and installed the item within the next year | 0.00      |
| Would have purchased and installed the item within the next year            | 0.50      |
| Don't know  | 0.25      |

\*Survey response to: If you had not received the free efficiency items in the kit, would you have purchased and installed any of these same items within the next year?

#### 4.1.2 Free Ridership Influence

FRI assesses how much influence the program had on a participant's decision to install (and keep installed) the items in the kit. The survey asked respondents to rate how much influence six program-related factors had on their respective decisions to install the measures, using a scale from 0 ("not at all influential") to 10 ("extremely influential"). The program-related factors included:

- The fact that the items were free
- The fact that the items were sent to their home
- The chance to win cash prizes for their household and school
- Information in the kit about how the items would save energy
- Information that their child brought home from school
- Other information or advertisements from Duke Energy, including its website

Asking respondents to separately rate the influence of each of the six above items had on the decision to install each measure would have been overly burdensome. Therefore, while the survey assessed FRC for each measure, it assessed influence at the end-use level once for all water-saving measures and once for the light bulbs.

For each end-use (water-saving and light bulbs), the highest-rated item for each respondent represents the overall program influence. The evaluation team assigned the following FRI scores, based on that rating (Table 4-2). The evaluation team calculated up to two FRI scores



for each respondent: one FRI score for water-saving measures and one FRI score for light bulbs.<sup>16</sup>

**Table 4-2: Free Ridership Influence Values**

| Highest Influence Rating | FRI Value |
|--------------------------|-----------|
| 0                        | 0.50      |
| 1                        | 0.45      |
| 2                        | 0.40      |
| 3                        | 0.35      |
| 4                        | 0.30      |
| 5                        | 0.25      |
| 6                        | 0.20      |
| 7                        | 0.15      |
| 8                        | 0.10      |
| 9                        | 0.05      |
| 10                       | 0.00      |

#### 4.1.3 End-Use-Specific Total Free Ridership

The evaluation team calculated total free ridership by end use, one for water saving measures, one for infiltration measures, and one for light bulbs, by:

- Calculating measure-specific FR scores for each respondent by summing each measure-specific FRC score with the corresponding end-use-specific FRI score.
- Calculating the mean FR score for each measure from the individual measure-specific FR scores.<sup>17</sup>
- Calculating a savings-weighted mean of the measure-specific FR means for water-saving measures and a separate savings-weighted mean of the measure-specific FR means for light bulbs. These two savings-weighted means represent the FR estimates for the two end-uses.

Table 4-3 and Table 4-4 presents the end-use FR estimates.

<sup>16</sup> Respondents were only asked to rate program influence on end-uses they installed and did not later uninstall. Thus, if a respondent installed both a showerhead and a light bulb, but later uninstalled the light bulb, the evaluation team only asked them to rate program influence on their decision to install the showerhead. Thus in this example, the evaluation team would only calculate a water end-use FRI score for this respondent.

<sup>17</sup> Since respondents were only asked about program influence on their decision to install the light bulbs and water saving items, infiltration measures leveraged the average influence score (FRI) across those two end uses. However, the FRC score used for infiltration measures was specific to that end use.

**Table 4-3: DEC End-Use-Level Free Ridership Scores**

| End-use               | End-Use Free Ridership |
|-----------------------|------------------------|
| Light bulbs           | 0.26                   |
| Water saving measures | 0.15                   |
| Infiltration measures | 0.12                   |

**Table 4-4: DEP End-Use-Level Free Ridership Scores**

| End-use               | End-Use Free Ridership |
|-----------------------|------------------------|
| Light bulbs           |                        |
| Water saving measures | 0.12                   |
| Infiltration measures | 0.08                   |

#### 4.1.4 Program-Level Free Ridership

The evaluation team estimated program-level free ridership by calculating a savings-weighted mean of the end-use FR scores presented in Table 4-3 and Table 4-4. Overall free ridership for the NTC kits is an estimated 16% for DEC and 13% for DEP.

## 4.2 Spillover

Spillover estimates energy savings from additional energy improvements made by participants who are influenced by the program to do so and is used to adjust gross savings. Since behavioral actions are considered gross impacts, spillover calculations only include additional installations of energy saving technologies. The evaluation team used participant survey data to estimate spillover. The survey asked respondents to indicate what energy-saving measures they had implemented since participating in the program. The evaluation team then asked participants to rate the influence the NTC program had on their decision to purchase these additional energy-saving measures on a scale of 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential.”

The evaluation team converted the ratings to a percentage representing the program-attributable percentage of the measure savings, from 0% to 100%. The team then applied the program-attributable percentage to the savings associated with each reported spillover measure to calculate the participant measure spillover (PMSO) for that measure. We defined the per unit energy savings for the reported spillover measures based on ENERGY STAR® calculators as well as algorithms and parameter assumptions listed in the in the 2018 Mid-Atlantic TRM, 2016 Pennsylvania TRM, and outputs from this impact evaluation.

Lighting measures (namely, LEDs) were commonly reported spillover measures. Since Duke Energy offered discounted lighting at participating retailers through their Energy Efficient Lighting (EEL) program as well through their Online Savings Store (DEC only), we asked

respondents to confirm they did not use Duke Energy's website to find or purchase discounted lighting. As to not double-count these savings, we adjusted lighting spillover savings to account for the proportion of respondents that said they used Duke Energy's website to find or purchase discounted lighting measures.

Participant measure spillover (PMSO) is calculated as follows:

$$PMSO = \text{Deemed Measure Savings} * \text{Program Attributable Percentage}$$

Table 4-5 and Table 4-6 exhibits the PMSO by measure category.

**Table 4-5: DEC PMSO, by Measure Category**

| Measure Category | Total kWh for Category | Percent Share of kWh |
|------------------|------------------------|----------------------|
| LEDs             | 6,345                  | 82%                  |
| CFLs             | 486                    | 6%                   |
| Appliances       | 768                    | 10%                  |
| Windows          | 160                    | 2%                   |
| AC Filters       | 3                      | <1%                  |
| <b>Total</b>     | <b>7,743</b>           | <b>100%</b>          |

**Table 4-6: DEP PMSO, by Measure Category**

| Measure Category | Total kWh for Category | Percent Share of kWh |
|------------------|------------------------|----------------------|
| LEDs             | 2,421                  | 87%                  |
| CFLs             | 19                     | 1%                   |
| Appliances       | 236                    | 8%                   |
| Windows          | 29                     | 1%                   |
| Outlet Gaskets   | 79                     | 3%                   |
| <b>Total</b>     | <b>2,783</b>           | <b>100%</b>          |

The evaluation team summed all PMSO values and divided them by the sample's gross program savings to calculate an estimated spillover percentage for the NTC program:

$$\text{Program SO} = \frac{\sum \text{Program PMSO}}{\sum \text{Sample's Gross Program Savings}}$$

These calculations produced a spillover estimate of 10% for DEC and 5% for DEP.

## 4.3 Net-to-Gross

Inserting the FR and SO estimates into the NTG formula ( $NTG = 1 - FR + SO$ ) produces an NTG value of 0.94 for the DEC program (Table 4-7) and 0.92 for the DEP program (Table 4-8). The evaluation team applied the NTG ratios to verified gross savings to calculate NTC kit net savings.

**Table 4-7: DEC Program Net-to-Gross Results**

| Free Ridership | Spillover | NTG  |
|----------------|-----------|------|
| 0.16           | 0.10      | 0.94 |

\*Totals may not sum to due to rounding

**Table 4-8: DEP Program Net-to-Gross Results**

| Free Ridership | Spillover | NTG  |
|----------------|-----------|------|
| 0.13           | 0.05      | 0.92 |

\*Totals may not sum to due to rounding

## 5 DEC Process Evaluation

### 5.1 Summary of Data Collection Activities

The process evaluation is based on telephone and web interviews and surveys with program and implementer staff, teachers, and student families who received a kit during the program evaluation year (Table 5-1).

**Table 5-1: Summary of Process Evaluation Data Collection Activities**

| Target Group   | Method                   | Sample Size | Population | Confidence / Precision |
|--|--------------------------|-------------|------------|------------------------|
| Duke Energy program staff                                      | Phone in-depth interview | 1           | N/A        | N/A                    |
| Implementation staff: NTC                                      | Phone in-depth interview | 1           | N/A        | N/A                    |
| Implementation staff: R1                                       | Phone in-depth interview | 1           | N/A        | N/A                    |
| Teachers who attended NTC performance                          | Web survey               | 44          | Unknown    | 90/17                  |
| Participating teacher follow-up interviews                     | Phone in-depth interview | 5           | Unknown    | N/A                    |
| Student families who received DEC kit and are customers of DEC | Phone/Web survey         | 334*        | 23,161     | 95/5                   |

\*260 web surveys and 74 phone surveys

#### 5.1.1 Teacher Surveys and Follow-Up Interviews

The evaluation team surveyed and interviewed teachers who attended NTC performances to better understand program success and delivery and to gather an educator perspective on what could be improved.

In April and May 2018, the evaluation team surveyed 44 teachers who attended NTC performances between September 7, 2017 and March 16, 2018. Of the 44 teacher respondents, 34 taught elementary school and 10 taught middle school. We report elementary and middle school findings together unless a meaningful difference emerged between school types.

In May 2018, the evaluation team contacted teachers who completed the web survey and indicated interest in being interviewed about their experience. The evaluation team requested their participation in a follow-up in-depth interview (IDI) about their experience with the performance, curriculum materials, and kit request forms. These IDIs served to get a deeper understanding of topics uncovered in the web survey and to provide additional details about their experience. The evaluation team completed interviews with five of these teachers. Two taught at elementary schools (one first grade teacher and one second) and three taught at middle schools (two sixth grade teachers and one seventh grade teacher).

### 5.1.2 Survey of Student Families Who Received the DEC Kit

In April and May 2018, the evaluation team surveyed 334 families who received energy efficiency kits from DEC between August 2017 and May 2018 (Table 5-2). During that period, DEC distributed a total of 5,587 kits to families who completed the kit request form their child brought home from school. The evaluation team attempted to contact a random sample frame of 12,515 households, sending email survey invitations to 11,449 households and attempting to call 1,066 households for which program records provided an email address and/or a phone number. Ultimately, the data collection effort achieved a 2.7% response rate, providing a sample with 95/5 confidence/precision. Comparisons with census data demonstrate that the sample is largely representative of income level and ownership status for the region. Respondents reported greater educational attainment and larger-sized households than typical of the region.<sup>18</sup>

**Table 5-2: DEC Student Family Survey Response Rates**

| Mode         | Population Size | Sample Frame Size | Completed Surveys | Response Rate | Confidence/Precision |
|--------------|-----------------|-------------------|-------------------|---------------|----------------------|
| Web-based    | 23,161          | 11,629            | 260               | 2.3%          | 95/5                 |
| Phone        |                 | 7,953             | 74                | 6.9%          |                      |
| <b>Total</b> |                 | <b>19,582</b>     | <b>334</b>        | <b>2.7%</b>   |                      |

## 5.2 Process Evaluation Findings

### 5.2.1 Awareness of DEC Sponsorship of the Program

Teachers and student families were largely aware of DEC's sponsorship of the program. A majority of teachers (84%) reported they were aware of DEC's sponsorship. The 37 teachers who knew of DEC's sponsorship most often learned about it through another staff member at their school (14) or DEC marketing materials (6) (Table 5-3).

**Table 5-3: How Teachers Learned of DEC's Sponsorship  
(Multiple Responses Allowed; n=37)**

| Source                                      | Number of Teachers |
|---|--------------------|
| Another staff person at school              | 14                 |
| The National Theatre for Children staff     | 12                 |
| Duke Energy marketing materials             | 6                  |
| The National Theatre for Children materials | 6                  |
| Prior performance at school                 | 5                  |
| Duke Energy staff                           | 1                  |
| Don't recall                                | 4                  |

<sup>18</sup> Region comparisons come from 2016 American Community Survey (Census) 5-year period estimates data for the state of North Carolina and South Carolina.

Awareness of DEC sponsorship among student families was also high, with most (94%) stating they knew the kit was sponsored by Duke Energy. Over half (59%) indicated they learned about Duke's sponsorship via the classroom materials their child brought home. Other common ways that families learned about Duke Energy sponsorship were material included in the kit (29%) and communications from their child's teacher or school (29%).

About one-third (31%) of student family respondents said they knew about the energy-related classroom activities and NTC performance at their child's school. Of those, most (77%) said they found out about the NTC activities from their child or from a teacher or school administrator (28%).

### 5.2.2 Parent Awareness of DEC Kit Opportunity

Classroom materials sent home with students were the key source of awareness of kits for families, with most student families (71%) hearing about the opportunity to receive a Duke Energy kit via this medium. Other respondents learned about the kits from various communications from the school (Table 5-4).

**Table 5-4: Sources of Parental Awareness of Kits (Multiple Responses Allowed; n=334)**

| Source of Kit Awareness      | Percent |
|------------------------------|---------|
| Classroom materials          | 71%     |
| School newsletter            | 17%     |
| Email from teacher/school    | 14%     |
| School website or web portal | 6%      |
| Conversations with teacher   | 4%      |
| Poster at school             | 4%      |
| After hour event at school   | 2%      |
| Other                        | 13%     |

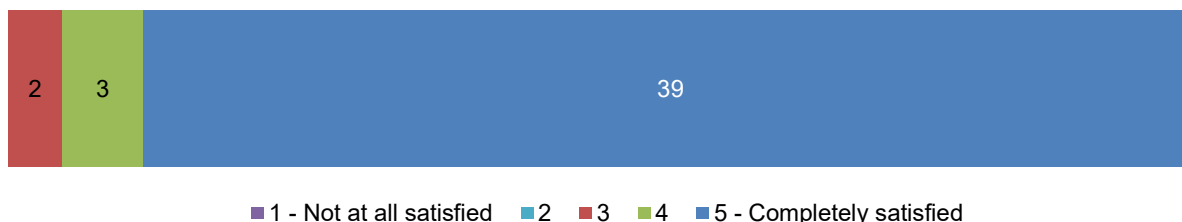
### 5.2.3 Teacher Experience with the Program

#### **NTC Performance**

Teachers were very pleased with the NTC performance. They specified that the content was age-appropriate and the performance itself was engaging, and they reported overall high satisfaction with it.

Overall, teachers were largely satisfied with the performance, with 95% (42 of 44) rating their satisfaction as a “4” or “5” on a one-to-five scale. The remaining two respondents were neither satisfied nor dissatisfied providing a response of “3” on the five-point scale (Table 5-1).

**Figure 5-1: Overall Teacher Satisfaction with NTC Performance (n=44)**



More than 90% of the surveyed teachers (40 of 44) said the explanation of energy-related concepts was “about right” for most of their students. Of the other four, three teachers (two first grade teachers and one elementary teacher that teaches several grades) reported the material was too advanced, while one sixth grade teacher said the material was too basic for their students.

Regarding age appropriateness, the comments from the interviewed teachers echoed the findings from the online survey. All five interviewed teachers said the performance was age appropriate and kept their students’ attention.

The interviewed teachers commented on the quality of the performance, specifically that the performance was engaging, and one noted that the performance gave students tangible actions to save energy.

Two surveyed teachers offered suggestions for improving the performance:

- Introduce vocabulary ahead of the performance. A first-grade teacher noted that having some key terms ahead of time would have allowed teachers to review them with students.
- Improve sound quality. A second-grade teacher noted that the it was hard to hear the performance in a large space. This teacher suggested the performers were not expecting have to perform in a large auditorium.

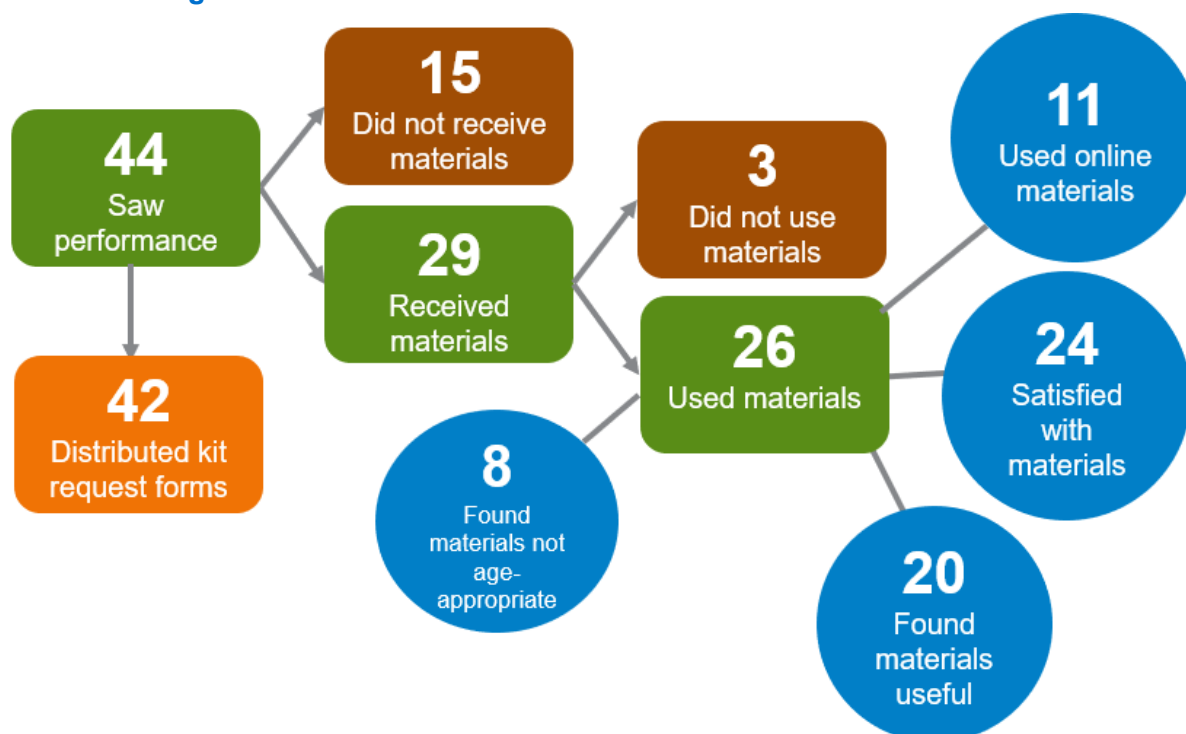
### ***Curriculum and Instructional Materials***

A notable percentage of teachers reported not receiving or using the curriculum materials, despite most reporting that they distributed kit request forms to their students (see Kit Request



Forms section below).<sup>19</sup> About two-thirds of teachers (29 of 44) reported receiving the curriculum and instructional materials, while fifteen said they did *not* receive the materials. Of the 29 who reported receiving the materials, three reported not using them “at all” because they did not have time to use them (2 mentions) or because state testing material took priority (Figure 5-2).

**Figure 5-2: DEC Teachers Use of Forms and Instructional Materials**



Twenty-six teachers reported use of the instructional materials and they reported on the materials’ usefulness, age-appropriateness, alignment with state science standards, or concepts children had trouble understanding. From their comments, the following observations emerged:

- Use of materials was limited to moderate: Eight teachers characterized their use as “a little” and twelve used the materials “moderately.” About 40% of respondents used the online aspect of the curriculum.
- Materials were useful: When asked to rate the usefulness of the materials, from 1 (not at all useful) to 5 (highly useful), most respondents rated the usefulness as a four (11) or five (9). The remaining six respondents scored the usefulness as a three.

<sup>19</sup> Kit request forms and curriculum materials are delivered to schools at the same time. The findings from this study are inconclusive as to whether teachers did not actually receive the instructional materials in the first place (for example: the school received them, but did not distribute them to the teachers), or if teachers did not remember receiving them due to a recency effect (in that, they did receive them but did not remember this event by the time of the survey, which seems particularly likely if the teacher did not distribute or use the materials despite receiving them).

- Materials were age-appropriate: Six reported the material was age-appropriate, while a fifth grade teacher reported it was somewhat too advanced.
- Most respondents said they varied in their thoughts about the alignment of materials with state science standards: Fourteen reported the curriculum “completely” (5) or “mostly” (9) aligned with state science standards, seven stated it “somewhat” aligned, and four did not know if the materials aligned. One fifth grade teacher reported there were no state science standards.
- One teacher reported abstract concepts such as electricity can be difficult for children to understand.

The eight teachers reporting “a little” use explained their rationale for limited use of the material. None of the comments focused on the quality of the materials per se. Rather, the reason for minimal use was because the materials did not align with their teaching priorities at that time (5 mentions) and concerns about the age appropriateness, with two kindergarten teachers saying the materials were too advanced and one sixth grade teacher reporting the materials were too basic.

No teacher specified any concepts the workbooks should have covered to make it more useful. Twenty-four of the 26 reported being satisfied with the materials (scored a “4” or “5” on a five-point scale) and two were neither satisfied or dissatisfied with the materials (scored a “3” on a five-point scale).

Two interviewed teachers said they used the curriculum materials. Of those, one used the workbooks in their classroom and one reported sending the materials home.

### ***Kit Request Forms***

As Figure 5-2 suggests, there was a disconnect among teachers between the kit request forms and the instructional materials. Teachers largely reported limited use of the instructional materials, with more than one-third indicating they never received the instructional materials. Yet nearly all reported distributing kit request forms to students, which are delivered to the school at the same time as the instructional materials. This suggests that teachers viewed the materials as tangential to the kit request forms.

Ninety-five percent of surveyed teachers distributed the kit request forms to their students and almost all took actions to encourage or promote the kits to their students. The interviewed teachers reported no challenges related to receiving or distributing the kit request forms and all noted ways they encouraged students to receive the kit (Table 5-5).

**Table 5-5: Actions Taken to Encourage Students to Receive Kit  
(Multiple Responses Allowed)**

| Actions                            | Teacher Survey Responses<br>(n=44) | Interview Mentions<br>(n=55) |
|------------------------------------|------------------------------------|------------------------------|
| Encouraged students to take action | 43                                 | 5                            |

|  |    |   |
|--|----|---|
| <i>Engaged students</i>                              | 41 | 3 |
| <i>Vocally encouraged students</i>                   | 40 | 2 |
| <i>Explain that school will get award</i>            | -  | 1 |
| <i>Posted MyEnergyKit.org poster</i>                 | 17 | - |
| <i>Engaged parents</i>                               | 24 | 4 |
| <i>Electronic reminders to parents (email, text)</i> | 18 | 3 |
| <i>Used classroom web portal</i>                     | 12 | - |
| <i>Spoke with parents in person</i>                  | 8  | 1 |
| <i>Used newsletter</i>                               | 2  | - |

About a third of surveyed teachers (32%) reported following up with students to find out whether their household requested a kit. Of those, teachers estimated between 5% to 65% of families ordered a kit, demonstrating an average of 22% of student families that requested a kit.<sup>20</sup>

### 5.2.4 Student Family Experience with the Program

#### **Installation and Use Rates**

Almost all (93%) participants used at least one measure in the kit, installing an average of three measures from their kit. Most kit recipients installed the lighting measures including LEDs (95%) and nightlights (83%); far fewer used the insulator gaskets and water related measures (ranging from 33% to 35%). Water related measures were also uninstalled more often than lighting measures. Most of the respondents who chose to uninstall kit measures reported dissatisfaction with the measure performance.

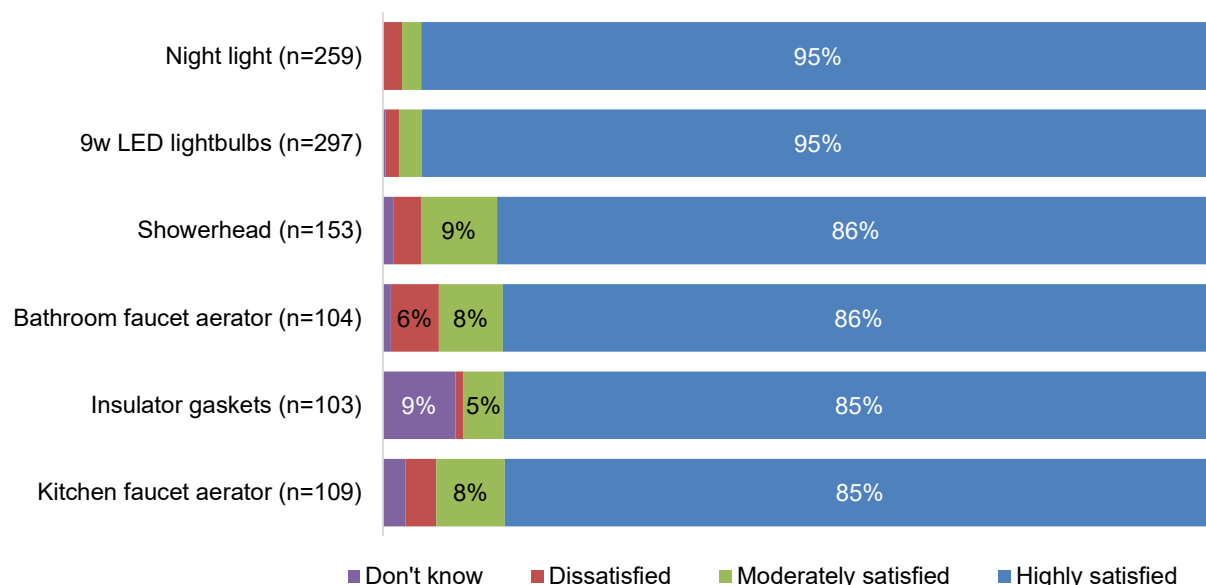
The majority of those installing light bulbs (71%) said they installed both bulbs included in the kit and they typically replaced incandescent bulbs.

Of those who did not install all items in the kit, about a third (34%) said they do not plan to install any of the items they had not yet installed. Respondents said they would not install the remaining items because the currently installed item is still working, they already had an efficient measure installed, they tried it and it didn't fit, or they had not "gotten around to it."

#### **Measure Satisfaction**

Nearly all kit recipients reported high satisfaction with the items they installed from their kit (Figure 5-3). To best gauge the experience with the measures, we asked respondents to rate their satisfaction with all measures they installed, including those they later uninstalled. Respondents explained that any dissatisfaction they had with water measures was due to low water pressure or that the measures did not fit properly.

<sup>20</sup> The Evaluation Team calculated the mean of the mid-point values of each teacher's selected range. For example, if one teacher selected 81%-90% and another selected 91%-100%, the mid-points are 85% and 95%, and the mean is 90%.

**Figure 5-3: Kit Recipient Satisfaction with Measures They Installed\***

\* Respondents rated their satisfaction with the measures on a 0 ("very dissatisfied") to 10 ("very satisfied") scale. Dissatisfied indicates 0-3 ratings, moderately satisfied indicates 4-6 ratings, and highly satisfied indicates 7-10 ratings.

### ***Energy Saving Educational Materials in the Kit***

The Energy Efficiency Kit includes a Duke Energy-labeled Department of Energy (DOE) Energy Saver Booklet that includes educational information on saving energy at home. Most (73%) respondents said they read the booklet, most of whom (82%) found it highly helpful.<sup>21</sup> Those not finding the booklet helpful stated they already knew the information presented in the booklet or they wanted additional energy saving tips and more detailed information included.

### ***Additional Energy Saving Actions***

Parents and children reported adopting new energy-saving actions since their involvement in the program. Over half of parents reported taking an energy-saving action (51%) and over half (51%) reported their child has adopted new energy saving behaviors since receiving their kit. Parents most commonly said that their child now turns off lights when not using a room (37%) or that they changed their thermostat settings (22%) (Table 5-6). More than three-quarters (81%) of respondents reporting new energy saving behaviors said the DEC-sponsored kit and materials were "highly influential" on their adoption of those behaviors.<sup>22</sup>

<sup>21</sup> We asked respondents to rate the helpfulness of the Duke Energy-labeled DOE Energy Saver Booklet on a scale from 0 ("not at all helpful") to 10 ("very helpful"). Eighty-two percent of respondents who reported reading the booklet gave a rating of 7 or higher. 16% gave ratings of 5 or 6, and 2% gave ratings of 0 through 4.

<sup>22</sup> We asked respondents to rate the influence of Duke Energy's kit and energy saving educational materials on their reported behavior changes, using a scale from 0 ("not at all influential") to 10 ("extremely influential"). Eighty-one percent of respondents (or, 205 of 252) who reported behavior changes gave a rating of 7 or higher.

**Table 5-6: New Behaviors Adopted by Parents and Children Since Receiving Kit  
(Multiple Responses Allowed; n=334)**

| New Behaviors Child Has Adopted                | Parents | Children |
|--|---------|----------|
| Adopted new behaviors since receiving kit      | 51%     | 51%      |
| Changed thermostat settings to use less energy | 22%     | -        |
| Turn off electronics when not using them       | 16%     | 25%      |
| Takes shorter shower                           | 16%     | 19%      |
| Using fans instead of air conditioning         | 15%     | -        |
| Turning off air conditioning when not home     | 12%     | -        |
| Turning off lights when not in a room          | 10%     | 37%      |
| Turning water heater thermostat down           | 8%      | -        |
| Turning off furnace when not home              | 5%      | -        |
| Other reason                                   | 5%      | 2%       |
| Refused  | 0%      | 1%       |

Receiving a kit may drive a desire to make additional energy efficiency improvements. Most student families reported a desire to receive more kit measures (90%), specifying interest in LEDs (78%), nightlights (58%), showerheads (24%), gasket insulators (15%), and bathroom and kitchen aerators (14%). Parents typically preferred requesting additional measures via the internet (74%) or pre-paid postcards (23%).

Many parent respondents reported they want to purchase additional energy saving products. More than half (58%) reported an interest in purchasing at least one of the products or services seen in Table 5-7.

**Table 5-7: Parent Interest in Additional Products and Services  
(Multiple Responses Allowed; n=334)**

| Products and Services                  | Parents |
|--|---------|
| New efficient lighting                 | 40%     |
| Air leak sealing                       | 28%     |
| Energy efficient appliances            | 23%     |
| Connected or smart thermostats         | 19%     |
| Energy efficient water heater          | 18%     |
| Efficient heating or cooling equipment | 16%     |
| Efficient windows                      | 16%     |
| Adding insulation                      | 16%     |
| Sealing or insulating ducts            | 14%     |
| Other                                  | 5%      |

The kit motivated some respondents to purchase energy efficient equipment or services (Table 5-8). More than one-quarter (28%) of respondents reported purchasing or installing additional energy efficiency measures since receiving their kit. Efficient light bulbs were the most commonly reported measure (mentioned by 67 respondents), with 59 respondents specifying LEDs and eight mentioning CFLs. Six respondents reported getting a Duke Energy rebate for their measure, four of whom said they received rebates for purchasing LEDs, one for CFLs, one for sealing air leaks, and another who received an incentive for their efficient heating or cooling equipment. Most (60 of 92) respondents said the Duke Energy schools program was at least partially influential on their decision to purchase and install additional energy saving measures.

**Table 5-8: Additional Energy Saving Measures Purchased**  
(Multiple Responses Allowed; n=334)

|   | Count of Respondents Reporting Purchases After Receiving the Kit | Count Reporting Duke Rebates for Measure | Count Reporting High Program Influence on Purchase* |
|---|--|--|---|
| At least one measure                          | 92   | 6  | 60  |
| Bought LEDs                                   | 59   | 4  | 33  |
| Bought energy efficient appliances            | 26   | 0  | 18  |
| Sealed air leaks                              | 18   | 1  | 8   |
| Installed an energy efficient water heater    | 12   | 0  | 6   |
| Added insulation                              | 10   | 0  | 3   |
| Sealed ducts                                  | 8  | 0  | 3   |
| Bought CFLs                                   | 8  | 1  | 4   |
| Other   | 8  | 0  | 3   |
| Bought efficient heating or cooling equipment | 7  | 1  | 4   |
| Bought efficient windows                      | 4  | 0  | 1   |
| Moved into an ENERGY STAR home                | 2  | 0  | 1   |

\*Respondents that rated the influence of the DEC program as 7 or higher on 10-point scale, where 0 was not at all influential and 10 was extremely influential.

## 6 DEP Process Evaluation

### 6.1 Summary of Data Collection Activities

The process evaluation is based on telephone and web interviews and surveys with program and implementer staff, teachers, and student families who received a kit during the program evaluation year (Table 6-1).

**Table 6-1: Summary of Process Evaluation Data Collection Activities**

| Target Group   | Method                   | Sample Size | Population | Confidence / Precision |
|--|--------------------------|-------------|------------|------------------------|
| Duke Energy program staff                                      | Phone in-depth interview | 1           | N/A        | N/A                    |
| Implementation staff: NTC                                      | Phone in-depth interview | 1           | N/A        | N/A                    |
| Implementation staff: R1                                       | Phone in-depth interview | 1           | N/A        | N/A                    |
| Teachers who attended NTC performance                          | Web survey               | 29          | Unknown    | 90/14                  |
| Participating teacher follow-up interviews                     | Phone in-depth interview | 5           | Unknown    | N/A                    |
| Student families who received DEP kit and are customers of DEP | Phone/Web survey         | 172*        | 9,025      | 90/6                   |

\*102 web surveys and 70 phone surveys

#### 6.1.1 Teacher Surveys and Follow-Up Interviews

The evaluation team surveyed and interviewed teachers who attended NTC performances to better understand program success and delivery and to gather an educator perspective on what could be improved.

In April and May 2018, the evaluation team surveyed 29 teachers who attended NTC performances between September 18, 2018 and March 15, 2018. Of the 29 teacher respondents, 19 taught elementary school and 10 taught middle school. We report elementary and middle school findings together unless a meaningful difference emerged between school types.

In May 2018, the evaluation team contacted teachers who completed the web survey that had indicated interest in being interviewed about their experience. The evaluation team requested their participation in a follow-up in-depth interview (IDI) (n=5) about their experience with the performance, curriculum materials, and kit request forms. These IDIs served to get a deeper understanding of topics uncovered in the web survey and to provide additional details about their experience. The evaluation team completed interviews with five of these teachers. Three taught at elementary schools (teaching kindergarten, fourth, and fifth grades, respectively) and



two taught sixth grade at middle schools.

### 6.1.2 Survey of Student Families Who Received the DEP Kit

In April and May 2018, the evaluation team surveyed 172 families who received energy efficiency kits from DEP between September 2017 and May 2018. (Table 6-2). During that period, DEP distributed a total of 5,587 kits to families who completed the kit request form their child brought home from school. The evaluation team attempted to contact a random sample frame of 4,877 households, sending email survey invitations to 3,974 households and attempting to call 903 households for which program records provided an email address and/or a phone number. Ultimately, the data collection effort achieved a 3.5% response rate, providing a sample with 90/6 confidence/precision. Comparisons with census data demonstrate that the sample is largely representative of housing type, income level, and ownership status for the region. However, respondents reported greater educational attainment and more household members than typical for the region.<sup>23</sup>

**Table 6-2: DEP Student Family Survey Response Rates**

| Mode         | Population Size | Sample Frame Size | Completed Surveys | Response Rate | Confidence/Precision |
|--------------|-----------------|-------------------|-------------------|---------------|----------------------|
| Web-based    | 9,025           | 3,974             | 102               | 2.6%          | 90/6                 |
| Phone        |                 | 903               | 70                | 7.8%          |                      |
| <b>Total</b> |                 | <b>4,877</b>      | <b>172</b>        | <b>3.5%</b>   |                      |

## 6.2 Process Evaluation Findings

The subsequent sections discuss the key process evaluation findings, beginning with a review sponsorship awareness.

### 6.2.1 Awareness of DEP Sponsorship of the Program

Teachers and student families were mostly aware of DEP's sponsorship of the program. A majority of teachers (84%) reported they were aware of DEP's sponsorship. The 23 teachers who knew of DEP's sponsorship most often learned about it through Duke materials (8 mentions) or NTC staff (8 mentions) (Table 6-3).

<sup>23</sup> Region comparisons come from 2016 American Community Survey (Census) 5-year period estimates data for the states of North Carolina and South Carolina.



**Table 6-3: How Teachers Learned of DEP's Sponsorship  
(Multiple Responses Allowed; n=23)**

| Source                                      | Number of Teachers |
|---|--------------------|
| Duke Energy marketing materials             | 8                  |
| The National Theatre for Children staff     | 8                  |
| Another staff person at school              | 7                  |
| The National Theatre for Children materials | 7                  |
| Duke Energy staff                           | 1                  |

Awareness among student families was high, with 88% of respondents stating they knew the kit was sponsored by Duke Energy. Over half (57%) indicated they learned about Duke's sponsorship via the classroom materials their child brought home. Other common ways that families learned about Duke Energy sponsorship were communications from their child's teacher or school (30%) and informational material included in the kit (27%).

Only about one-quarter (24%) of respondents said they knew about the energy-related classroom activities and NTC performance at their child's school. Of those, most said they found out about the NTC activities from their child (67%) and/or from a teacher or school administrator (41%).

### 6.2.2 Parent Awareness of DEP Kit Opportunity

Classroom materials sent home with students were the key source of awareness of kits for families, with most student families (69%) hearing about the opportunity to receive a Duke Energy kit via this medium. Other respondents learned about the kits from various communications from the school (Table 6-4).

**Table 6-4: Sources of Parental Awareness of Kits (Multiple Responses Allowed; n=172)**

| Kit Awareness                | Percent |
|------------------------------|---------|
| Classroom materials          | 69%     |
| Email from teacher/school    | 13%     |
| School newsletter            | 11%     |
| School website or web portal | 6%      |
| Conversations with teacher   | 5%      |
| Poster at school             | 3%      |
| After hour event at school   | 1%      |
| Other                        | 18%     |

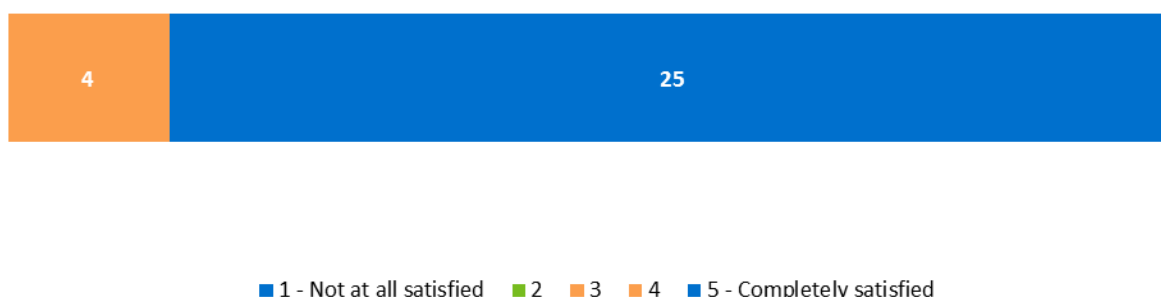
### 6.2.3 Teacher Experience with the Program

#### NTC Performance



Teachers were very pleased with the NTC performance. They specified that the content was age-appropriate and the performance itself was engaging, and they reported overall high satisfaction with it (Figure 6-1).

**Figure 6-1: Overall Teacher Satisfaction with NTC Performance (n=29)**



More than 90% of the surveyed teachers (27 of 29) said the explanation of energy-related concepts was “about right” for most of their students. The two remaining, one second grade teacher and one middle school teacher (who teaches grades 5 through 8), indicated the materials were “somewhat too advanced” for most students. Comments from the interviewed teachers echoed the findings from the online survey. Four of the five interviewed teachers – two elementary and two middle school teachers – said the performance was age appropriate and kept their students’ attention. By comparison, a kindergarten teacher reported that the material in the performance may have been better suited for older elementary students but indicated the performance still engaged the kindergarteners.

Five teachers commented on the quality of the performance, specifically that the performance was engaging, and the performers were humorous. One sixth grade teacher particularly liked that the performance was easy to understand and the other sixth grade teacher liked that the performance reinforced what they were covering in their classroom.

Only one of the surveyed teachers offered any improvements for the performance, suggesting that the NTC performance could include a list of advantages and disadvantages for renewable energy compared to nonrenewable energy.

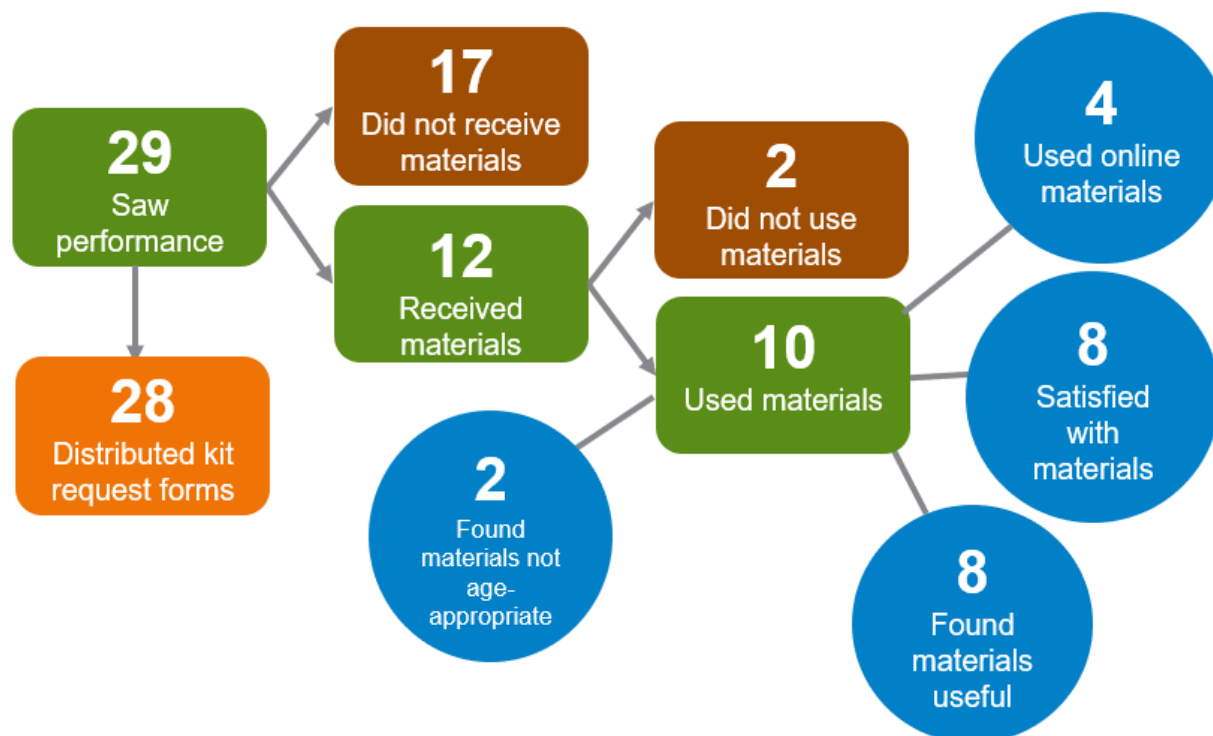
### ***Curriculum and Instructional Materials***

A notable percentage of teachers reported not receiving or using the curriculum materials.<sup>24</sup> About forty percent of teachers (12 of 29) reported receiving the curriculum and instructional

<sup>24</sup> Kit request forms and curriculum materials are delivered to schools at the same time. The findings from this study are inconclusive as to whether teachers did not actually receive the instructional materials in the first place (for example: the school received them, but did not distribute them to the teachers), or if teachers did not remember receiving them due to a recency effect (in that, they did receive them but did not remember this event by the time of the survey, which seems particularly likely if the teacher did not distribute or use the materials despite receiving them).

materials, while 17 said they did not receive the materials. Of the 12 who reported receiving the materials, two reported not using them “at all” because they did not have time to use them and integrate them into their existing curriculums (Figure 6-2).

**Figure 6-2: DEP Teachers Use of Forms and Instructional Materials**



The 10 teachers reporting use of the instructional materials made the following observations:

- Use of materials was limited: Two teachers characterized their use as “a little”, and four used the materials “moderately” and four used them “a lot.” Four respondents reported using the online aspect of the curriculum.
- Materials were useful: When asked to rate the usefulness of the materials, from 1 (not at all useful) to 5 (highly useful), two provided a score of three, five scored them a four, and three scored them the highest rating - five, extremely useful.
- Materials were age-appropriate: Seven reported the material was age-appropriate, while a kindergarten and a fifth-grade teacher reported the material was somewhat too advanced. One respondent did not know.
- Most respondents said the material aligned with state science standards: Seven reported the curriculum “completely” (1) or “mostly” (6) aligned with state science standards, and one said it “somewhat” aligned. Two did not know if the materials aligned with the standards.
- No teacher reported any specific concepts or topics children had trouble understanding.

The two teachers reporting “a little” use of the instructional materials explained their rationale for

limited use of the material. One mentioned that the material was not part of their curriculum at the time and another teacher noted that they only received one workbook but “tons of materials telling the kids about the kit.”

No teacher specified any concepts the workbooks should have covered to make it more useful. Eight reported being satisfied with the materials (scored a “4” or “5” on a five-point scale) and two were neither satisfied or dissatisfied with the materials (scored a “3” on a five-point scale).

Two of the five interviewed teachers said they used the curriculum materials. One of these respondents used the materials when teaching about the carbon cycle and another respondent noted using the materials when teaching about electricity.

### **Kit Request Forms**

Figure 6-2 suggests, there was a disconnect among teachers between the kit request forms and the instructional materials. Teachers largely reported limited use of the instructional materials, with more than half indicating they never received the instructional materials. Yet nearly all reported distributing kit request forms to students, which are delivered to the school at the same time as the instructional materials. This suggests that teachers viewed the materials as tangential to the kit request forms.

Nearly all surveyed teachers distributed the kit request forms to their students and all took actions to encourage or promote the kits to their students.<sup>25</sup> The interviewed teachers reported no challenges related to receiving or distributing the kit request forms, with three of the five reporting receiving the forms ahead of the performance, and all noted ways they encouraged students to receive the kit (Table 6-5).

**Table 6-5: Actions Taken to Encourage Students to Receive Kit  
(Multiple Responses Allowed)**

| Actions  | Teacher Survey Responses (n=29) | Interview Mentions (n=5) |
|--|---------------------------------|--------------------------|
| Encouraged students to take action                       | 29                              | 5                        |
| <i>Engaged students</i>                                  | 26                              | 4                        |
| <i>Vocally encouraged students</i>                       | 24                              | 4                        |
| <i>Awarded prizes to students that request kit</i>       | 1                               | -                        |
| <i>Posted MyEnergyKit.org poster</i>                     | 13                              | -                        |
| <i>Assisted students with online application for kit</i> | -                               | 1                        |
| <i>Engaged parents</i>                                   | 15                              | 2                        |
| <i>Electronic reminders to parents (email, text)</i>     | 11                              | 2                        |

<sup>25</sup> Note that one teacher respondent said they did not distribute kit request forms yet reported encouraging students to get a kit. Possible explanations for this discrepancy include that a different teacher distributed the forms, the teacher promoted online redemption instead, the respondent did not understand the question about distributing kit request forms, or the respondent accidentally selected the wrong response option.

| Actions                                       | Teacher Survey Responses (n=29) | Interview Mentions (n=5) |
|---|---------------------------------|--------------------------|
| <i>Spoke with parents in person</i>           | 5                               | -                        |
| <i>Used classroom web portal</i>              | 3                               | -                        |
| <i>Had school or principal send reminders</i> | -                               | 1                        |
| <i>Used newsletter</i>                        | 1                               | -                        |

About half (15 of 29) of surveyed teachers reported following up with students to find out whether their household requested a kit. Of those, 14 could estimate what percentage of student sent the forms to Duke Energy. Eleven estimated less than half of their families sent away for a kit and the remaining three reported more than half sent for a kit; on average, teachers reported that 34% of their students sent for a kit.<sup>26</sup>

## 6.2.4 Student Family Experience with the Program

### ***Installation and Use Rates***

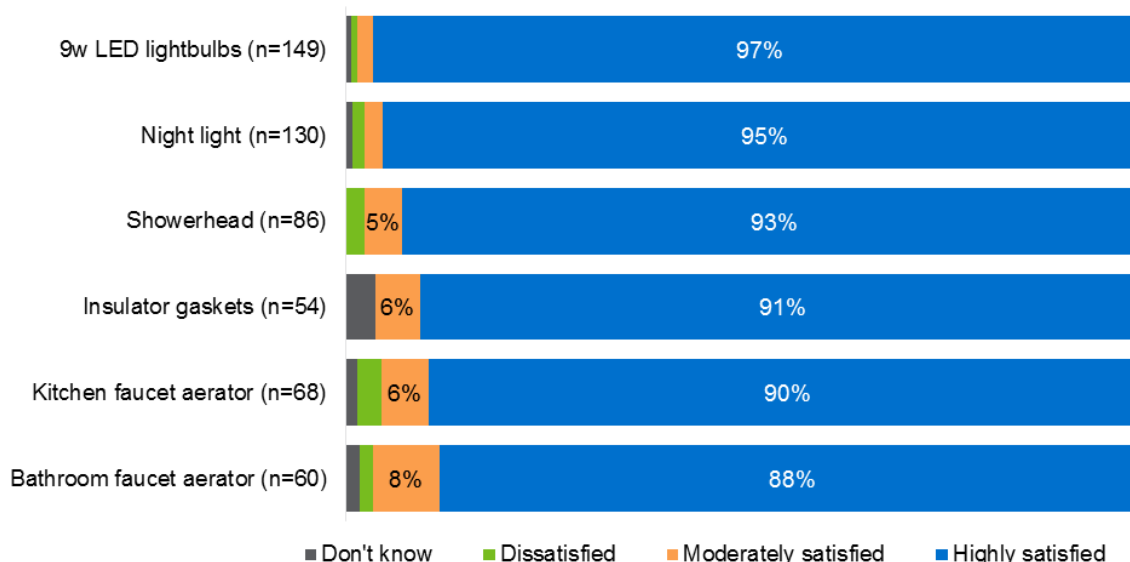
Almost all participants used at least one measure in the kit, but installation of the measures varies by type. Ninety-three percent of the surveyed kit recipients installed at least one measure, installing an average of three measures from their kit. Most kit recipients installed the energy efficient LEDs (93%) and night lights (81%); far fewer installed the water related measures (38% to 54%) and insulator gaskets (34%). The majority of those installing light bulbs (69%) said they installed both included in the kit bulbs and they typically replaced incandescent bulbs.

Of those who did not install all items in the kit, one-third said they do not plan to install any of the items they had not yet installed. Respondents said they would not install the remaining items because the currently installed item is still working, they already had an efficient measure installed, they had not “gotten around to it”, or they tried it and it didn’t fit or didn’t work as intended.

### ***Measure Satisfaction***

Nearly all kit recipients reported high satisfaction with the items they installed from their kit (Figure 6-3). To best gauge the experience with the measures, we asked respondents to rate their satisfaction with all measures they installed, including those they later uninstalled. Respondents explained that any dissatisfaction they had with water measures was due to low water pressure.

<sup>26</sup> The Evaluation Team calculated the mean of the mid-point values of each teacher’s selected range. For example, if one teacher selected 81%-90% and another selected 91%-100%, the mid-points are 85% and 95%, and the mean is 90%.

**Figure 6-3: Kit Recipient Satisfaction with Measures They Installed\***

\* Respondents rated their satisfaction with the measures on a 0 ("very dissatisfied") to 10 ("very satisfied") scale. Dissatisfied indicates 0-3 ratings, moderately satisfied indicates 4-6 ratings, and highly satisfied indicates 7-10 ratings.

### ***Energy Saving Educational Materials in the Kit***

The Energy Efficiency Kit includes a Duke Energy-labeled Department of Energy (DOE) Energy Saver Booklet that includes educational information on saving energy at home. Most (74%) respondents said they read the booklet, most of whom (86%) found it highly helpful.<sup>27</sup> The other respondents rated the booklet as moderately helpful (11%) or not very helpful (2%). Those not finding the booklet helpful stated they already knew the information presented in the booklet and they were already doing what was recommended in their homes.

### ***Additional Energy Saving Actions***

Parents and children reported adopting new energy-saving actions since their involvement in the program. Around half of parents reported taking an energy-saving action (48%) and half of respondents reported their child has adopted new energy saving behaviors since receiving their kit. Parents most commonly said that their child now turns off lights when not using a room (32%), and parents reported changing thermostat settings (22%) (Table 6-6). The majority (86%) of respondents reporting new energy saving behaviors said the DEP-sponsored kit and materials were "highly influential" in their adoption of those behaviors.<sup>28</sup>

<sup>27</sup> We asked respondents to rate the helpfulness of the Duke Energy-labeled DOE Energy Saver Booklet on a scale from 0 ("not at all helpful") to 10 ("very helpful"). Eighty six percent of respondents who reported reading the booklet gave a rating of 7 or higher. 11% gave ratings of 5 or 6, and 2% gave ratings of 0 through 4.

<sup>28</sup> We asked respondents to rate the influence of Duke Energy's kit and energy saving educational materials on their reported behavior changes, using a scale from 0 ("not at all influential") to 10 ("extremely influential"). Seventy-eight percent of respondents (or, 90 of 115) who reported behavior changes gave a rating of 7 or higher.

**Table 6-6: New Behaviors Adopted by Parents and Children Since Receiving Kit  
(Multiple Responses Allowed; n=172)**

| New Behaviors Child Has Adopted                | Parents | Children |
|--|---------|----------|
| Adopted new behaviors since receiving kit      | 48%     | 50%      |
| Changed thermostat settings to use less energy | 22%     | -        |
| Turn off electronics when not using them       | 19%     | 27%      |
| Turn off lights when not in a room             | 13%     | 32%      |
| Using fans instead of air conditioning         | 12%     | -        |
| Turning off air conditioning when not home     | 9%      | -        |
| Taking shorter showers                         | 9%      | 16%      |
| Turning water heater thermostat down           | 8%      | -        |
| Other  | 6%      | 6%       |
| Turning off furnace when not home              | 5%      | -        |
| Refused  | 0%      | 1%       |

Receiving a kit may drive a desire to make additional energy efficiency improvements. Most student families reported a desire to receive more kit measures (89%), specifying interest in LEDs (82%), nightlights (60%), showerheads (27%), gasket insulators (19%), bathroom aerators (18%), and kitchen aerators (16%). Parents typically preferred requesting additional measures via internet (61%) or pre-paid postcards (29%).

Many respondents reported they want to purchase additional energy saving products. Two-thirds of respondents reported an interest in purchasing at least one of the products or services in (Table 6-7).

**Table 6-7: Parent Interest in Additional Products and Services  
(Multiple Responses Allowed; n=172)**

| Products and Services                  | Parents |
|--|---------|
| New efficient lighting                 | 51%     |
| Energy efficient appliances            | 28%     |
| Efficient windows                      | 17%     |
| Air leak sealing                       | 17%     |
| Adding insulation                      | 15%     |
| Efficient heating or cooling equipment | 14%     |
| Connected or smart thermostats         | 13%     |
| Energy efficient water heater          | 11%     |
| Sealing or insulating ducts            | 9%      |
| Other                                  | 9%      |

The kits also motivated some student families to purchase energy efficient equipment or services. More than a quarter (26%) of respondents reported purchasing or installing additional

energy efficiency measures since receiving their kit. Efficient light bulbs were the most commonly reported measure (mentioned by 30 respondents), with 29 respondents specifying LEDs and one mentioning CFLs. Four respondents reported getting a Duke Energy rebate for their measure, two of whom said they received rebates for purchasing an energy efficient appliance, one who reported receiving a rebate for LEDs, and another who received an incentive for an unspecified measure. Most (31 of 45) respondents said the Duke Energy schools program was at least partially influential on their decision to purchase and install additional energy saving measures (Table 6-8)

**Table 6-8: Additional Energy Saving Measures Purchased  
(Multiple Responses Allowed; n=172)**

|   | Count of Respondents Reporting Purchases After Receiving the Kit | Count Reporting Duke Rebates for Measure | Count Reporting High Program Influence on Purchase* |
|---|--|--|---|
| At least one measure                          | 45   | 4  | 31  |
| Bought LEDs                                   | 29   | 1  | 19  |
| Sealed air leaks                              | 10   | 0  | 8   |
| Bought energy efficient appliances            | 8  | 2  | 5   |
| Added insulation                              | 8  | 0  | 4   |
| Other   | 8  | 1  | 3   |
| Bought efficient heating or cooling equipment | 4  | 0  | 0   |
| Sealed ducts                                  | 3  | 0  | 3   |
| Bought efficient windows                      | 2  | 0  | 0   |
| Moved into an ENERGY STAR home                | 2  | 0  | 2   |
| Installed an energy efficient water heater    | 1  | 0  | 1   |
| Bought CFLs                                   | 1  | 0  | 1   |



## 7 Conclusions and Recommendations

Based on evaluation findings, the evaluation team concluded the following and provides several recommendations for program improvement:

**Conclusion 1: NTC performances satisfy teachers by engaging students. It is less clear that the performances are linked to classroom learning, awareness at home, or change in behavior.** Teachers reported high satisfaction with the performance and recalled that the performance engaged students. However, curriculum materials were not always distributed or remembered by teachers, and those who used them did so in a limited way.

Parents were often not aware the performance occurred and about half of parents reported changes in their or their children's energy use behavior but those changes in behavior were limited.

**Recommendation:** Consider exploring ways to increase teacher receipt and use of materials, such as:

- Making sure teachers are aware that NTC aligns their materials with state science standards, and
- Requesting that teachers align energy-focused lesson plans with performance timing

**Conclusion 2: There is an opportunity to increase parental awareness of the kits and thus get more families to request and install kits.** Currently, students bear the bulk of the burden of generating parental awareness of the kit opportunity. Although most teachers engage students on the kit request process, only about half engage parents. Parent surveys corroborate this lack of teacher to parent engagement on the kits; few parents mentioned their child's teacher or school as the source of awareness of the kit (instead, most parents learned about the kit from their child). Additionally, two-thirds of parents did not know kits were associated with a performance and instructional materials. Although about one-third of teachers follow-up with students to see if parents requested kits, there is great variation in how much emphasis teachers place on promoting the kits.

Further, the contests appear to have limited success in encouraging kit requests, as a) only one teacher mentioned using the contests to encourage kit requests, and b) the household- and school-level contests had particularly low influence on parent motivations to get a kit.

**Recommendation:** Explore ways to increase parent awareness of and motivation for requesting the kits. For example: create a household-level contest that engages both students and their parents, so students are motivated to ask their parents to sign up and so parents are motivated to participate. For example, in addition to a cash prize drawing for parents, include a prize drawing aimed at students (e.g., toys, electronics, or other items

valued by students) or a guaranteed incentive such as a coupon for pizza (e.g., Book It model).

**Conclusion 3: The program influences families to save energy.** Families save energy they would not have saved without receiving the kits. Nearly all respondents installed at least one kit measure, and few would have installed the kit measures if they had not received them for free from the program (as evidenced by low free-ridership rates). About one-fifth of parent respondents reported making additional energy saving improvements, and over half of parent respondents said they or their children adopted new energy saving behaviors since receiving the kit.

**Recommendation:** Continue engaging student family households with the Education program.

**Conclusion 4: The Education program could be a good “gateway” program to generate even more energy savings in Duke Energy territories.** Kit recipients could be good targets for other Duke Energy efficiency program promotions, as they:

- Demonstrated willingness to save energy in their home
- Expressed interest in installing additional kit items or other energy saving measures (many of which Duke Energy currently incents)
- Are highly likely to read any information included with the kit
- Are commonly single family homeowners

**Recommendations:** Investigate the possibility of leveraging kits to promote other Duke Energy efficiency programs, such as targeting these households for direct mail campaigns or including information on Smart \$aver in the kit.

**Conclusion 5: Energy savings could be increased by encouraging participants to install LED lamps in higher usage areas.** LED lamp in-service rates (ISR) measured just below 80% for both DEC and DEP. This included some participants who store the LED kit lamp until a similar lamp in the home burns-out. Continue to encouraging participants to install the lamps as soon as the kit is received can increase LED lamp in-service rates and generate additional savings for the program.

Most kit lamps were installed in rooms with average (2 to 4 hour) dialy daily lighting usage, while very few lamps were installed in high use locations such as kitchens or exterior fixtures. Installation of lamps in high usage areas will results in higher energy savings (Table 7-1).

**Table 7-1: Lamp HOU Installation Rates**

| Daily Lamp Use*     | DEC Installation Rate | DEP Installation Rate |
|---------------------|-----------------------|-----------------------|
| Low (< 2 hours)     | 43%                   | 44%                   |
| Average (2-4 hours) | 36%                   | 32%                   |

| Daily Lamp Use*  | DEC Installation Rate | DEP Installation Rate |
|------------------|-----------------------|-----------------------|
| High (> 4 hours) | 21%                   | 24%                   |

\*Based on the participant survey responses

**Recommendations:** Program should continue to encourage lamp installations as soon as possible informing them where their new lamps can save the most energy. Alternatively, consider swapping out one of the A-shape LEDs with a lamp, such as an LED PAR, that may be more applicable to higher use areas like the kitchen

**Conclusion 6: Water-related measures drive savings, but installation rates are low.** Water measures contributed the majority of verified savings (DEC 74%, DEP 80%), yet fewer than half of all participants installed an aerator or showerhead (Table 7-2).

**Table 7-2: Water Measure In-Service Rates**

| Measure                 | DEC ISR | DEP ISR |
|-------------------------|---------|---------|
| Kitchen Faucet Aerator  | 30%     | 40%     |
| Bathroom Faucet Aerator | 30%     | 34%     |
| Showerhead              | 42%     | 50%     |

\*Based on the participant survey responses

**Recommendations:** Review water savings measures' satisfaction and dislikes as well as elicit feedback from Save Energy and Water Kit Program to determine if there are ways to improve the ISR for water measures.

## Appendix A Summary Forms

### DEC Summary Form

#### Description of program

The Energy Education in Schools Program is an energy efficiency program that provides free in-school performances by the National Theatre for Children (NTC) that teach elementary and middle school students about energy and conservation concepts in a humorous and engaging format. NTC provides teachers with: 1) student workbooks that reinforce topics taught in the NTC performance, which include a take-home form that students and parents can complete to receive an energy efficiency starter kit from DEC and 2) lesson plans associated with the content in the student workbooks.

|                                |                                |
|--------------------------------|--------------------------------|
| Date                           | October 15, 2018               |
| Region(s)                      | North and South Carolina       |
| Evaluation Period              | August 1, 2017 – July 31, 2018 |
| Annual Gross kWh Savings       | 6,283,232 kWh                  |
| Per Kit kWh Savings            | 271.3 kWh per kit              |
| Annual Gross Summer kW Savings | 777.7 kW                       |
| Annual Gross Winter kW Savings | 1,113.4 kW                     |
| Net-to-Gross Ratio             | 0.94                           |
| Process Evaluation             | Yes                            |
| Previous Evaluation(s)         | Yes                            |

#### Evaluation Methodology

##### Impact Evaluation Activities

- 334 telephone/web surveys and analysis of 8 unique measures.

##### Impact Evaluation Findings

- Realization rate = 135% for energy impacts; 61% for demand impacts
- Net-to-gross ratio = 0.94

##### Process Evaluation Activities

- 334 telephone/web surveys with student families and analysis of 8 unique measures.
- 44 web surveys with teachers from participating schools; 5 in-depth follow up interviews
- 1 in-depth interview with program staff
- 1 in-depth interview with NTC implementation staff
- 1 in-depth interview with R1 implementation staff

##### Process Evaluation Findings

- Teachers and parents aware of Duke Energy sponsorship of the kits
- Parents largely learning about kits from materials from their children.
- Student families are highly satisfied with kit items.
- The NTC program is successfully influencing families to adopt energy saving behaviors
- Teachers are not using materials as much as previous years

**DEP Summary Form****Description of program**

The Energy Education in Schools Program is an energy efficiency program that provides free in-school performances by the National Theatre for Children (NTC) that teach elementary and middle school students about energy and conservation concepts in a humorous and engaging format. NTC provides teachers with: 1) student workbooks that reinforce topics taught in the NTC performance, which include a take-home form that students and parents can complete to receive an energy efficiency starter kit from DEP and 2) lesson plans associated with the content in the student workbooks.

|                                |                               |
|--------------------------------|-------------------------------|
| Date                           | August 30, 2018               |
| Region(s)                      | North and South Carolina      |
| Evaluation Period              | August 1, 2017 – May 31, 2018 |
| Annual Gross kWh Savings       | 3,100,016 kWh                 |
| Per Kit kWh Savings            | 343.5 kWh per kit             |
| Annual Gross Summer kW Savings | 373.1 kW                      |
| Annual Gross Winter kW Savings | 581.0 kW                      |
| Net-to-Gross Ratio             | 0.92                          |
| Process Evaluation             | Yes                           |
| Previous Evaluation(s)         | Yes                           |

**Evaluation Methodology****Impact Evaluation Activities**

- 172 telephone/web surveys and analysis of 8 unique measures.

**Impact Evaluation Findings**

- Realization rate = 124% for energy impacts; 52% for demand impacts
- Net-to-gross ratio = 0.92

**Process Evaluation Activities**

- 172 telephone/web surveys with student families and analysis of 8 unique measures.
- 29 web surveys with teachers from participating schools; 5 in-depth follow up interviews
- 1 in-depth interview with program staff
- 1 in-depth interview with NTC implementation staff
- 1 in-depth interview with R1 implementation staff

**Process Evaluation Findings**

- Teachers and parents aware of Duke Energy sponsorship of the kits
- Parents largely learning about kits from materials from their children.
- Student families are highly satisfied with kit items.
- The NTC program is successfully influencing families to adopt energy saving behaviors
- Teachers are not using materials as much as previous years

## Appendix B Measure Impact Results

Table B-1: DEC Program Year 2017-2018 per Unit Verified Impacts by Measure – Key Measure Parameters

| Measure Category                | Gross Energy Savings (kWh) | Gross Summer Demand (kW) | Gross Winter Demand (kW) | Realization Rate (Energy) | Free Ridership | Spillover   | Net to Gross Ratio | M&V Factor (Energy) (RR x NTG) | Measure Life |
|---------------------------------|----------------------------|--------------------------|--------------------------|---------------------------|----------------|-------------|--------------------|--------------------------------|--------------|
| 9 Watt LEDs*                    | 27.0                       | 0.005                    | 0.002                    | N/A                       | 0.26           | <b>0.09</b> | <b>0.93</b>        | N/A                            | 5            |
| Nightlight                      | 9.8                        | 0.000                    | 0.000                    | N/A                       | 0.17           |             |                    | N/A                            | 8            |
| 1.5 GPM Showerhead              | 121.6                      | 0.010                    | 0.027                    | N/A                       | 0.16           |             |                    | N/A                            | 10           |
| 1.0 GPM Bathroom Faucet Aerator | 12.4                       | 0.002                    | 0.003                    | N/A                       | 0.12           |             |                    | N/A                            | 9            |
| 1.5 GPM Kitchen Faucet Aerator  | 38.2                       | 0.005                    | 0.008                    | N/A                       | 0.13           |             |                    | N/A                            | 9            |
| Water Temperature Gauge Card    | 23.7                       | 0.003                    | 0.005                    | N/A                       | 0.16           |             |                    | N/A                            | 4            |
| Outlet Insulating Gaskets       | 6.3                        | 0.008                    | 0.000                    | N/A                       | 0.12           |             |                    | N/A                            | 15           |
| Behavioral Changes              | 32.3                       | 0.001                    | 0.002                    | N/A                       | -              | -           | 1.00               | N/A                            | 0.3          |
| <b>Total</b>                    | <b>271.3</b>               | <b>0.034</b>             | <b>0.048</b>             | <b>135.0%</b>             | <b>0.16</b>    | <b>0.09</b> | <b>0.94</b>        | <b>125.2%</b>                  | <b>-</b>     |

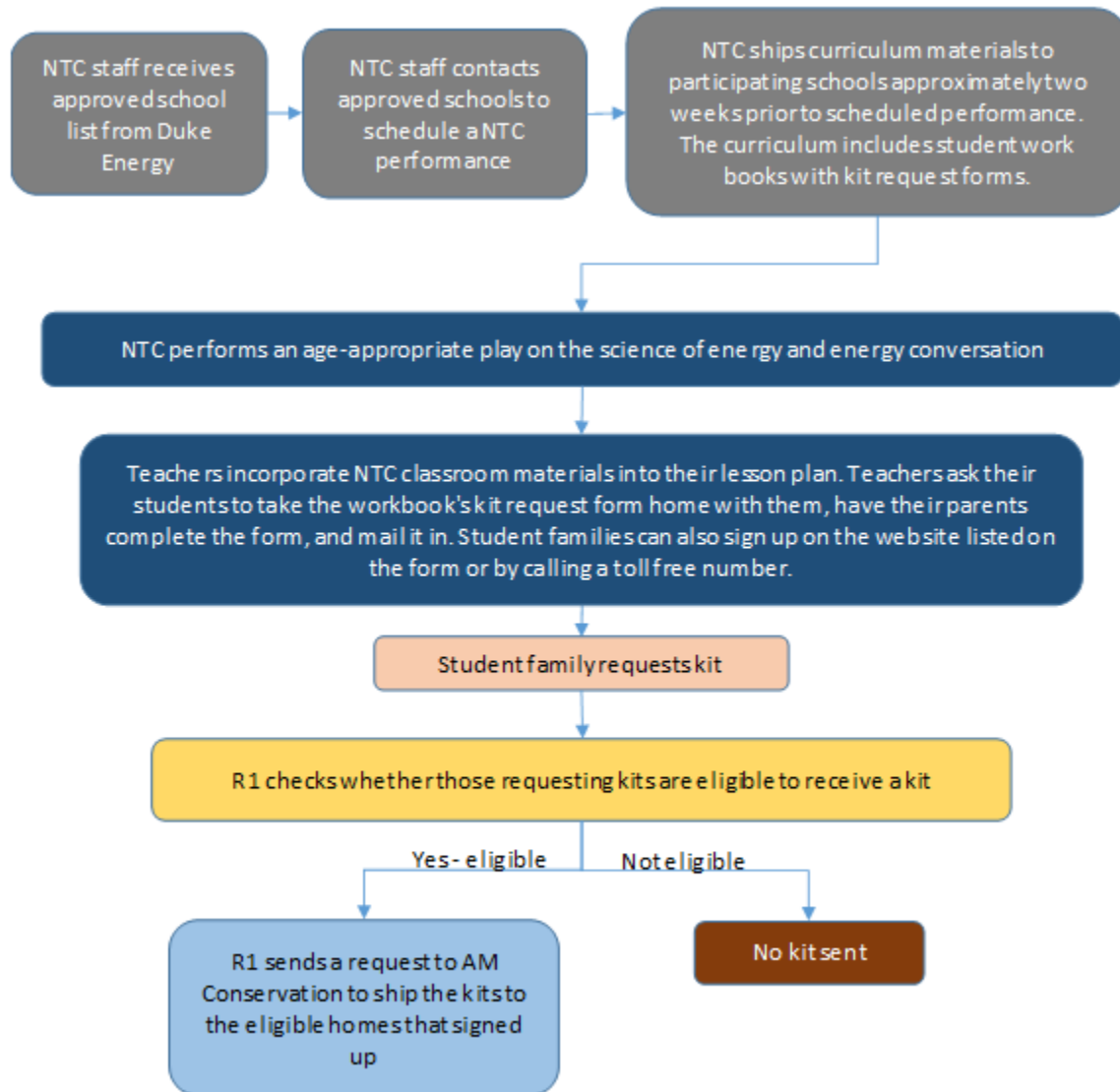
\*Represents two 9 watt LEDs

**Table B-2: DEP Program Year 2017-2018 per Unit Verified Impacts by Measure – Key Measure Parameters**

| Measure Category                | Gross Energy Savings (kWh) | Gross Summer Demand (kW) | Gross Winter Demand (kW) | Realization Rate (Energy) | Free Ridership | Spillover   | Net to Gross Ratio | M&V Factor (Energy) (RR x NTG) | Measure Life |
|---------------------------------|----------------------------|--------------------------|--------------------------|---------------------------|----------------|-------------|--------------------|--------------------------------|--------------|
| 9 Watt LEDs*                    | 25.4                       | 0.004                    | 0.002                    | N/A                       | 0.24           | <b>0.05</b> | <b>0.92</b>        | N/A                            | 5            |
| Nightlight                      | 10.9                       | 0.000                    | 0.000                    | N/A                       | 0.14           |             |                    | N/A                            | 8            |
| 1.5 GPM Showerhead              | 168.1                      | 0.013                    | 0.038                    | N/A                       | 0.14           |             |                    | N/A                            | 10           |
| 1.0 GPM Bathroom Faucet Aerator | 16.4                       | 0.002                    | 0.004                    | N/A                       | 0.06           |             |                    | N/A                            | 9            |
| 1.5 GPM Kitchen Faucet Aerator  | 62.3                       | 0.008                    | 0.014                    | N/A                       | 0.10           |             |                    | N/A                            | 9            |
| Water Temperature Gauge Card    | 23.5                       | 0.003                    | 0.005                    | N/A                       | 0.13           |             |                    | N/A                            | 4            |
| Outlet Insulating Gaskets       | 6.8                        | 0.009                    | 0.000                    | N/A                       | 0.08           | <b>0.05</b> | <b>0.92</b>        | N/A                            | 15           |
| Behavioral Changes              | 30.1                       | 0.001                    | 0.002                    | N/A                       | -              |             |                    | N/A                            | 0.3          |
| <b>Total</b>                    | <b>343.5</b>               | <b>0.041</b>             | <b>0.064</b>             | <b>124.3%</b>             | <b>0.13</b>    | <b>0.05</b> | <b>0.92</b>        | <b>114.0%</b>                  | <b>-</b>     |

\*Represents two 9 watt LEDs

## Appendix C Program Process Flow Chart





## Appendix D Program Performance Metrics

This appendix provides key program performance metrics, or PPIs. See Section 6.2 for the underlying results and more detailed findings.

**Figure D-1: Program Experience PPIs – DEC**

|   | Student Families |     | Teachers |    |
|---|------------------|-----|----------|----|
|   | %                | n   | %        | n  |
| <b>Awareness PPIs</b>   |                  |     |          |    |
| Aware of DEC sponsorship  | 94%              | 334 | 84%      | 44 |
| Learned of DEC sponsorship via program collateral                       | 68%              | 334 | 32%      | 37 |
| Learned of DEC sponsorship via teachers                                 | 28%              | 334 | 38%      | 37 |
| Read Energy Saver Booklet   | 73%              | 334 | -        |    |
| Rated Energy Saver Booklet as highly informative                        | 82%              | 245 |          |    |
| <b>Satisfaction PPIs</b>  |                  |     |          |    |
| NTC performance   | -                |     | 95%      | 44 |
| Usefulness of classroom materials                                       | -                |     | 77%      | 26 |
| Overall satisfaction with classroom materials                           | -                |     | 92%      | 26 |
| Bathroom faucet aerator   | 86%              | 104 | -        |    |
| Insulator gaskets   | 85%              | 103 | -        |    |
| Night light   | 95%              | 259 | -        |    |
| Light bulbs   | 95%              | 297 | -        |    |
| Showerhead  | 86%              | 153 | -        |    |
| Kitchen faucet aerator  | 85%              | 109 | -        |    |
| <b>Program influence on behavior PPIs</b>                               |                  |     |          |    |
| Installed at least one kit measure                                      | 93%              | 334 | -        |    |
| Plan to install measure[s] (of those that did not install any measures) | 91%              | 22  | -        |    |
| Respondents reporting spillover   | 19%              | 334 | -        |    |
| Adopted new energy saving behaviors: parents                            | 51%              | 334 | -        |    |
| Adopted new energy saving behaviors: children                           | 51%              | 334 | -        |    |
| <b>Challenges and opportunities for improvement PPIs</b>                |                  |     |          |    |
| Used NTC materials in classroom   | -                |     | 59%      | 44 |
| Suggested improvements to NTC performance                               | -                |     | 23%      | 44 |
| Distributed kit forms to classroom                                      | -                |     | 95%      | 44 |
| Mentioned challenges/concerns with instructional materials              | -                |     | 5%       | 44 |
| Suggested curriculum improvements                                       | -                |     | 14%      | 44 |

\*Program collateral includes NTC materials and DEC marketing materials

**Figure D-2: Program Experience PPis – DEP**

|   | Student Families |     | Teachers |    |
|---|------------------|-----|----------|----|
|   | %                | n   | %        | n  |
| <b>Awareness PPis</b>   |                  |     |          |    |
| Aware of DEP sponsorship  | 88%              | 172 | 79%      | 29 |
| Learned of DEP sponsorship via program collateral                       | 63%              | 172 | 65%      | 23 |
| Learned of DEP sponsorship via teachers                                 | 27%              | 172 | 30%      | 23 |
| Read Energy Saver Booklet   | 74%              | 172 | -        |    |
| Rated Energy Saver Booklet as highly informative                        | 86%              | 128 | -        |    |
| <b>Satisfaction PPis</b>  |                  |     |          |    |
| NTC performance   | -                |     | 59%      | 29 |
| Usefulness of classroom materials                                       | -                |     | 80%      | 10 |
| Overall satisfaction with classroom materials                           | -                |     | 80%      | 10 |
| Bathroom faucet aerator   | 88%              | 60  | -        |    |
| Insulator gaskets   | 91%              | 54  | -        |    |
| Night light   | 95%              | 130 | -        |    |
| Light bulbs   | 97%              | 149 | -        |    |
| Showerhead  | 93%              | 86  | -        |    |
| Kitchen faucet aerator  | 90%              | 68  | -        |    |
| <b>Program influence on behavior PPis</b>                               |                  |     |          |    |
| Installed at least one kit measure                                      | 93%              | 172 | -        |    |
| Plan to install measure[s] (of those that did not install any measures) | 100%             | 12  | -        |    |
| Respondents reporting spillover   | 18%              | 172 | -        |    |
| Adopted new energy saving behaviors: parents                            | 48%              | 172 | -        |    |
| Adopted new energy saving behaviors: children                           | 50%              | 172 | -        |    |
| <b>Challenges and opportunities for improvement PPis</b>                |                  |     |          |    |
| Used NTC materials in classroom   | -                |     | 34%      | 29 |
| Suggested improvements to NTC performance                               | -                |     | 10%      | 29 |
| Distributed kit forms to classroom                                      | -                |     | 97%      | 29 |
| Mentioned challenges/concerns with instructional materials              | -                |     | 0%       | 29 |
| Suggested curriculum improvements                                       | -                |     | 10%      | 29 |

\*Program collateral includes NTC materials and DEP marketing materials

Figure D-3: Student Family Demographics Reach PPIs

## Duke Energy Carolinas



### Housing Type

|          |     |
|----------|-----|
| Detached | 74% |
| Attached | 16% |
| Mobile   | 11% |



### Ownership Status

|                  |     |
|------------------|-----|
| Own              | 63% |
| Rent             | 35% |
| Occupy rent-free | 1%  |



### Household Size

|            |     |
|------------|-----|
| One to two | 14% |
| Three      | 20% |
| Four       | 35% |
| Five+      | 31% |



### Education

|                      |     |
|----------------------|-----|
| High school or less  | 22% |
| Some college         | 32% |
| Bachelors Degree     | 20% |
| Graduate Degree      | 22% |
| Refused / Don't know | 4%  |



### Income

|                      |     |
|----------------------|-----|
| < \$30k              | 24% |
| \$30k to < \$60k     | 27% |
| \$60k to < \$75k     | 6%  |
| \$75k to < \$100k    | 12% |
| \$100k+              | 13% |
| Refused / Don't know | 17% |

## Duke Energy Progress



### Housing Type

|          |     |
|----------|-----|
| Detached | 60% |
| Attached | 20% |
| Mobile   | 19% |



### Housing Type

|          |     |
|----------|-----|
| Detached | 60% |
| Attached | 20% |
| Mobile   | 19% |



### Ownership Status

|      |     |
|------|-----|
| Own  | 65% |
| Rent | 35% |



### Education

|                      |     |
|----------------------|-----|
| High school or less  | 24% |
| Some college         | 31% |
| Bachelors Degree     | 22% |
| Graduate Degree      | 22% |
| Refused / Don't know | 1%  |



### Education

|                      |     |
|----------------------|-----|
| High school or less  | 24% |
| Some college         | 31% |
| Bachelors Degree     | 22% |
| Graduate Degree      | 22% |
| Refused / Don't know | 1%  |

## Appendix E Billing Regression Analysis

This appendix provides additional detail regarding the billing regression analysis. Absent a randomized control trial, billing analysis can be unreliable when the percent energy savings are small. In order to assess if the billing analysis produces reliable results, the evaluation team implemented a series of placebo pressure tests. Rather than produce zero impacts, the billing analysis incorrectly concluded that the false enrollment dates led to changes in energy use when in fact no intervention had taken place. Moreover, the models incorrectly concluded that the erroneous impacts were statistically significant in several instances – an example of false precision. The evaluation team’s conclusion is not that there were no energy savings generated by the NTC program, but rather that billing analysis was not the correct tool for estimating the small percent energy savings from the program. Thus, the evaluation team’s recommendation is to rely on the engineering analysis and findings as the source of our verified gross and net savings for the programs.

The appendix includes:

1. A side by comparison of energy use, MyHER program penetration, and share of participants enrolling for the NTC kits over time for participants, and the comparison group. This includes both the pre- and post-intervention data and does not include any energy modeling.
2. Visual comparison of the side-by-side comparisons
3. The placebo tests output for the difference-in-differences panel regression model
4. The placebo tests output for the pre-post panel regression model

**Table E-1: Side-by-side Comparison of Control and Treatment Groups**

| Year and month | Daily kWh |         | Diff  | % Diff | Kit Penetration (%) |         |
|----------------|-----------|---------|-------|--------|---------------------|---------|
|                | Control   | Treated |       |        | Treat               | Control |
| Aug-15         | 52.9      | 52.8    | -0.11 | -0.20% | 0.0%                | 0.0%    |
| Sep-15         | 54.8      | 54.6    | -0.18 | -0.34% | 0.0%                | 0.0%    |
| Oct-15         | 41.6      | 41.4    | -0.15 | -0.36% | 0.0%                | 0.0%    |
| Nov-15         | 32.5      | 32.3    | -0.16 | -0.50% | 0.0%                | 0.0%    |
| Dec-15         | 40.4      | 40.3    | -0.13 | -0.31% | 0.0%                | 0.0%    |
| Jan-16         | 53.9      | 53.8    | -0.17 | -0.32% | 0.0%                | 0.0%    |
| Feb-16         | 58.0      | 57.9    | -0.19 | -0.32% | 0.0%                | 0.0%    |
| Mar-16         | 53.9      | 53.8    | -0.10 | -0.19% | 0.0%                | 0.0%    |
| Apr-16         | 41.9      | 41.7    | -0.15 | -0.36% | 0.0%                | 0.0%    |
| May-16         | 32.5      | 32.3    | -0.21 | -0.66% | 0.0%                | 0.0%    |
| Jun-16         | 36.2      | 35.9    | -0.27 | -0.74% | 0.0%                | 0.0%    |
| Jul-16         | 41.8      | 41.5    | -0.29 | -0.69% | 0.0%                | 0.0%    |
| Aug-16         | 51.4      | 50.9    | -0.44 | -0.85% | 0.0%                | 0.0%    |
| Sep-16         | 49.4      | 49.1    | -0.25 | -0.51% | 0.0%                | 0.0%    |
| Oct-16         | 36.1      | 36.0    | -0.11 | -0.30% | 0.0%                | 0.0%    |
| Nov-16         | 33.0      | 33.1    | 0.06  | 0.18%  | 0.0%                | 0.0%    |
| Dec-16         | 38.1      | 38.6    | 0.48  | 1.25%  | 0.0%                | 0.0%    |
| Jan-17         | 51.4      | 51.7    | 0.34  | 0.67%  | 0.0%                | 0.0%    |
| Feb-17         | 60.4      | 60.7    | 0.22  | 0.36%  | 0.0%                | 0.0%    |
| Mar-17         | 58.4      | 59.3    | 0.85  | 1.45%  | 0.0%                | 0.0%    |
| Apr-17         | 48.1      | 49.2    | 1.12  | 2.32%  | 0.0%                | 0.2%    |
| May-17         | 34.1      | 34.8    | 0.69  | 2.03%  | 0.0%                | 6.5%    |
| Jun-17         | 36.9      | 37.2    | 0.25  | 0.67%  | 0.0%                | 26.3%   |
| Jul-17         | 46.5      | 46.7    | 0.15  | 0.32%  | 0.0%                | 45.6%   |

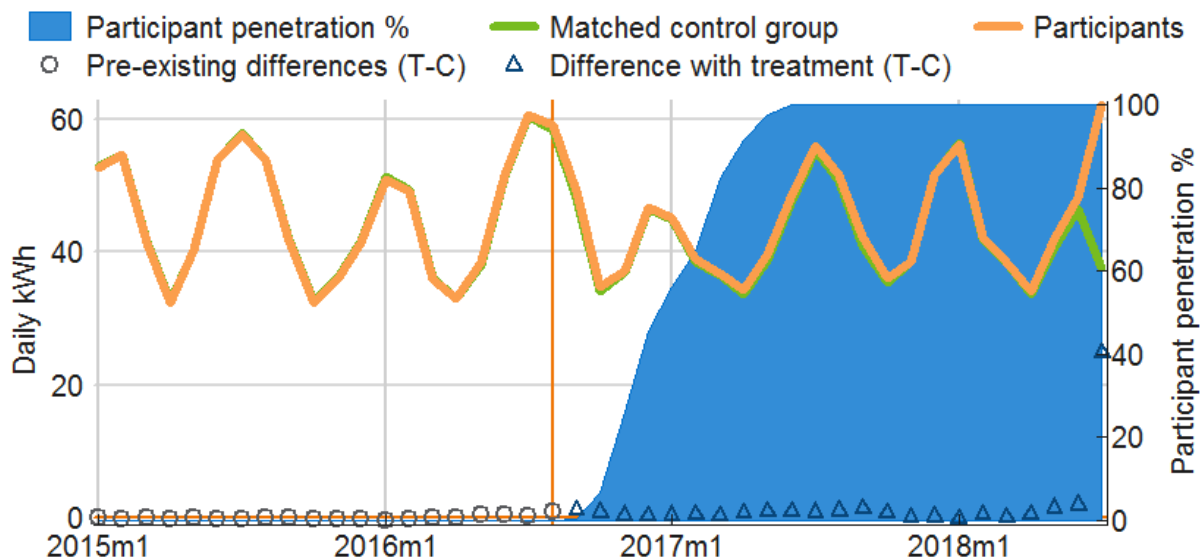
\*\*Only includes customers with pre-treatment data from Aug 2015 to July 2016

\*Billing periods were calendarized (calendar month)

**Figure E-1: Visual Comparison of Control and Treatment Groups**

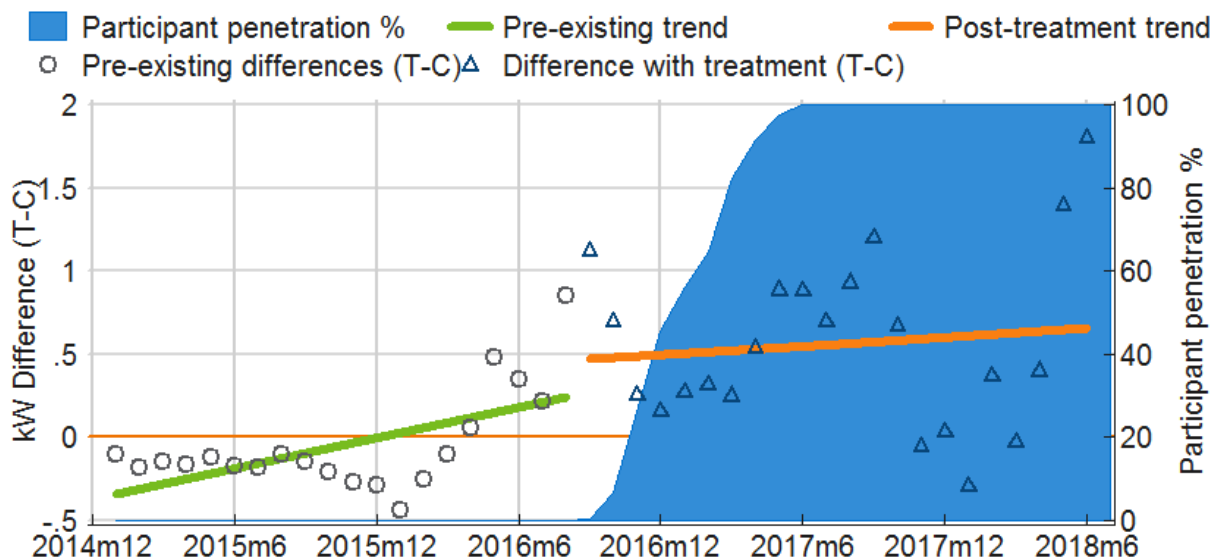
DEC-DEP - Does the difference grow as participant penetration increases?

Comparison using the matched control group



DEC-DEP - Does the difference in usage grow as participant penetration increases?

Comparison using the matched control group (zoom view)



**Figure E-2: Difference-in-Differences Panel Regression Model Placebo Test Results – 3 Months Prior**

|   |                |   |          |
|---|----------------|---|----------|
| Linear regression, absorbing indicators | Number of obs  | = | 628258   |
|   | F( 27, 594755) | = | 12265.82 |
|   | Prob > F       | = | 0.0000   |
|   | R-squared      | = | 0.7144   |
|   | Adj R-squared  | = | 0.6983   |
|   | Root MSE       | = | 12.2402  |

| daily_kwh         | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|-------------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo3_post      | -.5256702          | .0923383  | -5.69  | 0.000 | -.7066503            | -.3446901 |
| pseudo3_partxpost | .474797            | .1007961  | 4.71   | 0.000 | .2772399             | .6723541  |
| daily_cdd         | -.2624074          | .020821   | -12.60 | 0.000 | -.3032158            | -.2215991 |
| daily_hdd         | -.2409448          | .0212211  | -11.35 | 0.000 | -.2825375            | -.199352  |
| moyr              |                    |           |        |       |                      |           |
| 665               | 14.97549           | .1756674  | 85.25  | 0.000 | 14.63119             | 15.31979  |
| 666               | 19.55672           | .2106636  | 92.83  | 0.000 | 19.14383             | 19.96961  |
| 667               | 14.80155           | .1643195  | 90.08  | 0.000 | 14.47949             | 15.12361  |
| 668               | 1.706849           | .1002563  | 17.02  | 0.000 | 1.51035              | 1.903349  |
| 669               | -7.909724          | .2232815  | -35.42 | 0.000 | -8.347349            | -7.4721   |
| 670               | -3.208551          | .315886   | -10.16 | 0.000 | -3.827677            | -2.589425 |
| 671               | 2.497413           | .3207077  | 7.79   | 0.000 | 1.868836             | 3.12599   |
| 672               | 15.58922           | .6469555  | 24.10  | 0.000 | 14.3212              | 16.85723  |
| 673               | 12.54181           | .5461112  | 22.97  | 0.000 | 11.47145             | 13.61217  |
| 674               | -3.647916          | .2698748  | -13.52 | 0.000 | -4.176861            | -3.11897  |
| 675               | -7.109081          | .2069337  | -34.35 | 0.000 | -7.514665            | -6.703498 |
| 676               | -2.215585          | .1125347  | -19.69 | 0.000 | -2.436149            | -1.99502  |
| 677               | 12.51956           | .17157    | 72.97  | 0.000 | 12.18328             | 12.85583  |
| 678               | 22.42831           | .2298776  | 97.57  | 0.000 | 21.97776             | 22.87886  |
| 679               | 20.59289           | .2123426  | 96.98  | 0.000 | 20.17671             | 21.00908  |
| 680               | 9.216912           | .1433816  | 64.28  | 0.000 | 8.935889             | 9.497936  |
| 681               | -6.136477          | .1697139  | -36.16 | 0.000 | -6.469111            | -5.803843 |
| 682               | -1.411565          | .3650647  | -3.87  | 0.000 | -2.12708             | -.6960503 |
| 683               | 9.723139           | .5300884  | 18.34  | 0.000 | 8.684183             | 10.7621   |
| 684               | 7.686554           | .487174   | 15.78  | 0.000 | 6.731709             | 8.6414    |
| 685               | .8500553           | .3933818  | 2.16   | 0.031 | .0790395             | 1.621071  |
| 686               | -.8975118          | .4275042  | -2.10  | 0.036 | -1.735406            | -.0596172 |
| 687               | -5.511773          | .2879834  | -19.14 | 0.000 | -6.076211            | -4.947335 |
| _cons             | 41.93327           | .1165433  | 359.81 | 0.000 | 41.70485             | 42.1617   |
| account_id        | F(33475, 594755) = |           | 34.112 | 0.000 | (33476 categories)   |           |



**Figure E-3: Difference-in-Differences Panel Regression Model Placebo Test Results – 4 Months Prior**

Linear regression, absorbing indicators

|                |   |          |
|----------------|---|----------|
| Number of obs  | = | 659041   |
| F( 27, 625538) | = | 13689.79 |
| Prob > F       | = | 0.0000   |
| R-squared      | = | 0.7165   |
| Adj R-squared  | = | 0.7013   |
| Root MSE       | = | 12.1196  |

| daily_kwh         | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|-------------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo4_post      | -.4247787          | .0840387  | -5.05  | 0.000 | -.5894918            | -.2600656 |
| pseudo4_partxpost | .4851166           | .0846007  | 5.73   | 0.000 | .3193019             | .6509313  |
| daily_cdd         | -.2654691          | .020141   | -13.18 | 0.000 | -.3049448            | -.2259935 |
| daily_hdd         | -.2354826          | .0207305  | -11.36 | 0.000 | -.2761137            | -.1948515 |
| moyr              |                    |           |        |       |                      |           |
| 664               | 8.183583           | .1832708  | 44.65  | 0.000 | 7.824378             | 8.542788  |
| 665               | 23.18311           | .3132845  | 74.00  | 0.000 | 22.56908             | 23.79713  |
| 666               | 27.77034           | .3501534  | 79.31  | 0.000 | 27.08406             | 28.45663  |
| 667               | 23.00724           | .3009306  | 76.45  | 0.000 | 22.41743             | 23.59705  |
| 668               | 9.896078           | .2110981  | 46.88  | 0.000 | 9.482333             | 10.30982  |
| 669               | .2304075           | .1015936  | 2.27   | 0.023 | .0312874             | .4295276  |
| 670               | 4.905798           | .166716   | 29.43  | 0.000 | 4.57904              | 5.232556  |
| 671               | 10.61005           | .1711686  | 61.99  | 0.000 | 10.27457             | 10.94554  |
| 672               | 23.61627           | .480162   | 49.18  | 0.000 | 22.67517             | 24.55737  |
| 673               | 20.59528           | .3823227  | 53.87  | 0.000 | 19.84594             | 21.34462  |
| 674               | 4.478541           | .1299933  | 34.45  | 0.000 | 4.223759             | 4.733324  |
| 675               | 1.033154           | .0965464  | 10.70  | 0.000 | .843926              | 1.222382  |
| 676               | 5.938123           | .1368656  | 43.39  | 0.000 | 5.669871             | 6.206376  |
| 677               | 20.79924           | .3093994  | 67.22  | 0.000 | 20.19283             | 21.40565  |
| 678               | 30.72265           | .3700041  | 83.03  | 0.000 | 29.99745             | 31.44785  |
| 679               | 28.78262           | .350431   | 82.13  | 0.000 | 28.09579             | 29.46946  |
| 680               | 17.32469           | .271811   | 63.74  | 0.000 | 16.79195             | 17.85743  |
| 681               | 1.983447           | .1159611  | 17.10  | 0.000 | 1.756167             | 2.210727  |
| 682               | 6.528178           | .2243711  | 29.10  | 0.000 | 6.088418             | 6.967938  |
| 683               | 17.67602           | .36939    | 47.85  | 0.000 | 16.95203             | 18.40002  |
| 684               | 15.79898           | .3340732  | 47.29  | 0.000 | 15.1442              | 16.45375  |
| 685               | 8.773683           | .2505606  | 35.02  | 0.000 | 8.282592             | 9.264774  |
| 686               | 7.24334            | .2872157  | 25.22  | 0.000 | 6.680406             | 7.806273  |
| _cons             | 33.76435           | .1042117  | 324.00 | 0.000 | 33.5601              | 33.9686   |
| account_id        | F(33475, 625538) = |           | 35.716 | 0.000 | (33476 categories)   |           |



**Figure E-4: Difference-in-Differences Panel Regression Model Placebo Test Results – 5 Months Prior**

|   |                |   |          |
|---|----------------|---|----------|
| Linear regression, absorbing indicators | Number of obs  | = | 687621   |
|   | F( 27, 654118) | = | 13444.51 |
|   | Prob > F       | = | 0.0000   |
|   | R-squared      | = | 0.7106   |
|   | Adj R-squared  | = | 0.6958   |
|   | Root MSE       | = | 12.2627  |

| daily_kwh         | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|-------------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo5_post      | -.2841678          | .0819632  | -3.47  | 0.001 | -.444813             | -.1235227 |
| pseudo5_partxpost | .5195482           | .0770491  | 6.74   | 0.000 | .3685345             | .6705619  |
| daily_cdd         | -.4206152          | .0186884  | -22.51 | 0.000 | -.4572439            | -.3839866 |
| daily_hdd         | -.0656947          | .0194092  | -3.38  | 0.001 | -.103736             | -.0276534 |
| moyr              |                    |           |        |       |                      |           |
| 663               | -9.246892          | .2048831  | -45.13 | 0.000 | -9.648456            | -8.845328 |
| 664               | .2435606           | .33841    | 0.72   | 0.472 | -.4197121            | .9068332  |
| 665               | 16.37426           | .4606622  | 35.55  | 0.000 | 15.47138             | 17.27715  |
| 666               | 21.26268           | .4942919  | 43.02  | 0.000 | 20.29388             | 22.23148  |
| 667               | 16.09737           | .4494461  | 35.82  | 0.000 | 15.21647             | 16.97827  |
| 668               | 2.212501           | .3655132  | 6.05   | 0.000 | 1.496107             | 2.928896  |
| 669               | -9.344392          | .1735278  | -53.85 | 0.000 | -9.684501            | -9.004283 |
| 670               | -5.481911          | .1085518  | -50.50 | 0.000 | -5.694669            | -5.269153 |
| 671               | .1810658           | .1061787  | 1.71   | 0.088 | -.0270411            | .3891727  |
| 672               | 10.49394           | .275661   | 38.07  | 0.000 | 9.953652             | 11.03423  |
| 673               | 8.294643           | .1902391  | 43.60  | 0.000 | 7.921781             | 8.667505  |
| 674               | -5.512512          | .1359901  | -40.54 | 0.000 | -5.779048            | -5.245975 |
| 675               | -8.374107          | .1868889  | -44.81 | 0.000 | -8.740404            | -8.007811 |
| 676               | -2.477432          | .2890254  | -8.57  | 0.000 | -3.043912            | -1.910951 |
| 677               | 13.99713           | .457528   | 30.59  | 0.000 | 13.10039             | 14.89387  |
| 678               | 24.32712           | .512294   | 47.49  | 0.000 | 23.32304             | 25.3312   |
| 679               | 22.09522           | .4942646  | 44.70  | 0.000 | 21.12648             | 23.06397  |
| 680               | 9.967723           | .4222883  | 23.60  | 0.000 | 9.140051             | 10.79539  |
| 681               | -7.01392           | .2451765  | -28.61 | 0.000 | -7.494458            | -6.533382 |
| 682               | -4.366852          | .132827   | -32.88 | 0.000 | -4.627189            | -4.106516 |
| 683               | 5.525837           | .200146   | 27.61  | 0.000 | 5.133557             | 5.918117  |
| 684               | 3.966411           | .179768   | 22.06  | 0.000 | 3.614071             | 4.31875   |
| 685               | -2.179574          | .1592099  | -13.69 | 0.000 | -2.491621            | -1.867528 |
| _cons             | 42.38615           | .2649444  | 159.98 | 0.000 | 41.86686             | 42.90543  |
| account_id        | F(33475, 654118) = |           | 36.658 | 0.000 | (33476 categories)   |           |

**Figure E-5: Difference-in-Differences Panel Regression Model Placebo Test Results – 6 Months Prior**

Linear regression, absorbing indicators

Number of obs = 710185  
 F( 27, 676682) = 12262.54  
 Prob > F = 0.0000  
 R-squared = 0.6877  
 Adj R-squared = 0.6723  
 Root MSE = 13.1854

| daily_kwh         | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|-------------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo6_post      | -.2160949          | .0867745  | -2.49  | 0.013 | -.3861702            | -.0460197 |
| pseudo6_partxpost | .5809622           | .0778351  | 7.46   | 0.000 | .428408              | .7335165  |
| daily_cdd         | -.596042           | .0194923  | -30.58 | 0.000 | -.6342462            | -.5578377 |
| daily_hdd         | .0785573           | .019962   | 3.94   | 0.000 | .0394324             | .1176821  |
| moyr              |                    |           |        |       |                      |           |
| 662               | -11.93424          | .3343578  | -35.69 | 0.000 | -12.58957            | -11.27891 |
| 663               | -19.77144          | .5154094  | -38.36 | 0.000 | -20.78162            | -18.76125 |
| 664               | -8.98844           | .6590042  | -13.64 | 0.000 | -10.28007            | -7.696813 |
| 665               | 8.382719           | .7835346  | 10.70  | 0.000 | 6.847017             | 9.918421  |
| 666               | 13.61014           | .8173818  | 16.65  | 0.000 | 12.0081              | 15.21218  |
| 667               | 7.990053           | .7722869  | 10.35  | 0.000 | 6.476396             | 9.50371   |
| 668               | -6.742756          | .6868977  | -9.82  | 0.000 | -8.089053            | -5.396459 |
| 669               | -20.17191          | .4789355  | -42.12 | 0.000 | -21.1106             | -19.23321 |
| 670               | -17.00842          | .3865308  | -44.00 | 0.000 | -17.766              | -16.25083 |
| 671               | -11.37184          | .3814024  | -29.82 | 0.000 | -12.11937            | -10.6243  |
| 672               | -3.371243          | .1145078  | -29.44 | 0.000 | -3.595675            | -3.146812 |
| 673               | -4.869892          | .1803676  | -27.00 | 0.000 | -5.223406            | -4.516377 |
| 674               | -16.63903          | .4312435  | -38.58 | 0.000 | -17.48426            | -15.79381 |
| 675               | -19.06178          | .4947421  | -38.53 | 0.000 | -20.03146            | -18.0921  |
| 676               | -12.19545          | .6068682  | -20.10 | 0.000 | -13.38489            | -11.00601 |
| 677               | 5.935216           | .7802705  | 7.61   | 0.000 | 4.405911             | 7.46452   |
| 678               | 16.68188           | .8351525  | 19.97  | 0.000 | 15.045               | 18.31875  |
| 679               | 14.25023           | .817349   | 17.43  | 0.000 | 12.64826             | 15.85221  |
| 680               | 1.592694           | .7453375  | 2.14   | 0.033 | .1318565             | 3.053531  |
| 681               | -17.40192          | .5527553  | -31.48 | 0.000 | -18.4853             | -16.31854 |
| 682               | -16.24748          | .3630762  | -44.75 | 0.000 | -16.9591             | -15.53587 |
| 683               | -7.499445          | .2351205  | -31.90 | 0.000 | -7.960273            | -7.038616 |
| 684               | -8.718828          | .2718093  | -32.08 | 0.000 | -9.251566            | -8.186091 |
| _cons             | 52.4287            | .5864711  | 89.40  | 0.000 | 51.27924             | 53.57817  |
| account_id        | F(33475, 676682) = |           | 34.163 | 0.000 | (33476 categories)   |           |



**Figure E-6: Difference-in-Differences Panel Regression Model Placebo Test Results – 7 Months Prior**

Linear regression, absorbing indicators

|                |   |          |
|----------------|---|----------|
| Number of obs  | = | 730052   |
| F( 27, 696549) | = | 11715.39 |
| Prob > F       | = | 0.0000   |
| R-squared      | = | 0.6776   |
| Adj R-squared  | = | 0.6621   |
| Root MSE       | = | 13.6259  |

| daily_kwh         | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|-------------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo7_post      | -.2046139          | .0887691  | -2.31  | 0.021 | -.3785986            | -.0306293 |
| pseudo7_partxpost | .6511034           | .076956   | 8.46   | 0.000 | .5002723             | .8019346  |
| daily_cdd         | -.6336218          | .0198524  | -31.92 | 0.000 | -.6725317            | -.5947118 |
| daily_hdd         | .0715356           | .0200871  | 3.56   | 0.000 | .0321655             | .1109057  |
| moyr              |                    |           |        |       |                      |           |
| 661               | 1.614047           | .1338197  | 12.06  | 0.000 | 1.351765             | 1.876329  |
| 662               | -10.42732          | .2601788  | -40.08 | 0.000 | -10.93726            | -9.917377 |
| 663               | -18.28754          | .4388951  | -41.67 | 0.000 | -19.14776            | -17.42732 |
| 664               | -7.37477           | .5835965  | -12.64 | 0.000 | -8.518601            | -6.23094  |
| 665               | 10.23146           | .7107887  | 14.39  | 0.000 | 8.838334             | 11.62458  |
| 666               | 15.53028           | .7455107  | 20.83  | 0.000 | 14.0691              | 16.99145  |
| 667               | 9.812764           | .6992321  | 14.03  | 0.000 | 8.442292             | 11.18324  |
| 668               | -5.080311          | .611999   | -8.30  | 0.000 | -6.279809            | -3.880813 |
| 669               | -18.69904          | .4024735  | -46.46 | 0.000 | -19.48788            | -17.91021 |
| 670               | -15.51035          | .3110742  | -49.86 | 0.000 | -16.12005            | -14.90065 |
| 671               | -9.86332           | .3060847  | -32.22 | 0.000 | -10.46324            | -9.263404 |
| 672               | -1.774626          | .1095627  | -16.20 | 0.000 | -1.989365            | -1.559887 |
| 673               | -3.233484          | .1261926  | -25.62 | 0.000 | -3.480817            | -2.986151 |
| 674               | -15.18973          | .3565045  | -42.61 | 0.000 | -15.88847            | -14.49099 |
| 675               | -17.60579          | .4195775  | -41.96 | 0.000 | -18.42815            | -16.78344 |
| 676               | -10.6504           | .5315033  | -20.04 | 0.000 | -11.69213            | -9.60867  |
| 677               | 7.654997           | .7077851  | 10.82  | 0.000 | 6.267762             | 9.042233  |
| 678               | 18.46994           | .7642374  | 24.17  | 0.000 | 16.97206             | 19.96782  |
| 679               | 16.23986           | .7468902  | 21.74  | 0.000 | 14.77598             | 17.70374  |
| 680               | 3.337503           | .6722143  | 4.96   | 0.000 | 2.019985             | 4.655021  |
| 681               | -15.97908          | .4785406  | -33.39 | 0.000 | -16.917              | -15.04115 |
| 682               | -14.82792          | .2934069  | -50.54 | 0.000 | -15.40299            | -14.25285 |
| 683               | -5.91968           | .1847038  | -32.05 | 0.000 | -6.281694            | -5.557667 |
| _cons             | 51.02393           | .508591   | 100.32 | 0.000 | 50.0271              | 52.02075  |
| account_id        | F(33475, 696549) = |           | 33.802 | 0.000 | (33476 categories)   |           |

**Figure E-7: Difference-in-Differences Panel Regression Model Placebo Test Results – 8 Months Prior**

Linear regression, absorbing indicators

Number of obs = 714019  
F( 26, 680517) = 12483.04  
Prob > F = 0.0000  
R-squared = 0.6803  
Adj R-squared = 0.6646  
Root MSE = 13.5214

| daily_kwh         | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|-------------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo8_post      | -.2527771          | .0879036  | -2.88  | 0.004 | -.4250653            | -.0804889 |
| pseudo8_partxpost | .7253856           | .074626   | 9.72   | 0.000 | .5791211             | .8716502  |
| daily_cdd         | -.6138513          | .0199662  | -30.74 | 0.000 | -.6529844            | -.5747183 |
| daily_hdd         | .0639577           | .0202341  | 3.16   | 0.002 | .0242995             | .1036159  |
| moyr              |                    |           |        |       |                      |           |
| 661               | 1.645427           | .13356    | 12.32  | 0.000 | 1.383653             | 1.9072    |
| 662               | -10.51839          | .2614451  | -40.23 | 0.000 | -11.03081            | -10.00597 |
| 663               | -18.4631           | .4416991  | -41.80 | 0.000 | -19.32882            | -17.59739 |
| 664               | -7.66233           | .5874254  | -13.04 | 0.000 | -8.813665            | -6.510996 |
| 665               | 9.811116           | .7153954  | 13.71  | 0.000 | 8.408964             | 11.21327  |
| 666               | 15.07201           | .7503207  | 20.09  | 0.000 | 13.60141             | 16.54261  |
| 667               | 9.405752           | .7037725  | 13.36  | 0.000 | 8.02638              | 10.78512  |
| 668               | -5.396655          | .6160066  | -8.76  | 0.000 | -6.604007            | -4.189302 |
| 669               | -18.85279          | .4049933  | -46.55 | 0.000 | -19.64656            | -18.05901 |
| 670               | -15.62536          | .3128102  | -49.95 | 0.000 | -16.23845            | -15.01226 |
| 671               | -9.979628          | .3077796  | -32.42 | 0.000 | -10.58287            | -9.37639  |
| 672               | -1.683788          | .1102975  | -15.27 | 0.000 | -1.899968            | -1.467609 |
| 673               | -3.359955          | .1290097  | -26.04 | 0.000 | -3.61281             | -3.1071   |
| 674               | -15.39415          | .3595886  | -42.81 | 0.000 | -16.09893            | -14.68937 |
| 675               | -17.78332          | .4224407  | -42.10 | 0.000 | -18.61129            | -16.95535 |
| 676               | -10.94766          | .53508    | -20.46 | 0.000 | -11.9964             | -9.89892  |
| 677               | 7.107528           | .7126016  | 9.97   | 0.000 | 5.710852             | 8.504204  |
| 678               | 18.18085           | .7703218  | 23.60  | 0.000 | 16.67104             | 19.69065  |
| 679               | 15.86131           | .7514087  | 21.11  | 0.000 | 14.38857             | 17.33404  |
| 680               | 2.906622           | .6767679  | 4.29   | 0.000 | 1.580179             | 4.233065  |
| 681               | -16.19297          | .4812871  | -33.65 | 0.000 | -17.13628            | -15.24966 |
| 682               | -14.87434          | .2937033  | -50.64 | 0.000 | -15.44999            | -14.29869 |
| _cons             | 51.21454           | .5121434  | 100.00 | 0.000 | 50.21075             | 52.21832  |
| account_id        | F(33475, 680517) = |           | 33.117 | 0.000 | (33476 categories)   |           |



**Figure E-8: Difference-in-Differences Panel Regression Model Placebo Test Results – 9 Months Prior**

|   |                |   |          |
|---|----------------|---|----------|
| Linear regression, absorbing indicators | Number of obs  | = | 693985   |
|   | F( 25, 660484) | = | 12864.99 |
|   | Prob > F       | = | 0.0000   |
|   | R-squared      | = | 0.6806   |
|   | Adj R-squared  | = | 0.6644   |
|   | Root MSE       | = | 13.5794  |

| daily_kwh         | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|-------------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo9_post      | -.2994821          | .0883002  | -3.39  | 0.001 | -.4725477            | -.1264165 |
| pseudo9_partxpost | .7426867           | .0742484  | 10.00  | 0.000 | .5971623             | .8882111  |
| daily_cdd         | -.63676            | .0206267  | -30.87 | 0.000 | -.6771878            | -.5963323 |
| daily_hdd         | .0884283           | .020969   | 4.22   | 0.000 | .0473298             | .1295268  |
| moyr              |                    |           |        |       |                      |           |
| 661               | 1.544798           | .1358086  | 11.37  | 0.000 | 1.278618             | 1.810979  |
| 662               | -10.22824          | .2696294  | -37.93 | 0.000 | -10.7567             | -9.699775 |
| 663               | -17.94059          | .4570697  | -39.25 | 0.000 | -18.83643            | -17.04474 |
| 664               | -6.94917           | .6086018  | -11.42 | 0.000 | -8.14201             | -5.756331 |
| 665               | 10.69082           | .7415713  | 14.42  | 0.000 | 9.237364             | 12.14428  |
| 666               | 15.99617           | .7778181  | 20.57  | 0.000 | 14.47167             | 17.52066  |
| 667               | 10.27052           | .729504   | 14.08  | 0.000 | 8.840714             | 11.70032  |
| 668               | -4.645794          | .6383212  | -7.28  | 0.000 | -5.896883            | -3.394706 |
| 669               | -18.37783          | .4189051  | -43.87 | 0.000 | -19.19888            | -17.55679 |
| 670               | -15.27227          | .3231137  | -47.27 | 0.000 | -15.90556            | -14.63898 |
| 671               | -9.577161          | .3183308  | -30.09 | 0.000 | -10.20108            | -8.953243 |
| 672               | -1.819487          | .1145699  | -15.88 | 0.000 | -2.04404             | -1.594934 |
| 673               | -3.36976           | .1332714  | -25.28 | 0.000 | -3.630968            | -3.108552 |
| 674               | -14.96729          | .371883   | -40.25 | 0.000 | -15.69617            | -14.23841 |
| 675               | -17.28389          | .4372255  | -39.53 | 0.000 | -18.14084            | -16.42695 |
| 676               | -10.34816          | .5544759  | -18.66 | 0.000 | -11.43491            | -9.261405 |
| 677               | 8.208008           | .7400288  | 11.09  | 0.000 | 6.757575             | 9.65844   |
| 678               | 19.20255           | .798279   | 24.05  | 0.000 | 17.63795             | 20.76715  |
| 679               | 16.73138           | .7791     | 21.48  | 0.000 | 15.20437             | 18.25839  |
| 680               | 3.777532           | .7010761  | 5.39   | 0.000 | 2.403445             | 5.151618  |
| 681               | -15.57675          | .4972935  | -31.32 | 0.000 | -16.55143            | -14.60207 |
| _cons             | 50.60445           | .5303875  | 95.41  | 0.000 | 49.56491             | 51.64399  |
| account_id        | F(33475, 660484) = |           | 32.031 | 0.000 | (33476 categories)   |           |

**Figure E-9: Pre-Post Panel Regression Model Placebo Test Results – 3 Months Prior**

|   |               |   |         |
|---|---------------|---|---------|
| Linear regression, absorbing indicators | Number of obs | = | 113864  |
|   | F( 14, 97080) | = | 5848.72 |
|   | Prob > F      | = | 0.0000  |
|   | R-squared     | = | 0.8027  |
|   | Adj R-squared | = | 0.7686  |
|   | Root MSE      | = | 10.6273 |

| daily_kwh    | Coef.             | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|--------------|-------------------|-----------|--------|-------|----------------------|-----------|
| pseudo3_post | -.5314323         | .1114073  | -4.77  | 0.000 | -.7497894            | -.3130752 |
| daily_cdd    | -.3169182         | .0425132  | -7.45  | 0.000 | -.4002436            | -.2335929 |
| daily_hdd    | -.0590921         | .0494516  | -1.19  | 0.232 | -.1560167            | .0378326  |
| month        |                   |           |        |       |                      |           |
| 2            | -5.511652         | .3302651  | -16.69 | 0.000 | -6.158968            | -4.864336 |
| 3            | -7.344523         | .3685627  | -19.93 | 0.000 | -8.066901            | -6.622144 |
| 4            | -10.10898         | .8802062  | -11.48 | 0.000 | -11.83418            | -8.383791 |
| 5            | -6.835175         | .9498222  | -7.20  | 0.000 | -8.696816            | -4.973534 |
| 6            | 8.631092          | 1.343093  | 6.43   | 0.000 | 5.998646             | 11.26354  |
| 7            | 18.64833          | 1.461028  | 12.76  | 0.000 | 15.78474             | 21.51193  |
| 8            | 17.08849          | 1.420058  | 12.03  | 0.000 | 14.30519             | 19.87178  |
| 9            | 5.656242          | 1.254013  | 4.51   | 0.000 | 3.198392             | 8.114093  |
| 10           | -10.81806         | .8036582  | -13.46 | 0.000 | -12.39322            | -9.242901 |
| 11           | -8.042124         | .3424341  | -23.49 | 0.000 | -8.713291            | -7.370957 |
| 12           | 1.264436          | .2383657  | 5.30   | 0.000 | .7972415             | 1.73163   |
| _cons        | 46.49572          | .9312778  | 49.93  | 0.000 | 44.67042             | 48.32101  |
| account_id   | F(16769, 97080) = |           | 18.288 | 0.000 | (16770 categories)   |           |

**Figure E-10 Pre-Post Panel Regression Model Placebo Test Results – 4 Months Prior**

|   |                |   |         |
|---|----------------|---|---------|
| Linear regression, absorbing indicators | Number of obs  | = | 130634  |
|   | F( 14, 113850) | = | 7702.38 |
|   | Prob > F       | = | 0.0000  |
|   | R-squared      | = | 0.7963  |
|   | Adj R-squared  | = | 0.7663  |
|   | Root MSE       | = | 10.5521 |

| daily_kwh    | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|--------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo4_post | -.1019962          | .1000816  | -1.02  | 0.308 | -.2981547            | .0941622  |
| daily_cdd    | -.2495264          | .037817   | -6.60  | 0.000 | -.3236471            | -.1754057 |
| daily_hdd    | -.1536438          | .0435237  | -3.53  | 0.000 | -.2389495            | -.0683381 |
| month        |                    |           |        |       |                      |           |
| 2            | -6.529509          | .2999275  | -21.77 | 0.000 | -7.117362            | -5.941655 |
| 3            | -8.272702          | .3264474  | -25.34 | 0.000 | -8.912534            | -7.63287  |
| 4            | -13.7987           | .6396182  | -21.57 | 0.000 | -15.05234            | -12.54505 |
| 5            | -8.457698          | .8622915  | -9.81  | 0.000 | -10.14778            | -6.76762  |
| 6            | 6.275922           | 1.206549  | 5.20   | 0.000 | 3.911103             | 8.64074   |
| 7            | 16.04963           | 1.307554  | 12.27  | 0.000 | 13.48685             | 18.61242  |
| 8            | 14.40293           | 1.267052  | 11.37  | 0.000 | 11.91952             | 16.88633  |
| 9            | 3.200197           | 1.120023  | 2.86   | 0.004 | 1.004968             | 5.395425  |
| 10           | -12.40505          | .7229552  | -17.16 | 0.000 | -13.82203            | -10.98807 |
| 11           | -9.062039          | .3227195  | -28.08 | 0.000 | -9.694565            | -8.429514 |
| 12           | 1.292102           | .2099939  | 6.15   | 0.000 | .8805167             | 1.703686  |
| _cons        | 48.17469           | .8450344  | 57.01  | 0.000 | 46.51844             | 49.83095  |
| account_id   | F(16769, 113850) = |           | 19.675 | 0.000 | (16770 categories)   |           |



**Figure E-11: Pre-Post Panel Regression Model Placebo Test Results – 5 Months Prior**

|   |                |   |         |
|---|----------------|---|---------|
| Linear regression, absorbing indicators | Number of obs  | = | 147404  |
|   | F( 14, 130620) | = | 8335.33 |
|   | Prob > F       | = | 0.0000  |
|   | R-squared      | = | 0.7833  |
|   | Adj R-squared  | = | 0.7554  |
|   | Root MSE       | = | 10.7176 |

| daily_kwh    | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|--------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo5_post | .4194159           | .0891347  | 4.71   | 0.000 | .2447135             | .5941182  |
| daily_cdd    | -.3738546          | .0305868  | -12.22 | 0.000 | -.4338041            | -.313905  |
| daily_hdd    | -.0206818          | .0302047  | -0.68  | 0.494 | -.0798825            | .0385188  |
| month        |                    |           |        |       |                      |           |
| 2            | -5.88248           | .2519248  | -23.35 | 0.000 | -6.376248            | -5.388711 |
| 3            | -8.575499          | .3207776  | -26.73 | 0.000 | -9.204218            | -7.946781 |
| 4            | -11.24155          | .4305582  | -26.11 | 0.000 | -12.08543            | -10.39766 |
| 5            | -5.291916          | .581889   | -9.09  | 0.000 | -6.432408            | -4.151423 |
| 6            | 10.73817           | .8377623  | 12.82  | 0.000 | 9.096175             | 12.38017  |
| 7            | 20.74429           | .9219409  | 22.50  | 0.000 | 18.9373              | 22.55128  |
| 8            | 18.87646           | .8943449  | 21.11  | 0.000 | 17.12356             | 20.62936  |
| 9            | 7.029936           | .7837181  | 8.97   | 0.000 | 5.493863             | 8.56601   |
| 10           | -9.87039           | .5036506  | -19.60 | 0.000 | -10.85754            | -8.883244 |
| 11           | -8.10301           | .2452054  | -33.05 | 0.000 | -8.583609            | -7.622412 |
| 12           | 1.338839           | .1979009  | 6.77   | 0.000 | .9509568             | 1.726721  |
| _cons        | 45.06678           | .5613088  | 80.29  | 0.000 | 43.96663             | 46.16694  |
| account_id   | F(16769, 130620) = |           | 20.732 | 0.000 | (16770 categories)   |           |



**Figure E-12: Pre-Post Panel Regression Model Placebo Test Results – 6 Months Prior**

|   |                |   |         |
|---|----------------|---|---------|
| Linear regression, absorbing indicators | Number of obs  | = | 164174  |
|   | F( 14, 147390) | = | 6405.51 |
|   | Prob > F       | = | 0.0000  |
|   | R-squared      | = | 0.7329  |
|   | Adj R-squared  | = | 0.7025  |
|   | Root MSE       | = | 12.2721 |

| daily_kwh    | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|--------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo6_post | -.9050612          | .0909866  | -9.95  | 0.000 | -1.083393            | -.7267292 |
| daily_cdd    | -1.063065          | .0274973  | -38.66 | 0.000 | -1.11696             | -1.009171 |
| daily_hdd    | .6265702           | .0196531  | 31.88  | 0.000 | .5880505             | .6650899  |
| month        |                    |           |        |       |                      |           |
| 2            | -.3945862          | .1888234  | -2.09  | 0.037 | -.7646763            | -.024496  |
| 3            | -3.983506          | .2961308  | -13.45 | 0.000 | -4.563916            | -3.403096 |
| 4            | -3.870804          | .3644687  | -10.62 | 0.000 | -4.585155            | -3.156453 |
| 5            | 6.108178           | .4574688  | 13.35  | 0.000 | 5.211549             | 7.004808  |
| 6            | 29.04072           | .6475631  | 44.85  | 0.000 | 27.77151             | 30.30993  |
| 7            | 41.23932           | .7144837  | 57.72  | 0.000 | 39.83894             | 42.63969  |
| 8            | 38.68867           | .6880759  | 56.23  | 0.000 | 37.34005             | 40.03728  |
| 9            | 24.37551           | .5916628  | 41.20  | 0.000 | 23.21586             | 25.53515  |
| 10           | -.0603162          | .3778493  | -0.16  | 0.873 | -.8008932            | .6802609  |
| 11           | -4.625116          | .2321373  | -19.92 | 0.000 | -5.0801              | -4.170131 |
| 12           | -.2016072          | .2094856  | -0.96  | 0.336 | -.6121949            | .2089805  |
| _cons        | 34.95556           | .4414944  | 79.18  | 0.000 | 34.09024             | 35.82088  |
| account_id   | F(16769, 147390) = |           | 18.564 | 0.000 | (16770 categories)   |           |

**Figure E-13: Pre-Post Panel Regression Model Placebo Test Results – 7 Months Prior**

|   |                |   |         |
|---|----------------|---|---------|
| Linear regression, absorbing indicators | Number of obs  | = | 180944  |
|   | F( 14, 164160) | = | 5736.80 |
|   | Prob > F       | = | 0.0000  |
|   | R-squared      | = | 0.7117  |
|   | Adj R-squared  | = | 0.6823  |
|   | Root MSE       | = | 13.0199 |

| daily_kwh    | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|--------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo7_post | -.8407146          | .095874   | -8.77  | 0.000 | -1.028626            | -.6528037 |
| daily_cdd    | -1.141725          | .0275736  | -41.41 | 0.000 | -1.195768            | -1.087681 |
| daily_hdd    | .5698512           | .0177381  | 32.13  | 0.000 | .5350848             | .6046175  |
| month        |                    |           |        |       |                      |           |
| 2            | .0439932           | .1488409  | 0.30   | 0.768 | -.2477317            | .3357181  |
| 3            | -4.113582          | .3049181  | -13.49 | 0.000 | -4.711215            | -3.51595  |
| 4            | -3.996618          | .3745488  | -10.67 | 0.000 | -4.730726            | -3.262511 |
| 5            | 5.926219           | .4669832  | 12.69  | 0.000 | 5.010942             | 6.841496  |
| 6            | 29.21162           | .6597604  | 44.28  | 0.000 | 27.9185              | 30.50474  |
| 7            | 41.49021           | .7276829  | 57.02  | 0.000 | 40.06397             | 42.91645  |
| 8            | 39.25332           | .6999674  | 56.08  | 0.000 | 37.8814              | 40.62524  |
| 9            | 24.52563           | .5964482  | 41.12  | 0.000 | 23.35661             | 25.69466  |
| 10           | -.4510099          | .3884665  | -1.16  | 0.246 | -1.212396            | .310376   |
| 11           | -4.661574          | .2371764  | -19.65 | 0.000 | -5.126434            | -4.196713 |
| 12           | .27908             | .1831745  | 1.52   | 0.128 | -.0799381            | .6380981  |
| _cons        | 35.67814           | .4570338  | 78.06  | 0.000 | 34.78236             | 36.57391  |
| account_id   | F(16769, 164160) = |           | 19.220 | 0.000 | (16770 categories)   |           |

**Figure E-14: Pre-Post Panel Regression Model Placebo Test Results – 8 Months Prior**

|   |                |   |         |
|---|----------------|---|---------|
| Linear regression, absorbing indicators | Number of obs  | = | 197714  |
|   | F( 14, 180930) | = | 6483.45 |
|   | Prob > F       | = | 0.0000  |
|   | R-squared      | = | 0.7191  |
|   | Adj R-squared  | = | 0.6931  |
|   | Root MSE       | = | 12.6061 |

| daily_kwh    | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|--------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo8_post | -.6826227          | .0717895  | -9.51  | 0.000 | -.8233285            | -.5419168 |
| daily_cdd    | -1.109996          | .02343    | -47.37 | 0.000 | -1.155918            | -1.064073 |
| daily_hdd    | .5780858           | .0111235  | 51.97  | 0.000 | .556284              | .5998875  |
| month        |                    |           |        |       |                      |           |
| 2            | -.0808791          | .1344885  | -0.60  | 0.548 | -.3444736            | .1827153  |
| 3            | -4.021167          | .21272    | -18.90 | 0.000 | -4.438094            | -3.604241 |
| 4            | -3.895118          | .2534334  | -15.37 | 0.000 | -4.391842            | -3.398394 |
| 5            | 5.953745           | .3119416  | 19.09  | 0.000 | 5.342347             | 6.565144  |
| 6            | 28.81599           | .4565089  | 63.12  | 0.000 | 27.92124             | 29.71074  |
| 7            | 41.53259           | .5171521  | 80.31  | 0.000 | 40.51899             | 42.5462   |
| 8            | 39.11434           | .4945979  | 79.08  | 0.000 | 38.14493             | 40.08374  |
| 9            | 24.27672           | .4197223  | 57.84  | 0.000 | 23.45408             | 25.09937  |
| 10           | -.508134           | .2831966  | -1.79  | 0.073 | -1.063193            | .0469248  |
| 11           | -4.77302           | .2041849  | -23.38 | 0.000 | -5.173218            | -4.372823 |
| 12           | -.0497681          | .1625679  | -0.31  | 0.760 | -.3683974            | .2688612  |
| _cons        | 35.50422           | .2853676  | 124.42 | 0.000 | 34.9449              | 36.06353  |
| account_id   | F(16769, 180930) = |           | 22.212 | 0.000 | (16770 categories)   |           |



**Figure E-15 Pre-Post Panel Regression Model Placebo Test Results – 9 Months Prior**

|   |                |   |         |
|---|----------------|---|---------|
| Linear regression, absorbing indicators | Number of obs  | = | 214484  |
|   | F( 14, 197700) | = | 7887.48 |
|   | Prob > F       | = | 0.0000  |
|   | R-squared      | = | 0.7267  |
|   | Adj R-squared  | = | 0.7035  |
|   | Root MSE       | = | 12.2177 |

| daily_kwh    | Coef.              | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|--------------|--------------------|-----------|--------|-------|----------------------|-----------|
| pseudo9_post | -.4499133          | .065228   | -6.90  | 0.000 | -.5777586            | -.322068  |
| daily_cdd    | -1.043921          | .021781   | -47.93 | 0.000 | -1.086611            | -1.001231 |
| daily_hdd    | .5762994           | .0107475  | 53.62  | 0.000 | .5552346             | .5973642  |
| month        |                    |           |        |       |                      |           |
| 2            | -.2012934          | .1329344  | -1.51  | 0.130 | -.4618416            | .0592548  |
| 3            | -3.977699          | .2044698  | -19.45 | 0.000 | -4.378455            | -3.576943 |
| 4            | -3.984402          | .2431879  | -16.38 | 0.000 | -4.461045            | -3.50776  |
| 5            | 5.606003           | .3005122  | 18.65  | 0.000 | 5.017007             | 6.195     |
| 6            | 28.40953           | .4369316  | 65.02  | 0.000 | 27.55315             | 29.2659   |
| 7            | 40.61824           | .4882978  | 83.18  | 0.000 | 39.66119             | 41.57529  |
| 8            | 38.03025           | .4704454  | 80.84  | 0.000 | 37.10819             | 38.95231  |
| 9            | 23.54459           | .400655   | 58.77  | 0.000 | 22.75932             | 24.32987  |
| 10           | -.7655753          | .2733795  | -2.80  | 0.005 | -1.301392            | -.2297581 |
| 11           | -5.323539          | .1767645  | -30.12 | 0.000 | -5.669993            | -4.977085 |
| 12           | -.0229054          | .1571798  | -0.15  | 0.884 | -.330974             | .2851632  |
| _cons        | 35.44876           | .2723991  | 130.14 | 0.000 | 34.91486             | 35.98266  |
| account_id   | F(16769, 197700) = |           | 24.813 | 0.000 | (16770 categories)   |           |

## Appendix F Instruments

### F.1 Program Staff In-Depth Interview Guide

#### Introduction

Today, we'll be discussing your role in the Energy Efficiency Education Program the Duke Energy Progress and Carolinas territories. We would like to learn about your experiences in administering this/these program(s) in the 2017-2018 school year.

Your comments are confidential. If I ask you about areas you don't know about, please feel free to tell me that and we will move on. Also, if you want to refer me to specific documents to answer any of my questions, that's great – I'm happy to look things up if I know where to get the information.

I would like to record this interview for my note-taking purposes. Do I have your permission? Do you have any questions before we start?

#### Roles & Responsibilities

- Q1. Please describe your position at Duke Energy and your role in the Energy Efficiency Education Program.
- Q2. How long have you been in this role?

#### Program Delivery

- Q3. Next, I'd like to learn more about how this program was delivered in 2017-2018 school year. Last time we spoke with program staff we got a good understanding of the program delivery model. Have there been any changes in program delivery since the 2015-2016 school year?

[IF NEEDED:]

1. Did you adjust your marketing and outreach strategy since the 2015-2016 school year? If so, how?
2. In 2017-2018, was the program for elementary the same as the prior school year (Space Station Conservation)? Has the curriculum or performance changed at all? If so, was any of that at the direction of Duke program staff?
3. What was the program for middle schools last school year? I know in 2015-2016 it was "Conservation Crew" but I don't see that on the NTC website currently.
4. Do you have a copy of the 2017-2018 student and teacher materials you could send me?
5. Are new programs being implemented for the 2017-2018 school year? I see Kilowatt Kitchen and The E-Team on the NTC Playworks website for North and South Carolina.
6. When was the NTC Playworks website added to the program? What is its purpose? How has the changed the program delivery, goals, or success?

7. Are R1 and AM Conservation still acting as fulfillment contractors? Is their role any different from last year?
8. From the teacher and student family perspective, has the student family kit request process changed at all?

### Kits

Let's talk about the kits a little bit. The kits includes:

- LED Bulbs
- LED Night Light
- Energy-Efficient Showerhead
- Kitchen Faucet Aerator
- Bathroom Faucet Aerator
- Water Flow Meter Bag
- Switch and Outlet Insulators
- Teflon Tape (used for installing the Showerhead and Faucet Aerators)
- Hot Water Gauge Card
- D.O.E. Energy Savers Booklet
- Glow Ring Toy
- Product Information/Instruction Sheet

- Q4. Were there any changes to the items in the kit since 2015-2016 program year?
- Q5. Do you know when the program switched from CFLs to LEDs? (Was it April 2016?)
- Q6. They get two LEDs, twelve outlet gaskets, and one of each of the other items, right?
- Q7. Is the product information sheet purely instructional, or does it have behavior tips on it? Can you email me a copy?
- Q8. Is the DOE Energy Savers Booklet the 45-page booklet that is available online on the DOE's website?

We are almost done. I have a few more questions.

### Wrap Up

- Q9. The last evaluation revealed that the program curriculum may be targeting too wide of an age range to effectively teach all elementary grades. Also, some middle school teachers said the middle school content was too juvenile. However, this did not seem to affect kit distribution. How important is fine-tuning the educational component to Duke? Is that a priority?
- Q10. What would you say are the greatest strengths of this program?
- Q11. What would you say is the biggest challenge in administering this program?
- Q12. Is there anything else about the program that we have not discussed that you feel should

be mentioned?

Q13. What would you like to learn from the program evaluation?

Those are all of my questions. Thank you very much for your time.

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Feb 25 2020

## F.2 NTC Staff In-Depth Interview Guide

### Introduction

Today, we'll be discussing your role in the Energy Efficiency Education Program in the Duke Energy Progress and Carolinas territories. We would like to learn about your experiences in administering this/these program(s) in the 2017-2018 school year.

Your comments are confidential. If I ask you about areas you don't know about, please feel free to tell me that and we will move on. Also, if you want to refer me to specific documents to answer any of my questions, that's great – I'm happy to look things up if I know where to get the information.

I would like to record this interview for my note-taking purposes. Do I have your permission? Do you have any questions before we start?

### Roles & Responsibilities

- Q1. Please describe your position at NTC and your role in the Duke Energy Energy Efficiency Education Program.
- Q2. How long have you been in this role?

### Program Delivery

- Q3. Next, I'd like to learn more about how this program was delivered in 2017-2018 school year. Last time we spoke with program staff we got a good understanding of the program delivery model. Have there been any changes in program delivery since the 2015-2016 school year?

[IF NEEDED:]

1. Did you adjust your marketing and outreach strategy since the 2015-2016 school year? If so, how?
2. In 2017-2018, was the program for elementary the same as the prior school year (Space Station Conservation)? Has the curriculum or performance changed at all? If so, was any of that at the direction of Duke program staff?
3. What was the program for middle schools last school year? I know in 2015-2016 it was "Conservation Crew" but I don't see that on the NTC website currently.
4. Do you have a copy of the 2017-2018 student and teacher materials you could send me?
5. Are new programs being implemented for the 2017-2018 school year? I see Kilowatt Kitchen and The E-Team on the NTC Playworks website for North and South Carolina.
6. When was the NTC Playworks website added to the program? What is its purpose? How has the changed the program delivery, goals, or success?
7. From the teacher and student family perspective, has the student family kit request process changed at all?

### Wrap Up





- Q4. The last evaluation revealed that the program curriculum may be targeting too wide of an age range to effectively teach all elementary grades. Also, some middle school teachers said the middle school content was too juvenile. However, this did not seem to affect kit distribution. How important is fine-tuning the educational component to NTC? Is that a priority?
- Q5. What would you say are the greatest strengths of this program?
- Q6. What would you say is the biggest challenge in administering this program?
- Q7. Is there anything else about the program that we have not discussed that you feel should be mentioned?
- Q8. What would you like to learn from the program evaluation?

Those are all of my questions. Thank you very much for your time.

### F.3 Teacher Survey

#### Introduction to Survey (Once Survey is Opened)

Thank you for agreeing to take this survey. It starts with a few questions about what grades and subjects you teach, which we need for our analysis of the survey responses. The survey then asks for your feedback on various elements of the program.

#### Grades and Subjects Taught

Q1. What grade(s) of students do you teach? *Please select all that apply.*

[MULTIPLE RESPONSE]

1. Pre-K
2. Kindergarten
3. Grade 1
4. Grade 2
5. Grade 3
6. Grade 4
7. Grade 5
8. Grade 6
9. Grade 7
10. Grade 8
11. Grades 9-12
12. Other, please specify: [OPEN-ENDED RESPONSE]

[TERMINATE IF Kindergarten to Grade 8 (options 2-10) aren't selected]

[IF Q1=Kindergarten to Grade 5 AND Q1<> Grade 6 to Grade 8]

Q2. Are you a home room teacher?

[SINGLE RESPONSE]

1. Yes
2. No [-> TERMINATE]

[IF Q1=Grade 6 to Grade 8]

Q3. What subjects do you teach? *Please select all that apply.*

[MULTIPLE RESPONSE]

1. Math
2. Natural sciences
3. English/language arts
4. Social studies/social sciences/history
5. Music
6. Art

7. Physical education
8. Other – please specify: [OPEN-ENDED RESPONSE]

[IF Q3<>1 or 2]

Q4. Do you teach any topics on energy (electricity, gas, coal, etc.) generation, transformation, use, or conservation (including, but not limited to, topics/materials provided by the Energy Efficiency for Schools program)?

[SINGLE RESPONSE]

1. Yes
2. No [→ TERMINATE]

### Performance Seen

[IF Performance\_Name=Kilowatt Kitchen]

Q5. Did you see The National Theatre for Children performance for elementary school students called *Kilowatt Kitchen* on [PERFORMANCE\_DATE]?

1. Yes [SKIP TO Q7]
2. No [→ TERMINATE]
98. Don't know/ Can't recall [→ TERMINATE]

[IF Performance\_Name= The E-Team]

Q6. Did you see the National Theatre for Children performance for middle school students called *The E-Team* on [PERFORMANCE\_DATE]?

1. Yes
2. No [→ TERMINATE]
98. Don't know/ Can't recall [→ TERMINATE]

[TERMINATION SCREEN TEXT: We have determined that you do not meet the qualification criteria for this study. Thank you for your time!]

### Awareness of Duke Energy's Sponsorship

Q7. Before today, were you aware that Duke Energy sponsored the National Theatre for Children performance(s) in your school?

1. Yes
2. No
98. Don't know

[IF Q7 = 1 (YES)]

Q8. How did you learn of Duke Energy's involvement with the National Theatre for Children program? *Please select all that apply.*

[MULTIPLE RESPONSE]

1. Another teacher

2. Duke Energy marketing materials
3. Duke Energy staff
4. National Theatre for Children staff
5. National Theatre for Children materials
6. Other, please describe: [OPEN-ENDED RESPONSE]
98. Don't know

### Program Experience and Satisfaction

The next few questions are about the performance(s) that National Theatre for Children presented at your school.

- Q9. Thinking about how the school performance explained the energy-related concepts, would you say that, on the whole, the explanation was:

[SINGLE RESPONSE]

1. Far too advanced for most of your students
2. Somewhat too advanced for most of your students
3. About right for most of your students
4. Somewhat too basic for most of your students
5. Far too basic for most of your students
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF Q9 = 1 OR 2]

- Q10. What about the performance was too advanced for most of your students?

1. [OPEN ENDED]

- Q11. Were there any concepts that the performance(s) did not cover that *should have been* covered?

1. Yes
2. No [SKIP TO Q13]
98. Don't know [SKIP TO Q13]

[IF Q11 = 1 (YES)]

- Q12. What concepts were not covered that *should have been* covered?

1. [OPEN ENDED]

- Q13. Please rate your overall satisfaction with the National Theatre for Children performance on the following scale. [SINGLE RESPONSE; INSERT 1-5 SCALE WHERE 1=NOT AT ALL SATISFIED AND 5=COMPLETELY SATISFIED WITH DK; LABEL ONLY THE END POINTS (1 AND 5) – SHOULD LOOK SOMETHING LIKE THIS:

1. 1 – Not at all satisfied
2. 2

- 3. 3
- 4. 4
- 5. 5 – Completely satisfied
- 98. Don't know]

The next few questions are about the curriculum or instructional materials that you may have received from the National Theatre for Children around the time of the performance.

Q14. Did you receive curriculum or instructional materials, such as student workbooks, related to energy and energy conservation from National Theatre for Children in the 2017-2018 school year?

- 1. Yes
- 2. No [SKIP TO Q24]
- 98. Don't know [SKIP TO Q24]

[IF Q14 = 1 (YES)]

Q15. To what degree did you use the curriculum or instructional materials in teaching your students about energy?

[SINGLE RESPONSE]

- 1. Not at all [SKIP TO Q23]
- 2. A little
- 3. Moderately
- 4. A lot
- 5. Extensively
- 98. Don't know [SKIP TO Q24]

[IF Q15 = 2 (A LITTLE)]

Q15a. Why did you only use the workbooks “a little” in teaching your students about energy?

- 1. [OPEN ENDED]

Q15b. Did you incorporate the National Theatre for Children’s online component into your curriculum in the 2015-2016 school year? This is the official website that accompanies the performance and classroom curriculum; it has interactive games that reinforce the concepts taught in the performance and printed curriculum.

- 1. Yes
- 2. No
- 98. Don't know

[IF Q15B= 1 (YES)]

Q15c. How satisfied are you with that online component?

[SINGLE RESPONSE]

- 1. 1 – Not at all satisfied

- 2. 2
- 3. 3
- 4. 4
- 5. 5 – Completely satisfied
- 98. Don't know

[IF Q15 = 2 THROUGH 5]

Q16. Thinking about how the student workbooks explained energy-related concepts, would you say that the material was generally:

[SINGLE RESPONSE; READ EXCEPT OTHER, DK, AND REFUSED OPTIONS]

- 1. Far too advanced for most of your students
- 2. Somewhat too advanced for most of your students
- 3. About right for most of your students
- 4. Somewhat too basic for most of your students
- 5. Far too basic for most of your students
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused / I'd rather not say

[IF Q15 = 2, 3, 4, OR 5]

Q17. Please rate how useful the materials were to you in teaching your students about energy. [SINGLE RESPONSE; INSERT 1-5 SCALE WHERE 1=NOT AT ALL USEFUL AND 5=EXTREMELY USEFUL WITH DK; LABEL ONLY END POINTS, 1 AND 5]

[IF Q15 = 2, 3, 4, OR 5]

Q17a. Please rate the degree to which the topics in the workbook aligned with your state's science standards for the grade(s) you teach.

- 1. Completely aligned
- 2. Mostly aligned
- 3. Somewhat aligned
- 4. Poorly aligned
- 5. Not aligned at all
- 6. N/A – no science standards for my grade(s)
- 98. Don't know
- 99. Refused / I'd rather not say

[IF Q15 = 2, 3, 4, OR 5]

Q18. Were there any concepts covered in the curriculum or instructional materials that your students had particular challenges with?

- 1. Yes
- 2. No
- 98. Don't know

99. Refused / I'd rather not say

[IF Q18 = 1 (YES)]

Q19. What concepts did your students have particular challenges with?

1. [OPEN ENDED]

[IF Q15 = 2, 3, 4, OR 5]

Q20. Were there any concepts that the materials did not cover that *should have been* covered?

1. Yes

2. No

98. Don't know

99. Refused / I'd rather not say

[IF Q20 = 1 (YES)]

Q21. What concepts were not covered that *should have been* covered?

1. [OPEN ENDED]

[IF Q15 = 2 THROUGH 5]

Q22. Please rate your overall satisfaction with curriculum or instructional materials you received from the National Theatre for Children program using the following scale.

[SINGLE RESPONSE; INSERT 1-5 SCALE WHERE 1=NOT AT ALL SATISFIED AND 5=COMPLETELY SATISFIED WITH DK; LABEL ONLY END POINTS (1 AND 5)]

[IF Q15 = 1 (NOT AT ALL)]

Q23. Why did you *not* use the curriculum or instructional materials in teaching your students about energy?

1. [OPEN ENDED]

### Interactions with NTC Staff

Q24. Did you have any interactions with anyone from the National Theatre for Children regarding the curriculum or instructional materials?

1. Yes

2. No [SKIP TO Q27]

98. Don't know [SKIP TO Q27]

[IF Q24 = 1 (YES)]

Q25. What did those interactions address?

1. [OPEN ENDED]

[IF Q24 = 1 (YES)]

Q26. Using the scale provided, how satisfied were you with:

- a. Your interactions with the National Theatre for Children staff, overall
- b. The professionalism and courtesy of the National Theatre for Children staff
- c. The National Theatre for Children staff's knowledge about the topics you discussed with them

[SINGLE RESPONSE; FOR EACH ITEM, INSERT 1-5 SCALE WHERE 1=NOT AT ALL SATISFIED AND 5=COMPLETELY SATISFIED WITH DK; LABEL ONLY THE END POINTS (1 AND 5)]

### Encouragement of Students to Complete Survey, Receive Kit

In addition to the student workbooks provided by the National Theatre for Children there are materials directed at parents that instruct them on how to request a free energy saving kit from Duke Energy. The kit contains energy efficient light bulbs, low flow showerheads, and other items that students and their parents can install in their home to save energy.

Q27. Did you distribute the kit request materials to either your students or directly to their parents?

1. Yes
2. No
98. Don't recall

Q28. Were there any other ways in which you personally promoted the kits to your students and their families? If so, what were they? *[Select all that apply]*

1. Pinned up MyEnergyKit.org poster
2. Vocally encouraged students to sign up for a kit
3. Used my classroom web portal to encourage families to sign up for a kit
4. Emailed parents to encourage them to sign up for a kit
5. Spoke with parents in person to encourage them to sign up for a kit
6. Other (please specify)
7. No other actions taken *[EXCLUSIVE RESPONSE]*
98. Don't recall *[EXCLUSIVE RESPONSE]*

[IF Q27 = 1 (YES) OR Q28=1-6]

Q29. Did you follow up with students or parents later to find out if their household requested a kit?

1. Yes
2. No *[SKIP TO Q32]*
98. Don't know *[SKIP TO Q32]*

[IF Q29 = 1 (YES)]

Q30. In your best estimate, what percentage of your student households ordered the Duke Energy kit?

1. 0% to 10%



2. 11% to 20%
3. 21% to 30%
4. 31% to 40%
5. 41% to 50%
6. 51% to 60%
7. 61% to 70%
8. 71% to 80%
9. 81% to 90%
10. 91% to 100%
98. Don't know

[IF Q27 = 2 (NO)]

Q31. Why haven't you distributed the kit request materials to your students or their parents?

1. [OPEN-ENDED]

### **Challenges and Opportunities for Improvement**

Q32. What suggestions do you have to improve the National Theatre for Children performance(s)?

1. [OPEN ENDED]

[IF Q14 = 1 (YES)]

Q33. What suggestions do you have to improve the classroom materials received from the National Theatre for Children?

1. [OPEN ENDED]

[ASK ALL]

Q34. In addition to this survey, we will be conducting 15-minute-long telephone interviews with five teachers, where we will ask them additional questions about their experience with the National Theatre for Children program. Interview participants will be compensated for their time. If selected, would you be willing to participate in a follow-up telephone interview about your experience with the program?

[SINGLE RESPONSE]

1. Yes, I am willing to be interviewed
2. No, I am not willing to be interviewed

That was the last question. Thank you for your time!

## F.4 Teacher Interview Guide

### Teacher Background

Q1. First, can you tell me what grade and subjects you teach?

### NTC Performance

The next few questions are about the performance that National Theatre for Children (or NTC) gave at your school.

Q2. What topics were covered in the performance?

Q3. Do you think any of the topics could have been better emphasized or explained? If so, which ones and why?

Q4. Should any topics be removed from the performance? If so, which ones and why?

Q5. [IF ELEMENTARY SCHOOL TEACHER] What about age appropriateness – was the content appropriate for all ages, from kindergarten through grade-5? If not, what was not age appropriate? How could that be improved?

[IF MIDDLE SCHOOL TEACHER] What about age appropriateness – was the content appropriate for all ages from grade 6 through grade 8? If not, what was not age appropriate? How could that be improved?

Q6. Did the performance keep your students' attention? If not, how could the content be improved to keep the students entertained and attentive?

Q7. What did you like the most about the performance?

Q8. What did you dislike the most?

Q9. How did your students respond to the performance?

- Probes: What did students say about the performance? Did they like it? What specifically did they like most about it?

Q10. One of the goals of the NTC program is for performers to get students' families to sign up for energy efficiency kits from Duke Energy that contain energy efficient bulbs, low-flow shower heads, and other items that students' families can install in their home to save energy. Did the performers talk about the kits or the kit forms?

- [If yes] What did they say? Did they hand out kit request forms during the performance?

Q11. How many NTC performances have you seen in your school? When did you see that/these performance(s)? [If they saw multiple NTC performances:] How did the latest performance compare to the prior performance(s)?

### Materials/classroom [Ask All]

Q12. NTC provides student workbooks that contain educational materials and a form to get an energy saver kit for their home. Have you distributed these workbooks to your students?

- [If no:] Why not?
- [If yes:] How does the workbook distribution work? Do the students get the workbook at the assembly? Or do they get them in a class?

- [If distributed workbooks:] How did you use the workbooks in your classroom?
- Q13. Did you get any teacher-facing instructional material from NTC? [If yes] How did you receive it? [Probe: Left in your box, emailed if in digital form, or in some other way?] To what extent did you use that material?
- [If material was not used:] Why haven't you used the material(s)? What would make you more likely to use them?
  - [If used:] Using a 1 to 5 scale where 1 means "not at all useful" and 5 means "extremely useful," how useful was the instructional material? Why did you give that rating? What was most/least useful about them?
- Q14. Were any other materials handed out by the performers before, during, or after the performance? If so, what was handed out? Did you use these materials in your classroom, or did the students take them home? [probe about value of these materials]
- Q15. Thinking about the educational materials NTC provided...
- In what ways, if any, did you incorporate the material into your lesson plans? [IF NOT MENTIONED] That is, did you extensively use it – such as weaving it into your course work over the year – or did you briefly utilize it in the time surrounding the performance? Please explain how extensively you used the material.
  - Was the content age appropriate? Or was it too advanced or too basic? What was too basic/advanced? Is it age appropriate for all ages (grades K-5/ 6-8?) How effective is it in teaching kids about energy concepts?
  - [IF MIDDLE SCHOOL TEACHER AND NOT MENTIONED] What did you think of the comic book for teaching students about energy and energy conservation behaviors? How effective was it? Was it age appropriate? [IF NOT AGE APPROPRIATE] How was it not age appropriate?
- Q16. Did anyone or any of the materials you received emphasize the value of the kits to you? If so, what did they say?
- Q17. In the online survey you said you [DID / DID NOT] distribute the kit request form to your students.
- [IF DISTRIBUTED] What challenges, if any, did you encounter when trying to distribute the kit forms? Did you have to coordinate with other faculty or staff? If so, can you describe this process and how well the process worked? What can NTC or Duke Energy do to make this process easier for you?
  - [IF NOT DISTRIBUTED] Why did you not distribute the kit forms? What can NTC or Duke Energy do to make this process easier for you?
- Q18. What, if anything, did you say or do to encourage your students to take the kit form and have their parents fill it out?
- Q19. Thinking about the performance and curriculum as a whole, in what ways, if any, did your students subsequently demonstrate knowledge on the topics presented? [IF NOT MENTIONED] What were some of their main takeaways? What is the evidence of their increased knowledge? (test scores, etc.)

**Suggestions for Improvement [Ask All]**

- Q20. What suggestions do you have to improve the National Theatre for Children performance(s)?
- Q21. What suggestions do you have to improve the classroom materials received from the National Theatre for Children?
- Q22. What suggestions do you have to improve the distribution of the kit forms to students?

## F.5 Student Parent Survey

### Introduction/ Screening

Q1. [PHONE SURVEY] Hi, I'm \_\_\_\_\_, calling on behalf of Duke Energy. We are calling about an energy efficiency educational program that Duke Energy sponsored in your child's school. In addition to sponsoring classroom activities, Duke Energy sent a kit containing energy saving items to your home.

This kit included lightbulbs, a showerhead, and other items that help you save energy in your home. Do you recall receiving this kit?

1. Yes
2. No [If no: Can I speak with someone who may know something about this kit?]
98. Don't know [If DK: Can I speak with someone who may know something about this kit?]
99. Refused [TERMINATE]

Q1. [WEB SURVEY] We are conducting surveys about an energy efficiency educational program that Duke Energy sponsored in your child's school. In addition to sponsoring classroom activities, Duke Energy sent a kit containing energy saving items to your home.

This kit included lightbulbs, a showerhead, and other items that help you save energy in your home. Do you recall receiving this kit?

1. Yes
2. No [TERMINATE]

Q1\_phone. [IF Q1=1 AND VERSION=PHONE]. Do you have a few minutes to answer some questions about the kit, even if you never opened it?

1. Yes
2. No [TERMINATE]

[INTERVIEWER INSTRUCTIONS: *If no adults are able to speak about the kit, thank and terminate.*]

Q1a. Do you work at a school that teaches elementary or middle school grades?

1. Yes [-> TERMINATE]
2. No

### Program Experience

Q2. Before today, did you know the kit you received was sponsored by Duke Energy?

1. Yes
2. No
98. Don't know
99. Refused

[IF Q2=1]

Q3. How did you learn that the kit was sponsored by Duke Energy? [Select all that apply]

1. Classroom materials brought home by child
2. My child's teacher
3. Information material included in/on the kit
4. Other (specify:\_\_\_\_\_)
98. Don't know
99. Refused

Q3a. How did you hear about the opportunity to receive the kit from Duke Energy? [Select all that apply]

1. Classroom materials brought home by child
2. School newsletter
3. Email from my child's teacher/school
4. School website or school web portal
5. In-person conversations with my child's teacher
6. Saw a poster at my child's school
7. After hours event at my child's school
8. Other (specify:\_\_\_\_\_)
98. Don't know
99. Refused

Q4. Did you read the information about how to save energy in the booklet that came in the kit?

1. Yes
2. No
98. Don't know
99. Refused

[ASK IF Q4 = 1]

Q5. On a scale from 0 to 10 where 0 is not at all helpful and 10 is very helpful, how helpful was the information in the kit in identifying ways your household could save energy at home?

0. Not at all helpful
- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.

- 10. Very helpful
- 98. Don't know
- 99. Refused

[ASK IF Q4<7]

Q6. What might have made the information more helpful?

Q7. In addition to sending the energy saving kits, Duke Energy sponsored a program about energy and energy efficiency at your child's school, which included classroom materials and an in-school performance by the National Theatre for Children. Were you aware of this program before today?

*[Interviewer: Record 'yes' if the respondent reported any awareness of any aspect of the school program]*

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[ASK IF Q7=1]

Q9. Where did you hear about this program?

[MULTIPLE RESPONSE]

- 1. From my child/children
- 2. From a teacher
- 3. On Duke Energy website
- 4. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

### Assessing Energy Saver Kit Installation

We'd like to ask you about the energy saving items included in your kit.

The kit contained an energy-efficient showerhead, faucet aerators for the bathroom and kitchen, energy efficient light bulbs, a night light, and some insulator gaskets for light switches and electricity outlets.

*[IF NEEDED: The bathroom and kitchen faucet aerators are small metal pieces that you can screw in to a sink faucet to reduce water flow. The insulator gaskets are made of foam and are the size and shape of a light switch or electric outlet.]*

Q10. Have you or anyone else installed any of those items in your home, even if they were taken out later?

*[Interviewer: Throughout interview, remind respondent as needed to report whether someone else in the home installed or uninstalled any items]*

[SINGLE RESPONSE]

- 1. Yes
- 2. No [-> Q21]

- 98. Don't know [-> TERMINATE]
- 99. Refused [-> TERMINATE]

[ASK IF Q10 = 1]

Q12. Which of the items did you install, even if they were taken out later?

[Interviewer: Record each response, then prompt with the list items.]

| Item  | Response                    |
|---|-----------------------------|
| a. Showerhead   | 1. Yes 2. No 98. DK 99. REF |
| b. Kitchen faucet aerator                                       | 1. Yes 2. No 98. DK 99. REF |
| c. Bathroom faucet aerator                                      | 1. Yes 2. No 98. DK 99. REF |
| d. Night light  | 1. Yes 2. No 98. DK 99. REF |
| e. Energy efficient light bulb(s) (LEDs)                        | 1. Yes 2. No 98. DK 99. REF |
| f. Insulator gaskets for light switches and electricity outlets | 1. Yes 2. No 98. DK 99. REF |

[ASK IF Q12E (ENERGY EFFICIENT LIGHT BULB(S)) = 1 (YES)]

Q13. In addition to the night light, there were two LED light bulbs in the kit. Did you install one or both of the LED light bulbs in the kit?

[SINGLE RESPONSE]

- 1. Yes – I installed both LEDs
- 2. No – I installed only one LED light bulb
- 98. Don't know
- 99. Refused

[ASK IF Q12f = 1]

Q15. How many of the light switch gasket insulators from the kit did you [if needed: or anyone e/se] install in your home?

[SINGLE RESPONSE]

- 1. None
- 2. One
- 3. Two
- 4. Three
- 5. Four
- 98. Don't know
- 99. Refused

[ASK IF Q12f = 1]

Q16. How many electrical outlet gasket insulators from the kit did you [if needed: or anyone e/se] install in your home?

[SINGLE RESPONSE]

- 1. None



2. One
3. Two
4. Three
5. Four
6. Five
7. Six
8. Seven
9. Eight
98. Don't know
99. Refused

[ASK IF ANY PART OF Q12 = 1]

Q17. Overall, how satisfied are you with the item[s] you installed? Please use 0 to 10 scale, where 0 is very dissatisfied and 10 is very satisfied. How satisfied are you with...

| DISPLAY IF | Item                                  | Rating            |
|------------|---------------------------------------|-------------------|
| Q12a = 1   | a. Showerhead                         | 0-10 with DK, REF |
| Q12b = 1   | b. Kitchen faucet aerator             | 0-10 with DK, REF |
| Q12c = 1   | c. Bathroom faucet aerator            | 0-10 with DK, REF |
| Q12d = 1   | d. Night light                        | 0-10 with DK, REF |
| Q12e = 1   | e. Energy efficient lightbulbs (LEDs) | 0-10 with DK, REF |
| Q12f = 1   | f. Insulator gaskets                  | 0-10 with DK, REF |

[ASK IF ANY ITEMS IN Q17<7]

Q17a. Can you please explain any dissatisfaction you had with [DISPLAY ALL ITEMS IN Q17 THAT ARE <7]?

[OPEN END: RECORD VERBATIM]

[ASK IF ANY PART OF Q12 = 1]

Q18. Have you since uninstalled any of the items from the kit that you had previously installed?

[SINGLE RESPONSE]

1. Yes
2. No
98. Don't know
99. Refused

[ASK IF Q18 = 1]

Q19. Which of the items did you uninstall?

[Interviewer: Record the response, then prompt with the list items.]

[MULTIPLE RESPONSE]



1. [DISPLAY IF Q12a = 1] Showerhead

2. [DISPLAY IF Q12b = 1] Kitchen faucet aerator
3. [DISPLAY IF Q12c = 1] Bathroom faucet aerator
4. [DISPLAY IF Q12d = 1] Night light
5. [DISPLAY IF Q12e = 1] Energy efficient light bulbs (LEDs)
6. [DISPLAY IF Q12f = 1] Insulator gaskets
98. Don't know
99. Refused

[ASK IF Q19 1-6 OPTIONS WERE SELECTED]

Q20. Why were those items uninstalled? Let's start with...

*[Interviewer: Read each item]*

[MULTIPLE RESPONSE]

| DISPLAY<br>ONLY THOSE<br>1-6 ITEMS<br>THAT WERE<br>SELECTED IN<br>Q19 | Item                                   | Reason  |
|---|--|---|
|   | a. Showerhead                          | 1. It was broken<br>2. I didn't like how it worked<br>3. I didn't like how it looked<br>96. Other: (specify)<br>98. DK<br>99. REF |
|   | b. Kitchen faucet aerator              | Repeat reason options   |
|   | c. Bathroom faucet aerator             | Repeat reason options   |
|   | d. Night light                         | Repeat reason options   |
|   | e. Energy efficient light bulbs (LEDs) | Repeat reason options   |
|   | f. Insulator gaskets                   | Repeat reason options   |

[ASK IF ANY PART OF Q12 = 2 OR Q10 = 2]

Q21. You said you haven't installed [INPUT ONLY THOSE ITEMS IN Q12 IF Q12a-f = 2].

Which of those items do you plan to install in the next three months?

*[Interviewer: Record the response, then prompt with the list items.]*

[MULTIPLE RESPONSE] [DISPLAY ALL IF Q10 = 2]

1. [DISPLAY IF Q12a = 2] Showerhead
2. [DISPLAY IF Q12b = 2] Kitchen faucet aerator
3. [DISPLAY IF Q12c = 2] Bathroom faucet aerator
4. [DISPLAY IF Q12d = 2] Night light
5. [DISPLAY IF Q12e = 2] Energy efficient light bulbs (LEDs)
6. [DISPLAY IF Q12f = 2] Insulator gaskets
98. None
99. Refused

[ASK IF ANY 1-6 OPTIONS WERE NOT SELECTED IN Q21 OR OPTION "NONE" WAS SELECTED]

Q22. What's preventing you from installing those items? Let's start with....

[Interviewer: Read items]

[MULTIPLE RESPONSE]

| DISPLAY IF            | Item                                   | Reason                              |
|-----------------------|--|-------------------------------------|
| Q21a was not selected | a. Showerhead                          | Use multiple response options below |
| Q21b was not selected | b. Kitchen faucet aerator              | Use multiple response options below |
| Q21c was not selected | c. Bathroom faucet aerator             | Use multiple response options below |
| Q21d was not selected | d. Night light                         | Use multiple response options below |
| Q21e was not selected | e. Energy efficient light bulbs (LEDs) | Use multiple response options below |
| Q21f was not selected | f. Insulator gaskets                   | Use multiple response options below |

[MULTIPLE RESPONSE OPTIONS FOR Q22]

1. Didn't know what that was
2. Tried it, didn't fit
3. Tried it, didn't work as intended (Please specify: \_\_\_\_\_)
4. Haven't gotten around to it
5. Current one is still working
6. Takes too much time to install it/No time/Too busy
7. Too difficult to install it, don't know how to do it
8. Don't have the tools I need
9. Don't have the items any longer (threw away, gave away)
11. [DISPLAY IF Q21e was not selected] Already have LEDs
12. [DISPLAY IF Q21a was not selected] Already have efficient showerhead
13. [DISPLAY IF Q21b was not selected] Already have efficient kitchen faucet aerator
14. [DISPLAY IF Q21c was not selected] Already have efficient bathroom faucet aerators
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[IF ANY PART OF Q12 = 1 AND IT'S NOT THE CASE THAT ALL PARTS OF Q19=SELECTED (THAT IS, THEY INSTALLED ANYTHING AND DID NOT UNINSTALL EVERYTHING THEY INSTALLED)]

Q22a. Thinking of the items you installed, would you be interested in receiving any more of them from Duke Energy? If so, which ones?

[MULTIPLE RESPONSES]

1. [IF Q12a = 1 AND Q19.1 NOT SELECTED] Yes, I would like another energy-efficient showerhead
2. [IF Q12b = 1 AND Q19.2 NOT SELECTED] Yes, I would like another kitchen faucet aerator
3. [IF Q12c = 1 AND Q19.3 NOT SELECTED] Yes, I would like more bathroom faucet aerators
4. [IF Q12d = 1 AND Q19.4 NOT SELECTED] Yes, I would like more energy-efficient night lights
5. [IF Q12e = 1 AND Q19.5 NOT SELECTED] Yes, I would like more energy-efficient light bulbs (LEDs)
6. [IF Q12f = 1 AND Q19.6 NOT SELECTED] Yes, I would like more switch/outlet gasket insulators
7. No, I am not interested in receiving any more of the items
98. Don't know
99. Refused

[IF Q22a=1-6]

Q22b. What would be your preferred way to request these additional items?

[MULTIPLE RESPONSES]

1. Internet
2. Telephone
3. Pre-paid postcard
4. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[ASK IF Q12d = 1 AND Q19 NIGHT LIGHT OPTION WAS NOT SELECTED]

Q26. You said you installed the night light. Did the night light replace an existing night light?

1. Yes
2. No
98. Don't know
99. Refused

[ASK IF Q26 = 1]

Q27. Did the old nightlight have a bulb that you could take out and replace once it burned out?

1. Yes
2. No
98. Don't know

99. Refused

[ASK IF (Q12e = 1 AND Q19 ENERGY EFFICIENT LIGHTS WERE NOT SELECTED)]

Q28. You said you installed at least one of the energy efficient lights. What type of bulb(s) did you replace with the energy efficient lightbulbs?

1. All incandescent [*Interviewer: describe as an old fashioned light bulb - likely purchased more than two years ago*]
2. All halogen [*Interviewer: describe as bulb that looks like an incandescent, but has a glass tube inside of the bulb*]  
All CFL [*Interviewer: describe as spiral, or twisty shape bulb that fit into ordinary light fixtures*]
3. All LED [*Interviewer: describe as a new bulb type that uses little electricity and lasts a long time*]
4. Some combination [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[ASK IF (Q12e = 1 AND Q19 ENERGY EFFICIENT LIGHT BULBS NOT SELECTED)]

Q29. In what rooms did you install the energy efficient lightbulbs that were included in the kit?

[MULTIPLE RESPONSE] [*Interviewer: If the respondent gives more than two responses, remind them that there were only two bulbs.*]

1. Living room
2. Dining room
3. Bedroom
4. Kitchen
5. Bathroom
6. Den
7. Garage
8. Hallway
9. Basement
10. Outdoors
11. Other area (please specify): \_\_\_\_\_
98. Don't know
99. Refused

Q30. Have you adjusted the temperature of your water heater based on the Hot Water Gauge Card included in your kit?

1. Yes
2. No
3. Don't recall seeing the Hot Water Gauge Card
98. Don't know
99. Refused

Q31. Do you know what the old temperature setting on your hot water heater was?

1. Yes (*please type in previous temperature setting here*)
2. No

[ASK IF Q30=1]

Q32. And what was the new temperature setting you set your hot water heater to?

[Record response]

[ASK IF Q30=1]

Q33. Is the new water heater temperature setting still in place?

1. Yes
2. No
98. Don't know
99. Refused

[IF Q33=2]

Q34. Why did you change the water heater temperature a second time?

[Record response]

Q35. What is the fuel type of your water heater?

1. Electricity
2. Natural Gas
3. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

Q36. How old is your water heater?

1. Less than five years old
2. Five to nine years old
3. Ten to fifteen years old
4. More than fifteen years old
98. Don't know

## NTG

[IF ANY PART OF Q12 = 1 AND IT'S NOT THE CASE THAT ALL PARTS OF Q19=SELECTED (THAT IS, THEY INSTALLED ANYTHING AND DID NOT UNINSTALL EVERYTHING THEY INSTALLED)]

Q37. If you had not received the free efficiency items in the kit, would you have purchased and installed any of these same items within the next year?

1. Yes
2. No
98. Don't know

99. Refused

[If Q37 = 1]

Q38. What items would you have purchased and installed within the next year?

[MULTIPLE RESPONSES]

1. [IF Q12a = 1 AND Q19.1 NOT SELECTED] Energy-Efficient Showerhead
2. [IF Q12b = 1 AND Q19.2 NOT SELECTED] Kitchen Faucet Aerator
3. [IF Q12c = 1 AND Q19.3 NOT SELECTED] Bathroom Faucet Aerator
4. [IF Q12d = 1 AND Q19.4 NOT SELECTED] Energy-Efficient Light Bulbs
5. [IF Q12e = 1 AND Q19.5 NOT SELECTED] Energy-Efficient Night Light
6. [IF Q12f = 1 AND Q19.6 NOT SELECTED] Switch/Outlet Gasket Insulators
7. No I would not have purchased any of the items
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[IF Q38.4 IS SELECTED]

Q39. Q39. If you had not received them for free in the kit, how many LED light bulbs would you have purchased?

1. One
2. Two
98. Don't know
99. Refused

[IF (Q12a=1 AND Q19.1 NOT SELECTED) or (Q12b=1 AND Q19.2 NOT SELECTED) or (Q12c=1 AND Q19.3 NOT SELECTED)]

Q40. Now, thinking about the water savings items that were provided in the kit - using a scale from 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential" how influential were the following factors on your decision to install the water saving items from the kit? How influential was...

[Interviewer: If respondent says "Not applicable - I didn't get/use that," then follow up with: "So would you say it was "not at all influential?" and probe to code]

[MATRIX QUESTION: SCALE]

| Elements   | Responses                          |
|--|------------------------------------|
| The fact that the items were free                            | 0-10 scale with DK and REF options |
| The fact that the items were mailed to your house            | 0-10 scale with DK and REF options |
| The chance to win cash prizes for your household and school  | 0-10 scale with DK and REF options |
| Information in the kit about how the items would save energy | 0-10 scale with DK and REF options |
| Information that your child brought home from school         | 0-10 scale with DK and REF options |

|   |                                    |
|---|------------------------------------|
| Other information or advertisements from Duke Energy, including its website | 0-10 scale with DK and REF options |
|---|------------------------------------|

[IF Q12e=11 AND Q19.5 NOT SELECTED]

Q41. Using a scale from 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential” how influential were the following factors on your decision to install the lightbulbs from the kit? How influential was...

*[Interviewer: If respondent says “Not applicable - I didn’t get/use that,” then follow up with: “So would you say it was “not at all influential?” and probe to code]*

[MATRIX QUESTION: SCALE]

| Elements  | Responses                          |
|---|------------------------------------|
| The fact that the items were free   | 0-10 scale with DK and REF options |
| The fact that the items were mailed to your house                           | 0-10 scale with DK and REF options |
| The chance to win cash prizes for your household and school                 | 0-10 scale with DK and REF options |
| Information in the kit about how the items would save energy                | 0-10 scale with DK and REF options |
| Information that your child brought home from school                        | 0-10 scale with DK and REF options |
| Other information or advertisements from Duke Energy, including its website | 0-10 scale with DK and REF options |

[ASK IF MYHER=1]

Q42. I’ve got just a few final questions about other energy saving activities. First, Duke Energy asked us to ask a couple of questions about the Home Energy Reports it sends to some families. These reports provide detailed information on your home’s energy usage and compare your home to similar homes of your neighbors.  
During the school year, did you receive any Home Energy Reports from Duke Energy?  
*[If needed: This is extra information on energy use that is mailed separately from your energy bill.]*

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[ASK IF Q42=1]

Q43. How often do you read those Home Energy Reports?

- 1. Never
- 2. Sometimes
- 3. Always
- 98. Don't know
- 99. Refused



[ASK IF Q43=2-3]

Q44. The Home Energy Reports provide specific recommendations for how you can save energy in your home. Have you completed any of the energy saving recommendations from the Home Energy Reports? If so, which ones? [MULTIPLE RESPONSE] *[Don't read, probe if needed]*

1. Nothing
2. Purchased energy saving products for my home and received a Duke Energy rebate
3. Purchased energy saving products for my home but did not receive a Duke Energy rebate
4. Made energy saving modifications to my home [example if necessary: installed insulation or windows]
5. Adjusted how or when I use energy in my home
6. Looked for additional information on how to save energy
7. Other, please specify:
98. Don't know
99. Refused

[IF MYHER=1 AND Q44=2-7, READ] Now we'd like to ask you about any other actions you or your child may have taken to save energy in your home. So please focus on any other things you or your child has done other than what you just told me.

[IF MYHER=1 AND Q44=1, 98, OR 99, READ] Okay, so you said that you have not followed any of the energy savings recommendations from your Home Energy Report. I'd still like to ask you about any actions you or your child may have taken to save energy in your home since your child learned about energy conservation at school and signed up for your energy kit from Duke Energy.

[IF MYHER≠1, READ] I'd like to ask you about any actions you or your child may have taken to save energy in your home since your child learned about energy conservation at school and signed up for your energy kit from Duke Energy.

Q45. Since your child learned about energy conservation at school and signed up for your energy kit from Duke Energy, has your child adopted any **new** behaviors to help save energy in your home? This would only include new energy saving **behaviors** that your child adopted since receiving the kit. *[IF NEEDED: like turning off the lights when room is unoccupied]*

[MULTIPLE RESPONSE] *[Interviewer: Do not read list. After each response ask, "Anything else?"]*

1. Not applicable - no new behaviors
2. Turn off lights when not in a room
3. Turn off electronics when not using them
4. Take shorter showers
5. Other (specify: \_\_\_\_\_)

98. Don't know

99. Refused

Q45b. [IF Q45 =2-5] Before receiving the kit, was your child already...

[MATRIX QUESTION]

| DISPLAY IF        | DISPLAY:                                    | ANSWERS             |
|-------------------|---|---------------------|
| Q45.2 IS SELECTED | Turning off lights when not in a room       | Yes, No, Don't know |
| Q45.3 IS SELECTED | Turning off electronics when not using them | Yes, No, Don't know |
| Q45.4 IS SELECTED | Taking shorter showers                      | Yes, No, Don't know |
| Q45.5 IS SELECTED | [Q45.5 VERBATIM TEXT]                       | Yes, No, Don't know |

Q46. Since receiving your energy kit from Duke Energy, have you adopted any new behaviors to help save energy in your home? This would only include new energy saving **behaviors** that you have adopted since receiving the kit. [IF NEEDED: like turning off the lights when room is unoccupied]

[MULTIPLE RESPONSE] *[Interviewer: Do not read list. After each response ask, "Anything else?"]*

1. Not applicable - no new behaviors
2. Turn off lights when not in a room
3. Turn off furnace when not home
4. Turn off air conditioning when not home
5. Changed thermostat settings to use less energy
6. Used fans instead of air conditioning
7. Turn off electronics when we are not using them
8. Take shorter showers
9. Turned water heat thermostat down
10. Other (specify: \_\_\_\_\_)
98. Don't know
99. Refused

Q46b. [IF Q46 =2-10] Before receiving the kit, were you already...

[MATRIX QUESTION]

| DISPLAY IF        | DISPLAY:   | ANSWERS             |
|-------------------|--|---------------------|
| Q46.2 IS SELECTED | Turning off lights when not in a room                                      | Yes, No, Don't know |
| Q46.3 IS SELECTED | Turning off furnace when not home  | Yes, No, Don't know |
| Q46.4 IS SELECTED | Turning off air conditioning when not home                                 | Yes, No, Don't know |
| Q46.5 IS SELECTED | Changing thermostat settings so heating or cooling system uses less energy | Yes, No, Don't know |
| Q46.6 IS SELECTED | Using fans instead of air conditioning                                     | Yes, No, Don't know |

|                    |   |                     |
|--------------------|---|---------------------|
| Q46.7 IS SELECTED  | Turning off electronics when not using them | Yes, No, Don't know |
| Q46.8 IS SELECTED  | Taking shorter showers                      | Yes, No, Don't know |
| Q46.9 IS SELECTED  | Turning water heat thermostat down          | Yes, No, Don't know |
| Q46.10 IS SELECTED | [Q46.10 VERBATIM TEXT]                      | Yes, No, Don't know |

[IF Q46 <> 1 or 98]

Q47. On a scale of 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential," how much influence did Duke Energy's kit and materials on saving energy have on your decision to [LIST ALL RESPONSES FROM Q46].

|                            |   |   |   |   |   |   |   |   |   |                            |       |       |
|----------------------------|---|---|---|---|---|---|---|---|---|----------------------------|-------|-------|
| 0 – Not at all influential | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 – Extremely influential | 98 DK | 99 RF |
|----------------------------|---|---|---|---|---|---|---|---|---|----------------------------|-------|-------|

Q47a. Thinking of the near future, are you interested in purchasing any additional products or services to help save energy in your home?

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[IF Q47a=1]

Q47b. What additional products or services are you interested in purchasing?

[MULTIPLE RESPONSE]

- 1. Energy efficient appliances
- 2. Efficient heating or cooling equipment
- 3. Efficient windows
- 4. Adding insulation
- 5. Sealing air leaks
- 6. Sealing or insulating ducts
- 7. Efficient lighting (LEDs)
- 8. Energy efficient water heater
- 9. Internet connected "smart" thermostat
- 96. Other, please specify: \_\_\_\_\_
- 98. Don't know
- 99. Refused

Q48. Since receiving your energy kit from Duke Energy, have you purchased and installed any other **products** or made any improvements to your home to help save energy?

- 1. Yes
- 2. No
- 98. Don't know

99. Refused

[If Q48 = 1]

Q49. What **products** have you purchased and installed to help save energy in your home?

[Do not read list. After each response, ask, "Anything else?"] [MULTIPLE RESPONSE]

1. Bought energy efficient appliances
2. Moved into an ENERGY STAR home [VERIFY: "Is Duke Energy still your gas or electricity utility?" Yes/No]
3. Bought efficient heating or cooling equipment
4. Bought efficient windows
5. Added insulation
6. Sealed air leaks [NOT DUCT SEALING – PROBE TO CODE]
7. Sealed ducts
8. Bought LEDs
9. Bought CFLs
10. Installed an energy efficient water heater
11. None – no other actions taken
96. Other, please specify: \_\_\_\_\_
98. Don't know
99. Refused

[ASK IF Q49<>11, 98, OR 99]

Q50. Did you get a rebate from Duke Energy for any of those products or services? If so, which ones?

| [LOGIC] Item   | Response      |
|--|---------------|
| [IF Q49.1 IS SELECTED] 1. Buy energy efficient appliances            | Yes No DK REF |
| [IF Q49.2 IS SELECTED] 2. Move into an ENERGY STAR home              | Yes No DK REF |
| [IF Q49.3 IS SELECTED] 3. Buy efficient heating or cooling equipment | Yes No DK REF |
| [IF Q49.4 IS SELECTED] 4. Buy efficient windows                      | Yes No DK REF |
| [IF Q49.5 IS SELECTED] 5. Buy additional insulation                  | Yes No DK REF |
| [IF Q49.6 IS SELECTED] 6. Seal air leaks                             | Yes No DK REF |
| [IF Q49.7 IS SELECTED] 7. Seal ducts                                 | Yes No DK REF |
| [IF Q49.8 IS SELECTED] 8. Buy LEDs                                   | Yes No DK REF |
| [IF Q49.9 IS SELECTED] 9. Buy CFLs                                   | Yes No DK REF |
| [IF Q49.10 IS SELECTED] 10. Install an energy efficient water heater | Yes No DK REF |
| [IF Q49.96 IS SELECTED] [Q49 open ended response]                    | Yes No DK REF |

[ASK IF ANY ITEM IN Q49 WAS SELECTED]

Q51. On a scale of 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential", how much influence did the Duke Energy schools program have on your decision to...

[MATRIX QUESTION: SCALE]



| [LOGIC] Item   | Response                   |
|--|----------------------------|
| [IF Q49.1 IS SELECTED] 1. Buy energy efficient appliances            | 0-10 scale with DK and REF |
| [IF Q49.2 IS SELECTED] 2. Move into an ENERGY STAR home              | 0-10 scale with DK and REF |
| [IF Q49.3 IS SELECTED] 3. Buy efficient heating or cooling equipment | 0-10 scale with DK and REF |
| [IF Q49.4 IS SELECTED] 4. Buy efficient windows                      | 0-10 scale with DK and REF |
| [IF Q49.5 IS SELECTED] 5. Buy additional insulation                  | 0-10 scale with DK and REF |
| [IF Q49.6 IS SELECTED] 6. Seal air leaks                             | 0-10 scale with DK and REF |
| [IF Q49.7 IS SELECTED] 7. Seal ducts                                 | 0-10 scale with DK and REF |
| [IF Q49.8 IS SELECTED] 8. Buy LEDs                                   | 0-10 scale with DK and REF |
| [IF Q49.9 IS SELECTED] 9. Buy CFLs                                   | 0-10 scale with DK and REF |
| [IF Q49.10 IS SELECTED] 10. Install an energy efficient water heater | 0-10 scale with DK and REF |
| [IF Q49.96 IS SELECTED] [Q49 open ended response]                    | 0-10 scale with DK and REF |

[ASK IF Q49.1 IS SELECTED AND Q51.1 <> 0]

Q52. What kinds of appliance(s) did you buy?

[Do not read list] [MULTIPLE RESPONSE]

1. Refrigerator
2. Stand-alone Freezer
3. Dishwasher
4. Clothes washer
5. Clothes dryer
6. Oven
7. Microwave
96. Other, please specify: \_\_\_\_\_
98. Don't know
99. Refused

[ASK IF Q52 = 1-96]

Q53. Was the [INSERT Q52 RESPONSE] an ENERGY STAR or high-efficiency model?

[SINGLE RESPONSE]

1. Yes
2. No
98. Don't know
99. Refused

[REPEAT THIS QUESTION FOR EACH ITEM MENTIONED IN Q52]

[ASK IF Q52 = 5]

Q54. Does the new clothes dryer use natural gas?

1. Yes - it uses natural gas
2. No – does not use natural gas
98. Don't know
99. Refused

[ASK IF Q49.3 IS SELECTED AND Q51.3 > 0]

Q55. What type of heating or cooling equipment did you buy?

[Do not read list] [MULTIPLE RESPONSE]

1. Central air conditioner
2. Window/room air conditioner unit
3. Wall air conditioner unit
4. Air source heat pump
5. Geothermal heat pump
6. Boiler
7. Furnace
8. Wifi-enabled thermostat
96. Other, please specify: \_\_\_\_\_
98. Don't know
99. Refused

[ASK IF Q55= 6-7]

Q56. Does the new [INSERT Q55 RESPONSE] use natural gas?

1. Yes - it uses natural gas
2. No – does not use natural gas
98. Don't know
99. Refused

[ASK IF Q55= 1-7, 96]

Q57. Was the [INSERT Q55 RESPONSE] an ENERGY STAR or high-efficiency model?

[SINGLE RESPONSE]

1. Yes
2. No
98. Don't know
99. Refused

[REPEAT THIS QUESTION FOR EACH ITEM MENTIONED IN Q55, EXCLUDING wifi-enabled thermostat]

[ASK IF Q49.4 IS SELECTED AND Q51.4 > 0]

Q58. How many windows did you install?

1. [RECORD VERBATIM \_\_\_\_\_]
98. Don't know

99. Refused

[ASK IF Q49.5 IS SELECTED AND Q51.5 > 0]

Q59. Did you add insulation to your attic, walls, or below the floor?

[Do not read list] [MULTIPLE RESPONSE]

- 1. Attic
- 2. Walls
- 3. Below the floor
- 98. Don't know
- 99. Refused

[ASK IF Q59<>98-99]

[PROGRAMMER: REPEAT Q60 FOR EACH ITEM MENTIONED IN Q59]

Q60. Approximately what proportion of the [ITEM MENTIONED IN Q59] space did you add insulation?

- 1. [RECORD VERBATIM AS % - INPUT MID-POINT IF RANGE IS OFFERED:]  
\_\_\_\_\_ [IF NEEDED: *Your best estimate is fine*]
- 2. Don't know
- 99. Refused

[ASK IF Q49.8 IS SELECTED AND Q51.8 > 0]

Q61. How many of LEDs did you install in your property?

- 1. [RECORD VERBATIM:] \_\_\_\_\_ [IF NEEDED: *Your best estimate is fine*]
- 2. Don't know
- 99. Refused

[ASK IF Q49.9 IS SELECTED AND Q51.9 > 0]

Q62. How many of CFLs did you install in your property?

- 1. [RECORD VERBATIM:] \_\_\_\_\_ [IF NEEDED: *Your best estimate is fine*]
- 2. Don't know
- 99. Refused

[ASK IF Q49.10 IS SELECTED AND Q51.10 > 0]

Q63. Does the new water heater use natural gas?

- 1. Yes - it uses natural gas
- 2. No – does not use natural gas
- 98. Don't know
- 99. Refused

[ASK IF Q49.10 IS SELECTED AND Q51.10 > 0]

Q64. Which of the following water heaters did you purchase?

- 1. A traditional water heater with a large tank that holds the hot water

- 2. A tankless water heater that provides hot water on demand
- 3. A solar water heater
- 4. Other, please specify: \_\_\_\_\_
- 98. Don't know
- 99. Refused

[ASK IF Q49.10 IS SELECTED AND Q51.10 > 0]

Q65. Is the new water heater an ENERGY STAR model?

[SINGLE RESPONSE]

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

### Demographics

Lastly, we have some basic demographic questions for you. Please be assured that your responses are confidential and are for statistical purposes only.

Q66. Which of the following types of housing units would you say best describes your home?  
It is . . . ?

- 1. Single-family detached house
- 2. Single-family attached home (such as a townhouse or condo)
- 3. Duplex, triplex or four-plex
- 4. Apartment or condominium with 5 units or more
- 5. Manufactured or mobile home
- 6. Other \_\_\_\_\_
- 98. Don't know
- 99. Refused

Q67. How many square feet of living space are there in your residence, including bathrooms, foyers and hallways (exclude garages, unfinished basements, and unheated porches)?

- 1. Less than 500 square feet
- 2. 500 to under 1,000 square feet
- 3. 1,000 to under 1,500 square feet
- 4. 1,500 to under 2,000 square feet
- 5. 2,000 to under 2,500 square feet
- 6. 2,500 to under 3,000 square feet
- 7. Greater than 3,000 square feet
- 98. Don't know
- 99. Refused

Q68. Do you or members of your household own your home, or do you rent it?

- 1. Own / buying
- 2. Rent / lease



- 3. Occupy rent-free
- 98. Don't know
- 99. Refused

Q69. Including yourself, how many people currently live in your home year-round?

- 1. I live by myself
- 2. Two people
- 3. Three people
- 4. Four people
- 5. Five people
- 6. Six people
- 7. Seven people
- 8. Eight or more people
- 98. Don't know
- 99. Refused

Q70. What was your total annual household income for 2017, before taxes?

- 1. Under \$20,000
- 2. 20 to under \$30,000
- 3. 30 to under \$40,000
- 4. 40 to under \$50,000
- 5. 50 to under \$60,000
- 6. 60 to under \$75,000
- 7. 75 to under \$100,000
- 8. 100 to under \$150,000
- 9. 150 to under \$200,000
- 10. \$200,000 or more
- 98. Don't know
- 99. Prefer not to say

Q71. What is the highest level of education achieved among those living in your household?

- 1. Less than high school
- 2. Some high school
- 3. High school graduate or equivalent (such as GED)
- 4. Trade or technical school
- 5. Some college (including Associate degree)
- 6. College degree (Bachelor's degree)
- 7. Some graduate school
- 8. Graduate degree, professional degree
- 9. Doctorate
- 98. Don't know
- 99. Prefer not to say



## Appendix G Survey Results

### G.1 Teacher Survey - DEP

Q1. What grade(s) of students do you teach?

| Response Option | Count | Percent (n=29) |
|-----------------|-------|----------------|
| Pre-K           | 0     | 0%             |
| Kindergarten    | 4     | 14%            |
| Grade 1         | 1     | 3%             |
| Grade 2         | 3     | 10%            |
| Grade 3         | 3     | 10%            |
| Grade 4         | 6     | 21%            |
| Grade 5         | 4     | 14%            |
| Grade 6         | 5     | 17%            |
| Grade 7         | 3     | 10%            |
| Grade 8         | 8     | 28%            |
| Grades 9 - 12   | 1     | 3%             |

Q2. Are you a home room teacher?

| Response Option | Count | Percent (n=29) |
|-----------------|-------|----------------|
| Yes             | 19    | 66%            |
| No              | 10    | 34%            |

Q3. What subjects do you teach?

| Response Option                        | Count (n=10) |
|--|--------------|
| Math                                   | 2            |
| Natural sciences                       | 4            |
| English/language arts                  | 2            |
| Social studies/social sciences/history | 5            |
| Music                                  | 0            |
| Art                                    | 0            |
| Physical education                     | 0            |
| Other                                  | 0            |

- Q4. Do you teach any topics on energy (electricity, gas, coal, etc.) generation, transformation, use, or conservation (including, but not limited to, topics/materials provided by the Energy Efficiency for Schools program)?

| Response Option | Count | Percent (n=29) |
|-----------------|-------|----------------|
| Yes             | 24    | 83%            |
| No              | 5     | 17%            |

- Q5. Did you see The National Theatre for Children performance for elementary school students called *Kilowatt Kitchen* on [PERFORMANCE\_DATE]?

| Response Option | Count | Percent (n=29) |
|-----------------|-------|----------------|
| Yes             | 19    | 66%            |
| No              | 10    | 34%            |

- Q6. Did you see the National Theatre for Children performance for middle school students called *The E-Team* on [PERFORMANCE\_DATE]?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 10    | 34%            |
| No              | 19    | 66%            |

- Q7. Before today, were you aware that Duke Energy sponsored the National Theatre for Children performance(s) in your school?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 23    | 79%            |
| No              | 6     | 21%            |
| Don't know      | 0     | 0%             |

- Q8. How did you learn of Duke Energy's involvement with the National Theatre for Children program?

| Response Option                             | Count | Percent (n=23) |
|---|-------|----------------|
| Another teacher                             | 7     | 30%            |
| Duke Energy marketing materials             | 8     | 35%            |
| Duke Energy staff                           | 1     | 4%             |
| The National Theatre for Children staff     | 8     | 35%            |
| The National Theatre for Children materials | 7     | 30%            |
| Other                                       | 0     | 0%             |

## APPENDIX G

## SURVEY RESULTS

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|            |   |    |
|------------|---|----|
| Don't know | 0 | 0% |
|------------|---|----|

- Q9. Thinking about how the school performance explained the energy-related concepts, would you say that, on the whole, the explanation was:

| Response Option                                 | Count | Percent (n=29) |
|---|-------|----------------|
| Far too advanced for most of your students      | 0     | 0%             |
| Somewhat too advanced for most of your students | 2     | 7%             |
| About right for most of your students           | 27    | 93%            |
| Somewhat too basic for most of your students    | 0     | 0%             |
| Far too basic for most of your students         | 0     | 0%             |
| Other   | 0     | 0%             |
| Don't know                                      | 0     | 0%             |

- Q10. What about the performance was too advanced for most of your students?

| Response Option  | Count (n=2) |
|--|-------------|
| Pre-k through second grade attends the performance and some of the vocabulary is over their head and not explained thoroughly or is done too quickly | 1           |
| Some of the concepts about energy the students may not have understood.  | 1           |

- Q11. Were there any concepts that the performance(s) did not cover that *should have been* covered?

| Response Option | Count | Percent (n=29) |
|-----------------|-------|----------------|
| Yes             | 1     | 3%             |
| No              | 26    | 90%            |
| Don't know      | 2     | 7%             |

- Q12. What concepts were not covered that *should have been* covered?

| Response Option   | Count (n=1) |
|---|-------------|
| Advantages/disadvantages of renewable and nonrenewable resources. | 1           |

- Q13. Please rate your overall satisfaction with the National Theatre for Children performance on the following scale.

| Response Option          | Count | Percent (n=29) |
|--------------------------|-------|----------------|
| 1 - Not at all satisfied | 0     | 0%             |

## APPENDIX G

## SURVEY RESULTS

|                          |    |     |
|--------------------------|----|-----|
| 2                        | 0  | 0%  |
| 3                        | 0  | 0%  |
| 4                        | 4  | 14% |
| 5 - Completely satisfied | 25 | 86% |
| Don't know               | 0  | 0%  |

- Q14. Did you receive curriculum or instructional materials, such as student workbooks, related to energy and energy conservation from National Theatre for Children in the 2017-2018 school year?

| Response Option | Count | Percent (n=29) |
|-----------------|-------|----------------|
| Yes             | 12    | 41%            |
| No              | 11    | 38%            |
| Don't know      | 6     | 21%            |

- Q15. To what degree did you use the curriculum or instructional materials in teaching your students about energy?

| Response Option | Count | Percent (n=12) |
|-----------------|-------|----------------|
| Not at all      | 2     | 17%            |
| A little        | 2     | 17%            |
| Moderately      | 4     | 33%            |
| A lot           | 4     | 33%            |
| Extensively     | 0     | 0%             |
| Not at all      | 0     | 0%             |
| Don't know      | 2     | 0%             |

- Q15a. Why did you only use the workbooks “a little” in teaching your students about energy?

| Response Option  | Count (n=2) |
|--|-------------|
| This is not part of our curriculum so we could only touch on it.   | 1           |
| We only received one workbook, but a ton of materials telling the kids about the kit. If I had enough workbooks for my entire class I would have definitely used them. We study electricity and magnetism in 4th grade and it would be a great addition to the curriculum. | 1           |

Q15b. Did you incorporate the National Theatre for Children's online component into your curriculum in the 2015-2016 school year? This is the official website that accompanies the performance and classroom curriculum; it has interactive games that reinforce the concepts taught in the performance and printed curriculum.

| Response Option | Count | Percent (n=10) |
|-----------------|-------|----------------|
| Yes             | 4     | 40%            |
| No              | 6     | 60%            |

Q16. Thinking about how the student workbooks explained energy-related concepts, would you say that the material was generally:

| Response Option                                 | Count | Percent (n=10) |
|---|-------|----------------|
| Far too advanced for most of your students      | 0     | 0%             |
| Somewhat too advanced for most of your students | 2     | 20%            |
| About right for most of your students           | 7     | 70%            |
| Somewhat too basic for most of your students    | 0     | 0%             |
| Far too basic for most of your students         | 0     | 0%             |
| Other   | 0     | 0%             |
| Don't know                                      | 1     | 10%            |
| I'd rather not say                              | 0     | 0%             |

Q17. Please rate how useful the materials were to you in teaching your students about energy.

| Response Option       | Count | Percent (n=10) |
|-----------------------|-------|----------------|
| 1 - Not at all useful | 0     | 0%             |
| 2                     | 0     | 0%             |
| 3                     | 2     | 20%            |
| 4                     | 5     | 50%            |
| 5 - Extremely useful  | 3     | 30%            |
| Don't know            | 0     | 0%             |

Q17a. Please rate the degree to which the topics in the workbook aligned with your state's science standards for the grade(s) you teach.

| Response Option    | Count | Percent (n=10) |
|--------------------|-------|----------------|
| Completely aligned | 1     | 10%            |
| Mostly aligned     | 6     | 60%            |
| Somewhat aligned   | 1     | 10%            |
| Not aligned at all | 0     | 0%             |
| Don't know         | 2     | 20%            |

Q18. Were there any concepts covered in the curriculum or instructional materials that your students had particular challenges with?

| Response Option | Count | Percent (n=10) |
|-----------------|-------|----------------|
| No              | 10    | 100%           |

Q20. Were there any concepts that the materials did not cover that *should have been* covered?

| Response Option | Count | Percent (n=10) |
|-----------------|-------|----------------|
| Yes             | 0     | 0%             |
| No              | 9     | 90%            |
| Don't know      | 1     | 10%            |

Q22. Please rate your overall satisfaction with curriculum or instructional materials you received from the National Theatre for Children program using the following scale.

| Response Option          | Count | Percent (n=9) |
|--------------------------|-------|---------------|
| 1 - Not at all satisfied | 0     | 0%            |
| 2                        | 0     | 0%            |
| 3                        | 2     | 20%           |
| 4                        | 3     | 30%           |
| 5 - Completely satisfied | 5     | 50%           |
| Don't know               | 0     | 0%            |

Q23. Why did you *not* use the curriculum or instructional materials in teaching your students about energy?

| Response Option  | Count (n=2) |
|--|-------------|
| I just don't have the time in the day and I'm a Science Teacher.<br>If the materials aren't related to a standard, I don't teach it. | 1           |
| Not enough time to add in on top of our own curriculum materials   | 1           |



## APPENDIX G

## SURVEY RESULTS

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|                  |   |
|------------------|---|
| Too low a level. | 1 |
|------------------|---|

Q24. Did you have any interactions with anyone from the National Theatre for Children regarding the curriculum or instructional materials?

| Response Option | Count | Percent (n=29) |
|-----------------|-------|----------------|
| Yes             | 3     | 10%            |
| No              | 21    | 72%            |
| Don't know      | 5     | 17%            |

Q25. What did those interactions address?

| Response Option | Count |
|-----------------|-------|
| Not applicable  | 0     |

Q26. Using the scale provided, how satisfied were you with:

| Response Option          | Count | Percent (n=9) |
|--------------------------|-------|---------------|
| 1 - Not at all satisfied | 0     | 0%            |
| 2                        | 0     | 0%            |
| 3                        | 0     | 0%            |
| 4                        | 0     | 0%            |
| 5 - Completely satisfied | 3     | 100%          |
| Don't know               | 0     | 0%            |

Q27. Did you distribute the kit request materials to either your students or directly to their parents?

| Response Option | Count | Percent (n=19) |
|-----------------|-------|----------------|
| Yes             | 28    | 97%            |
| No              | 1     | 3%             |
| Don't know      | 0     | 0%             |

Q28. Were there any other ways in which you personally promoted the kits to your students and their families? If so, what were they?

| Response Option   | Count | Percent (n=29) |
|---|-------|----------------|
| MyEnergyKit.org poster  | 13    | 45%            |
| Vocally encouraged students to sign up for a kit                        | 24    | 83%            |
| Used my classroom web portal to encourage families to sign up for a kit | 3     | 10%            |
| Emailed parents to encourage them to sign up for a kit                  | 11    | 38%            |

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## SURVEY RESULTS

|   |   |     |
|---|---|-----|
| Spoke with parents in person to encourage them to sign up for a kit | 5 | 17% |
| Other   | 2 | 7%  |
| No other actions taken  | 0 | 0%  |
| Don't recall  | 2 | 7%  |

Q29. Did you follow up with students or parents later to find out if their household requested a kit?

| Response Option | Count | Percent (n=29) |
|-----------------|-------|----------------|
| Yes             | 15    | 52%            |
| No              | 13    | 45%            |
| Don't know      | 1     | 3%             |

Q30. In your best estimate, what percentage of your student households ordered the Duke Energy kit?

| Response Option | Count | Percent (n=15) |
|-----------------|-------|----------------|
| 0% to 10%       | 3     | 20%            |
| 11% to 20%      | 2     | 13%            |
| 21% to 30%      | 2     | 13%            |
| 31% to 40%      | 3     | 20%            |
| 41% to 50%      | 1     | 7%             |
| 51% to 60%      | 1     | 7%             |
| 61% to 70%      | 0     | 0%             |
| 71% to 80%      | 0     | 0%             |
| 81% to 90%      | 1     | 7%             |
| 91% to 100%     | 1     | 7%             |

Q32. What suggestions do you have to improve the National Theatre for Children performance(s)?

| Response Option   | Count (n=29) |
|---|--------------|
| Is it possible for the performers to have a mic? It is very difficult to hear in the back even though the actors project their voice.   | 1            |
| Share info about kits before coming to school and performing.   | 1            |
| The performers were a little late (coming from a distant school), and the limited time they had forced them to either skip or rush through certain portions - pace was very quick. With more time devoted, the material would be better reinforced. | 1            |

| Response Option | Count (n=29) |
|-----------------|--------------|
| None            | 26           |

Q33. What suggestions do you have to improve the classroom materials received from the National Theatre for Children?

| Response Option   | Count |
|---|-------|
| I teach 5th grade, but we are at a Middle school so if materials for elementary are available, it might be more appropriate | 1     |
| Provide standards to go along with instructional materials.   | 1     |
| We were sent way too many.  | 1     |
| None  | 26    |

Q34. In addition to this survey, we will be conducting 15-minute-long telephone interviews with five teachers, where we will ask them additional questions about their experience with the National Theatre for Children program. Interview participants will be compensated for their time. If selected, would you be willing to participate in a follow-up telephone interview about your experience with the program?

| Response Option                        | Count | Percent (n=29) |
|--|-------|----------------|
| Yes, I am willing to be interviewed    | 14    | 48%            |
| No, I am not willing to be interviewed | 15    | 52%            |

**G.2 Teacher Survey - DEC**

Q1. What grade(s) of students do you teach?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Pre-K           | 0     | 0%             |
| Kindergarten    | 10    | 23%            |
| Grade 1         | 6     | 14%            |
| Grade 2         | 8     | 18%            |
| Grade 3         | 3     | 7%             |
| Grade 4         | 5     | 11%            |
| Grade 5         | 10    | 23%            |
| Grade 6         | 8     | 18%            |
| Grade 7         | 4     | 9%             |
| Grade 8         | 1     | 2%             |
| Grades 9 - 12   | 1     | 2%             |

Q2. Are you a home room teacher?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 33    | 75%            |
| No              | 11    | 25%            |

Q3. What subjects do you teach?

| Response Option                        | Count (n=11) |
|--|--------------|
| Math                                   | 5            |
| Natural sciences                       | 6            |
| English/language arts                  | 1            |
| Social studies/social sciences/history | 3            |
| Music                                  | 0            |
| Art                                    | 0            |
| Physical education                     | 0            |
| Other                                  | 2            |

- Q4. Do you teach any topics on energy (electricity, gas, coal, etc.) generation, transformation, use, or conservation (including, but not limited to, topics/materials provided by the Energy Efficiency for Schools program)?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 35    | 80%            |
| No              | 9     | 20%            |

- Q5. Did you see The National Theatre for Children performance for elementary school students called *Kilowatt Kitchen* on [PERFORMANCE\_DATE]?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 34    | 77%            |
| No              | 10    | 23%            |

- Q6. Did you see the National Theatre for Children performance for middle school students called *The E-Team* on [PERFORMANCE\_DATE]?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 10    | 23%            |
| No              | 34    | 77%            |

- Q7. Before today, were you aware that Duke Energy sponsored the National Theatre for Children performance(s) in your school?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 37    | 84%            |
| No              | 7     | 16%            |
| Don't know      | 0     | 0%             |

- Q8. How did you learn of Duke Energy's involvement with the National Theatre for Children program?

| Response Option                             | Count | Percent (n=37) |
|---|-------|----------------|
| Another teacher                             | 14    | 38%            |
| Duke Energy marketing materials             | 6     | 16%            |
| Duke Energy staff                           | 1     | 3%             |
| The National Theatre for Children staff     | 12    | 32%            |
| The National Theatre for Children materials | 6     | 16%            |
| Other                                       | 0     | 0%             |

## APPENDIX G

## SURVEY RESULTS

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|            |   |     |
|------------|---|-----|
| Don't know | 5 | 14% |
|------------|---|-----|

- Q9. Thinking about how the school performance explained the energy-related concepts, would you say that, on the whole, the explanation was:

| Response Option                                 | Count | Percent (n=44) |
|---|-------|----------------|
| Far too advanced for most of your students      | 0     | 0%             |
| Somewhat too advanced for most of your students | 3     | 7%             |
| About right for most of your students           | 40    | 91%            |
| Somewhat too basic for most of your students    | 1     | 2%             |
| Far too basic for most of your students         | 0     | 0%             |
| Other   | 0     | 0%             |
| Don't know                                      | 0     | 0%             |

- Q10. What about the performance was too advanced for most of your students?

| Response Option   | Count (n=3) |
|---|-------------|
| First grade standards are limited to recycling and natural resources.   | 1           |
| Some of the vocabulary and jokes were above their heads, but it's first grade so I expect that to happen.   | 1           |
| The performance was great. However, I teach very low level special needs students, so the fast pace and large group they were in made things over their heads. I know it would be time consuming, but a program a little slower paced with special needs children in mind would be amazing. | 1           |

- Q11. Were there any concepts that the performance(s) did not cover that *should have been* covered?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 2     | 5%             |
| No              | 35    | 80%            |
| Don't know      | 7     | 16%            |

- Q12. What concepts were not covered that *should have been* covered?

| Response Option   | Count (n=2) |
|-------------------|-------------|
| All were covered  | 1           |
| Natural resources | 1           |

- Q13. Please rate your overall satisfaction with the National Theatre for Children performance on the following scale.

| Response Option          | Count | Percent (n=44) |
|--------------------------|-------|----------------|
| 1 - Not at all satisfied | 0     | 0%             |
| 2                        | 0     | 0%             |
| 3                        | 2     | 5%             |
| 4                        | 3     | 7%             |
| 5 - Completely satisfied | 39    | 89%            |
| Don't know               | 0     | 0%             |

Q14. Did you receive curriculum or instructional materials, such as student workbooks, related to energy and energy conservation from National Theatre for Children in the 2017-2018 school year?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 29    | 66%            |
| No              | 11    | 25%            |
| Don't know      | 4     | 9%             |

Q15. To what degree did you use the curriculum or instructional materials in teaching your students about energy?

| Response Option | Count | Percent (n=12) |
|-----------------|-------|----------------|
| Not at all      | 3     | 10%            |
| A little        | 8     | 28%            |
| Moderately      | 12    | 41%            |
| A lot           | 4     | 14%            |
| Extensively     | 2     | 7%             |
| Not at all      | 0     | 0%             |
| Don't know      | 3     | 10%            |

Q15a. Why did you only use the workbooks “a little” in teaching your students about energy?

| Response Option   | Count (n=8) |
|---|-------------|
| It is difficult for them to use due to lack of reading skills   | 1           |
| Limited class time. Plus some of it repeated the curriculum we had already covered  | 1           |
| The information in the workbooks was a bit above the kindergarten grade level. I used the books as a review and allowed students to take them home to do with the help of a parent.   | 1           |
| The only available date for our area was in February but we covered the material in October. Our school has been impressed by the performances and was willing to wait until February to see it this year. The performance also provided our students with a review of our lesson | 1           |
| They were a little too elementary for my 6th graders.   | 1           |

APPENDIX G

SURVEY RESULTS

|   |   |
|---|---|
| Time factor   | 1 |
| Timing was off  | 1 |
| We cover those subjects in the Spring so at the time of the program performance<br>I did not use the resources very much. | 1 |

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Q15b. Did you incorporate the National Theatre for Children's online component into your curriculum in the 2015-2016 school year? This is the official website that accompanies the performance and classroom curriculum; it has interactive games that reinforce the concepts taught in the performance and printed curriculum.

| Response Option | Count | Percent (n=26) |
|-----------------|-------|----------------|
| Yes             | 11    | 42%            |
| No              | 18    | 58%            |

Q16. Thinking about how the student workbooks explained energy-related concepts, would you say that the material was generally:

| Response Option                                 | Count | Percent (n=26) |
|---|-------|----------------|
| Far too advanced for most of your students      | 1     | 4%             |
| Somewhat too advanced for most of your students | 5     | 19%            |
| About right for most of your students           | 18    | 69%            |
| Somewhat too basic for most of your students    | 1     | 4%             |
| Far too basic for most of your students         | 1     | 4%             |
| Other   | 0     | 0%             |
| Don't know                                      | 0     | 0%             |
| I'd rather not say                              | 0     | 0%             |

Q17. Please rate how useful the materials were to you in teaching your students about energy.

| Response Option       | Count | Percent (n=10) |
|-----------------------|-------|----------------|
| 1 - Not at all useful | 0     | 0%             |
| 2                     | 0     | 0%             |
| 3                     | 6     | 23%            |
| 4                     | 11    | 42%            |
| 5 - Extremely useful  | 9     | 35%            |
| Don't know            | 0     | 0%             |

Q17a. Please rate the degree to which the topics in the workbook aligned with your state's science standards for the grade(s) you teach.

| Response Option    | Count | Percent (n=26) |
|--------------------|-------|----------------|
| Completely aligned | 5     | 19%            |
| Mostly aligned     | 9     | 35%            |
| Somewhat aligned   | 7     | 27%            |
| Not aligned at all | 1     | 4%             |
| Don't know         | 4     | 15%            |

Q18. Were there any concepts covered in the curriculum or instructional materials that your students had particular challenges with?

| Response Option | Count | Percent (n=10) |
|-----------------|-------|----------------|
| Yes             | 2     | 8%             |
| NO              | 20    | 77%            |
| Don't know      | 4     | 15%            |

Q19. What concepts did your students have particular trouble with?

| Response Option  | Count (n=2) |
|--|-------------|
| Speed of presentation  | 1           |
| The concept of saving energy because it is not a physical thing that they can hold or truly see, they sometimes have a hard time with abstract concepts. | 1           |

Q20. Were there any concepts that the materials did not cover that *should have been* covered?

| Response Option | Count | Percent (n=10) |
|-----------------|-------|----------------|
| Yes             | 1     | 4%             |
| No              | 19    | 73%            |
| Don't know      | 6     | 23%            |

Q21. What concepts were not covered that should have been covered?

| Response Option  | Count (n=2) |
|--|-------------|
| If there could be more information on how energy travels that would be great!<br>There's a lot in our curriculum about energy waves. | 1           |

Q22. Please rate your overall satisfaction with curriculum or instructional materials you received from the National Theatre for Children program using the following scale.

| Response Option          | Count | Percent (n=26) |
|--------------------------|-------|----------------|
| 1 - Not at all satisfied | 0     | 0%             |
| 2                        | 0     | 0%             |
| 3                        | 2     | 8%             |
| 4                        | 9     | 35%            |
| 5 - Completely satisfied | 15    | 58%            |
| Don't know               | 0     | 0%             |

Q23. Why did you *not* use the curriculum or instructional materials in teaching your students about energy?

| Response Option  | Count (n=3) |
|--|-------------|
| I have other state tested material that takes priority in math | 1           |
| No time  | 1           |
| We did not receive the materials until the last minute.        | 1           |

Q24. Did you have any interactions with anyone from the National Theatre for Children regarding the curriculum or instructional materials?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 6     | 14%            |
| No              | 35    | 80%            |
| Don't know      | 3     | 7%             |

Q25. What did those interactions address?

| Response Option | Count |
|-----------------|-------|
| Not applicable  | 0     |

Q26. Using the scale provided, how satisfied were you with:

| Response Option          | Count | Percent (n=0) |
|--------------------------|-------|---------------|
| 1 - Not at all satisfied | 0     | 0%            |
| 2                        | 0     | 0%            |
| 3                        | 0     | 0%            |
| 4                        | 0     | 0%            |
| 5 - Completely satisfied | 0     | 0%            |
| Don't know               | 0     | 0%            |

Q27. Did you distribute the kit request materials to either your students or directly to their parents?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 42    | 95%            |
| No              | 1     | 2%             |
| Don't know      | 1     | 2%             |

Q28. Were there any other ways in which you personally promoted the kits to your students and their families? If so, what were they?

| Response Option   | Count | Percent (n=44) |
|---|-------|----------------|
| MyEnergyKit.org poster  | 17    | 39%            |
| Vocally encouraged students to sign up for a kit                        | 40    | 91%            |
| Used my classroom web portal to encourage families to sign up for a kit | 12    | 27%            |
| Emailed parents to encourage them to sign up for a kit                  | 18    | 41%            |
| Spoke with parents in person to encourage them to sign up for a kit     | 8     | 18%            |
| Other   | 0     | 0%             |
| No other actions taken  | 1     | 2%             |
| Don't recall  | 0     | 0%             |

Q29. Did you follow up with students or parents later to find out if their household requested a kit?

| Response Option | Count | Percent (n=44) |
|-----------------|-------|----------------|
| Yes             | 15    | 34%            |
| No              | 29    | 66%            |
| Don't know      | 0     | 0%             |

Q30. In your best estimate, what percentage of your student households ordered the Duke Energy kit?

| Response Option | Count | Percent (n=15) |
|-----------------|-------|----------------|
| 0% to 10%       | 5     | 33%            |
| 11% to 20%      | 3     | 20%            |
| 21% to 30%      | 3     | 20%            |
| 31% to 40%      | 0     | 0%             |
| 41% to 50%      | 1     | 7%             |
| 51% to 60%      | 1     | 7%             |

## APPENDIX G

## SURVEY RESULTS

|             |   |    |
|-------------|---|----|
| 61% to 70%  | 1 | 7% |
| 71% to 80%  | 0 | 0% |
| 81% to 90%  | 0 | 0% |
| 91% to 100% | 0 | 0% |
| Don't know  | 1 | 7% |

Q32. What suggestions do you have to improve the National Theatre for Children performance(s)?

| Response Option  | Count (n=44) |
|--|--------------|
| Fewer students per presentation. Pre/Post Test   | 1            |
| For the performance to be at a slower pace   | 1            |
| Get the students more involved in the performance.   | 1            |
| Have performers speak slowly. Many of our English Language Learners couldn't understand them because they were talking so fast.  | 1            |
| Hearing them was an issue. Not sure if it were because of them or the equipment.   | 1            |
| It may be that another teacher was provided the information prior to the performance, but I felt a bit uninformed regarding what topics the performance was about. Also, really wish I had been given the workbooks/comics (whatever materials I was supposed to be able to give to students). | 1            |
| Just what I stated earlier. Have a program geared toward special needs students, providing the same information, just in a format more suitable to them, because the program was great!  | 1            |
| More at-home materials to show parents what students learned   | 1            |
| None   | 36           |

Q33. What suggestions do you have to improve the classroom materials received from the National Theatre for Children?

| Response Option  | Count (n=44) |
|--|--------------|
| Change the content a little more from year to year so that the kids aren't bored of the items.   | 1            |
| Include more worksheet activities on 6th grade level for independent work time.  | 1            |
| Make them more related to the NC Standards by grade level. Or, we could simply have the science teacher responsible for it.  | 1            |
| Maybe get the kids more involved with the show more.   | 1            |
| Sometimes, we use the program as an introduction to our Energy Unit, other years we have used it as a culminating activity. We use it as an introduction, it would be nice to see it prior to the program and before our teaching begins, so we can plan more efficiently. | 1            |
| You could likely save paper by using online only materials.  | 1            |

| Response Option | Count (n=44) |
|-----------------|--------------|
| None            | 38           |

- Q34. In addition to this survey, we will be conducting 15-minute-long telephone interviews with five teachers, where we will ask them additional questions about their experience with the National Theatre for Children program. Interview participants will be compensated for their time. If selected, would you be willing to participate in a follow-up telephone interview about your experience with the program?

| Response Option                        | Count | Percent (n=44) |
|--|-------|----------------|
| Yes, I am willing to be interviewed    | 25    | 57%            |
| No, I am not willing to be interviewed | 19    | 43%            |



**G.3 Student Parent Survey - DEP**

Q2. Before today, did you know the kit you received was sponsored by Duke Energy?

| Response Option | Count | Percent (n=172) |
|-----------------|-------|-----------------|
| Yes             | 151   | 88%             |
| No              | 21    | 12%             |
| Don't know      | 0     | 0%              |

Q3. How did you learn that the kit was sponsored by Duke Energy? [Select all that apply]

| Response Option                             | Count | Percent (n=151) |
|---|-------|-----------------|
| Classroom materials brought home by child   | 86    | 57%             |
| My child's teacher/school                   | 46    | 30%             |
| Information material included in/on the kit | 40    | 26%             |
| Other                                       | 18    | 12%             |
| Don't know                                  | 3     | 2%              |

Q3. Other...

| Response Option  | Count |
|--|-------|
| Bill   | 1     |
| By information we received before we received the kit                              | 1     |
| Email from School  | 1     |
| Granddaughter is a student at the school.  | 1     |
| Grandson brought home brochure from school   | 1     |
| Grandson told me about the program   | 1     |
| Mail   | 1     |
| Mail flyer   | 1     |
| My child spoke about it  | 1     |
| Received packages from Duke  | 1     |
| Saw it on a paper my grandson got  | 1     |
| Someone called me to verify that I received it                                     | 1     |
| The school sent paperwork home with my kids containing material about the program. | 1     |
| We had an in-home energy efficiency rep come to our house.                         | 1     |
| Wife is active in the PTA  | 1     |
| Word of mouth from daughter (School secretary)                                     | 1     |
| Word of mouth from family  | 1     |
| Written on box and a paper brought home with it                                    | 1     |



Q3a. How did you hear about the opportunity to receive the kit from Duke Energy? [Select all that apply]

| Response Option                                 | Count | Percent (n=172) |
|---|-------|-----------------|
| Classroom materials brought home by child       | 118   | 69%             |
| School newsletter                               | 19    | 11%             |
| Email from my child's teacher/school            | 23    | 13%             |
| School website or school web portal             | 10    | 6%              |
| In-person conversations with my child's teacher | 9     | 5%              |
| Saw a poster at my child's school               | 5     | 3%              |
| After hours event at my child's school          | 1     | 1%              |
| Other (please specify in the box below)         | 31    | 18%             |
| Don't know                                      | 7     | 4%              |

Q3a. Other...

| Response Option   | Count |
|---|-------|
| Ad on Facebook  | 1     |
| Bill  | 1     |
| Daughter mentioned it   | 3     |
| Daughter works for the school   | 1     |
| Duke Energy had sent me a post card in the mail that explained all about the kit. | 1     |
| Duke site   | 3     |
| Email also  | 1     |
| Flyer came in mail  | 1     |
| Form from school  | 1     |
| From my daughter's school, they sent it in their packet                           | 1     |
| From the school   | 1     |
| From the school, a brochure   | 1     |
| I received a phone call   | 1     |
| It just came  | 1     |
| Kids told me  | 1     |
| Mail flyer  | 1     |
| My child spoke about it   | 1     |
| Paper sent home with child  | 1     |
| Provided by grandchild  | 1     |
| PTA meeting at the school   | 1     |

| Response Option                  | Count |
|----------------------------------|-------|
| Relatives who work at the school | 1     |
| School                           | 2     |
| School Facebook Page.            | 1     |
| Southern Academy Promoted it     | 1     |
| The principle informed her       | 1     |
| The school PTA                   | 1     |
| Wife works for PTA               | 1     |
| Word of mouth                    | 1     |
| Word of mouth from daughter      | 2     |

Q4. Did you read the information about how to save energy in the booklet that came in the kit?

| Response Option | Count | Percent (n=172) |
|-----------------|-------|-----------------|
| Yes             | 128   | 74%             |
| No              | 31    | 18%             |
| Don't know      | 13    | 8%              |

Q5. On a scale from 0 to 10 where 0 is not at all helpful and 10 is very helpful, how helpful was the information in the kit in identifying ways your household could save energy at home?

| Response Option   | Count | Percent (n=128) |
|-------------------|-------|-----------------|
| 0                 | 0     | 0%              |
| 1                 | 0     | 0%              |
| 2                 | 0     | 0%              |
| 3                 | 2     | 2%              |
| 4                 | 0     | 0%              |
| 5                 | 6     | 5%              |
| 6                 | 8     | 6%              |
| 7                 | 18    | 14%             |
| 8                 | 23    | 18%             |
| 9                 | 17    | 13%             |
| 10 - Very helpful | 52    | 41%             |
| Don't know        | 2     | 2%              |

Q6. What might have made the information more helpful?

| Response Option  | Count |
|--|-------|
| I didn't read all of the booklet   | 1     |
| I have already seen and understood most of the things that were there. I have used energy-saving aerators and LED bulbs. If I was looking for something useful, I would consider solar energy (even though I live in the woods) and insulation for my house. | 1     |
| I thought it was a good learning tool. I just already understood most of the info  | 1     |
| If it was true and accurate  | 1     |
| If there was more information for log cabins old or new.   | 1     |
| More specifics, but that's difficult for a variety of houses.  | 1     |
| Nothing many of the things listed we already knew about or do.   | 1     |
| Nothing. I'm very aware of most of the topics  | 1     |
| Quick summary of 44-page energy saving tips  | 1     |
| Was more of a refresher than new information being brought up. Already has a lot of the suggestions in place in the home.  | 1     |

- Q7. In addition to sending the energy saving kits, Duke Energy sponsored a program about energy and energy efficiency at your child's school, which included classroom materials and an in-school performance by the National Theatre for Children. Were you aware of this program before today?

| Response Option | Count | Percent (n=172) |
|-----------------|-------|-----------------|
| Yes             | 42    | 24%             |
| No              | 128   | 74%             |
| Don't know      | 2     | 1%              |

- Q9. Where did you hear about this program?

| Response Option                     | Count | Percent (n=42) |
|-------------------------------------|-------|----------------|
| From my child/children              | 28    | 67%            |
| From a teacher/school administrator | 17    | 41%            |
| On the Duke Energy website          | 0     | 0%             |
| Other                               | 6     | 14%            |
| Don't remember                      | 0     | 0%             |

- Q9a. Other...

| Response Option  | Count |
|------------------|-------|
| From my grandson | 1     |
| From the school  | 1     |

## APPENDIX G

## SURVEY RESULTS

|   |   |
|---|---|
| From your child   | 1 |
| Included with the information, probably in the initial form | 1 |
| PTA   | 1 |
| Weekly information call from school                         | 1 |

Q10. Have you or anyone else installed any of those items in your home, even if they were taken out later?

| Response Option | Count | Percent (n=172) |
|-----------------|-------|-----------------|
| Yes             | 160   | 93%             |
| No              | 12    | 7%              |
| Don't know      | 0     | 0%              |

Q12. Which of the items did you install, even if they were taken out later?

| Response Option  | Count | Percent (n=160) |
|--|-------|-----------------|
| Showerhead   | 86    | 54%             |
| Kitchen faucet aerator                                       | 68    | 43%             |
| Bathroom faucet aerator                                      | 60    | 38%             |
| Night light  | 130   | 81%             |
| Energy efficient light bulb(s) (LEDs)                        | 149   | 93%             |
| Insulator gaskets for light switches and electricity outlets | 54    | 34%             |
| I never installed any of the items from the kit              | 0     | 0%              |

Q13. In addition to the night light, there were two LED light bulbs in the kit. Did you install one or both of the LED light bulbs in the kit?

| Response Option                          | Count | Percent (n=149) |
|--|-------|-----------------|
| Yes - I installed both LEDs              | 119   | 80%             |
| No - I installed only one LED light bulb | 28    | 19%             |
| Don't know                               | 2     | 1%              |

Q15. How many of the light switch gasket insulators from the kit did you *[if needed: or anyone else]* install in your home?

| Response Option | Count | Percent (n=54) |
|-----------------|-------|----------------|
| None            | 0     | 0%             |
| One             | 5     | 9%             |

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|            |    |     |
|------------|----|-----|
| Two        | 19 | 35% |
| Three      | 3  | 6%  |
| Four       | 25 | 46% |
| Don't know | 2  | 4%  |

Q16. How many electrical outlet gasket insulators from the kit did you [if needed: or anyone else] install in your home?

| Response Option | Count | Percent (n=54) |
|-----------------|-------|----------------|
| None            | 2     | 4%             |
| One             | 2     | 4%             |
| Two             | 20    | 37%            |
| Three           | 1     | 2%             |
| Four            | 7     | 13%            |
| Five            | 0     | 0%             |
| Six             | 3     | 6%             |
| Seven           | 2     | 4%             |
| Eight           | 11    | 20%            |
| Don't know      | 6     | 11%            |

Q17. Overall, how satisfied are you with the item[s] you installed? Please use 0 to 10 scale, where 0 is very dissatisfied and 10 is very satisfied. How satisfied are you with...

|                               | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7           | 8           | 9           | 10          | Don't know | Total       |
|-------------------------------|--------|--------|--------|--------|--------|--------|--------|-------------|-------------|-------------|-------------|------------|-------------|
| Show<br>erhead                | 0<br>% | 0<br>% | 1<br>% | 1<br>% | 1<br>% | 3<br>% | 0<br>% | 1<br>0<br>% | 1<br>3<br>% | 8<br>%      | 6<br>2<br>% | 0<br>%     | 8<br>6      |
| Kitchen<br>faucet<br>aerator  | 0<br>% | 1<br>% | 0<br>% | 1<br>% | 0<br>% | 3<br>% | 3<br>% | 6<br>%      | 7<br>%      | 9<br>%      | 6<br>8<br>% | 1<br>%     | 6<br>8      |
| Bathroom<br>faucet<br>aerator | 0<br>% | 0<br>% | 0<br>% | 2<br>% | 5<br>% | 2<br>% | 2<br>% | 8<br>%      | 1<br>0<br>% | 1<br>0<br>% | 6<br>0<br>% | 2<br>%     | 6<br>0      |
| Night<br>light                | 1<br>% | 0<br>% | 0<br>% | 1<br>% | 1<br>% | 1<br>% | 1<br>% | 4<br>%      | 5<br>%      | 5<br>%      | 8<br>2<br>% | 1<br>%     | 1<br>3<br>0 |



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|                                     |    |    |    |    |    |    |    |    |     |    |     |    |     |
|-------------------------------------|----|----|----|----|----|----|----|----|-----|----|-----|----|-----|
| Energy efficient light bulbs (LEDs) | 1% | 0% | 0% | 0% | 1% | 0% | 1% | 3% | 4%  | 7% | 83% | 1% | 149 |
| Insulator gaske                     | 0% | 0% | 0% | 0% | 0% | 6% | 0% | 4% | 13% | 7% | 67% | 4% | 54  |

Q17a. Can you please explain any dissatisfaction you had with the showerhead?

| Response Option  | Count |
|--|-------|
| Decreased water output   | 1     |
| Doesn't give much power  | 1     |
| Leaked   | 1     |
| The pressure is so low   | 1     |
| The showerhead is a water waster. So much water comes out so quickly that it drains our water heater. We have to put less pressure on the faucet so that less water comes out to be able to use it, in other words--not at capacity. | 1     |

Q17b. Can you please explain any dissatisfaction you had with the kitchen faucet aerator?

| Response Option                       | Count |
|---------------------------------------|-------|
| Because the water comes out very slow | 1     |
| Didn't fit well                       | 1     |
| The water flow is terrible, very slow | 1     |

Q17c. Can you please explain any dissatisfaction you had with the bathroom faucet aerator?

| Response Option  | Count |
|--|-------|
| Bulb is super bright. Faucet piece leaked  | 1     |
| Didn't fit well  | 1     |
| I had to take the guts out of the aerator and put them in the casing that was already on my faucet | 1     |
| Slow   | 1     |
| Water barely come out  | 1     |

Q17d. Can you please explain any dissatisfaction you had with the night light?

| Response Option                       | Count |
|---------------------------------------|-------|
| It didn't work and only one led light | 1     |

| Response Option                         | Count |
|---|-------|
| It's very low. The light is not enough. | 1     |
| Stopped working after a few days        | 1     |

Q17e. Can you please explain any dissatisfaction you had with the energy efficient light bulbs (LEDs)?

| Response Option  | Count |
|--|-------|
| Did not work   | 1     |
| I'm not dissatisfied, it's just like any other light                                     | 1     |
| My bill went up. I usually pay \$30 a month but after changing the it is \$50 a month.   | 1     |
| Still stuck on the old light bulbs. These need to "warm" up before getting good lighting | 1     |

Q17f. Can you please explain any dissatisfaction you had with the insulator gaskets?

| Response Option  | Count |
|--|-------|
| Our home was built in the last 4 years and most already had some outlets were difficult to put back. It really had nothing to do with the insulators more that I took off covers and they already had so i wasted a lot of time. | 1     |
| There wasn't an equal amount in each pack  | 1     |

Q18. Have you since uninstalled any of the items from the kit that you had previously installed?

| Response Option | Count | Percent (n=160) |
|-----------------|-------|-----------------|
| Yes             | 3     | 2%              |
| No              | 157   | 98%             |
| Don't know      | 0     | 0%              |

Q19. Which of the items did you uninstall?

| Response Option                     | Count |
|-------------------------------------|-------|
| Showerhead                          | 0     |
| Kitchen faucet aerator              | 0     |
| Bathroom faucet aerator             | 1     |
| Night light                         | 1     |
| Energy efficient light bulbs (LEDs) | 1     |
| Insulator gaskets                   | 0     |
| Don't know                          | 0     |

Q20. Why were those items uninstalled? Let's start with...

Q20a. the showerhead?

| Response Option           | Count |
|---------------------------|-------|
| It was broken             | 0     |
| Didn't like how it worked | 0     |
| Didn't like how it looked | 0     |
| Don't know                | 0     |

Q20b. the kitchen faucet aerator?

| Response Option            | Count |
|----------------------------|-------|
| It was broken              | 0     |
| Didn't like how it worked. | 0     |
| Didn't like how it looked. | 0     |
| Don't know                 | 0     |

Q20c. the bathroom faucet aerator?

| Response Option           | Count |
|---------------------------|-------|
| It was broken             | 0     |
| Didn't like how it worked | 0     |
| Didn't like how it looked | 1     |
| Don't know                | 0     |

Q20d. the night light?

| Response Option            | Count |
|----------------------------|-------|
| It was broken              | 1     |
| Didn't like how it worked. | 0     |
| Didn't like how it looked. | 0     |
| Don't know                 | 0     |

Q20e. the energy efficient light bulbs (LEDs)?

| Response Option                     | Count |
|-------------------------------------|-------|
| It was broken                       | 0     |
| Didn't like how it worked.          | 0     |
| Didn't like how it looked.          | 0     |
| Other – Because it was super bright | 1     |
| Don't know                          | 0     |



Q20f. the insulator gaskets?

| Response Option            | Count |
|----------------------------|-------|
| It was broken              | 0     |
| Didn't like how it worked. | 0     |
| Didn't like how it looked. | 0     |
| Don't know                 | 0     |

Q21. You said you haven't installed [INPUT ONLY THOSE ITEMS IN Q12 IF Q12a-f = 2]. Which of those items do you plan to install in the next three months?

| Response Option  | Count | Percent (n=150) |
|--|-------|-----------------|
| Showerhead   | 37    | 25%             |
| Kitchen faucet aerator   | 40    | 27%             |
| Bathroom faucet aerator  | 48    | 32%             |
| Night light  | 24    | 16%             |
| Energy efficient lightbulbs (LEDs)                                   | 16    | 11%             |
| Insulator gaskets  | 50    | 33%             |
| Im not planning on installing any of these in the next three months. | 50    | 33%             |

Q22. What's preventing you from installing those items? Let's start with....

Q22. Showerhead...

| Response Option   | Count | Percent (n=49) |
|---|-------|----------------|
| Didn't know what that was   | 1     | 2%             |
| Tried it, didn't fit  | 7     | 14%            |
| Tried it, didn't work as intended (please explain in the box below) | 5     | 10%            |
| Haven't gotten around to it   | 2     | 4%             |
| Current one is still working  | 11    | 22%            |
| Takes too much time to install it / No time / Too busy              | 0     | 0%             |
| Too difficult to install it, don't know how to do it                | 0     | 0%             |
| Don't have the tools I need   | 0     | 0%             |
| Don't have the items any longer (threw away, gave away)             | 1     | 2%             |
| Already have an efficient showerhead                                | 18    | 37%            |
| Other (please specify in the box below)                             | 12    | 24%            |
| Don't know  | 1     | 2%             |

Q22. Kitchen faucet aerator...

| Response Option   | Count | Percent (n=64) |
|---|-------|----------------|
| Didn't know what that was   | 2     | 3%             |
| Tried it, didn't fit  | 11    | 17%            |
| Tried it, didn't work as intended (please explain in the box below) | 5     | 8%             |
| Haven't gotten around to it   | 14    | 22%            |
| Current one is still working  | 11    | 17%            |
| Takes too much time to install it / No time / Too busy              | 1     | 2%             |
| Too difficult to install it, don't know how to do it                | 2     | 3%             |
| Don't have the tools I need   | 2     | 3%             |
| Don't have the items any longer (threw away, gave away)             | 1     | 2%             |
| Already have an efficient kitchen faucet aerator                    | 11    | 17%            |
| Other (please specify in the box below)                             | 10    | 16%            |
| Don't know  | 3     | 5%             |

Q22. Bathroom faucet aerator...

| Response Option   | Count | Percent (n=64) |
|---|-------|----------------|
| Didn't know what that was   | 4     | 6%             |
| Tried it, didn't fit  | 10    | 16%            |
| Tried it, didn't work as intended (please explain in the box below) | 4     | 6%             |
| Haven't gotten around to it   | 11    | 17%            |
| Current one is still working  | 14    | 22%            |
| Takes too much time to install it / No time / Too busy              | 1     | 2%             |
| Too difficult to install it, don't know how to do it                | 3     | 5%             |
| Don't have the tools I need   | 3     | 5%             |
| Don't have the items any longer (threw away, gave away)             | 1     | 2%             |
| Already have an efficient bathroom faucet aerator                   | 11    | 17%            |
| Other (please specify in the box below)                             | 11    | 17%            |
| Don't know  | 4     | 6%             |

Q22. Energy efficient lightbulbs (LEDs)...

| Response Option           | Count | Percent (n=7) |
|---------------------------|-------|---------------|
| Didn't know what that was | 0     | 0%            |

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|   |   |     |
|---|---|-----|
| Tried it, didn't fit  | 0 | 0%  |
| Tried it, didn't work as intended (please explain in the box below) | 0 | 0%  |
| Haven't gotten around to it   | 1 | 14% |
| Current one is still working  | 1 | 14% |
| Takes too much time to install it / No time / Too busy              | 0 | 0%  |
| Too difficult to install it, don't know how to do it                | 1 | 14% |
| Don't have the tools I need   | 0 | 0%  |
| Don't have the items any longer (threw away, gave away)             | 0 | 0%  |
| Already have LEDs   | 1 | 14% |
| Other (please specify in the box below)                             | 3 | 43% |
| Don't know  | 0 | 0%  |

Q22. Night lights...

| Response Option   | Count | Percent (n=16) |
|---|-------|----------------|
| Didn't know what that was   | 0     | 0%             |
| Tried it, didn't fit  | 0     | 0%             |
| Tried it, didn't work as intended (please explain in the box below) | 1     | 6%             |
| Haven't gotten around to it   | 3     | 19%            |
| Current one is still working  | 4     | 25%            |
| Takes too much time to install it / No time / Too busy              | 0     | 0%             |
| Too difficult to install it, don't know how to do it                | 0     | 0%             |
| Don't have the tools I need   | 0     | 0%             |
| Don't have the items any longer (threw away, gave away)             | 0     | 0%             |
| Other (please specify in the box below)                             | 7     | 44%            |
| Don't know  | 2     | 17%            |

Q22. Insulator gaskets...

| Response Option   | Count | Percent (n=66) |
|---|-------|----------------|
| Didn't know what that was   | 7     | 11%            |
| Tried it, didn't fit  | 3     | 5%             |
| Tried it, didn't work as intended (please explain in the box below) | 0     | 0%             |
| Haven't gotten around to it   | 23    | 35%            |
| Current one is still working  | 9     | 14%            |

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|   |    |     |
|---|----|-----|
| Takes too much time to install it / No time / Too busy  | 3  | 5%  |
| Too difficult to install it, don't know how to do it    | 0  | 0%  |
| Don't have the tools I need                             | 1  | 2%  |
| Don't have the items any longer (threw away, gave away) | 1  | 2%  |
| Other (please specify in the box below)                 | 13 | 20% |
| Don't know  | 7  | 11% |

Q22a. Thinking of the items you installed, would you be interested in receiving any more of them from Duke Energy? If so, which ones?

| Response Option  | Count | Percent (n=161) |
|--|-------|-----------------|
| Yes, I would like another energy-efficient showerhead      | 43    | 27%             |
| Yes, I would like another kitchen faucet aerator           | 25    | 16%             |
| Yes, I would like more bathroom faucet aerators            | 29    | 18%             |
| Yes, I would like more energy-efficient night lights       | 97    | 60%             |
| Yes, I would like more energy-efficient light bulbs (LEDs) | 132   | 82%             |
| Yes, I would like more switch/outlet gasket insulators     | 31    | 19%             |
| No, I am not interested in receiving any more of the items | 17    | 11%             |
| Don't know   | 0     | 0%              |

Q22b. What would be your preferred way to request these additional items?

| Response Option       | Count | Percent (n=144) |
|-----------------------|-------|-----------------|
| Internet              | 88    | 61%             |
| Telephone             | 26    | 18%             |
| Pre-paid postcard     | 42    | 29%             |
| Other, please specify | 3     | 2%              |
| Don't know            | 3     | 2%              |

Q26. You said you installed the night light. Did the night light replace an existing night light?

| Response Option | Count | Percent (n=129) |
|-----------------|-------|-----------------|
| Yes             | 88    | 68%             |
| No              | 41    | 32%             |
| Don't know      | 0     | 0%              |

Q27. Did the old nightlight have a bulb that you could take out and replace once it burned out?

| Response Option | Count | Percent (n=88) |
|-----------------|-------|----------------|
| Yes             | 64    | 73%            |
| No              | 20    | 23%            |
| Don't know      | 4     | 5%             |

Q28. You said you installed at least one of the energy efficient lights. What type of bulb(s) did you replace with the energy efficient lightbulbs?

| Response Option  | Count | Percent (n=148) |
|--|-------|-----------------|
| All incandescent (old fashioned light bulb - likely purchased more than two years ago) | 59    | 40%             |
| All halogen (looks like an incandescent, but has a glass tube inside of the bulb)      | 7     | 5%              |
| All CFL (spiral or twisty shaped bulb that fits into ordinary light fixtures)          | 67    | 45%             |
| All LED (new bulb type that uses little electricity and lasts a long time)             | 5     | 3%              |
| Some combination of bulb types (please specify which ones in the box below)            | 6     | 4%              |
| Don't know   | 4     | 3%              |

Q29. In what rooms did you install the energy efficient lightbulbs that were included in the kit?

| Response Option                              | Count | Percent (n=148) |
|--|-------|-----------------|
| Living room                                  | 59    | 40%             |
| Dining room                                  | 13    | 9%              |
| Bedroom                                      | 60    | 41%             |
| Kitchen                                      | 28    | 19%             |
| Bathroom                                     | 16    | 11%             |
| Den  | 3     | 2%              |
| Garage                                       | 3     | 2%              |
| Hallway                                      | 13    | 9%              |
| Basement                                     | 0     | 0%              |
| Outdoors                                     | 2     | 1%              |
| Other area (please specify in the box below) | 4     | 3%              |
| Don't Know                                   | 2     | 1%              |

Q30. Have you adjusted the temperature of your water heater based on the Hot Water Gauge Card included in your kit?

| Response Option                              | Count | Percent (n=172) |
|--|-------|-----------------|
| Yes  | 25    | 15%             |
| No   | 111   | 65%             |
| Don't recall seeing the Hot Water Gauge Card | 26    | 15%             |
| Don't know                                   | 10    | 6%              |

Q31. Do you know what the old temperature setting on your hot water heater was?

| Response Option | Count | Percent (n=25) |
|-----------------|-------|----------------|
| Yes             | 3     | 12%            |
| No              | 22    | 88%            |

Q31a. Temperature setting...

| Response Option    | Count |
|--------------------|-------|
| 110                | 1     |
| 135                | 1     |
| 20 or 50-something | 1     |

Q32. And what was the new temperature setting you set your hot water heater to?

| Response Option | Count |
|-----------------|-------|
| 70              | 1     |
| 100             | 1     |
| 120             | 2     |
| 125             | 1     |
| 130             | 1     |
| 176             | 1     |

Q33. Is the new water heater temperature setting still in place?

| Response Option | Count | Percent (n=25) |
|-----------------|-------|----------------|
| Yes             | 22    | 88%            |
| No              | 2     | 8%             |
| Don't know      | 1     | 4%             |

Q34. Why did you change the water heater temperature a second time?

| Response Option  | Count |
|--|-------|
| Customer says it was not too hot   | 1     |
| We had an element that went out. We put it back and it will be replaced next week. | 1     |

Q35. What is the fuel type of your water heater?

| Response Option                         | Count | Percent (n=172) |
|---|-------|-----------------|
| Electricity                             | 134   | 78%             |
| Natural Gas                             | 28    | 16%             |
| Other (please specify in the box below) | 2     | 1%              |
| Don't know                              | 8     | 5%              |

Q36. How old is your water heater?

| Response Option             | Count | Percent (n=172) |
|-----------------------------|-------|-----------------|
| Less than five years old    | 49    | 29%             |
| Five to nine years old      | 38    | 22%             |
| Ten to fifteen years old    | 24    | 14%             |
| More than fifteen years old | 13    | 8%              |
| Don't know                  | 48    | 28%             |

Q37. If you had not received the free efficiency items in the kit, would you have purchased and installed any of these same items within the next year?

| Response Option | Count | Percent (n=159) |
|-----------------|-------|-----------------|
| Yes             | 60    | 38%             |
| No              | 70    | 44%             |
| Don't know      | 29    | 18%             |

Q38. What items would you have purchased and installed within the next year?

| Response Option                    | Count | Percent (n=58) |
|------------------------------------|-------|----------------|
| Energy-Efficient Showerhead        | 11    | 19%            |
| Kitchen faucet aerator             | 7     | 12%            |
| Bathroom faucet aerator            | 2     | 3%             |
| Energy-Efficient Night light       | 20    | 35%            |
| Energy efficient lightbulbs (LEDs) | 53    | 91%            |
| Switch/Outlet Gasket Insulators    | 3     | 5%             |

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|  |   |    |
|--|---|----|
| No I would not have purchased any of the items | 0 | 0% |
| Other  | 0 | 0% |
| Don't know                                     | 1 | 2% |

Q39. If you had not received them for free in the kit, how many LED light bulbs would you have purchased?

| Response Option | Count | Percent (n=45) |
|-----------------|-------|----------------|
| One             | 2     | 4%             |
| Two             | 34    | 76%            |
| Don't know      | 9     | 20%            |

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Q40. Now, thinking about the water savings items that were provided in the kit - using a scale from 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential” how influential were the following factors on your decision to install the water saving items from the kit? How influential was...

|   | 0   | 1   | 2   | 3   | 4   | 5   | 6   | 7    | 8    | 9   | 10   | Don't know | Total |
|---|-----|-----|-----|-----|-----|-----|-----|------|------|-----|------|------------|-------|
| The fact that the items were free   | 4 % | 0 % | 0 % | 1 % | 1 % | 3 % | 3 % | 7 %  | 8 %  | 6 % | 67 % | 1 %        | 106   |
| The fact that the items were mailed to your house                           | 1 % | 0 % | 0 % | 0 % | 0 % | 3 % | 2 % | 4 %  | 5 %  | 7 % | 79 % | 0 %        | 106   |
| The chance to win cash prizes for your household and school                 | 8 % | 2 % | 2 % | 2 % | 1 % | 6 % | 6 % | 4 %  | 7 %  | 8 % | 53 % | 4 %        | 106   |
| Information in the kit about how the items would save energy                | 0 % | 0 % | 0 % | 1 % | 2 % | 4 % | 6 % | 6 %  | 10 % | 9 % | 60 % | 2 %        | 106   |
| Information that your child brought home from school                        | 3 % | 0 % | 1 % | 1 % | 0 % | 5 % | 7 % | 8 %  | 11 % | 9 % | 52 % | 2 %        | 106   |
| Other information or advertisements from Duke Energy, including its website | 8 % | 1 % | 0 % | 4 % | 3 % | 8 % | 5 % | 10 % | 15 % | 5 % | 37 % | 4 %        | 106   |

Q41. Using a scale from 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential” how influential were the following factors on your decision to install the lightbulbs from the kit? How influential was...



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|   | 0   | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8   | 9  | 10  | Don't know | Total |
|---|-----|----|----|----|----|----|----|----|-----|----|-----|------------|-------|
| The fact that the items were free   | 1%  | 0% | 0% | 0% | 1% | 4% | 1% | 5% | 5%  | 4% | 79% | 1%         | 148   |
| The fact that the items were mailed to your house                           | 0%  | 0% | 0% | 1% | 1% | 2% | 1% | 3% | 7%  | 5% | 80% | 1%         | 148   |
| The chance to win cash prizes for your household and school                 | 7%  | 2% | 1% | 3% | 1% | 9% | 4% | 3% | 6%  | 3% | 57% | 4%         | 148   |
| Information in the kit about how the items would save energy                | 1%  | 0% | 0% | 1% | 3% | 8% | 3% | 6% | 11% | 6% | 59% | 1%         | 148   |
| Information that your child brought home from school                        | 5%  | 1% | 0% | 1% | 3% | 7% | 3% | 7% | 9%  | 6% | 53% | 3%         | 148   |
| Other information or advertisements from Duke Energy, including its website | 11% | 1% | 1% | 3% | 5% | 8% | 3% | 7% | 7%  | 8% | 41% | 4%         | 148   |

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- Q42. I've got just a few final questions about other energy saving activities. First, Duke Energy asked us to ask a couple of questions about the Home Energy Reports it sends to some families. These reports provide detailed information on your home's energy usage and compare your home to similar homes of your neighbors.

During the school year, did you receive any Home Energy Reports from Duke Energy?

| Response Option | Count | Percent (n=110) |
|-----------------|-------|-----------------|
| Yes             | 90    | 82%             |
| No              | 13    | 12%             |
| Don't know      | 7     | 6%              |

- Q43. How often do you read those Home Energy Reports?

| Response Option | Count | Percent (n=90) |
|-----------------|-------|----------------|
| Never           | 1     | 1%             |
| Sometimes       | 25    | 28%            |
| Always          | 64    | 71%            |
| Don't know      | 0     | 0%             |

- Q44. The Home Energy Reports provide specific recommendations for how you can save energy in your home. Have you completed any of the energy saving recommendations from the Home Energy Reports? If so, which ones? [MULTIPLE RESPONSE]

| Response Option  | Count |
|--|-------|
| Nothing  | 29    |
| Purchased energy saving products for my home and received a Duke Energy rebate         | 8     |
| Purchased energy saving products for my home but did not receive a Duke Energy rebate  | 9     |
| Made energy saving modifications to my home (example: installed insulation or windows) | 18    |
| Adjusted how or when I use energy in my home   | 33    |
| Looked for additional information on how to save energy                                | 9     |
| Other (please specify in the box below)  | 7     |
| Don't know   | 4     |

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- Q45. Since your child learned about energy conservation at school and signed up for your energy kit from Duke Energy, has your child adopted any **new** behaviors to help save energy in your home? This would only include new energy saving **behaviors** that your child adopted since receiving the kit. *[IF NEEDED: like turning off the lights when room is unoccupied]*

| Response Option                          | Count |
|--|-------|
| Not applicable - no new behaviors        | 48    |
| Turn off lights when not in a room       | 97    |
| Turn off electronics when not using them | 65    |
| Take shorter showers                     | 35    |
| Other                                    | 17    |
| Don't know                               | 8     |

- Q45a. Other...

| Response Option   | Count |
|---|-------|
| I don't have any children   | 1     |
| I really haven't noticed anything.  | 1     |
| Make sure all the doors and windows are closed  | 1     |
| My child just turned 3. She doesn't really understand about it yet, but we've raised her to always turn off lights when they're not being used. | 1     |
| My daughter is now aware of saving electricity and encourages recycling.  | 1     |
| Not that I know of, because she's only six.   | 1     |
| Saving/not wasting water  | 3     |
| She lectures everyone about turning lights off and closing the refrigerator and turning off electronics   | 1     |
| Turning off water while brushing teeth  | 3     |
| Turns off the water.  | 1     |
| Unplugging computers and TV's when leaving the house.   | 1     |
| Unplugs nightlight when not using it.   | 1     |
| Using less water.   | 1     |

- Q45b. [IF Q45 =2-5] Before receiving the kit, was your child already...

| Response Option                             | Count | Percent (n=54) |
|---|-------|----------------|
| Turning off lights when not in a room       | 42    | 78%            |
| Turning off electronics when not using them | 18    | 33%            |
| Taking shorter showers                      | 7     | 13%            |
| Other                                       | 5     | 9%             |

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- Q46. Since receiving your energy kit from Duke Energy, have you adopted any new behaviors to help save energy in your home? This would only include new energy saving **behaviors** that you have adopted since receiving the kit. [IF NEEDED: like turning off the lights when room is unoccupied]  
[MULTIPLE RESPONSE] *[Interviewer: Do not read list. After each response ask, "Anything else?"]*

| Response Option                                    | Count |
|--|-------|
| Not applicable - no new behaviors                  | 41    |
| Turning off lights when not in a room              | 85    |
| Turning off furnace when not home                  | 19    |
| Turning off air conditioning when not home         | 33    |
| Changed thermostat settings to use less energy     | 72    |
| Using fans instead of air conditioning             | 55    |
| Turning off electronics when we are not using them | 62    |
| Taking shorter showers                             | 28    |
| Turning water heat thermostat down                 | 18    |
| Other (please specify in the box below)            | 16    |
| Don't know   | 1     |

Q46a. Other...

| Response Option  | Count |
|--|-------|
| Adjusted the thermostat  | 1     |
| Buy LEDs when lights go out.   | 4     |
| Consider using more LED bulbs  | 1     |
| I installed more things for the a/c area.  | 1     |
| I'm leaving the new LED bulb in the hallway on 24 hours a day so I can see how much energy LED's save. | 1     |
| Installed LED bulbs  | 1     |
| More mindful of the use meter  | 1     |
| Try not to do but 1 load of laundry a day  | 1     |
| Turn off the a/c when we go to bed   | 1     |
| Turning hot water heater down and checking it  | 1     |
| Use LEDs   | 1     |
| Using energy-efficient appliances  | 1     |
| Wash clothes later on at night   | 1     |
| Washer machine unplugged   | 1     |
| Watching the thermostat and making adjustments when needed   | 1     |
| We keep everything unplugged when we're not using them.  | 1     |

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Q46b. [IF Q46 =2-10] Before receiving the kit, were you already...

| Response Option  | Count | Percent (n=89) |
|--|-------|----------------|
| Turning off lights when not in a room                                      | 60    | 67%            |
| Turning off furnace when not home  | 10    | 11%            |
| Turning off air conditioning when not home                                 | 17    | 19%            |
| Changing thermostat settings so heating or cooling system uses less energy | 31    | 35%            |
| Using fans instead of air conditioning                                     | 35    | 39%            |
| Turning off electronics when not using them                                | 29    | 33%            |
| Taking shorter showers   | 12    | 13%            |
| Turning water heat thermostat down   | 4     | 4%             |
| Other  | 6     | 7%             |

Q47. On a scale of 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential,” how much influence did Duke Energy’s kit and materials on saving energy have on your decision to [LIST ALL RESPONSES FROM Q46].

| Response Option            | Count | Percent (n=130) |
|----------------------------|-------|-----------------|
| 0 – Not at all influential | 4     | 3%              |
| 1                          | 0     | 0%              |
| 2                          | 1     | 1%              |
| 3                          | 2     | 2%              |
| 4                          | 0     | 0%              |
| 5                          | 7     | 5%              |
| 6                          | 3     | 2%              |
| 7                          | 21    | 16%             |
| 8                          | 17    | 13%             |
| 9                          | 10    | 8%              |
| 10 - Extremely influential | 64    | 49%             |
| Don't know                 | 1     | 1%              |

Q47a. Thinking of the near future, are you interested in purchasing any additional products or services to help save energy in your home?

| Response Option | Count | Percent (n=172) |
|-----------------|-------|-----------------|
| Yes             | 115   | 67%             |
| No              | 30    | 17%             |
| Don't know      | 27    | 16%             |

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Q47b. What additional products or services are you interested in purchasing?

| Response Option                        | Count |
|--|-------|
| Energy efficient appliances            | 48    |
| Efficient heating or cooling equipment | 24    |
| Efficient windows                      | 30    |
| Adding insulation                      | 25    |
| Sealing air leaks                      | 30    |
| Sealing or insulating ducts            | 15    |
| Efficient lighting (LEDs)              | 87    |
| Energy efficient water heater          | 19    |
| Internet connected "smart" thermostat  | 23    |
| Other                                  | 16    |
| Don't know                             | 7     |

Q48. Since receiving your energy kit from Duke Energy, have you purchased and installed any other **products** or made any improvements to your home to help save energy?

| Response Option | Count | Percent (n=172) |
|-----------------|-------|-----------------|
| Yes             | 46    | 27%             |
| No              | 120   | 70%             |
| Don't know      | 6     | 4%              |

Q49. What **products** have you purchased and installed to help save energy in your home?  
[MULTIPLE RESPONSE]

| Response Option                               | Count |
|---|-------|
| Bought energy efficient appliances            | 8     |
| Moved into an ENERGY STAR home                | 2     |
| Bought efficient heating or cooling equipment | 4     |
| Bought efficient windows                      | 2     |
| Added insulation                              | 8     |
| Sealed air leaks                              | 10    |
| Sealed ducts                                  | 3     |
| Bought LEDs                                   | 29    |
| Bought CFLs                                   | 1     |
| Installed an energy efficient water heater    | 1     |
| None – no other actions taken                 | 0     |
| Other (please specify in the box below)       | 8     |
| Don't know                                    | 1     |

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Q49a. Other...

| Response Option   | Count |
|---|-------|
| Added a smart thermostat  | 1     |
| Air Conditioning Service, making sure it is properly maintained to save on energy costs | 1     |
| Bought and installed a new heat pump  | 1     |
| Dish Washer, Refrigerator and Stove   | 1     |
| Drapes for blackouts so that the sun doesn't heat up the rooms during Summer            | 1     |
| Just the a/c things   | 1     |
| Solar panels  | 1     |
| Upgraded A/C filters  | 1     |

Q50. Did you get a rebate from Duke Energy for any of those products or services? If so, which ones?

| Response Option                               | Count |
|---|-------|
| Bought energy efficient appliances            | 2     |
| Moved into an ENERGY STAR home                | 0     |
| Bought efficient heating or cooling equipment | 0     |
| Bought efficient windows                      | 0     |
| Bought additional insulation                  | 0     |
| Sealed air leaks                              | 0     |
| Sealed ducts                                  | 0     |
| Bought LEDs                                   | 1     |
| Bought CFLs                                   | 0     |
| Installed an energy efficient water heater    | 0     |
| Other   | 1     |
| I did not get any Duke Rebates                | 36    |
| Don't know                                    | 5     |



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Q51. On a scale of 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential”, how much influence did the Duke Energy schools program have on your decision to...

|  | 0 - Not at all influential | 1  | 2   | 3  | 4   | 5   | 6   | 7   | 8   | 9   | 10 - Extremely influential | Do n't Know | Total |
|--|----------------------------|----|-----|----|-----|-----|-----|-----|-----|-----|----------------------------|-------------|-------|
| Buy energy efficient appliances            | 0%                         | 0% | 13% | 0% | 13% | 0%  | 13% | 13% | 13% | 0%  | 38%                        | 0%          | 14    |
| Move into an ENERGY STAR home              | 0%                         | 0% | 0%  | 0% | 0%  | 0%  | 0%  | 0%  | 50% | 0%  | 50%                        | 0%          | 1     |
| Buy efficient heating or cooling equipment | 50%                        | 0% | 0%  | 0% | 25% | 25% | 0%  | 0%  | 0%  | 0%  | 0%                         | 0%          | 5     |
| Buy efficient windows                      | 50%                        | 0% | 50% | 0% | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 0%                         | 0%          | 5     |
| Add insulation                             | 25%                        | 0% | 0%  | 0% | 0%  | 13% | 13% | 0%  | 13% | 13% | 25%                        | 0%          | 12    |
| Seal air leaks                             | 10%                        | 0% | 0%  | 0% | 0%  | 0%  | 10% | 0%  | 20% | 10% | 50%                        | 0%          | 6     |
| Seal ducts                                 | 0%                         | 0% | 0%  | 0% | 0%  | 0%  | 0%  | 0%  | 0%  | 33% | 67%                        | 0%          | 1     |
| Buy LEDs                                   | 3%                         | 0% | 0%  | 7% | 3%  | 10% | 7%  | 0%  | 17% | 7%  | 41%                        | 3%          | 28    |
| Buy CFLs                                   | 0%                         | 0% | 0%  | 0% | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 100%                       | 0%          | 1     |
| Install an energy efficient water heater   | 0%                         | 0% | 0%  | 0% | 0%  | 0%  | 0%  | 0%  | 0%  | 0%  | 100%                       | 0%          | 3     |
| Other                                      | 38%                        | 0  | 0   | 0  | 0   | 1   | 0   | 0   | 1   | 0   | 25%                        | 13          | 10    |

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|  |  |   |   |   |   |        |   |   |        |   |  |   |  |
|--|--|---|---|---|---|--------|---|---|--------|---|--|---|--|
|  |  | % | % | % | % | 3<br>% | % | % | 3<br>% | % |  | % |  |
|--|--|---|---|---|---|--------|---|---|--------|---|--|---|--|

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Q52. What kinds of appliance(s) did you buy?

| Response Option     | Count |
|---------------------|-------|
| Refrigerator        | 4     |
| Stand-alone Freezer | 0     |
| Dishwasher          | 3     |
| Clothes washer      | 5     |
| Clothes dryer       | 6     |
| Oven                | 0     |
| Microwave           | 1     |
| Other               | 0     |
| Don't know          | 0     |

Q53. Was the [INSERT Q52 RESPONSE] an ENERGY STAR or high-efficiency model?

| Response Option     | Count | Percent (n=7) |
|---------------------|-------|---------------|
| Refrigerator        | 4     | 57%           |
| Stand-alone Freezer | 0     | 0%            |
| Dishwasher          | 2     | 29%           |
| Clothes washer      | 4     | 57%           |
| Clothes dryer       | 5     | 71%           |
| Oven                | 0     | 0%            |
| Microwave           | 1     | 14%           |
| Other               | 0     | 0%            |

Q54. Does the new clothes dryer use natural gas?

| Response Option               | Count |
|-------------------------------|-------|
| Yes- it uses natural gas      | 1     |
| No – does not use natural gas | 5     |
| Don't know                    | 0     |

Q55. What type of heating or cooling equipment did you buy?

| Response Option                  | Count | Percent (n=2) |
|----------------------------------|-------|---------------|
| Central air conditioner          | 1     | 50%           |
| Window/room air conditioner unit | 0     | 0%            |
| Wall air conditioner unit        | 0     | 0%            |
| Air source heat pump             | 0     | 0%            |
| Geothermal heat pump             | 0     | 0%            |
| Boiler                           | 0     | 0%            |

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| Response Option                         | Count | Percent (n=2) |
|---|-------|---------------|
| Furnace                                 | 0     | 0%            |
| Wifi-enabled thermostat                 | 0     | 0%            |
| Other (please specify in the box below) | 0     | 0%            |
| Don't know                              | 1     | 50%           |

Q55a. Other...

| Response Option | Count |
|-----------------|-------|
| Not applicable  | 0     |

Q56. Does the new [INSERT Q55 RESPONSE] use natural gas?

| Response Option | Count |
|-----------------|-------|
| Not applicable  | 0     |

Q57. Was the [INSERT Q55 RESPONSE] an ENERGY STAR or high-efficiency model?

| Response Option                         | Count | Percent (n=1) |
|---|-------|---------------|
| Central air conditioner                 | 1     | 100%          |
| Window/room air conditioner unit        | 0     | 0%            |
| Wall air conditioner unit               | 0     | 0%            |
| Air source heat pump                    | 0     | 0%            |
| Geothermal heat pump                    | 0     | 0%            |
| Boiler                                  | 0     | 0%            |
| Furnace                                 | 0     | 0%            |
| Wifi-enabled thermostat                 | 0     | 0%            |
| Other (please specify in the box below) | 0     | 0%            |
| Don't know                              | 0     | 0%            |

Q58. How many windows did you install?

| Response Option | Count |
|-----------------|-------|
| 10              | 1     |

Q59. Did you add insulation to your attic, walls, or below the floor? [MULTIPLE RESPONSE]

| Response Option | Count |
|-----------------|-------|
| Attic           | 5     |
| Walls           | 3     |
| Below the floor | 1     |
| Don't know      | 0     |

Q60a. Approximately what proportion of the attic space did you add insulation?

| Response Option | Count |
|-----------------|-------|
| 50              | 1     |
| 50%             | 1     |
| 90%             | 1     |
| Don't know      | 0     |

Q60b. Approximately what proportion of the wall space did you add insulation?

| Response Option | Count |
|-----------------|-------|
| 3               | 1     |
| 50%             | 1     |
| Don't know      | 0     |

Q60c. Approximately what proportion of the below the floor space did you add insulation?

| Response Option | Count |
|-----------------|-------|
| 50%             | 1     |

Q61. Do you know how many of LEDs you installed at your property?

| Response Option | Count |
|-----------------|-------|
| Yes             | 25    |
| Don't know      | 3     |

Q61a. How many of LEDs did you install in your property?

| Response Option       | Count |
|-----------------------|-------|
| 2                     | 2     |
| 3                     | 1     |
| 4                     | 2     |
| 5                     | 1     |
| 6                     | 7     |
| 8                     | 1     |
| 8 plus 2 from the box | 1     |
| 10                    | 2     |
| 12                    | 1     |
| 15                    | 1     |
| 20                    | 4     |
| 25                    | 1     |

| Response Option | Count |
|-----------------|-------|
| 30              | 1     |
| Don't know      | 0     |

Q62. How many of CFLs did you install in your property?

| Response Option | Count |
|-----------------|-------|
| Yes             | 1     |
| Don't know      | 1     |

Q62. Number of CFLS installed...

| Response Option | Count |
|-----------------|-------|
| 2               | 1     |

Q63. Does the new water heater use natural gas?

| Response Option               | Count |
|-------------------------------|-------|
| Yes - it uses natural gas     | 1     |
| No – does not use natural gas | 0     |
| Don't know                    | 0     |

Q64. Which of the following water heaters did you purchase?

| Response Option   | Count |
|---|-------|
| A traditional water heater with a large tank that holds the hot water | 0     |
| A tankless water heater that provides hot water on demand             | 1     |
| A solar water heater  | 0     |
| Other   | 0     |
| Don't know  | 0     |

Q65. Is the new water heater an ENERGY STAR model?

| Response Option | Count |
|-----------------|-------|
| Yes             | 1     |
| No              | 0     |
| Don't know      | 0     |

Q66. Which of the following types of housing units would you say best describes your home?  
It is . . .?

| Response Option   | Count | Percent (n=172) |
|---|-------|-----------------|
| Single-family detached house                                | 102   | 59%             |
| Single-family attached home (such as a townhouse or condo)  | 9     | 5%              |
| Duplex, triplex or four-plex                                | 3     | 2%              |
| Apartment or condominium in a building with 5 units or more | 22    | 13%             |
| Manufactured or mobile home                                 | 32    | 19%             |
| Other   | 2     | 1%              |
| Don't know  | 1     | 1%              |

Q66. Other...

| Response Option   | Count |
|---|-------|
| Buying own house soon and will want to make more energy efficient | 1     |
| Single family log cabin   | 1     |

Q67. How many square feet of living space are there in your residence, including bathrooms, foyers and hallways (exclude garages, unfinished basements, and unheated porches)?

| Response Option                  | Count | Percent (n=172) |
|----------------------------------|-------|-----------------|
| Less than 500 square feet        | 1     | 1%              |
| 500 to under 1,000 square feet   | 12    | 7%              |
| 1,000 to under 1,500 square feet | 42    | 24%             |
| 1,500 to under 2,000 square feet | 20    | 12%             |
| 2,000 to under 2,500 square feet | 22    | 13%             |
| 2,500 to under 3,000 square feet | 16    | 9%              |
| Greater than 3,000 square feet   | 17    | 10%             |
| Don't know                       | 42    | 24%             |

Q68. Do you or members of your household own your home, or do you rent it?

| Response Option  | Count | Percent (n=172) |
|------------------|-------|-----------------|
| Own / buying     | 111   | 65%             |
| Rent / lease     | 61    | 36%             |
| Occupy rent-free | 0     | 0%              |

|            |   |    |
|------------|---|----|
| Don't know | 0 | 0% |
|------------|---|----|

Q69. Including yourself, how many people currently live in your home year-round?

| Response Option      | Count | Percent (n=172) |
|----------------------|-------|-----------------|
| I live by myself     | 8     | 5%              |
| Two people           | 25    | 15%             |
| Three people         | 42    | 24%             |
| Four people          | 54    | 31%             |
| Five people          | 30    | 17%             |
| Six people           | 9     | 5%              |
| Seven people         | 3     | 2%              |
| Eight or more people | 1     | 1%              |
| Don't know           | 0     | 0%              |

Q70. What was your total annual household income for 2017, before taxes?

| Response Option              | Count | Percent (n=172) |
|------------------------------|-------|-----------------|
| Under \$20,000               | 27    | 16%             |
| \$20,000 to under \$30,000   | 19    | 11%             |
| \$30,000 to under \$40,000   | 18    | 10%             |
| \$40,000 to under \$50,000   | 14    | 8%              |
| \$50,000 to under \$60,000   | 11    | 6%              |
| \$60,000 to under \$75,000   | 9     | 5%              |
| \$75,000 to under \$100,000  | 19    | 11%             |
| \$100,000 to under \$150,000 | 20    | 12%             |
| \$150,000 to under \$200,000 | 9     | 5%              |
| \$200,000 or more            | 3     | 2%              |
| Don't know                   | 4     | 2%              |
| Prefer not to say            | 19    | 11%             |

Q71. What is the highest level of education achieved among those living in your household?

| Response Option                                  | Count | Percent (n=172) |
|--|-------|-----------------|
| Less than high school                            | 1     | 1%              |
| Some high school                                 | 7     | 4%              |
| High school graduate or equivalent (such as GED) | 33    | 19%             |
| Trade or technical school                        | 4     | 2%              |
| Some college (including Associate degree)        | 50    | 29%             |



| Response Option                      | Count | Percent (n=172) |
|--------------------------------------|-------|-----------------|
| College degree (Bachelor's degree)   | 38    | 22%             |
| Some graduate school                 | 5     | 3%              |
| Graduate degree, professional degree | 32    | 19%             |
| Doctorate                            | 1     | 1%              |
| Don't know                           | 0     | 0%              |
| Prefer not to say                    | 1     | 1%              |

#### G.4 Student Parent Survey - DEC

Q2. Before today, did you know the kit you received was sponsored by Duke Energy?

| Response Option | Count | Percent (n=334) |
|-----------------|-------|-----------------|
| Yes             | 313   | 94%             |
| No              | 19    | 6%              |
| Don't know      | 2     | 1%              |

Q3. How did you learn that the kit was sponsored by Duke Energy? [Select all that apply]

| Response Option                             | Count | Percent (n=313) |
|---|-------|-----------------|
| Classroom materials brought home by child   | 183   | 58%             |
| My child's teacher/school                   | 92    | 29%             |
| Information material included in/on the kit | 92    | 29%             |
| Other                                       | 33    | 11%             |
| Don't know                                  | 6     | 2%              |

Q3. Other...

| Response Option  | Count |
|--|-------|
| A friend   | 1     |
| Advertisement sent home from school that we signed up for      | 1     |
| By a letter  | 1     |
| contest sponsored at daughter's school                         | 1     |
| Duke Energy  | 1     |
| Flyer  | 1     |
| Friend told me   | 1     |
| From Duke Power.   | 1     |
| Had to fill something out online and it was on the box as well | 1     |

| Response Option   | Count |
|---|-------|
| Heard some of the parents talking about it.                                 | 1     |
| I signed up for it online.  | 1     |
| I use to work as a substitute teacher part time.                            | 1     |
| I work for Duke HEHC Program  | 1     |
| In the papers that came with it   | 1     |
| Informed by neighbors on the next door app                                  | 1     |
| Internet  | 1     |
| My daughter shared her experiences with me prior to receiving the materials | 1     |
| My wife teaches at the middle school level.                                 | 1     |
| Neighbor is a retired Duke Employee.  | 1     |
| Network neighborhood site   | 1     |
| Online  | 2     |
| Pervious Experience   | 1     |
| Previous participation in the LED kit.                                      | 1     |
| PTO promotion of kit!   | 1     |
| Requested it when I moved into my house                                     | 1     |
| Saw information about the kit online  | 1     |
| School's Social Media   | 1     |
| Teacher told me   | 1     |
| Website   | 3     |
| When it arrived I was told by my grandson it was from Duke                  | 1     |

Q3a. How did you hear about the opportunity to receive the kit from Duke Energy? [Select all that apply]

| Response Option                                 | Count | Percent (n=334) |
|---|-------|-----------------|
| Classroom materials brought home by child       | 238   | 71%             |
| School newsletter                               | 57    | 17%             |
| Email from my child's teacher/school            | 46    | 14%             |
| School website or school web portal             | 20    | 6%              |
| In-person conversations with my child's teacher | 14    | 4%              |
| Saw a poster at my child's school               | 12    | 4%              |
| After hours event at my child's school          | 8     | 2%              |
| Other (please specify in the box below)         | 44    | 13%             |
| Don't know                                      | 10    | 3%              |

Q3a. Other...

| Response Option  | Count |
|--|-------|
| A friend   | 1     |
| Assembly sponsored by Duke Energy.   | 1     |
| Call from my child's school  | 1     |
| Class Dojo message from school   | 1     |
| Contest at my daughter's school  | 1     |
| Duke Energy Website  | 1     |
| Either something we filled out or something that came home with the kids from school | 1     |
| Facebook   | 1     |
| Flyer from school  | 2     |
| Friend told me.  | 1     |
| From my niece Stacey Johnson   | 1     |
| From the school  | 1     |
| Grand daughter brought home a card   | 1     |
| Heard about it from another child's parent   | 1     |
| Heard some of the parents talking about it.  | 1     |
| I saw it on my light bill.   | 1     |
| It just came in the mail   | 1     |
| Letter from the school   | 1     |
| Monthly Bill   | 1     |
| My child   | 1     |
| My child told me.  | 1     |
| My wife teaches at the school.   | 1     |
| Neighbors posted on nextdoor app   | 1     |
| Network neighborhood site  | 1     |
| Once it arrived  | 1     |
| Pervious Experience  | 1     |
| Room Parent emails PTO newsletter PTO Facebook posts                                 | 1     |
| Saw it on Facebook   | 1     |
| School   | 1     |
| School Facebook page   | 1     |
| School sent me a brochure  | 1     |
| Social media from school   | 1     |
| Supporter of saving the environment, step daughter brought home paper from school    | 1     |
| The school may have given us flyers  | 1     |
| Was told by my child   | 1     |

| Response Option  | Count |
|--|-------|
| Website  | 3     |
| When it arrived I was told it was from Duke by my grandson | 1     |
| Word of mouth from family                                  | 1     |
| Work for duke  | 1     |

- Q4. Did you read the information about how to save energy in the booklet that came in the kit?

| Response Option | Count | Percent (n=334) |
|-----------------|-------|-----------------|
| Yes             | 245   | 73%             |
| No              | 62    | 19%             |
| Don't know      | 27    | 8%              |

- Q5. On a scale from 0 to 10 where 0 is not at all helpful and 10 is very helpful, how helpful was the information in the kit in identifying ways your household could save energy at home?

| Response Option   | Count | Percent (n=245) |
|-------------------|-------|-----------------|
| 0                 | 1     | 0%              |
| 1                 | 1     | 0%              |
| 2                 | 0     | 0%              |
| 3                 | 2     | 1%              |
| 4                 | 5     | 2%              |
| 5                 | 17    | 7%              |
| 6                 | 17    | 7%              |
| 7                 | 42    | 17%             |
| 8                 | 43    | 18%             |
| 9                 | 24    | 10%             |
| 10 - Very helpful | 93    | 38%             |
| Don't know        | 0     | 0%              |

- Q6. What might have made the information more helpful?

| Response Option   | Count |
|---|-------|
| A chart of the options and other ways to save.                            | 1     |
| Adding more statistical data to prove that what's actually stated is true | 1     |
| Better as video than booklet.   | 1     |
| Could have used more specific info on insulating pipes.                   | 1     |

| Response Option  | Count |
|--|-------|
| Different ways to save energy.   | 1     |
| I already knew the info. I'm sure it would be helpful to someone who didn't already know.  | 1     |
| I did this line of work for a living so I already knew the info  | 1     |
| I don't know but it was stuff I already knew   | 1     |
| I was pretty much aware of all the ways to save energy. I am very conservative with everything.  | 1     |
| Including information to help renters  | 1     |
| It was kind of confusing, need more detail   | 1     |
| It was too long  | 1     |
| It was very helpful. We rent so there is only so much we can do.   | 1     |
| Just didn't apply to me  | 1     |
| Low income resources   | 1     |
| More ideas on savings.   | 1     |
| More incentive to use the items... Example rebates...note with power bill telling how much your own home saved after using the items make it more personal not a average | 1     |
| More info for energy savings in a mobile home  | 1     |
| More options and more detailed information and instructions.   | 1     |
| More pictures. More info   | 1     |
| Sleep  | 1     |
| Tell how to really save energy   | 1     |
| The reading  | 1     |
| Tips   | 1     |
| We tend to try our best at club conservation, so I'm not the best to think of with changing minds.   | 1     |
| Well the showerheads need to be a little bigger for my shower  | 1     |

- Q7. In addition to sending the energy saving kits, Duke Energy sponsored a program about energy and energy efficiency at your child's school, which included classroom materials and an in-school performance by the National Theatre for Children. Were you aware of this program before today?

| Response Option | Count | Percent (n=334) |
|-----------------|-------|-----------------|
| Yes             | 104   | 31%             |
| No              | 228   | 68%             |
| Don't know      | 2     | 1%              |

- Q9. Where did you hear about this program?

| Response Option                     | Count | Percent (n=104) |
|-------------------------------------|-------|-----------------|
| From my child/children              | 80    | 77%             |
| From a teacher/school administrator | 29    | 28%             |
| On the Duke Energy website          | 15    | 14%             |
| Other                               | 5     | 5%              |
| Don't remember                      | 2     | 2%              |

Q9a. Other...

| Response Option               | Count |
|-------------------------------|-------|
| From the school               | 1     |
| Network neighborhood site     | 1     |
| PTO                           | 1     |
| School's website.             | 1     |
| Through the school newsletter | 1     |

Q10. Have you or anyone else installed any of those items in your home, even if they were taken out later?

| Response Option | Count | Percent (n=334) |
|-----------------|-------|-----------------|
| Yes             | 312   | 93%             |
| No              | 22    | 7%              |
| Don't know      | 0     | 0%              |

Q12. Which of the items did you install, even if they were taken out later?

| Response Option  | Count | Percent (n=312) |
|--|-------|-----------------|
| Showerhead   | 153   | 49%             |
| Kitchen faucet aerator                                       | 109   | 35%             |
| Bathroom faucet aerator                                      | 104   | 33%             |
| Night light  | 259   | 83%             |
| Energy efficient light bulb(s) (LEDs)                        | 297   | 95%             |
| Insulator gaskets for light switches and electricity outlets | 103   | 33%             |
| I never installed any of the items from the kit              | 0     | 0%              |

Q13. In addition to the night light, there were two LED light bulbs in the kit. Did you install one or both of the LED light bulbs in the kit?

| Response Option                          | Count | Percent (n=297) |
|--|-------|-----------------|
| Yes - I installed both LEDs              | 237   | 80%             |
| No - I installed only one LED light bulb | 50    | 17%             |
| Don't know                               | 10    | 3%              |

Q15. How many of the light switch gasket insulators from the kit did you *[if needed: or anyone else]* install in your home?

| Response Option | Count | Percent (n=103) |
|-----------------|-------|-----------------|
| None            | 3     | 3%              |
| One             | 11    | 11%             |
| Two             | 31    | 30%             |
| Three           | 7     | 7%              |
| Four            | 44    | 43%             |
| Don't know      | 7     | 7%              |

Q16. How many electrical outlet gasket insulators from the kit did you *[if needed: or anyone else]* install in your home?

| Response Option | Count | Percent (n=103) |
|-----------------|-------|-----------------|
| None            | 4     | 4%              |
| One             | 6     | 6%              |
| Two             | 29    | 28%             |
| Three           | 5     | 5%              |
| Four            | 20    | 19%             |
| Five            | 2     | 2%              |
| Six             | 5     | 5%              |
| Seven           | 1     | 1%              |
| Eight           | 18    | 17%             |
| Don't know      | 13    | 13%             |

Q17. Overall, how satisfied are you with the item[s] you installed? Please use 0 to 10 scale, where 0 is very dissatisfied and 10 is very satisfied. How satisfied are you with...

|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Don't know | Total |
|--|---|---|---|---|---|---|---|---|---|---|----|------------|-------|
|  |   |   |   |   |   |   |   |   |   |   |    |            |       |

APPENDIX G

SURVEY RESULTS

|   |        |        |        |        |        |        |        |             |             |             |             |        |             |
|---|--------|--------|--------|--------|--------|--------|--------|-------------|-------------|-------------|-------------|--------|-------------|
| Show<br>erhead                                  | 1<br>% | 1<br>% | 1<br>% | 1<br>% | 1<br>% | 5<br>% | 3<br>% | 1<br>3<br>% | 1<br>3<br>% | 1<br>0<br>% | 5<br>0<br>% | 1<br>% | 1<br>5<br>3 |
| Kitchen<br>faucet<br>aerator                    | 2<br>% | 0<br>% | 1<br>% | 1<br>% | 1<br>% | 5<br>% | 3<br>% | 7<br>%      | 8<br>%      | 3<br>%      | 6<br>7<br>% | 3<br>% | 1<br>0<br>9 |
| Bathroom<br>faucet<br>aerator                   | 2<br>% | 1<br>% | 0<br>% | 3<br>% | 0<br>% | 5<br>% | 3<br>% | 9<br>%      | 9<br>%      | 7<br>%      | 6<br>2<br>% | 1<br>% | 1<br>0<br>4 |
| Night<br>light                                  | 0<br>% | 1<br>% | 0<br>% | 1<br>% | 0<br>% | 1<br>% | 1<br>% | 3<br>%      | 1<br>0<br>% | 8<br>%      | 7<br>5<br>% | 0<br>% | 2<br>5<br>9 |
| Energy<br>efficient<br>light<br>bulbs<br>(LEDs) | 1<br>% | 0<br>% | 0<br>% | 1<br>% | 0<br>% | 0<br>% | 2<br>% | 3<br>%      | 5<br>%      | 1<br>0<br>% | 7<br>7<br>% | 0<br>% | 2<br>9<br>7 |
| Insulator<br>gaske<br>ts                        | 0<br>% | 0<br>% | 0<br>% | 1<br>% | 2<br>% | 2<br>% | 1<br>% | 6<br>%      | 1<br>4<br>% | 7<br>%      | 5<br>9<br>% | 9<br>% | 1<br>0<br>3 |

Q17a. Can you please explain any dissatisfaction you had with the showerhead?

| Response Option  | Count |
|--|-------|
| Absolutely no water pressure. Takes forever to rinse soap off.<br>Had another water saver head and it had tons of pressure.<br>Uninstalled the free one after 2 days. I was itchy because soap<br>would not rinse off without leaving the water on forever. I feel I<br>used more water using this head because I had to leave the<br>water on longer. | 1     |
| I wish there was flow from the center of the shower head as well<br>as the circle. It makes washing longer hair a little harder to get<br>the shampoo out.   | 1     |
| It was not like the one we already had installed. The one we had<br>was flatter and spread more water.   | 1     |
| It's a dumb criticism, but it doesn't look as cool as it could.  | 1     |
| Live in apartment it isn't dissatisfaction with the shower head but<br>with the general water pressure at apartment  | 1     |
| Pressure was very poor   | 1     |
| Shower head leaks water  | 1     |
| The water flow is different and we have to get used to it.   | 1     |
| Too slow   | 1     |
| Very slow  | 1     |



| Response Option   | Count |
|---|-------|
| Water flow pressure was very low. Took longer to wash out soap or to clean off! | 1     |

Q17b. Can you please explain any dissatisfaction you had with the kitchen faucet aerator?

| Response Option  | Count |
|--|-------|
| Came out to slow   | 1     |
| Didn't properly fit right on the sink.   | 1     |
| It kept leaking even when the water was shut off so i had to put the old one back on.                  | 1     |
| It made water squirt out everywhere  | 1     |
| It was too large for my faucet, it needed an additional adapter  | 1     |
| Just don't like the loss of flow   | 1     |
| Low water pressure. Very hard to rinse off dishes and takes longer!                                    | 1     |
| Not saving   | 1     |
| the only con is the kitchen water doesn't have as much water power/pressure when washing as it used to | 1     |
| There was not enough pressure  | 1     |
| We couldn't install it correctly. Wasn't matching the sink I believe.                                  | 1     |

Q17c. Can you please explain any dissatisfaction you had with the bathroom faucet aerator?

| Response Option  | Count |
|--|-------|
| Cut back too much water  | 1     |
| Didn't properly fit right.   | 1     |
| It didn't fit our faucet correctly   | 1     |
| Low water pressure and so wouldn't even wash tooth paste off tooth brushes!! Removed them all. | 1     |
| Made water squirt out everywhere   | 1     |
| Not saving   | 1     |
| Sprays water out   | 1     |

Q17d. Can you please explain any dissatisfaction you had with the night light?

| Response Option  | Count |
|--|-------|
| I'd prefer it to have an on/off switch   | 1     |
| I'm not really sure what the nightlight does or how it will save me energy at this time. | 1     |
| It is not bright enough.   | 1     |
| It's not very bright   | 1     |

| Response Option   | Count |
|---|-------|
| No just wasn't needed.                                  | 1     |
| Not bright enough for my needs                          | 1     |
| Not saving  | 1     |
| Nothing but an energy user with little helping of light | 1     |
| very happy with the night light                         | 1     |
| Wasn't bright enough for my child                       | 1     |

Q17e. Can you please explain any dissatisfaction you had with the energy efficient light bulbs (LEDs)?

| Response Option  | Count |
|--|-------|
| Blink sometimes  | 1     |
| Not a huge fan of the type of lighting they provide              | 1     |
| Not enough   | 1     |
| Not saving   | 1     |
| There are not as bright. I brought lights that were brighter.    | 1     |
| They were not bright enough for the area                         | 1     |
| They were too dim and it took a long time to actually get bright | 1     |

Q17f. Can you please explain any dissatisfaction you had with the insulator gaskets?

| Response Option  | Count |
|--|-------|
| I have an older home built in 1986. I have not noticed a difference in my home insulation since installing these. I installed them only on exterior walls. | 1     |
| I still feel air coming through.   | 1     |
| Not saving   | 1     |

Q18. Have you since uninstalled any of the items from the kit that you had previously installed?

| Response Option | Count | Percent (n=312) |
|-----------------|-------|-----------------|
| Yes             | 30    | 10%             |
| No              | 279   | 89%             |
| Don't know      | 3     | 1%              |

Q19. Which of the items did you uninstall?

| Response Option | Count (n=30) |
|-----------------|--------------|
| Showerhead      | 13           |

| Response Option                     | Count (n=30) |
|-------------------------------------|--------------|
| Kitchen faucet aerator              | 10           |
| Bathroom faucet aerator             | 4            |
| Night light                         | 8            |
| Energy efficient light bulbs (LEDs) | 5            |
| Insulator gaskets                   | 1            |
| Don't know                          | 1            |

Q20. Why were those items uninstalled? Let's start with...

Q20a. the showerhead?

| Response Option                                       | Count |
|---|-------|
| It was broken   | 1     |
| Didn't like how it worked                             | 8     |
| Didn't like how it looked                             | 2     |
| Other – Leaks water                                   | 1     |
| Other – Switched to handheld shower                   | 1     |
| Other – Wanted to install the one with the water line | 1     |
| Don't know  | 0     |

Q20b. the kitchen faucet aerator?

| Response Option  | Count |
|--|-------|
| It was broken  | 1     |
| Didn't like how it worked.   | 5     |
| Didn't like how it looked.   | 0     |
| Other – Couldn't install it correctly                                    | 1     |
| Other – Did not have an adapter  | 1     |
| Other – Had to install a filter Brita system                             | 1     |
| Other – Water kept leaking out of it even when the water was turned off. | 1     |
| Don't know   | 0     |

Q20c. the bathroom faucet aerator?

| Response Option              | Count |
|------------------------------|-------|
| It was broken                | 0     |
| Didn't like how it worked    | 2     |
| Didn't like how it looked    | 0     |
| Other – Didn't fit correctly | 1     |

| Response Option                                | Count |
|--|-------|
| Other – Sprays water out instead of the normal | 1     |
| Don't know                                     | 0     |

Q20d. the night light?

| Response Option   | Count |
|---|-------|
| It was broken   | 2     |
| Didn't like how it worked.                                    | 0     |
| Didn't like how it looked.                                    | 1     |
| Other – Child removed and lost the light                      | 1     |
| Other – To keep my lamps off                                  | 1     |
| Other – Too bright  | 1     |
| Other – Wasn't needed   | 1     |
| Other – We had to move the night light to a different outlet. | 1     |
| Don't know  | 0     |

Q20e. the energy efficient light bulbs (LEDs)?

| Response Option  | Count |
|--|-------|
| It was broken  | 2     |
| Didn't like how it worked.   | 1     |
| Didn't like how it looked.   | 1     |
| Other – They went out  | 1     |
| Other – Was not bright enough in the area but we did install into just a simple lamp | 1     |
| Don't know   | 0     |

Q20f. the insulator gaskets?

| Response Option            | Count |
|----------------------------|-------|
| It was broken              | 0     |
| Didn't like how it worked. | 0     |
| Didn't like how it looked. | 1     |
| Don't know                 | 0     |

Q21. You said you haven't installed [INPUT ONLY THOSE ITEMS IN Q12 IF Q12a-f = 2]. Which of those items do you plan to install in the next three months?

| Response Option | Count | Percent (n=314) |
|-----------------|-------|-----------------|
| Showerhead      | 63    | 20%             |

## APPENDIX G

## SURVEY RESULTS

|  |     |     |
|--|-----|-----|
| Kitchen faucet aerator   | 68  | 22% |
| Bathroom faucet aerator  | 82  | 26% |
| Night light  | 40  | 13% |
| Energy efficient lightbulbs (LEDs)                                   | 26  | 8%  |
| Insulator gaskets  | 92  | 29% |
| Im not planning on installing any of these in the next three months. | 106 | 34% |

Q22. What's preventing you from installing those items? Let's start with....

Q22. Showerhead...

| Response Option   | Count | Percent (n=118) |
|---|-------|-----------------|
| Didn't know what that was   | 2     | 2%              |
| Tried it, didn't fit  | 9     | 8%              |
| Tried it, didn't work as intended (please explain in the box below) | 6     | 5%              |
| Haven't gotten around to it   | 11    | 9%              |
| Current one is still working  | 33    | 28%             |
| Takes too much time to install it / No time / Too busy              | 3     | 3%              |
| Too difficult to install it, don't know how to do it                | 2     | 2%              |
| Don't have the tools I need   | 1     | 1%              |
| Don't have the items any longer (threw away, gave away)             | 1     | 1%              |
| Already have an efficient showerhead                                | 45    | 38%             |
| Other (please specify in the box below)                             | 21    | 18%             |
| Don't know  | 2     | 2%              |

Q22. Kitchen faucet aerator...

| Response Option   | Count | Percent (n=156) |
|---|-------|-----------------|
| Didn't know what that was   | 9     | 6%              |
| Tried it, didn't fit  | 32    | 21%             |
| Tried it, didn't work as intended (please explain in the box below) | 8     | 5%              |
| Haven't gotten around to it   | 28    | 18%             |
| Current one is still working  | 26    | 17%             |
| Takes too much time to install it / No time / Too busy              | 2     | 1%              |
| Too difficult to install it, don't know how to do it                | 4     | 3%              |
| Don't have the tools I need   | 1     | 1%              |

## APPENDIX G

## SURVEY RESULTS

|   |    |     |
|---|----|-----|
| Don't have the items any longer (threw away, gave away) | 2  | 1%  |
| Already have an efficient kitchen faucet aerator        | 34 | 22% |
| Other (please specify in the box below)                 | 23 | 15% |
| Don't know  | 3  | 2%  |

Q22. Bathroom faucet aerator...

| Response Option   | Count | Percent (n=148) |
|---|-------|-----------------|
| Didn't know what that was   | 13    | 9%              |
| Tried it, didn't fit  | 30    | 20%             |
| Tried it, didn't work as intended (please explain in the box below) | 6     | 4%              |
| Haven't gotten around to it   | 32    | 22%             |
| Current one is still working  | 15    | 10%             |
| Takes too much time to install it / No time / Too busy              | 1     | 1%              |
| Too difficult to install it, don't know how to do it                | 1     | 1%              |
| Don't have the tools I need   | 3     | 2%              |
| Don't have the items any longer (threw away, gave away)             | 2     | 1%              |
| Already have an efficient bathroom faucet aerator                   | 24    | 16%             |
| Other (please specify in the box below)                             | 25    | 17%             |
| Don't know  | 4     | 3%              |

Q22. Energy efficient lightbulbs (LEDs)...

| Response Option   | Count | Percent (n=11) |
|---|-------|----------------|
| Didn't know what that was   | 0     | 0%             |
| Tried it, didn't fit  | 1     | 9%             |
| Tried it, didn't work as intended (please explain in the box below) | 0     | 0%             |
| Haven't gotten around to it   | 1     | 9%             |
| Current one is still working  | 2     | 18%            |
| Takes too much time to install it / No time / Too busy              | 0     | 0%             |
| Too difficult to install it, don't know how to do it                | 0     | 0%             |
| Don't have the tools I need   | 0     | 0%             |
| Don't have the items any longer (threw away, gave away)             | 0     | 0%             |
| Already have LEDs   | 3     | 27%            |
| Other (please specify in the box below)                             | 3     | 27%            |

## APPENDIX G

## SURVEY RESULTS

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|            |   |    |
|------------|---|----|
| Don't know | 1 | 9% |
|------------|---|----|

Q22. Night lights...

| Response Option   | Count | Percent (n=35) |
|---|-------|----------------|
| Didn't know what that was   | 0     | 0%             |
| Tried it, didn't fit  | 1     | 3%             |
| Tried it, didn't work as intended (please explain in the box below) | 2     | 6%             |
| Haven't gotten around to it   | 10    | 29%            |
| Current one is still working  | 5     | 14%            |
| Takes too much time to install it / No time / Too busy              | 0     | 0%             |
| Too difficult to install it, don't know how to do it                | 0     | 0%             |
| Don't have the tools I need   | 0     | 0%             |
| Don't have the items any longer (threw away, gave away)             | 1     | 3%             |
| Other (please specify in the box below)                             | 13    | 37%            |
| Don't know  | 3     | 9%             |

Q22. Insulator gaskets...

| Response Option   | Count | Percent (n=139) |
|---|-------|-----------------|
| Didn't know what that was   | 12    | 9%              |
| Tried it, didn't fit  | 7     | 5%              |
| Tried it, didn't work as intended (please explain in the box below) | 4     | 3%              |
| Haven't gotten around to it   | 48    | 35%             |
| Current one is still working  | 19    | 14%             |
| Takes too much time to install it / No time / Too busy              | 10    | 7%              |
| Too difficult to install it, don't know how to do it                | 9     | 6%              |
| Don't have the tools I need   | 3     | 2%              |
| Don't have the items any longer (threw away, gave away)             | 2     | 1%              |
| Other (please specify in the box below)                             | 27    | 19%             |
| Don't know  | 9     | 6%              |

Q22a. Thinking of the items you installed, would you be interested in receiving any more of them from Duke Energy? If so, which ones?

| Response Option | Count | Percent (n=326) |
|-----------------|-------|-----------------|
|-----------------|-------|-----------------|

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|  |     |     |
|--|-----|-----|
| Yes, I would like another energy-efficient showerhead      | 79  | 24% |
| Yes, I would like another kitchen faucet aerator           | 45  | 14% |
| Yes, I would like more bathroom faucet aerators            | 47  | 14% |
| Yes, I would like more energy-efficient night lights       | 190 | 58% |
| Yes, I would like more energy-efficient light bulbs (LEDs) | 254 | 78% |
| Yes, I would like more switch/outlet gasket insulators     | 49  | 15% |
| No, I am not interested in receiving any more of the items | 32  | 10% |
| Don't know   | 79  | 24% |

Q22b. What would be your preferred way to request these additional items?

| Response Option       | Count | Percent (n=293) |
|-----------------------|-------|-----------------|
| Internet              | 218   | 74%             |
| Telephone             | 35    | 12%             |
| Pre-paid postcard     | 66    | 23%             |
| Other, please specify | 5     | 2%              |
| Don't know            | 7     | 2%              |

Q26. You said you installed the night light. Did the night light replace an existing night light?

| Response Option | Count | Percent (n=251) |
|-----------------|-------|-----------------|
| Yes             | 167   | 67%             |
| No              | 83    | 33%             |
| Don't know      | 1     | 0%              |

Q27. Did the old nightlight have a bulb that you could take out and replace once it burned out?

| Response Option | Count | Percent (n=167) |
|-----------------|-------|-----------------|
| Yes             | 113   | 68%             |
| No              | 50    | 30%             |
| Don't know      | 4     | 2%              |

Q28. You said you installed at least one of the energy efficient lights. What type of bulb(s) did you replace with the energy efficient lightbulbs?

| Response Option  | Count | Percent (n=292) |
|--|-------|-----------------|
| All incandescent (old fashioned light bulb - likely purchased more than two years ago) | 132   | 45%             |



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|   |     |     |
|---|-----|-----|
| All halogen (looks like an incandescent, but has a glass tube inside of the bulb) | 8   | 3%  |
| All CFL (spiral or twisty shaped bulb that fits into ordinary light fixtures)     | 123 | 42% |
| All LED (new bulb type that uses little electricity and lasts a long time)        | 12  | 4%  |
| Some combination of bulb types (please specify which ones in the box below)       | 13  | 4%  |
| Don't know  | 4   | 1%  |

Q29. In what rooms did you install the energy efficient lightbulbs that were included in the kit?

| Response Option                              | Count | Percent (n=292) |
|--|-------|-----------------|
| Living room                                  | 131   | 45%             |
| Dining room                                  | 20    | 7%              |
| Bedroom                                      | 104   | 36%             |
| Kitchen                                      | 56    | 19%             |
| Bathroom                                     | 59    | 20%             |
| Den  | 8     | 3%              |
| Garage                                       | 4     | 1%              |
| Hallway                                      | 25    | 9%              |
| Basement                                     | 4     | 1%              |
| Outdoors                                     | 5     | 2%              |
| Other area (please specify in the box below) | 11    | 4%              |
| Don't Know                                   | 6     | 2%              |

Q30. Have you adjusted the temperature of your water heater based on the Hot Water Gauge Card included in your kit?

| Response Option                              | Count | Percent (n=334) |
|--|-------|-----------------|
| Yes  | 57    | 17%             |
| No   | 222   | 66%             |
| Don't recall seeing the Hot Water Gauge Card | 45    | 13%             |
| Don't know                                   | 10    | 3%              |

Q31. Do you know what the old temperature setting on your hot water heater was?

| Response Option | Count | Percent (n=57) |
|-----------------|-------|----------------|
| Yes             | 16    | 28%            |
| No              | 41    | 72%            |

Q31a. Temperature setting...

| Response Option                         | Count |
|---|-------|
| 120                                     | 2     |
| 128                                     | 1     |
| 130                                     | 3     |
| 140                                     | 4     |
| 155                                     | 1     |
| 160                                     | 1     |
| Actually, it was not hot enough to read | 1     |
| The recommended for you                 | 1     |
| Very hot                                | 1     |

Q32. And what was the new temperature setting you set your hot water heater to?

| Response Option | Count |
|-----------------|-------|
| 72              | 1     |
| 100             | 1     |
| 105             | 1     |
| 110             | 1     |
| 118             | 1     |
| 120             | 8     |
| 130             | 2     |
| 140             | 1     |
| 180             | 1     |
| Low             | 1     |

Q33. Is the new water heater temperature setting still in place?

| Response Option | Count | Percent (n=57) |
|-----------------|-------|----------------|
| Yes             | 51    | 90%            |
| No              | 2     | 4%             |
| Don't know      | 4     | 7%             |

Q34. Why did you change the water heater temperature a second time?

| Response Option             | Count |
|-----------------------------|-------|
| It was too cold for showers | 1     |
| Not hot enough              | 1     |

Q35. What is the fuel type of your water heater?

| Response Option                         | Count | Percent (n=334) |
|---|-------|-----------------|
| Electricity                             | 213   | 64%             |
| Natural Gas                             | 106   | 32%             |
| Other (please specify in the box below) | 3     | 1%              |
| Don't know                              | 12    | 4%              |

Q36. How old is your water heater?

| Response Option             | Count | Percent (n=334) |
|-----------------------------|-------|-----------------|
| Less than five years old    | 111   | 33%             |
| Five to nine years old      | 62    | 19%             |
| Ten to fifteen years old    | 50    | 15%             |
| More than fifteen years old | 19    | 6%              |
| Don't know                  | 92    | 28%             |

Q37. If you had not received the free efficiency items in the kit, would you have purchased and installed any of these same items within the next year?

| Response Option | Count | Percent (n=309) |
|-----------------|-------|-----------------|
| Yes             | 119   | 39%             |
| No              | 105   | 34%             |
| Don't know      | 85    | 28%             |

Q38. What items would you have purchased and installed within the next year?

| Response Option                                | Count | Percent (n=117) |
|--|-------|-----------------|
| Energy-Efficient Showerhead                    | 24    | 21%             |
| Kitchen faucet aerator                         | 8     | 7%              |
| Bathroom faucet aerator                        | 7     | 6%              |
| Energy-Efficient Night light                   | 38    | 33%             |
| Energy efficient lightbulbs (LEDs)             | 101   | 86%             |
| Switch/Outlet Gasket Insulators                | 7     | 6%              |
| No I would not have purchased any of the items | 0     | 0%              |
| Other  | 0     | 0%              |
| Don't know                                     | 1     | 1%              |

Q39. If you had not received them for free in the kit, how many LED light bulbs would you have purchased?

| Response Option | Count | Percent (n=83) |
|-----------------|-------|----------------|
| One             | 3     | 4%             |
| Two             | 58    | 70%            |
| Don't know      | 22    | 27%            |

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Q40. Now, thinking about the water savings items that were provided in the kit - using a scale from 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential” how influential were the following factors on your decision to install the water saving items from the kit? How influential was...

|   | 0  | 1  | 2  | 3  | 4  | 5   | 6  | 7   | 8   | 9   | 10  | Don't know | Total |
|---|----|----|----|----|----|-----|----|-----|-----|-----|-----|------------|-------|
| The fact that the items were free   | 3% | 0% | 1% | 1% | 1% | 6%  | 4% | 5%  | 8%  | 6%  | 64% | 2%         | 191   |
| The fact that the items were mailed to your house                           | 1% | 0% | 1% | 1% | 0% | 4%  | 1% | 4%  | 7%  | 5%  | 76% | 1%         | 191   |
| The chance to win cash prizes for your household and school                 | 8% | 1% | 3% | 2% | 2% | 9%  | 3% | 4%  | 5%  | 5%  | 57% | 4%         | 191   |
| Information in the kit about how the items would save energy                | 1% | 0% | 0% | 2% | 2% | 7%  | 5% | 6%  | 12% | 13% | 50% | 3%         | 191   |
| Information that your child brought home from school                        | 1% | 0% | 2% | 4% | 2% | 9%  | 3% | 5%  | 13% | 9%  | 48% | 4%         | 191   |
| Other information or advertisements from Duke Energy, including its website | 8% | 1% | 1% | 5% | 2% | 10% | 6% | 10% | 11% | 7%  | 37% | 3%         | 191   |

Q41. Using a scale from 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential” how influential were the following factors on your decision to install the lightbulbs from the kit? How influential was...



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|   | 0   | 1  | 2  | 3  | 4  | 5   | 6  | 7   | 8   | 9   | 10  | Don't know | Total |
|---|-----|----|----|----|----|-----|----|-----|-----|-----|-----|------------|-------|
| The fact that the items were free   | 3%  | 0% | 1% | 1% | 1% | 4%  | 1% | 4%  | 7%  | 9%  | 70% | 1%         | 292   |
| The fact that the items were mailed to your house                           | 2%  | 0% | 0% | 1% | 0% | 3%  | 2% | 5%  | 6%  | 8%  | 73% | 0%         | 292   |
| The chance to win cash prizes for your household and school                 | 10% | 2% | 1% | 1% | 3% | 7%  | 3% | 4%  | 7%  | 7%  | 52% | 3%         | 292   |
| Information in the kit about how the items would save energy                | 5%  | 0% | 2% | 2% | 1% | 8%  | 5% | 11% | 11% | 11% | 44% | 1%         | 292   |
| Information that your child brought home from school                        | 7%  | 0% | 2% | 3% | 2% | 8%  | 4% | 10% | 12% | 8%  | 42% | 3%         | 292   |
| Other information or advertisements from Duke Energy, including its website | 12% | 2% | 2% | 3% | 2% | 13% | 5% | 9%  | 11% | 7%  | 30% | 2%         | 292   |

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- Q42. I've got just a few final questions about other energy saving activities. First, Duke Energy asked us to ask a couple of questions about the Home Energy Reports it sends to some families. These reports provide detailed information on your home's energy usage and compare your home to similar homes of your neighbors.

During the school year, did you receive any Home Energy Reports from Duke Energy?

| Response Option | Count | Percent (n=187) |
|-----------------|-------|-----------------|
| Yes             | 158   | 85%             |
| No              | 22    | 12%             |
| Don't know      | 7     | 4%              |

- Q43. How often do you read those Home Energy Reports?

| Response Option | Count | Percent (n=158) |
|-----------------|-------|-----------------|
| Never           | 0     | 0%              |
| Sometimes       | 37    | 23%             |
| Always          | 121   | 77%             |
| Don't know      | 0     | 0%              |

- Q44. The Home Energy Reports provide specific recommendations for how you can save energy in your home. Have you completed any of the energy saving recommendations from the Home Energy Reports? If so, which ones? [MULTIPLE RESPONSE]

| Response Option  | Count |
|--|-------|
| Nothing  | 27    |
| Purchased energy saving products for my home and received a Duke Energy rebate         | 6     |
| Purchased energy saving products for my home but did not receive a Duke Energy rebate  | 28    |
| Made energy saving modifications to my home (example: installed insulation or windows) | 34    |
| Adjusted how or when I use energy in my home   | 85    |
| Looked for additional information on how to save energy                                | 35    |
| Other (please specify in the box below)  | 10    |
| Don't know   | 5     |

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- Q45. Since your child learned about energy conservation at school and signed up for your energy kit from Duke Energy, has your child adopted any **new** behaviors to help save energy in your home? This would only include new energy saving **behaviors** that your child adopted since receiving the kit. *[IF NEEDED: like turning off the lights when room is unoccupied]*

| Response Option                          | Count |
|--|-------|
| Not applicable - no new behaviors        | 84    |
| Turn off lights when not in a room       | 209   |
| Turn off electronics when not using them | 133   |
| Take shorter showers                     | 89    |
| Other                                    | 21    |
| Don't know                               | 11    |

Q45a. Other...

| Response Option  | Count |
|--|-------|
| Addressing the television being left on.   | 1     |
| He was very excited to get the kit and loved installing the new things.  | 1     |
| I don't know how to answer this, because my child doesn't live with me.  | 1     |
| I was always taught to be aware of cutting off lights etc. so I've always felt my children to do the same thing. | 1     |
| Keep the doors shut  | 1     |
| No but they were already aware of energy savings   | 1     |
| No child in family - wife is teacher at the school   | 1     |
| Reminds others not to waste water when brushing teeth  | 1     |
| She has increased awareness  | 1     |
| She's 6.   | 1     |
| Turn off water when brushing teeth or washing hands  | 1     |
| Turns water off while brushing teeth   | 7     |
| Using less water   | 1     |
| Using the night light  | 1     |
| When she brushes her teeth, she turns the water off. She opens up the blinds to use sunlight instead of lights.  | 1     |

Q45b. [IF Q45 =2-5] Before receiving the kit, was your child already...

| Response Option                             | Count | Percent (n=108) |
|---|-------|-----------------|
| Turning off lights when not in a room       | 81    | 75%             |
| Turning off electronics when not using them | 44    | 41%             |



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|                        |    |     |
|------------------------|----|-----|
| Taking shorter showers | 23 | 21% |
| Other                  | 11 | 10% |

- Q46. Since receiving your energy kit from Duke Energy, have you adopted any new behaviors to help save energy in your home? This would only include new energy saving **behaviors** that you have adopted since receiving the kit. [IF NEEDED: like turning off the lights when room is unoccupied]  
[MULTIPLE RESPONSE] *[Interviewer: Do not read list. After each response ask, "Anything else?"]*

| Response Option                                    | Count |
|--|-------|
| Not applicable - no new behaviors                  | 75    |
| Turning off lights when not in a room              | 157   |
| Turning off furnace when not home                  | 42    |
| Turning off air conditioning when not home         | 74    |
| Changed thermostat settings to use less energy     | 151   |
| Using fans instead of air conditioning             | 109   |
| Turning off electronics when we are not using them | 126   |
| Taking shorter showers                             | 80    |
| Turning water heat thermostat down                 | 40    |
| Other (please specify in the box below)            | 29    |
| Don't know   | 7     |

Q46a. Other...

| Response Option  | Count |
|--|-------|
| Closing blinds during the day  | 1     |
| Cut down on use of electronics as well as cut down on how much light we use per room                               | 1     |
| Do not let the water run when cooking  | 1     |
| Doing laundry less frequently. Using solar lighting for exterior.  | 1     |
| For the heater, put 1 down, instead of at 68, put at 67.   | 1     |
| Girls will use natural lights instead of overhead electrical lights  | 1     |
| I don't know of any, we are pretty efficient anyway.   | 1     |
| I was already very conscious on saving energy to save money  | 1     |
| I'm trying to get my trailer under bin to help save energy, especially during the winter to save on heating costs. | 1     |
| Installing energy-efficient equipment  | 1     |
| More aware of electricity usage, bought more LED's   | 1     |
| No running a half-full washer  | 1     |
| Opening the blinds to use sunlight.  | 1     |

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| Response Option   | Count |
|---|-------|
| Purchasing and installing new energy efficient appliances including an a/c      | 1     |
| Replacing all light bulbs for LEDs  | 1     |
| Switched to energy-efficient lightbulbs   | 1     |
| Trying to be more energy conscience and installed energy efficient windows      | 1     |
| Turn off water when brushing teeth or cooking                                   | 1     |
| Turning off the water when not using it.  | 1     |
| Turning off water while brushing teeth  | 1     |
| Turning water on for less time  | 1     |
| Using electron appliances at night.   | 1     |
| Using energy-efficient lighting   | 1     |
| Using open windows instead of air conditioner. Using energy-efficient equipment | 1     |
| Using the toilet water gauges to consume less water                             | 1     |
| Watch how much water we use   | 1     |
| Water conservation  | 1     |
| We were already doing these things  | 1     |

Q46b. [IF Q46 =2-10] Before receiving the kit, were you already...

| Response Option  | Count | Percent (n=183) |
|--|-------|-----------------|
| Turning off lights when not in a room                                      | 121   | 66%             |
| Turning off furnace when not home  | 25    | 14%             |
| Turning off air conditioning when not home                                 | 33    | 18%             |
| Changing thermostat settings so heating or cooling system uses less energy | 75    | 41%             |
| Using fans instead of air conditioning                                     | 60    | 33%             |
| Turning off electronics when not using them                                | 72    | 39%             |
| Taking shorter showers   | 27    | 15%             |
| Turning water heat thermostat down   | 13    | 7%              |
| Other  | 11    | 6%              |

Q47. On a scale of 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential,” how much influence did Duke Energy’s kit and materials on saving energy have on your decision to [LIST ALL RESPONSES FROM Q46].

| Response Option            | Count | Percent (n=252) |
|----------------------------|-------|-----------------|
| 0 – Not at all influential | 5     | 2%              |

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|                            |    |     |
|----------------------------|----|-----|
| 1                          | 1  | 0%  |
| 2                          | 0  | 0%  |
| 3                          | 1  | 0%  |
| 4                          | 3  | 1%  |
| 5                          | 14 | 6%  |
| 6                          | 22 | 9%  |
| 7                          | 41 | 16% |
| 8                          | 49 | 19% |
| 9                          | 18 | 7%  |
| 10 - Extremely influential | 97 | 38% |
| Don't know                 | 1  | 0%  |

Q47a. Thinking of the near future, are you interested in purchasing any additional products or services to help save energy in your home?

| Response Option | Count | Percent (n=334) |
|-----------------|-------|-----------------|
| Yes             | 195   | 58%             |
| No              | 65    | 19%             |
| Don't know      | 74    | 22%             |

Q47b. What additional products or services are you interested in purchasing?

| Response Option                        | Count |
|--|-------|
| Energy efficient appliances            | 76    |
| Efficient heating or cooling equipment | 54    |
| Efficient windows                      | 54    |
| Adding insulation                      | 54    |
| Sealing air leaks                      | 92    |
| Sealing or insulating ducts            | 47    |
| Efficient lighting (LEDs)              | 134   |
| Energy efficient water heater          | 60    |
| Internet connected "smart" thermostat  | 63    |
| Other                                  | 18    |
| Don't know                             | 6     |

Q48. Since receiving your energy kit from Duke Energy, have you purchased and installed any other **products** or made any improvements to your home to help save energy?

| Response Option | Count | Percent (n=334) |
|-----------------|-------|-----------------|
|-----------------|-------|-----------------|

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|            |     |     |
|------------|-----|-----|
| Yes        | 92  | 28% |
| No         | 226 | 68% |
| Don't know | 16  | 5%  |

Q49. What **products** have you purchased and installed to help save energy in your home?  
[MULTIPLE RESPONSE]

| Response Option                               | Count |
|---|-------|
| Bought energy efficient appliances            | 26    |
| Moved into an ENERGY STAR home                | 2     |
| Bought efficient heating or cooling equipment | 7     |
| Bought efficient windows                      | 4     |
| Added insulation                              | 10    |
| Sealed air leaks                              | 18    |
| Sealed ducts                                  | 8     |
| Bought LEDs                                   | 59    |
| Bought CFLs                                   | 8     |
| Installed an energy efficient water heater    | 12    |
| None – no other actions taken                 | 0     |
| Other (please specify in the box below)       | 8     |
| Don't know                                    | 0     |

Q49a. Other...

| Response Option  | Count |
|--|-------|
| Added window tinting                                       | 1     |
| I purchased more foam that goes behind the light switches. | 1     |
| Installed a storm door                                     | 1     |
| one energy efficient a/c                                   | 1     |
| programmable thermostat                                    | 1     |
| Smart thermostat   | 1     |
| Water leakage tape   | 1     |
| Water Program.   | 1     |

Q50. Did you get a rebate from Duke Energy for any of those products or services? If so, which ones?

| Response Option                               | Count |
|---|-------|
| Bought energy efficient appliances            | 0     |
| Moved into an ENERGY STAR home                | 0     |
| Bought efficient heating or cooling equipment | 1     |

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| Response Option                            | Count |
|--|-------|
| Bought efficient windows                   | 0     |
| Bought additional insulation               | 0     |
| Sealed air leaks                           | 1     |
| Sealed ducts                               | 0     |
| Bought LEDs                                | 4     |
| Bought CFLs                                | 1     |
| Installed an energy efficient water heater | 0     |
| Other                                      | 0     |
| I did not get any Duke Rebates             | 79    |
| Don't know                                 | 7     |

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Q51. On a scale of 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential”, how much influence did the Duke Energy schools program have on your decision to...

|  | 0 -<br>Not<br>at all<br>influe<br>ntial | 1           | 2           | 3           | 4      | 5           | 6           | 7           | 8           | 9           | 10 -<br>Extre<br>mely<br>influe<br>ntial | Do<br>n't<br>Kn<br>ow | To<br>tal |
|--|---|-------------|-------------|-------------|--------|-------------|-------------|-------------|-------------|-------------|--|-----------------------|-----------|
| Buy energy<br>efficient<br>appliances            | 8%                                      | 0<br>%      | 0<br>%      | 4<br>%      | 8<br>% | 1<br>2<br>% | 0<br>%      | 1<br>5<br>% | 1<br>5<br>% | 8<br>%      | 31%                                      | 0<br>%                | 26        |
| Move into an<br>ENERGY STAR<br>home              | 0%                                      | 0<br>%      | 0<br>%      | 0<br>%      | 0<br>% | 0<br>%      | 0<br>%      | 0<br>%      | 0<br>%      | 0<br>%      | 50%                                      | 50<br>%               | 2         |
| Buy efficient<br>heating or cooling<br>equipment | 29%                                     | 0<br>%      | 0<br>%      | 0<br>%      | 0<br>% | 0<br>%      | 0<br>%      | 2<br>9<br>% | 0<br>%      | 0<br>%      | 29%                                      | 14<br>%               | 7         |
| Buy efficient<br>windows                         | 25%                                     | 0<br>%      | 2<br>5<br>% | 0<br>%      | 0<br>% | 2<br>5<br>% | 0<br>%      | 0<br>%      | 0<br>%      | 0<br>%      | 25%                                      | 0<br>%                | 4         |
| Add insulation                                   | 40%                                     | 1<br>0<br>% | 0<br>%      | 1<br>0<br>% | 0<br>% | 1<br>0<br>% | 0<br>%      | 0<br>%      | 0<br>%      | 1<br>0<br>% | 20%                                      | 0<br>%                | 10        |
| Seal air leaks                                   | 0%                                      | 6<br>%      | 6<br>%      | 0<br>%      | 6<br>% | 2<br>2<br>% | 1<br>7<br>% | 6<br>%      | 0<br>%      | 6<br>%      | 33%                                      | 0<br>%                | 18        |
| Seal ducts                                       | 0%                                      | 0<br>%      | 1<br>3<br>% | 0<br>%      | 0<br>% | 5<br>0<br>% | 0<br>%      | 0<br>%      | 0<br>%      | 0<br>%      | 38%                                      | 0<br>%                | 8         |
| Buy LEDs   | 10%                                     | 2<br>%      | 0<br>%      | 3<br>%      | 0<br>% | 1<br>2<br>% | 1<br>4<br>% | 1<br>0<br>% | 1<br>0<br>% | 7<br>%      | 29%                                      | 2<br>%                | 59        |
| Buy CFLs   | 0%                                      | 0<br>%      | 0<br>%      | 0<br>%      | 0<br>% | 2<br>5<br>% | 2<br>5<br>% | 2<br>5<br>% | 0<br>%      | 0<br>%      | 25%                                      | 0<br>%                | 8         |
| Install an energy<br>efficient water<br>heater   | 8%                                      | 0<br>%      | 8<br>%      | 0<br>%      | 0<br>% | 8<br>%      | 8<br>%      | 0<br>%      | 0<br>%      | 0<br>%      | 50%                                      | 17<br>%               | 12        |

APPENDIX G

SURVEY RESULTS

|       |     |             |        |        |        |        |        |             |        |        |     |        |   |
|-------|-----|-------------|--------|--------|--------|--------|--------|-------------|--------|--------|-----|--------|---|
| Other | 50% | 1<br>3<br>% | 0<br>% | 0<br>% | 0<br>% | 0<br>% | 0<br>% | 1<br>3<br>% | 0<br>% | 0<br>% | 25% | 0<br>% | 8 |
|-------|-----|-------------|--------|--------|--------|--------|--------|-------------|--------|--------|-----|--------|---|

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Q52. What kinds of appliance(s) did you buy?

| Response Option     | Count |
|---------------------|-------|
| Refrigerator        | 7     |
| Stand-alone Freezer | 5     |
| Dishwasher          | 10    |
| Clothes washer      | 12    |
| Clothes dryer       | 9     |
| Oven                | 8     |
| Microwave           | 7     |
| Other               | 1     |
| Don't know          | 1     |

Q53. Was the [INSERT Q52 RESPONSE] an ENERGY STAR or high-efficiency model?

| Response Option     | Count | Percent (n=16) |
|---------------------|-------|----------------|
| Refrigerator        | 5     | 31%            |
| Stand-alone Freezer | 3     | 19%            |
| Dishwasher          | 8     | 50%            |
| Clothes washer      | 10    | 63%            |
| Clothes dryer       | 8     | 50%            |
| Oven                | 6     | 38%            |
| Microwave           | 3     | 19%            |
| Other               | 0     | 0%             |

Q54. Does the new clothes dryer use natural gas?

| Response Option               | Count |
|-------------------------------|-------|
| Yes- it uses natural gas      | 1     |
| No – does not use natural gas | 8     |
| Don't know                    | 0     |

Q55. What type of heating or cooling equipment did you buy?

| Response Option                  | Count | Percent (n=5) |
|----------------------------------|-------|---------------|
| Central air conditioner          | 2     | 40%           |
| Window/room air conditioner unit | 0     | 0%            |
| Wall air conditioner unit        | 0     | 0%            |
| Air source heat pump             | 2     | 40%           |
| Geothermal heat pump             | 0     | 0%            |
| Boiler                           | 0     | 0%            |



| Response Option                         | Count | Percent (n=5) |
|---|-------|---------------|
| Furnace                                 | 1     | 20%           |
| Wifi-enabled thermostat                 | 1     | 20%           |
| Other (please specify in the box below) | 0     | 0%            |
| Don't know                              | 0     | 0%            |

Q55a. Other...

| Response Option | Count |
|-----------------|-------|
| Not applicable  | 0     |

Q56. Does the new [INSERT Q55 RESPONSE] use natural gas?

| Response Option | Count |
|-----------------|-------|
| Yes             | 1     |

Q57. Was the [INSERT Q55 RESPONSE] an ENERGY STAR or high-efficiency model?

| Response Option                         | Count | Percent (n=4) |
|---|-------|---------------|
| Central air conditioner                 | 2     | 50%           |
| Window/room air conditioner unit        | 0     | 0%            |
| Wall air conditioner unit               | 0     | 0%            |
| Air source heat pump                    | 2     | 50%           |
| Geothermal heat pump                    | 0     | 0%            |
| Boiler                                  | 0     | 0%            |
| Furnace                                 | 1     | 25%           |
| Wifi-enabled thermostat                 | 0     | 0%            |
| Other (please specify in the box below) | 0     | 0%            |
| Don't know                              | 0     | 0%            |

Q58. How many windows did you install?

| Response Option | Count |
|-----------------|-------|
| 3               | 1     |
| 6               | 1     |
| 8               | 1     |

Q59. Did you add insulation to your attic, walls, or below the floor? [MULTIPLE RESPONSE]

| Response Option | Count |
|-----------------|-------|
| Attic           | 3     |
| Walls           | 2     |

| Response Option | Count |
|-----------------|-------|
| Below the floor | 3     |
| Don't know      | 0     |

Q60a. Approximately what proportion of the attic space did you add insulation?

| Response Option | Count |
|-----------------|-------|
| Not applicable  | 0     |

Q60b. Approximately what proportion of the wall space did you add insulation?

| Response Option | Count |
|-----------------|-------|
| Not applicable  | 0     |

Q60c. Approximately what proportion of the below the floor space did you add insulation?

| Response Option | Count |
|-----------------|-------|
| Not applicable  | 0     |

Q61. Do you know how many of LEDs you installed at your property?

| Response Option | Count |
|-----------------|-------|
| Yes             | 48    |
| Don't know      | 5     |

Q61a. How many of LEDs did you install in your property?

| Response Option | Count |
|-----------------|-------|
| 2               | 2     |
| 3               | 1     |
| 4               | 1     |
| 5               | 6     |
| 6               | 2     |
| 7               | 1     |
| 8               | 5     |
| 9               | 1     |
| 10              | 3     |
| 12              | 4     |
| 15              | 4     |
| 17              | 2     |
| 18              | 1     |
| 20              | 7     |

| Response Option | Count |
|-----------------|-------|
| 25              | 2     |
| 30              | 1     |
| 36              | 1     |
| 38              | 1     |
| 40              | 2     |
| 50              | 1     |
| Don't know      | 0     |

Q62. How many of CFLs did you install in your property?

| Response Option | Count |
|-----------------|-------|
| Yes             | 6     |
| Don't know      | 2     |

Q62. Number of CFLS installed...

| Response Option | Count |
|-----------------|-------|
| 4               | 2     |
| 5               | 1     |
| 8               | 1     |
| 15              | 1     |
| 36              | 1     |

Q63. Does the new water heater use natural gas?

| Response Option               | Count |
|-------------------------------|-------|
| Yes - it uses natural gas     | 4     |
| No – does not use natural gas | 7     |
| Don't know                    | 0     |

Q64. Which of the following water heaters did you purchase?

| Response Option   | Count |
|---|-------|
| A traditional water heater with a large tank that holds the hot water | 10    |
| A tankless water heater that provides hot water on demand             | 0     |
| A solar water heater  | 0     |
| Other   | 0     |
| Don't know  | 0     |

Q65. Is the new water heater an ENERGY STAR model?

| Response Option | Count |
|-----------------|-------|
| Yes             | 10    |
| No              | 0     |
| Don't know      | 1     |

Q66. Which of the following types of housing units would you say best describes your home?  
It is . . .?

| Response Option   | Count | Percent (n=334) |
|---|-------|-----------------|
| Single-family detached house                                | 245   | 73%             |
| Single-family attached home (such as a townhouse or condo)  | 11    | 3%              |
| Duplex, triplex or four-plex                                | 6     | 2%              |
| Apartment or condominium in a building with 5 units or more | 36    | 11%             |
| Manufactured or mobile home                                 | 35    | 10%             |
| Other   | 0     | 0%              |
| Don't know  | 1     | 0%              |

Q66. Other...

| Response Option | Count |
|-----------------|-------|
| Not applicable  | 0     |

Q67. How many square feet of living space are there in your residence, including bathrooms, foyers and hallways (exclude garages, unfinished basements, and unheated porches)?

| Response Option                  | Count | Percent (n=334) |
|----------------------------------|-------|-----------------|
| Less than 500 square feet        | 8     | 2%              |
| 500 to under 1,000 square feet   | 37    | 11%             |
| 1,000 to under 1,500 square feet | 82    | 25%             |
| 1,500 to under 2,000 square feet | 66    | 20%             |
| 2,000 to under 2,500 square feet | 49    | 15%             |
| 2,500 to under 3,000 square feet | 22    | 7%              |
| Greater than 3,000 square feet   | 36    | 11%             |
| Don't know                       | 34    | 10%             |

Q68. Do you or members of your household own your home, or do you rent it?

| Response Option | Count | Percent (n=333) |
|-----------------|-------|-----------------|
|-----------------|-------|-----------------|

|                  |     |     |
|------------------|-----|-----|
| Own / buying     | 211 | 63% |
| Rent / lease     | 117 | 35% |
| Occupy rent-free | 5   | 2%  |
| Don't know       | 0   | 0%  |

Q69. Including yourself, how many people currently live in your home year-round?

| Response Option      | Count | Percent (n=334) |
|----------------------|-------|-----------------|
| I live by myself     | 9     | 3%              |
| Two people           | 39    | 12%             |
| Three people         | 66    | 20%             |
| Four people          | 117   | 35%             |
| Five people          | 68    | 20%             |
| Six people           | 25    | 7%              |
| Seven people         | 7     | 2%              |
| Eight or more people | 2     | 1%              |
| Don't know           | 1     | 0%              |

Q70. What was your total annual household income for 2017, before taxes?

| Response Option              | Count | Percent (n=334) |
|------------------------------|-------|-----------------|
| Under \$20,000               | 41    | 12%             |
| \$20,000 to under \$30,000   | 39    | 12%             |
| \$30,000 to under \$40,000   | 35    | 10%             |
| \$40,000 to under \$50,000   | 31    | 9%              |
| \$50,000 to under \$60,000   | 24    | 7%              |
| \$60,000 to under \$75,000   | 21    | 6%              |
| \$75,000 to under \$100,000  | 41    | 12%             |
| \$100,000 to under \$150,000 | 28    | 8%              |
| \$150,000 to under \$200,000 | 10    | 3%              |
| \$200,000 or more            | 7     | 2%              |
| Don't know                   | 7     | 2%              |
| Prefer not to say            | 50    | 15%             |

Q71. What is the highest level of education achieved among those living in your household?

| Response Option       | Count | Percent (n=334) |
|-----------------------|-------|-----------------|
| Less than high school | 7     | 2%              |
| Some high school      | 6     | 2%              |

| Response Option                                  | Count | Percent<br>(n=334) |
|--|-------|--------------------|
| High school graduate or equivalent (such as GED) | 59    | 18%                |
| Trade or technical school                        | 18    | 5%                 |
| Some college (including Associate degree)        | 89    | 27%                |
| College degree (Bachelor's degree)               | 67    | 20%                |
| Some graduate school                             | 5     | 1%                 |
| Graduate degree, professional degree             | 57    | 17%                |
| Doctorate  | 11    | 3%                 |
| Don't know                                       | 0     | 0%                 |
| Prefer not to say                                | 15    | 5%                 |



## REPORT



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# Smart \$aver Evaluation Report — May 1, 2016 – April 30, 2017

Submitted to Duke Energy Carolinas  
in partnership with Research into Action

March 15, 2019

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# 1 Executive Summary

## 1.1 Program Summary

The Smart \$aver program offers Duke Energy Carolina (“Duke” or “DEC”) existing and new construction residential customers incentives for improving their home’s energy efficiency through the installation of energy efficient heating, ventilating, and air conditioning (HVAC) units, smart thermostats, water heating equipment, pool pump, duct sealing and insulation, and attic insulation with air sealing<sup>1</sup>. A tiered incentive structure offers larger rebates for higher efficiency units. Quality install and smart thermostat incentives are not offered as standalone incentives; customers must receive a rebate for a new HVAC system to be eligible for these additional incentives. The program is provided through independent, prequalified contractors who install the eligible energy efficiency measures consistent with the program standards and guidelines, and submit the rebate application documentation on behalf of the customer.

## 1.2 Evaluation Objectives and Results

This report presents the results and findings of evaluation activities for the Smart \$aver program conducted by the evaluation team, collectively Nexant Inc. and our subcontracting partner, Research into Action, in the evaluation period of May 1, 2016 – April 30, 2017.

### 1.2.1 Impact Evaluation

We conducted this evaluation of the Smart \$aver program to estimate gross and net energy, summer demand, and winter demand savings for the entire program and for each major measure type. The evaluation team reviewed available program databases to help inform the design of the evaluation effort and sampling approach. Activities included an in-situ metering study (n=44) to estimate operational hours of air source heat pumps and central air conditioners paired with engineering desk analyses to estimate gross savings for all measures in the program during the evaluation period of May 1, 2016 – April 30, 2017. Net savings are a reflection of the degree to which the gross impacts are a result of the program-specific efforts and incentives. Therefore, we implemented attribution surveys with program participants and contractors to estimate the rates of free ridership and spillover. Program level results for the Smart \$aver program are provided in Table 1-1.

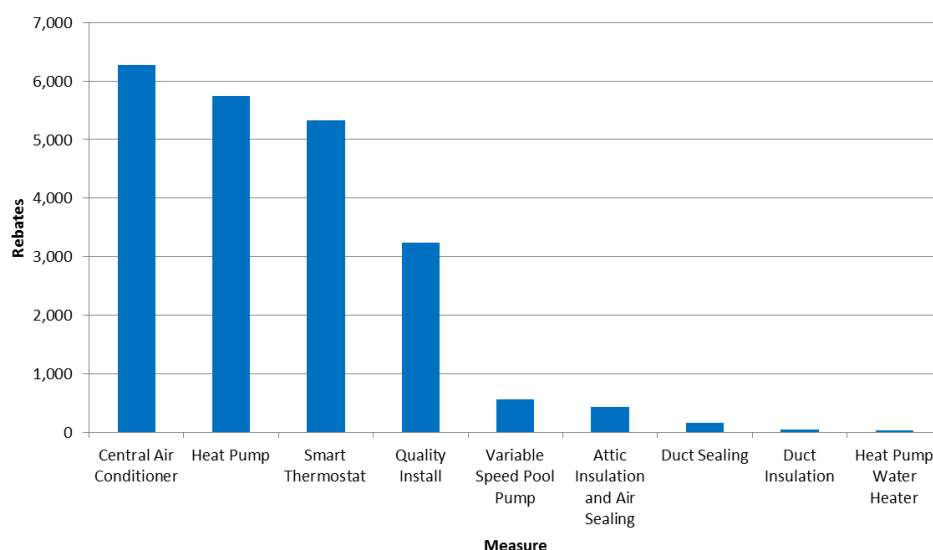
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<sup>1</sup> HVAC tune-ups were also included in the program offering; however, there was no participation for this service during the evaluation timeframe.

**Table 1-1: Program Impact Results**

| Measurement        | Reported  | Realization Rate | Gross Verified | Net-to-Gross Ratio | Net Verified |
|--------------------|-----------|------------------|----------------|--------------------|--------------|
| Energy (kWh)       | 9,593,312 | 83.0%            | 7,960,401      | 66.7%              | 5,308,068    |
| Summer Demand (MW) | 2.95      | 70.5%            | 2.08           |                    | 1.38         |
| Winter Demand (MW) | 1.30      | 196.8%           | 2.50           |                    | 1.67         |

In the evaluation period of May 1, 2016 – April 30, 2017, the program provided rebates for 21,817 measures installed in single family homes, resulting in 7,960 MWh in gross verified energy savings. The program primarily incentivized HVAC equipment and related add-on measures (quality installation and smart thermostats), which accounted for 80% of rebated measures and 76% of verified energy savings, as shown in Figure 1-1 and Figure 1-2.

**Figure 1-1: Smart \$aver Rebated Measures**



**Figure 1-2: Smart \$aver Verified Energy Savings**

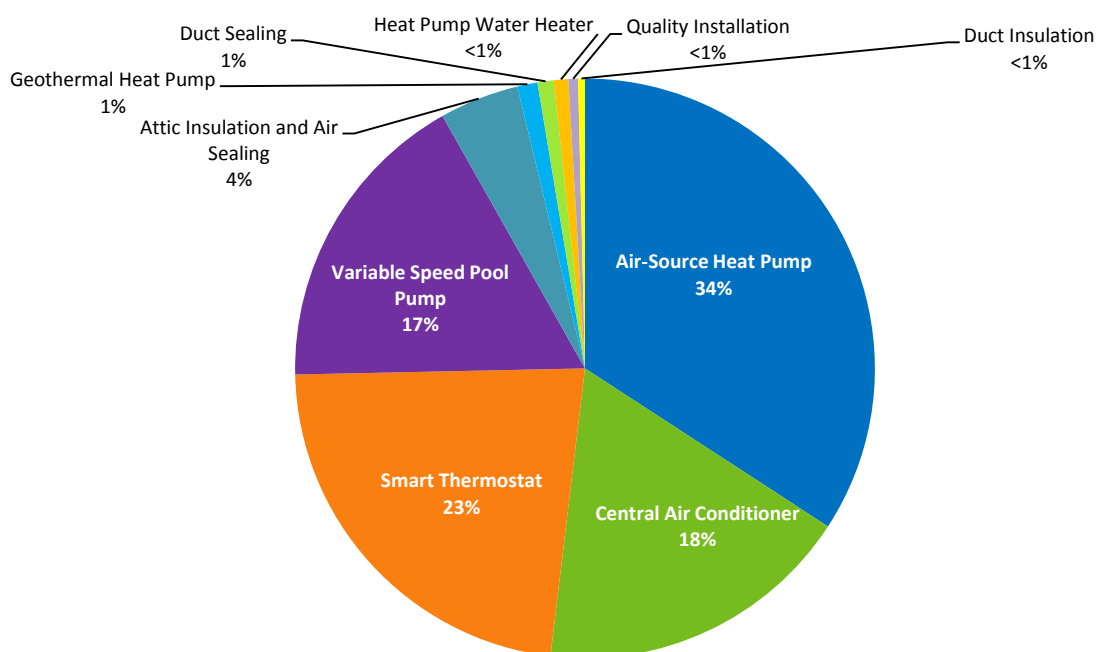


Table 1-2 presents per unit verified gross energy and demand savings with the calculated net-to-gross ratio for each rebated measure.

Table 1-2: Program Verified Impacts by Measure

| Measure                          | Reported Energy Savings per unit (kWh) | Realization Rate | Verified Gross Energy Savings per unit (kWh) | Reported Summer Coincident Demand Savings per unit (kW) | Realization Rate | Verified Gross Summer Coincident Demand per unit (kW) | Reported Winter Coincident Demand Savings per unit (kW) | Realization Rate | Verified Gross Winter Coincident Demand per unit (kW) | Net to Gross Ratio |
|----------------------------------|--|------------------|--|---|------------------|---|---|------------------|---|--------------------|
| Central Air Conditioner*         | 320                                    | 70.2%            | 225  | 0.195   | 63.0%            | 0.123   | 0.032   | 516.0%           | 0.167   | 66.7%              |
| Heat Pump**                      | 416                                    | 117.7%           | 490  | 0.139   | 107.5%           | 0.149   | 0.122   | 174.3%           | 0.213   |                    |
| Quality Install                  | 376                                    | 3.5%             | 13   | 0.133   | 3.8%             | 0.005   | 0.084   | 5.0%             | 0.004   |                    |
| Smart Thermostat                 | 377                                    | 90.1%            | 340  | 0.000   | 100.0%           | 0.000   | 0.000   | 100.0%           | 0.000   |                    |
| Attic Insulation and Air Sealing | 1,163                                  | 70.9%            | 824  | 0.184   | 120.1%           | 0.221   | 0.194   | 205.8%           | 0.399   |                    |
| Variable Speed Pool Pump         | 2,342                                  | 103.8%           | 2,430  | 0.590   | 89.3%            | 0.527   | 0.000   | 100.0%           | 0.000   |                    |
| Heat Pump Water Heater           | 1,616                                  | 100.0%           | 1,616  | 0.124   | 100.0%           | 0.124   | 0.000   | 100.0%           | 0.000   |                    |
| Duct Sealing                     | 350                                    | 125.1%           | 438  | 0.291   | 55.5%            | 0.162   | 0.000   | 100.0%           | 0.153   |                    |
| Duct Insulation                  | 688                                    | 92.1%            | 634  | 0.573   | 40.9%            | 0.234   | 0.000   | 100.0%           | 0.222   |                    |

\*All values are a weighted average of Tiers 1, 2, and 3. Per unit verified savings for each Tier is provided in Section 3.

\*\* All values are a weighted average of Tiers 1, 2, and 3 with air source heat pumps combined with geothermal heat pumps. The evaluation team assessed savings separately for each technology type and tier and presents these findings in Section 3. References to "heat pump" in subsequent tables and figures in this evaluation report reflect the combined findings for air source and geothermal heat pumps unless otherwise noted.

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### 1.2.2 Process Evaluation

This process evaluation assessed why and how rebated energy saving measures were implemented through Smart \$aver and identified ways to improve the program design and implementation. To answer these research questions, the evaluation team interviewed program and implementer staff (n=2) and “high volume” trade allies (n=5), and surveyed stratified random samples of trade allies (n=58) and participants (n=73).<sup>1</sup>

#### **Program Successes**

The DEC Smart \$aver Program found success in the following areas.

**Overall, participants are highly satisfied with Smart \$aver.** Participants were especially satisfied with their contractors, their upgrade project, and the program overall.

**Smart \$aver influences energy efficiency contracting services in DEC service territory.**

Trade allies reported that participating in Smart \$aver influenced them to recommend and implement qualifying measures and has increased their knowledge of energy efficient technologies.

**Trade allies are Smart \$aver’s most successful marketing channel.** Participant surveys demonstrated that trade allies are the primary source of program awareness (Table 1-3) and are the most influential factor on the customer’s decision to implement rebated measures.

**Table 1-3: Source of Program Awareness (Multiple Responses Allowed; n=73)**

| Source of Program Awareness | Percent |
|-----------------------------|---------|
| Trade ally                  | 77%     |
| Online                      | 11%     |
| Mailer                      | 8%      |
| Other                       | 3%      |
| Don't know                  | 6%      |

#### **Program Challenges**

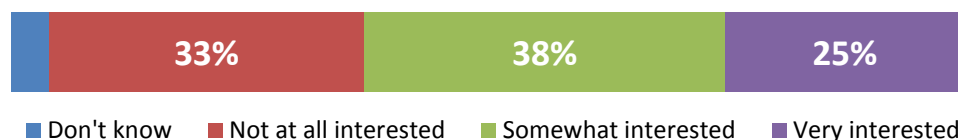
The following concerns were highlighted by trade allies and participants.

Smart \$aver is not a strong gateway program. About one-third (29%) of participants reported awareness of other DEC programs, and 41% of those participated (12% of total sample). Since receiving Smart Saver rebates, 30% of participants reported purchasing other products or services to help save energy in their homes. However, very little of this resulted in attributable spillover savings as most (16 of 22) said Smart \$aver had no influence on their subsequent energy upgrades.

<sup>1</sup> High volume trade allies are companies in the top 20% of trade allies in terms of number of rebated measures, for a given campaign, in 2016.

Trade allies could benefit from additional sales training. Most trade allies expressed interest in training to help them sell qualified measures (Figure 1-3).

**Figure 1-3: Trade Ally Interest in Sales Training (n=58)**



**The transition to the online portal has been challenging for trade allies.** The portal was the biggest sticking point for trade allies, with 71% reporting problems or frustrations with the new rebate application process. Trade allies most commonly reported the following issues:

- data entry and form upload problems (which causes them to resubmit forms)
- reasons for rebate rejections are vague or unknown
- the application process takes too much time
- resolving application issues tend to be an onerous task

However, nearly three-fourths of trade allies said portal issues have gotten at least somewhat better over time.

**Quality installation has caused dissatisfaction among many trade allies.** While most trade allies said they were already doing all of the techniques on the quality install checklist, only one mentioned all of the primary components of the checklist when asked to list the specific techniques. When asked if they had any suggestions for improving quality install, many trade allies noted their frustration with and criticism of the measure. Trade allies were most dissatisfied with the cumbersome process of the quality installation checklist and many either suggested eliminating the requirement or compensating the trade ally for their time completing the quality installation.

## 1.3 Evaluation Conclusions and Recommendations

Based on evaluation findings, the evaluation team concluded the following and provides several recommendations for program improvement.

**Conclusion 1: Trade allies are the driving force of the program, but there may be opportunities to improve their program experience and effectiveness.** Trade allies are the primary mechanism for bringing participants into the program, as they often upsell energy efficient systems to customers who have no prior awareness of the program during a time of immediate heating or cooling needs. However, trade ally satisfaction with certain program elements is relatively low, particularly: the application process and portal, program training, and the quality installation process and requirements.

- **Recommendation: Look for ways to increase trade ally satisfaction and rebate volumes.** Trade allies are vital to the program's success, DEC should work with Blackhawk Engagement Solutions, the program implementer, to improve the trade ally experience and look for ways to increase trade ally effectiveness in the field.
- Potential strategies for increasing trade ally effectiveness (and simultaneously increasing trade ally satisfaction):
  - Provide marketing materials to trade allies, such as co-op marketing
  - Attempt to increase trade ally participation in training events. Potential strategies:
    - Align training offerings with trade ally content requests, particularly: sales, quality install, portal/application process, and program changes
    - Ensure training sessions occur during convenient periods during the year (i.e., non-peak seasons) and convenient times (breakfast meetings can be particularly successful).
- Potential strategies for improving Trade Ally (TA) satisfaction:
  - Continue improving portal system and simplifying the application process
  - Consider splitting incentives with TAs to compensate TAs for their time spent on Duke Energy processes. Shifting a small portion of the incentive to the trade ally is unlikely to negatively impact participation levels, as participants were only marginally influenced by the rebate and were instead mainly influenced by their contractor's recommendation (a finding which underscores the need to retain a strong trade ally network).

**Conclusion 2: Approximately 60% of sampled quality install sheets included issues.**

Trade allies complete quality install sheets detailing system measurements taken while on site. Upon review of a sample of quality install sheets, the evaluation team found several issues including:

- Math errors
- Calculated capacities below program requirement
- Rule of thumb CFM estimates instead of actual measurements
- Testing in sub-optimal conditions

These issues compromise the validity of the impact of quality installation and therefore the associated energy and demand savings cannot be verified.

- **Recommendations:**
  - Establish additional internal QA/QC processes when reviewing submitted quality install sheets.
  - Work with trade allies to better understand issues encountered with the quality install sheets and to improve quality install reporting.

**Conclusion 3: The quality installation measure may have experienced some growing pains in its infancy.** Many trade allies expressed frustration with the 'complex and time

consuming' quality install form, especially since they receive no compensation for completing it. These concerns may have limited the initial growth of the new measure:

- Tier 1 (which requires QI) was the least installed HVAC tier, amounting to about one-tenth of all HVAC units in the program.
- Less than one-third of Tier 2 and Tier 3 HVAC units received a QI rebate.
  - **Recommendation: As DEC matures the quality installation measure, look for ways to retain, expand, and improve trade ally quality install practices.**
  - Potential strategies for retaining and expanding trade ally quality installation practices:
    - Shift the quality install rebate to trade allies: trade ally dissatisfaction with the process may be mitigated by compensation.
    - Hold a round table meeting with trade allies to collaborate on a revised quality install process that better serves the needs of both parties: for DEC to generate cost-effective savings from the measure, the process must be minimally burdensome for trade allies so that they actively and accurately complete it

**Conclusion 4: New HVAC rebates and requirements are generating additional energy savings that would not have occurred naturally.** The new HVAC program components have resulted in increased trade ally sales of high SEER HVAC units and smart thermostats. Although comparatively less successful, quality installation rebates and requirements have encouraged a minority of trade allies to adopt new quality install techniques.

- **Recommendation 1:** Continue offering the new incentives:
  - tiered HVAC incentives
  - smart thermostats incentives
  - QI incentives (however, shift the rebate to trade allies)
- **Recommendation 2:** Continue looking for new program offerings that could generate additional savings.

## 2 Introduction and Program Description

### 2.1 Program Description

The Smart \$aver program offers Duke Energy Carolinas (“Duke” or “DEC”) existing and new construction residential customers incentives for improving their home’s energy efficiency through the installation of energy efficient heating, ventilating, and air conditioning (HVAC) units, smart thermostats, water heating equipment, pool pump, duct sealing and insulation, and attic insulation with air sealing<sup>1</sup>. A tiered incentive structure offers larger rebates for higher efficiency units. Quality install and smart thermostat incentives are not offered as standalone incentives; customers must receive a rebate for a new HVAC system to be eligible for these additional incentives.

The program is provided through independent prequalified contractors – called “trade allies” – who install the eligible energy efficiency measures consistent with the program standards and guidelines, and submit the rebate application documentation on behalf of the customer. Trade allies receive no monetary incentives for measures they install in existing buildings, but builders are eligible to receive rebates for qualified HVAC equipment installed in residential new construction projects.

#### 2.1.1 Energy Efficiency Measures

Energy efficiency measures included in the Smart \$aver program are summarized in Table 2-1.

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<sup>1</sup> HVAC tune-ups were also included in the program offering; however, there was no participation for this service during the evaluation timeframe.

**Table 2-1: Smart \$aver Measures and Incentives**

| Measures                    |                   | Rebate Amount                                   | Details  |
|-----------------------------|-------------------|---|--|
| Central Air Conditioner     |                   | Tier 1: \$250<br>Tier 2: \$250<br>Tier 3: \$300 | Tier 1: 14 SEER, ECM fan on indoor unit, quality installation required<br>Tier 2: 15 and 16 SEER, with ECM<br>Tier 3: 17 SEER or greater, with ECM   |
| Heat Pump*                  | <i>Air Source</i> | Tier 1: \$250<br>Tier 2: \$250<br>Tier 3: \$300 | Tier 1: 14 SEER, ECM fan on indoor unit, quality installation required<br>Tier 2: 15 and 16 SEER, with ECM<br>Tier 3: 17 SEER or greater, with ECM   |
|                             | <i>Geothermal</i> | Tier 3: \$300                                   | Tier 3: 19 SEER or greater, with ECM   |
| Smart Thermostat            |                   | \$100   | Add-on incentive for HVAC participants   |
| Quality Installation        |                   | \$60  | Required on Tier 1 HVAC (no add-on incentive provided), add-on incentive for Tier 2 and Tier 3 HVAC participants   |
| Attic Insulation & Air Seal |                   | \$250   | R-19 or below to R-30 or greater; decrease home air leakage by 5% or more  |
| Variable Speed Pool Pump    |                   | \$300   | Equipment must be an ENERGY STAR® qualified variable-speed pool pump for use with main filtration of in-ground residential swimming pool; applications for motor replacements only are not eligible. |
| Heat Pump Water Heater      |                   | \$350   | ENERGY STAR® qualified units. Must have an EF ≥ 2  |
| Duct Sealing                |                   | \$100/duct system                               | Decrease air duct leakage by 12% or more   |
| Duct insulation*            |                   | \$75/duct system                                | For unconditioned attic: R-4.2 to R-19 or greater; for unconditioned crawl space or basement: R-0 to R-6 or greater  |

\*The Smart\$aver program filing stipulates heat pumps as a certified measure. However, because the program rebated both air source and geothermal heat pumps during the evaluation period, the evaluation team assessed savings separately for each technology type. References to “heat pump” in subsequent tables and figures in this evaluation report reflect the combined findings for air source and geothermal heat pumps unless otherwise noted.



## 2.2 Program Implementation

The Smart \$aver program is chiefly implemented by Blackhawk Engagement Solutions (BES). BES manages the trade ally registration process, incentive application submission and fulfillment, the trade ally online portal, and the program call center. As part of the prequalification process, all contractors who wish to participate are required to enter into a Letter of Agreement or Prequalified Contractor Participation Agreement for participation in the program. Contractors who meet program requirements are included in a prequalified contractor listing on the program website. Prequalified contractors have permission to promote Smart \$aver program measures and identify themselves as a program contractor.

Upon selection by the customer, contractors will complete the requested installation in accordance with all Smart \$aver Program standards and guidelines, and all applicable building codes. Contractors use the online portal to submit incentive applications. Paper format incentive applications are also accepted, but discouraged. Prequalified contractors provide itemized invoices with sufficient detail describing what was installed.

Upon receipt of the application, BES verifies that the application is complete and accurate, and will follow up with customers or contractors to resolve any discrepancies. DEC staff conduct quality control inspections on a small share of installed measures.<sup>2</sup> Inspections are to be shared across all contractors, with new contractors and those who have had quality issues being inspected at a higher rate. Upon approval of applications, incentives are issued to participating customers (and, when applicable, builders or trade allies) for the incentive value.

DEC provides marketing through several channels, including: direct mail campaigns, utility website, participating contractor outreach and advertising, and contractor associations. DEC also performs trade ally outreach and training services.

### **Eligibility**

DEC residential account holders residing in DEC electric service territory are eligible for the Smart \$aver rebates. All customers participating in the program must be on a DEC residential electric rate. The program is open to existing residential electric service customers living in single-family homes, condominiums, mobile homes, townhomes and duplexes. Builders may also apply for HVAC rebates for their residential new construction projects.

## 2.3 Key Research Objectives

Over-arching project goals will follow the definition of impact evaluation established in the “Model Energy-Efficiency Program Impact Evaluation Guide – A Resource of the National Action Plan for Energy Efficiency,” November 2007:

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<sup>2</sup> DEC staff inspects the first five projects completed by new trade allies. Further, DEC staff randomly inspects 10% of projects for each measure category.

*“Evaluation is the process of determining and documenting the results, benefits, and lessons learned from an energy-efficiency program. Evaluation results can be used in planning future programs and determining the value and potential of a portfolio of energy-efficiency programs in an integrated resource planning process. It can also be used in retrospectively determining the performance (and resulting payments, incentives, or penalties) of contractors and administrators responsible for implementing efficiency programs.”*

Evaluation has two key objectives:

- 1) To document and measure the effects of a program and determine whether it met its goals with respect to being a reliable energy resource.
- 2) To help understand why those effects occurred and identify ways to improve.

### 2.3.1 Impact

Over-arching project impact evaluation processes followed standard industry protocols and definitions, where applicable, and include the Department of Energy Uniform Methods Protocol, as an example. As part of evaluation planning, the evaluation team outlined the following activities for this program evaluation:

- Quantify accurate and supportable energy (kWh) and demand (kW) savings for energy efficient measures and equipment implemented in participants' homes;
- Assess the rate of free riders from customer and contractor perspective and determine spillover effects;
- Benchmark verified measure level energy impacts to applicable technical reference manuals (TRMs) and other Duke-similar programs in other jurisdictions;
- Consider and verify that measure installation vintage aligns with measure baseline definitions, i.e. early replacement, burnout on failure, etc.; and,
- To the extent possible for the purposes of program planning, the evaluation team will seek to provide estimated per-unit savings by measure.

### 2.3.2 Process

The process evaluation was designed to support organizational learning and program adaptation. To this end, the evaluation team sought to research several elements of the program delivery and customer experience as outlined below:

- **Awareness and Engagement:** How aware are customers of the Smart \$aver program? What are the primary sources of information (e.g., trade allies, program website, bill inserts) that customers use to learn more about the program? How do customers typically learn about energy efficient technologies? How are trade allies engaged in the Smart \$aver program, and what is the most effective engagement source (e.g., implementer, program website). Is there a need to conduct any additional marketing of the program and/or provide marketing support to trade allies?

- **Program Satisfaction:** How satisfied are participants with the overall program experience, their contractor and the quality of the installation, incentive turnaround, energy savings after the work was performed, and Duke Energy? How satisfied are trade allies with the program?
- **Program Influence:** Does the program influence participants to engage in other Duke Energy energy-efficiency programs? Does the program increase contractor's knowledge of energy-efficient technologies? Does the program increase how often participating contractors promote energy-efficient equipment and services to their customers?
- **Challenges and opportunities for improvement:** Are there any inefficiencies or challenges with the application, incentive turnaround, or trade allies? What training opportunities could be offered to trade allies to help them more effectively sell rebated equipment? How engaged are trade allies in using the implementer web portal or other program resources?
- **Participant characteristics and potential:** What are the demographic characteristics of those participating in the program? Are there segments of the population that are not participating but have high participation potential and should be reached?
- **Code Changes:** New Seasonal Energy Efficiency Ratio (SEER) standards were enforced for heat pumps and air conditioners manufactured or distributed on or after January 1, 2015. What are trade ally perspectives on how this change will affect the market and the program?

## 2.4 Evaluation Overview

The evaluation team divided the approach into key tasks to meet the goals outlined:

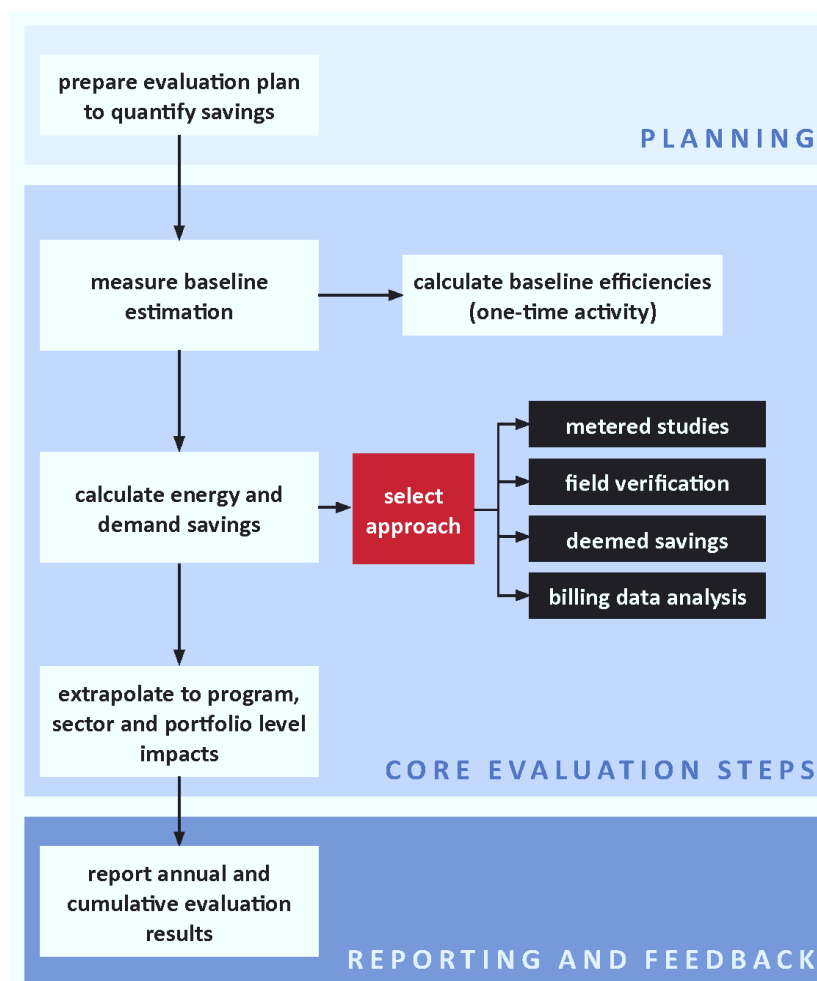
- **Task 1** – Develop and manage evaluation plan to describe the processes that will be followed to complete the evaluation tasks outlined in this project;
- **Task 2** – Conduct a process review to determine how successfully the program is being delivered to market and identify opportunities for improvement;
- **Task 3** – Verify gross and net energy and peak demand savings resulting from the Smart Saver program through on-site measurements and verification activities of a sample of program participants and projects.

### 2.4.1 Impact Evaluation

The primary determinants of impact evaluation costs are the sample size and the level of rigor employed in collecting the data used in the impact analysis. The accuracy of the study findings is in turn dependent on these parameters. Techniques that we used to conduct our evaluation, measurement, and verification (EM&V) activities, and to meet the goals for this evaluation, include on-site inspections and measurements, telephone surveys, database review, best practice review, and interviews with implementation staff, trade allies, and program participants.

Figure 2-1 demonstrates the principle evaluation steps organized through planning, core evaluation activities, and final reporting.

Figure 2-1: Impact Evaluation Process



The evaluation team targeted sample sizes for on-site activities based upon the evaluation team's understanding of the expected significance (or magnitude) of expected participation, the level of certainty of savings, and the variety of measures.

The evaluation generally comprised the following steps, which are described in further detail throughout this report:

- **Design the Sample for Measurement and Verification (M&V):** The review, measurement, and verification of all implemented projects is not plausible or cost-effective given the size of this program. Consequently, a sample of projects was established for M&V. In order to provide the most cost-effective sample, the evaluation team employed a Value of Information (VOI) approach. VOI is used to balance cost and rigor and follows a process to allocate the bulk of the evaluation funds to programs and projects with high impact and high uncertainty.
- **Develop Measure-Specific M&V Plans:** Upon review of the program documents, a unique M&V plan was developed for each program and measure, including a metering protocol, as applicable. M&V methods were developed with adherence to

the International Performance Measurement and Verification Protocol (IPMVP) and other well-established engineering analysis procedures.

- **Participant Surveys and On-site Inspections:** The database review provided the necessary information to design a sample of projects to review. All sampled projects received a telephone survey with the participant. Additionally, a portion of the sampled projects received on-site measurement and verification to further detail the information obtained during the database review and ultimately used to calculate energy savings. Table 2-2, in Section 2.4.3 below summarizes the number of surveys and on-site inspections completed. The samples were drawn to meet a 90% confidence and 10% precision at the program level.
- **Calculate Impacts and Analyze Load Shapes:** Data collected via the on-site visits, database reviews and telephone surveys enabled the evaluation team to calculate gross verified energy and demand savings for each project or measure. Hourly load shapes are important in calculating system on-peak demand savings, especially when the measures installed have daily and seasonal variations in the operating schedule.
- **Estimate Net Savings:** Net impacts are a reflection of the degree to which the gross savings are a result of the program efforts and incentives. The evaluation team estimated free-ridership and spillover for each project in the impact sample utilizing self-report methods through surveys with program participants. The ratio of net verified savings to gross verified savings is the net-to-gross ratio as an applied scaling factor to the reported savings.

### 2.4.2 Process Evaluation

Process evaluation tells the qualitative story behind the quantitative impact evaluation by understanding the program in its unique context. The goal of process evaluation is to perform a systematic assessment of an energy efficiency program by generating feedback that achieves the following outcomes:

- Document program operations
- Recommend improvements to increase the program's efficiency and effectiveness
- Assess stakeholder satisfaction

These outcomes can inform program planning, existing program implementation, or efforts to redesign a program. Process evaluations typically cover all aspects of a program including its design, implementation, marketing and outreach, data tracking, quality assurance, customer and stakeholder feedback, and market conditions. By evaluating the broad context in which a program operates, evaluators can recommend realistic improvements. Evaluators typically examine program aspects through the following mechanisms:

- Database and document review
- Interviews with program staff and key stakeholders, such as trade allies
- Surveys with customers

- Benchmarking research
- Marketing review

Information gathered from participating customers and trade allies through process evaluation activities can be measured and analyzed to form the basis of a NTG ratio. For example, participant surveys used to assess participant satisfaction also provide opportunity to ask participants about their motivations for participating and the influence of the program on their decisions, both of which are key components of a free ridership calculation. Similarly, the participant surveys are used to assess whether participants installed additional energy savings measures, which could be attributed to spillover.

### 2.4.3 Summary of Activities

Techniques we utilized to conduct the evaluation, measurement, and verification (EM&V) activities, and to meet the goals for this evaluation, included field inspection and metering, telephone surveys with program participants, program database reviews and in-depth interviews (IDI) with utility staff, implementer, and trade allies. Table 2-2 provides a summary of the activities Nexant conducted as part of the Smart \$aver program process and impact evaluation for the period of May 1, 2016 – April 30, 2017.

**Table 2-2: Summary of Evaluation Activities**

| Target Group                                     | Population | Sample | Method                        |
|--|------------|--------|-------------------------------|
| Central Air Conditioner and Air Source Heat Pump | 11,976     | 46     | Field inspection and metering |
| Participants (rebated measures)                  | 9,841      | 73     | Telephone Survey              |
| Duke Energy Program Staff                        | N/A        | 1      | In-depth interview (IDI)      |
| Implementer Staff                                | N/A        | 1      | IDI                           |
| Most Active Trade Allies                         | ~20        | 5      | IDI                           |
| Trade Allies                                     | 624        | 58     | Telephone survey              |

## 2.5 Sample and Estimation

The gross and net verified energy and demand savings estimates presented for the majority of the Smart \$aver program participation were generally determined through the observation of key measure parameters among a sample of program participants. A census evaluation would involve surveying, measuring, or otherwise evaluating the entire population of projects within a population. Although a census approach would eliminate the sampling uncertainty for an entire program, the reality is that M&V takes many resources both on the part of the evaluation team and the program participants who agree to be surveyed or have site inspections conducted in their home. When a sample of projects is selected and analyzed, the sample statistics can be extrapolated to provide a reasonable estimate of the population parameters. Therefore, when used effectively, sampling can improve the overall quality of an evaluation study but at a lower



cost. By limiting resource-intensive data collection and analysis to a random sample of all projects, more attention can be devoted to each project surveyed.

The nuances and tradeoffs considered by the evaluation team when developing sampling approaches varied by measure across the program and are discussed in more detail in Section 3 and Section 4. However, several common objectives were shared across measures and research objectives. The most important sampling objective was representativeness – that is that the projects selected in the evaluation were representative of the population they were selected from and would produce unbiased estimates of population parameters. A second key sampling objective was to consider the value of information being collected and align sample allocations accordingly. This effort generally involves considering the size (contribution to program savings) and uncertainty associated with the measure being studied and making a determination about the appropriate level of evaluation resources to allocate.

The evaluation team relied primarily on mean-per-unit estimation for the Smart \$aver program and separated the program population into a series of homogenous measure categories. This approach works well for residential programs that include a large number of rebates for similar equipment types where the evaluation objective is to determine an average kWh savings per rebated measure. With mean-per-unit estimation, the average kWh savings and NTG ratio observed within the sample is applied to all projects in the population. For several measures the characteristics observed within the evaluation sample were supplemented with parameter values that were available for all members of the population in the program database. For example, the program database stores the capacity (BTU/hour) for every rebated air source heat pump so the evaluation team used the population mean capacity when calculating average per-unit energy savings rather than the sample mean.

### 2.5.1 Stratification

The evaluation team used sample stratification for the gross impact, net impact, and process evaluation sampling. Stratification is a departure from simple random sampling, where each sampling unit (customer/project/rebate/measure) has an identical likelihood of being selected in the sample. Stratified random sampling refers to the designation of two or more sub-groups (strata) from within a program population prior to the selection process. The evaluation team felt that stratification was advantageous and utilized this approach in the sample design for a variety of reasons across the program, including:

- Increased precision of the within-stratum variability was expected to be small compared to the variability of the population as a whole. Stratification in this case allows for increased precision or smaller total sample sizes, which lowered evaluation costs.
- Ensured a minimum number of units within a particular stratum will be verified. For example, Smart \$aver participation in the defined evaluation period was dominated by air source heat pump and central air conditioner installations. A simple random sample would have likely returned zero heat pump water heaters or pool pump

samples. The evaluation team felt it was important to develop primary research results for less common offerings; therefore, separate strata were created.

- Allowed for a value-of-information approach to be implemented through which the largest measures are sampled at a much higher rate than smaller projects by creating size-based strata.

### 2.5.2 Presentation of Uncertainty

There is an inherent risk, or uncertainty, that accompanies sampling, because the projects selected in the evaluation sample may not be representative of the program population as a whole with respect to the parameters of interest. As the proportion of projects in the program population that are sampled increases, the amount of sampling uncertainty in the findings decreases. The amount of variability in the sample also affects the amount of uncertainty introduced by sampling. A small sample drawn from a homogeneous population will provide a more reliable estimate of the true population characteristics than a small sample drawn from a heterogeneous population. Variability is expressed using the coefficient of variation ( $C_v$ ) for programs that use simple random sampling, and an error ratio for programs that use ratio estimation. The  $C_v$  of a population is equal to the standard deviation ( $\sigma$ ) divided by the mean ( $\mu$ ) as shown in Equation 2-1.

#### Equation 2-1: Coefficient of Variation

$$C_v = \frac{\sigma}{\mu}$$

Equation 2-2 shows the formula used to calculate the required sample size for each evaluation sample, based on the desired level of confidence and precision. Notice that the  $C_v$  term is in the numerator, so the required sample size will increase as the level of variability increases. For programs that rely on ratio estimation error ratio replaces the  $C_v$  term in Equation 2-2. Results of the previous Duke Energy evaluations and Nexant evaluations from other jurisdictions were the primary source of error ratio and  $C_v$  assumptions for the 2016 Smart \$aver evaluation.

#### Equation 2-2: Required Sample Size

$$n_0 = \left( \frac{Z * C_v}{D} \right)^2$$

Where:

|       |   |   |
|-------|---|---|
| $n_0$ | = | The required sample size before adjusting for the size of the population                                |
| $Z$   | = | A constant based on the desired level of confidence (equal to 1.645 for 90% confidence two-tailed test) |
| $C_v$ | = | Coefficient of variation (error ratio for ratio estimation)   |
| $D$   | = | Desired relative precision  |



The sample size formula shown in Equation 2-2 assumes that the population of the program is infinite and that the sample being drawn is reasonably large. In practice, this assumption is not always met. For sampling purposes, any population greater than approximately 7,000 may be considered infinite for the purposes of sampling. For smaller, or finite, populations, the use of a finite population correction factor (FPC) is warranted. This adjustment accounts for the extra precision that is gained when the sampled projects make up more than about 5% of the program savings. Multiplying the results of Equation 2-2 by the FPC formula shown in Equation 2-3 will produce the required sample size for a finite population.

#### Equation 2-3: Finite Population Correction Factor

$$fpc = \sqrt{\frac{N - n_0}{N - 1}}$$

Where:

$N$  = Size of the population

$n_0$  = The required sample size before adjusting for the size of the population

The required sample size ( $n$ ) after adjusting for the size of the population is given by Equation 2-4.

#### Equation 2-4: Application of the Finite Population Correction Factor

$$n = n_0 * fpc$$

Verified savings estimates always represent the point estimate of total savings, or the midpoint of the confidence interval around the verified savings estimate for the program. Equation 2-5 shows the formula used to calculate the margin of error for a parameter estimate.

#### Equation 2-5: Error Bound of the Savings Estimate

$$\text{Error Bound} = se * (z - \text{statistic})$$

Where:

$se$  = The standard error of the population parameter of interest (proportion of customers installing a measure, realization rate, total energy savings, etc.) This formula will differ according to the sampling technique utilized.

$z - \text{statistic}$  = Calculated based on the desired confidence level and the standard normal distribution.

The 90% confidence level is a widely accepted industry standard for reporting program-level uncertainty in evaluation findings. The z-statistic associated with 90% confidence is 1.645.

When evaluators or regulators use the term “90/10”, the 10 refers to the relative precision of the estimate. The formula for relative precision shown in Equation 2-6:

**Equation 2-6: Relative Precision of the Savings Estimate**

$$Relative\ Precision_{Verified\ Savings} = \frac{Error\ Bound_{(kWh\ or\ kW)}}{Verified\ Impact_{(kWh\ or\ kW)}}$$

An important attribute of relative precision to consider when reviewing achieved precision values is that it is “relative” to the impact estimate. Therefore measures with low realization rates are likely to have larger relative precision values because the error bound (in kWh or kW) is being divided by a smaller number. This means two measures with exactly the same reported savings and sampling error in absolute terms, will have very different relative precision values, as shown in Table 2-3.

**Table 2-3: Relative Precision Example**

| Program    | Reported kWh | Realization Rate | Error Bound (kWh) | Verified kWh | Relative Precision (90%) |
|------------|--------------|------------------|-------------------|--------------|--------------------------|
| Measure #1 | 4,000,000    | 0.5              | 400,000           | 2,000,000    | ± 20%                    |
| Measure #2 | 4,000,000    | 1.0              | 400,000           | 4,000,000    | ± 10%                    |

To calculate a Smart \$aver program-level savings estimate requires summation of the verified savings estimates from several strata. In order to calculate the relative precision for these program-level savings estimates, the Evaluation Team used Equation 2-7 to estimate the error bound for the program as a whole from the stratum-level error bounds.

**Equation 2-7: Combining Error Bounds across Strata**

$$Error\ Bound_{Program} = \sqrt{Error\ Bound_{Stratum1}^2 + Error\ Bound_{Stratum2}^2 + Error\ Bound_{Stratum3}^2}$$

Using this methodology, the evaluation team developed verified savings estimates for the program and an error bound for that estimate. The relative precision of the verified savings for the program is then calculated by dividing the error bound by the verified savings estimate.

## 3 Impact Evaluation

### 3.1 Methodology

An impact evaluation was performed to evaluate energy and demand savings attributable to the Smart \$aver program. The evaluation was divided into two research areas; determining gross and net savings (or impacts). Gross impacts are energy and demand savings found at a participant's home that are the direct result of a measure installed and rebated through the program. Net impacts are a reflection of the degree to which the gross savings are a result of the program efforts and funds. The evaluation team verified energy and demand savings attributable to the Smart \$aver program by conducting the following impact evaluation activities:

- Database and ex ante savings review.
- Sampling of participating measures.
- Performing on-site metering for air source heat pump and central air conditioner replacements to estimate hours of operation and associated amperage.
- Estimating gross verified savings using data collected in previous tasks.
- Comparing the DEC ex ante savings to gross-verified savings to determine program- and measure-level realization rates.
- Applying attribution surveys to estimate net-to-gross ratios and net-verified savings at the program level.

The impact evaluation activities result in the calculation of an adjustment factor called a realization rate, which is applied to the reported savings documented in the program tracking records. The realization rate is the ratio of the savings determined from the site inspections, M&V activities, or engineering calculations to the program-reported savings. The adjusted savings obtained by multiplying the realization rate by the program-reported savings are termed the verified gross savings and they reflect the direct energy and demand impact of the program's operations.

### 3.2 Database and Ex Ante Review

Review of the program database provided details that informed all evaluation activities. The scope of the evaluation was oriented based on information referenced from the program database, including; the rebate count for each measure and measure specific installation details. These data were considered when designing approaches and methods to evaluate the program. For example, the database included baseline efficiencies for existing equipment; however, it did not include details regarding the working condition of that equipment. Therefore, the participant survey included questions to understand the condition of participants' original equipment to inform the type of baseline the evaluation should use when calculating savings (i.e., early replacement or burnout).

The evaluation team also conducted a review of ex ante savings values, i.e., program reported savings, for each measure rebated during the evaluation period. This review consisted of benchmarking the ex ante value against other evaluation results of similar programs from nearby Duke Energy jurisdictions as well as against regional technical reference manuals (TRMs). This review allowed the evaluation team to understand if the program's assumed savings values are or are not in line with expectations. The details of the ex ante review are referenced in Table 3-1.

This benchmarking exercise exposed concerns regarding the program's two most active measures: central air conditioners and air source heat pumps. Both of these measures had significantly larger ex ante values for Tier 1 efficiencies when compared to each TRM as well as a recently completed evaluation for a very similar HVAC program in Duke Energy Progress. Tiers 2 and 3 ex ante values for central air conditioners and air source heat pumps, however, were more aligned with the benchmarked values. Due to this variation, additional emphasis was placed these measures during the evaluation.

**Table 3-1: Comparison of DEC Smart \$aver Energy Savings Estimates to Peer Group Estimates**

| Measure                     | DEC Smart \$aver 2016 PY Deemed Savings (kWh) | DEP HEIP 2014 PY Evaluation (kWh) | Georgia Power 2014 Evaluation (kWh) <sup>1</sup> | Ohio 2010 TRM (kWh) <sup>2</sup> | Texas 2017 TRM (kWh) <sup>3</sup> | Mid-Atlantic 2016 TRM (kWh) <sup>4</sup> |
|-----------------------------|---|-----------------------------------|--|----------------------------------|-----------------------------------|--|
| Attic Insulation & Air Seal | 1,163   | 364                               | 461  | 100/2,183*                       | 443/2,045*                        | 187/2,086*                               |
| Central Air Conditioner     | -   | 299                               | 525  | -                                | -                                 | -  |
| Tier 1                      | 464 <sup>5</sup>                              | n/a                               | -  | 181                              | 156                               | 195                                      |
| Tier 2                      | 283   | n/a                               | -  | 328                              | 299                               | 304                                      |
| Tier 3                      | 404   | n/a                               | -  | 485                              | 894                               | 444                                      |
| Air Source Heat Pump        | -   | 865                               | 875  | -                                | -                                 | -  |
| Tier 1                      | 702 <sup>5</sup>                              | n/a                               | -  | 279                              | 394                               | 210                                      |
| Tier 2                      | 350   | n/a                               | -  | 764                              | 686                               | 553                                      |
| Tier 3                      | 496   | n/a                               | -  | 1,497                            | 1,757                             | 1,074                                    |
| Ground Source Heat Pump     | n/a   | 1,725                             | 2,744  | 2,744                            | 1,836                             | 2,698                                    |
| Smart Thermostat            | 377   | n/a                               | n/a  | n/a                              | n/a                               | n/a                                      |
| Quality Installation        | 376   | n/a                               | n/a  | n/a                              | n/a                               | n/a                                      |
| Variable Speed Pool Pump    | 2,342   | n/a                               | n/a  | 1,170                            | n/a                               | 594                                      |
| Duct Sealing                | 350   | 336                               | 353  | 68                               | 205/383*                          | 248/592*                                 |
| Heat Pump Water Heater      | 1,616   | 1,978                             | 1,477  | 2,076/1,297*                     | 1,737                             | 1,511/1,362*                             |

\* Values separated by a slash show the estimated savings for homes with AC and gas heating and those with Air Source Heat Pumps. Central AC homes are shown first with Heat Pump homes shown second

<sup>1</sup> July 2015 Evaluation Report Public Filing

<sup>2</sup> State of Ohio Energy Efficiency Technical Reference Manual. August 6, 2010; Dayton location chosen for weather dependent measures

<sup>3</sup> Texas Technical Reference Manual, version 4.0, Volume 2 Residential Measures. November 1, 2016. Amarillo location chosen for weather dependent measures

<sup>4</sup> Mid-Atlantic Technical Reference Manual, version 6.0, May 2016. Washington DC location chosen for weather dependent measures

<sup>5</sup> Tier 1 Central Air Conditioner and Air Source Heat Pump Savings include savings from mandatory Quality Installation and ECM

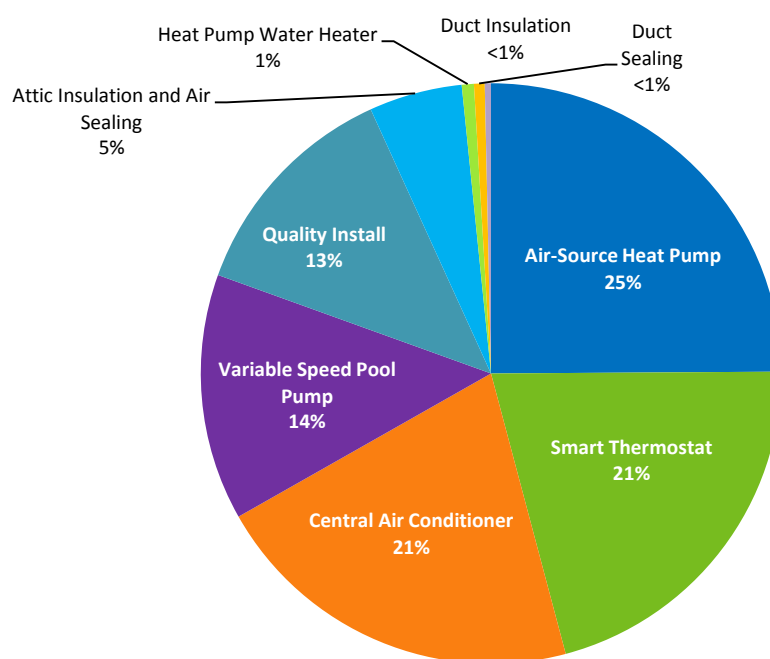
### 3.3 Sampling Plan and Achievement

To provide representative results, and meet program evaluation goals, a sampling plan was created to guide all evaluation activity. A random sample was created to target 90/10 confidence and precision at the program-level, assuming a coefficient of variation ( $C_v$ ) equal to 0.5.

For the evaluation period of May 1, 2016 – April 30, 2017, rebated air source heat pumps and central air conditioners were the largest measure contributors for both reported energy and demand savings. Therefore, these measures received the largest share of research activities and the highest level of rigor with on-site equipment measurement.

The evaluation team requested a participation database extract of 2016 and 2017 program results, which included counts and details on installed measures. The distribution of ex ante energy savings based on measure counts from the participation database, shown in Figure 3-1, provided insight to measures with greater influence on total program savings.

**Figure 3-1: Reported Energy Savings**



Central air conditioners, heat pumps, and bundled measures (smart thermostat, quality install) accounted for 80% of reported energy savings. The sampling plan designed for the evaluation period is included in Table 3-2.

Table 3-2: Impact Sampling Plan

| Measure                     | Metering and/or Verification Sites |           | Phone Survey |            |
|-----------------------------|------------------------------------|-----------|--------------|------------|
|                             | Achieved                           | Targeted  | Achieved     | Targeted   |
| Central Air Conditioner     |                                    |           |              |            |
| <i>Tier 1</i>               | 1                                  | 1         | 3            | 2          |
| <i>Tier 2</i>               | 23                                 | 16        | 24           | 24         |
| <i>Tier 3</i>               | 4                                  | 4         | 6            | 6          |
| Air Source Heat Pump        |                                    |           |              |            |
| <i>Tier 1</i>               | 3                                  | 3         | 3            | 3          |
| <i>Tier 2</i>               | 11                                 | 14        | 20           | 20         |
| <i>Tier 3</i>               | 4                                  | 4         | 6            | 5          |
| Geothermal Heat Pump        | n/a                                | n/a       | 1            | 1          |
| Smart Thermostat*           | n/a                                | n/a       | 31           | 29         |
| Quality Install*            | n/a                                | n/a       | 27           | 31         |
| Attic Insulation & Air Seal | n/a                                | n/a       | 3            | 2          |
| Variable Speed Pool Pump    | n/a                                | n/a       | 4            | 4          |
| Duct Sealing                | n/a                                | n/a       | 1            | 1          |
| Duct Insulation             | n/a                                | n/a       | 1            | 1          |
| Heat Pump Water Heater      | n/a                                | n/a       | 1            | 1          |
| <b>Total</b>                | <b>46</b>                          | <b>42</b> | <b>73*</b>   | <b>70*</b> |

\*Targeted and achieved phone sample size counts for Smart Thermostat and Quality Install are imbedded within phone sample size counts for Central Air Conditioner and Air Source Heat Pump.

### 3.4 Description of Analysis

The evaluation team applied varying analysis techniques depending on the measure, the measure's prominence within the program, and the availability of data on baseline and retrofit savings. A database of program participation provided useful information about measures installed, participants, as well as additional inputs that varied by measure and informed the analysis. Table 3-3 shows the type of analysis applied to each measure.

**Table 3-3: Analysis Approach**

| Measure                     | Achieved                             |
|-----------------------------|--------------------------------------|
| Central Air Conditioner     | Metering study and desk analysis     |
| Air Source Heat Pump        | Metering study and desk analysis     |
| Geothermal Heat Pump        | Desk analysis                        |
| Smart Thermostat            | Desk analysis and secondary research |
| Quality Install             | Metering study and desk analysis     |
| Attic Insulation & Air Seal | Desk analysis                        |
| Variable Speed Pool Pump    | Desk analysis                        |
| Duct Sealing                | Desk analysis                        |
| Heat Pump Water Heater      | Deemed                               |

\*Energy savings for the Quality Install measure were based on metering data collected for the EFLH Study

### 3.4.1 Metering study

Given that a large share of overall program savings is derived from air source heat pumps and central air conditioners, an end-use metering approach was applied for the analysis of these two measures. There are three primary inputs needed to calculate residential HVAC savings. The units' heating/cooling efficiencies and capacities were provided by the program database. The third input, hours of operation, has the highest level of uncertainty and the metering study enabled us to estimate cooling and heating Equivalent Full Load Hours (EFLH) for the program. The methodology used for the metering study follows the Uniform Methods Project (UMP) and most closely resembles IPMVP Option A: Partial Retrofit Isolation/Metered Equipment.

#### 3.4.1.1 Data Collection

To complete the metering study, field engineers were dispatched to the homes of Smart \$aver participants who received a rebate for an air source heat pump or central air conditioner replacement. Participants who took part in the metering study were provided a \$75 incentive divided across two visits to their home. Forty-six sites were metered across all the DEC territory. Two data sets were dropped due to data quality and ultimately 44 sites, including 28 central air conditioners and 16 air source heat pumps, were used in the analysis. All meters were installed in February 2017 and collected in July 2017 ensuring that ample data was available during both the cooling and heating seasons.

During site visits, field engineers performed various data collection activities. Voltage, amperage, and power factor spot measurements were taken on each unit while in operation. Unit specifications, including capacity, were obtained from each system's nameplate information. Finally, a HOBO CTV-A current transducer (CT) was connected on the conductors supplying electricity to the condensing unit located on the exterior of the home to record electrical current measurements. The CT was paired with a U12-006 data logger that stored current data at 10 minute intervals. The result was a trended data log of electrical current between February and July.



Data collected during the metering study was used in a regression analysis that supplied an estimated EFLH for both cooling and heating periods.

### 3.4.2 Analysis, Regression, EFLH Calculation

Three primary inputs are required to estimate annual cooling and heating savings for air source heat pumps and central air conditioners:

1. Capacity - the size (kBtuh) of the efficient unit
2. Efficiency - the SEER or Heating Seasonal Performance Factor (HSPF) value of the efficient unit
3. Equivalent Full Load Hours (EFLH) - how often the unit is in operation at full capacity

EFLH is an effective measure for estimating the cooling and heating requirement for a specific region and provides a comparison of energy use between regions and equipment types. The general form for the EFLH term is shown in Equation 3-1.

#### Equation 3-1: Effective Full Load Hours

$$EFLH_{cool} = \sum_{h=1}^{8760} \frac{\text{Estimated Hourly Load (kW)}}{\text{Connected Load (kW)}}$$

Where:

*Estimated Hourly Load* = Electric demand of the unit in hour *h*  
*Connected Load* = Electric demand draw of the unit when operating at full power

The evaluation team assigned a connected load to each unit in the sample using nameplate size, efficiency, and spot measurements of voltage and power factor collected on-site. Hourly load was obtained from the logger data and was divided by the connected load to calculate the unit's runtime for each hour in the evaluated period.

The evaluation team collected hourly weather records for the full metering period (February 2017 through July 2017) from six weather stations in North and South Carolina, and assigned each sampled customer to one of six weather stations based on proximity, in order to develop a relationship between observed HVAC system usage runtimes and outdoor temperature. In addition, the evaluation team obtained data for typical meteorological year (TMY3) weather for each location and applied the observed relationship between runtimes and weather to the TMY3 data to estimate annual  $EFLH_{heat}$  and  $EFLH_{cool}$  for a typical year.

The evaluation team originally intended to utilize the program database to segment the sample based on customer tier levels and estimate EFLH separately for each tier group. However, due to an unbalanced sample, as well as restrictions related to small sample sizes within a segmented dataset, we were not able to confidently estimate EFLH separately by tier. Instead, the evaluation team used an aggregated EFLH value across all tiers. The assumption that EFLH is consistent across different tiers is based on the fact that the heating or cooling load for a home is independent of the efficiency of the HVAC system that conditions the space. A higher

efficiency air conditioner may run additional hours during the day, but it does so by consuming energy at a level below full load and removing heat from the home at a slower rate. This system saves energy by operating below full load for longer periods of time but the EFLH, a product of hours operating at given power level, remains constant.

As mentioned above, units were metered from February through July 2017. Because the metering period covered both cooling, heating, and shoulder seasons, and the regression analysis was performed twice to estimate annual  $EFLH_{cool}$  and annual  $EFLH_{heat}$  separately. The evaluation team split the meter data into two separate datasets. The first dataset contained only observations where average daily temperatures exceeded the base temperature of 65°F, or where temperatures indicated cooling. The second dataset contained observations where average daily temperatures fell below the base temperature of 65°F, or where outdoor temperatures indicated heating.

The evaluation team developed weather-normalized estimates of  $EFLH_{cool}$  for each unit in the sample using a linear regression model of observed runtimes as a function of the observed cooling degree days (base 65°F) during the cooling season. Figure 3-2 shows the relationship between average daily runtimes (hours) and cooling degree days. Each blue + represents the average air conditioning runtime in hours for each day in the cooling dataset, i.e. each day with an average temperature exceeding 65°F.

**Figure 3-2: Cooling Runtime as a Function of Temperature**

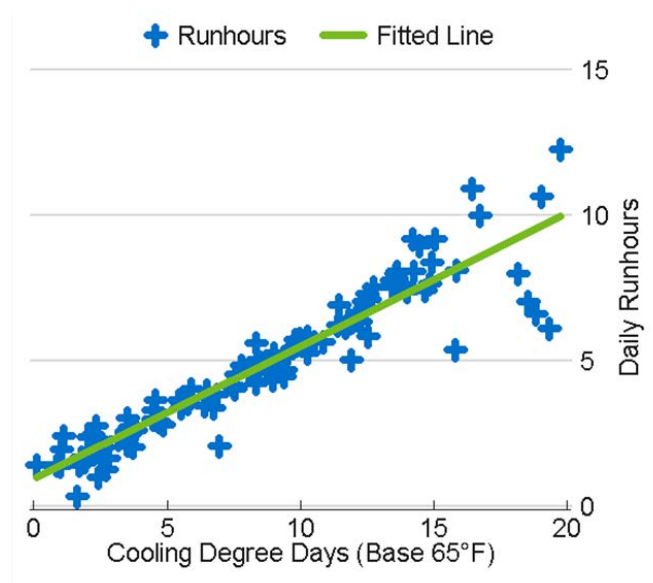


Table 3-4 shows the regression output for the relationship described in Figure 3-2. The key value to consider is the Cooling Degree Day (CDD) coefficient of 0.54. This term indicates that DEC customers use an average of 0.54 hours, or approximately 33 minutes, of additional cooling per CDD.

**Table 3-4: EFLH<sub>cool</sub> Regression Output**

| Model Term | Coefficient | Std. Err. | t-stat | P-value | [90% Confidence Interval] |
|------------|-------------|-----------|--------|---------|---------------------------|
| CDD        | 0.54        | 0.005     | 104.71 | 0.000   | ± 1.6%                    |

The evaluation team ran a similar linear regression model to develop weather-normalized estimates of EFLH<sub>heat</sub> for each air source heat pump unit. The key difference is that instead of CDD, the model estimated runtimes as a function of observed Heating Degree Days (HDD) during the heating season.

Figure 3-3 shows the relationship between average daily runtimes and heating degree days. Each blue + represents the average air source heat pump runtime in hours for each day in the heating dataset, i.e. each day with an average daily temperature below 65°F.

**Figure 3-3: Heating Runtime as a Function of Temperature**

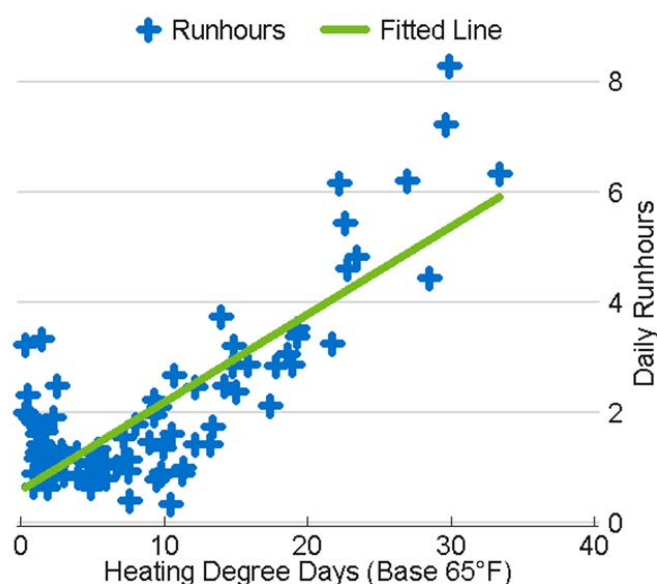


Table 3-5 shows the regression output for the relationship described in Figure 3-3. The coefficient term 0.19 indicates that DEC customers use an average of 0.19 hours, or approximately 12 minutes, of additional heating per HDD.

**Table 3-5: EFLH<sub>heat</sub> Regression Output**

| Model Term | Coefficient | Std. Err. | t-stat | P-value | [90% Confidence Interval] |
|------------|-------------|-----------|--------|---------|---------------------------|
| HDD        | 0.19        | 0.006     | 33.70  | 0.000   | ± 4.9%                    |

The evaluation team utilized hourly TMY3 data for Carolina weather stations to calculate annual CDD and HDD and used those values to estimate EFLH<sub>cool</sub> and EFLH<sub>heat</sub> for each customer region. Table 3-6 shows regression coefficients, annual CDD, annual HDD, and estimated EFLH values for each season. EFLH<sub>cool</sub> and EFLH<sub>heat</sub> were calculated by multiplying each term's regression coefficient by the average CDD and HDD values determined by TMY3 data.

**Table 3-6: EFLH Calculations**

| Term | Regression Coefficient | Annual CDD (Base 64°F) | Annual HDD (Base 65°F) | EFLH <sub>cool</sub> (hours) | EFLH <sub>heat</sub> (hours) |
|------|------------------------|------------------------|------------------------|------------------------------|------------------------------|
| CDD  | 0.54                   | 1,393                  | -                      | 752                          | -                            |
| HDD  | 0.19                   | -                      | 3,674                  |                              | 698                          |

The field data collected by Nexant also provided the peak summer cooling demand coincidence factor (CF<sub>summer</sub>). Just as EFLH is a necessary component of the annual energy savings calculation, peak coincidence factor is a necessary component of the peak demand savings calculation. Peak demand coincidence factor is defined here as the probability that the cooling equipment is operating during system peak hours. The basic form for the CF term is a ratio of hourly load to full load during a given hour of the day, and is shown in Equation 3-2.

**Equation 3-2: Coincidence Factor**

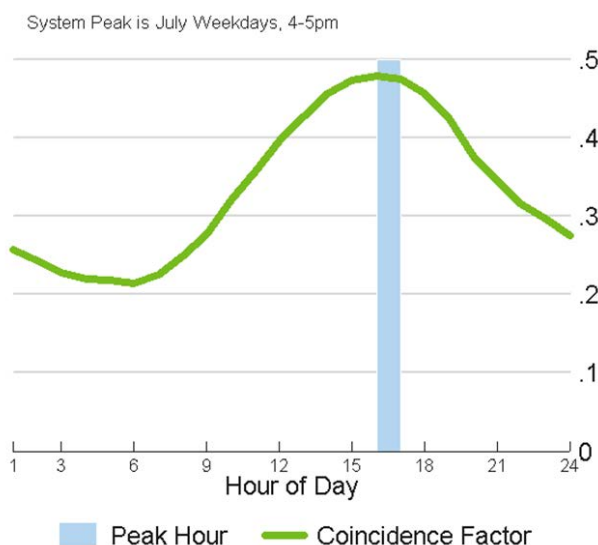
$$CF_h = \frac{\text{Hourly Load}_h \text{ (kW)}}{\text{Full Load (kW)}}$$

Where:

*Hourly Load* = Electric demand of the unit at hour *h*

*Full Load* = Electric demand draw of the unit when operating at full power

The evaluation team calculated the peak demand coincidence factor to estimate peak demand savings for the sample. A system's peak demand period refers to the period during which the highest level of power is needed to satisfy its electric demand requirement. DEC defines its summer peak period as July weekdays between 4:00pm and 5:00pm (hour ending 17). Figure 3-4 shows the average CF<sub>summer</sub> load curve for each weekday of July 2017 for the metered sample. The system's peak period is highlighted in light blue. The CF<sub>summer</sub> during the system peak is 0.47.

**Figure 3-4: Summer Peak Demand Coincidence Factor**

A winter peak coincidence factor ( $CF_{\text{winter}}$ ) was not able to be estimated through the metering study because the metering period did not coincide with the timeframe during which DEC's winter peak is defined. DEC defines its winter peak period as January weekdays between 7:00am and 8:00am (hour ending 8). However, due to the evaluation schedule, loggers were installed in early February and we were unable to collect January usage information to estimate winter demand coincidence factor for the Carolinas territory. Since we were unable to estimate a program specific winter demand CF, the evaluation team applied the estimated  $CF_{\text{winter}}$  found through a similar 2016 metering study performed in DEP territory in order to calculate winter demand (kW) savings. Although the Duke Energy Progress (DEP) and Carolinas service territories border each other, differences in geography like mountains or coastal regions result in varying HVAC needs across the two territories. Applying the  $CF_{\text{winter}}$  found in the DEP evaluation is a strong approximation of performance in DEC, but the uncertainty is increased due to variations in program participants and their location.

#### 3.4.2.1 Central Air Conditioner and Air Source Heat Pump Savings Calculation

Energy and demand savings for central air conditioners and air source heat pumps were determined by engineering algorithms shown in Table 3-7 using the inputs provided in Table 3-8 and Table 3-12.

**Table 3-7: Algorithms for HVAC Energy and Demand Savings**

| Calculation                   | Equation  |
|-------------------------------|---|
| Summer Cooling Energy Savings | $\Delta kWh_{cool} = EFLH_{cool} \times Cap_{cool} \times \left( \frac{1}{SEER_{base}} - \frac{1}{SEER_{ee}} \right)$ |
| Summer Cooling Demand Savings | $\Delta kW_{cool} = Cap_{cool} \times \left( \frac{1}{SEER_{base}} - \frac{1}{SEER_{ee}} \right) \times CF_{cool}$    |
| Winter Heating Energy Savings | $\Delta kWh_{heat} = EFLH_{heat} \times Cap_{heat} \times \left( \frac{1}{HSPF_{base}} - \frac{1}{HSPF_{ee}} \right)$ |
| Winter Heating Demand Savings | $\Delta kW_{heat} = Cap_{heat} \times \left( \frac{1}{HSPF_{base}} - \frac{1}{HSPF_{ee}} \right) \times CF_{heat}$    |
| Algorithm Reference           | Mid-Atlantic TRM, v6.0, May 2016  |

**Table 3-8: Inputs for Central AC Energy and Demand Savings**

| Input                    | Units | Tier | Value           | Source             |
|--------------------------|-------|------|-----------------|--------------------|
| EFLH <sub>cool</sub>     | Hours | All  | 752             | Metering study     |
| Capacity <sub>cool</sub> | kBtuh | 1    | 33.8            | Population average |
|                          |       | 2    | 32.0            |                    |
|                          |       | 3    | 32.8            |                    |
| SEER <sub>base</sub>     | SEER  | All  | 14 <sup>1</sup> | Code minimum       |
| SEER <sub>ee</sub>       | SEER  | 1    | 14.2            | Population average |
|                          |       | 2    | 15.7            |                    |
|                          |       | 3    | 18.1            |                    |
| CF <sub>summer</sub>     | n/a   | All  | 0.475           | Metering study     |
| CF <sub>winter</sub>     | n/a   | All  | 0.588           | Metering study     |

**Electrically Commutated Motor Savings**

For participants who received an electrically commutated motor (ECM) as part of their central air conditioner replacement, the evaluation team estimated the savings impacts resulting from the fan operation in conjunction with a furnace during the heating season. To estimate this impact, we leveraged primary ECM metered data collected previously by the evaluation team in Duke Energy's Progress territory as well as secondary research to establish baseline conditions. The ECM metered data provided five minute amperage intervals which we used in combination with recorded voltage and power factor measurements to estimate the average power draw of an

<sup>1</sup> The results of the participant survey found no existing central air conditioners were in good working condition when replaced. Therefore, an early replacement adjustment was not applicable.

ECM in operating mode. Our secondary research<sup>2</sup> found that ECMs use half the energy of a standard fan motor when used in residential furnace applications. This insight was applied to estimate baseline fan usage.

To calculate savings, we applied an estimated annual effective full load hours (EFLH) for furnaces to our estimated baseline and ECM power draw. The evaluation team calculated the ECM savings as the difference in consumption between the baseline and ECM fans. We further adjusted the estimated ECM savings by applying the percentage of customers in the program who received an ECM with their new system (86%) as well as by the saturation of residential customers with central air conditioners and forced air furnaces (52%) based on Duke Energy's 2013 residential appliance saturation study (RASS). The algorithm applied to estimate ECM fan savings during the heating season (Table 3-9) along with DEC centric inputs (Table 3-10) are included below.

**Table 3-9: Algorithm for ECM Fan Energy and Demand Savings**

| Calculation                      | Equation   |
|----------------------------------|--|
| ECM Fan, furnace, energy savings | $\Delta kWh_{furnace} = EFLH_{furnace} \times Power_{ECM} \times System\ Type\ Adj \times Program\ ECM\ Adj$ |

**Table 3-10: Inputs for Central AC Energy and Demand Savings**

| Input                   | Units | Tier | Value            | Source               |
|-------------------------|-------|------|------------------|----------------------|
| EFLH <sub>furnace</sub> | Hours | All  | 359              | Metering study       |
| Power <sub>ECM</sub>    | kW    | All  | 0.191            | DEP metering study   |
| System Type Adj         | %     | All  | 52% <sup>3</sup> | 2013 Duke RASS       |
| Program ECM Adj         | %     | All  | 86% <sup>4</sup> | DEC Program Database |

Energy and demand savings for central air conditioners are presented in Table 3-11.

<sup>2</sup> Pigg, Scott and Talerico, Tom. 2004. "Electricity Savings from Variable-Speed Furnaces in Cold Climates" in *ACEEE 2004 Summer Study on Energy Efficiency in Buildings, Panel 1, Paper 23*, [http://aceee.org/files/proceedings/2004/data/papers/SS04\\_Panel1\\_Paper23.pdf](http://aceee.org/files/proceedings/2004/data/papers/SS04_Panel1_Paper23.pdf)

<sup>3</sup> Penetration of central AC systems paired with forced air furnaces in Duke Progress territory per the 2013 RASS

<sup>4</sup> Accounts for participants who only replaced the central AC condensing unit and cooling coil without improving the blower section of the HVAC system

**Table 3-11: Central AC Gross Verified Savings**

| Season       | Tier     | Energy Savings (kWh)* | Summer Demand Savings (kW) | Winter Demand Savings (kW) |
|--------------|----------|-----------------------|----------------------------|----------------------------|
| Cooling      | 1        | 36 <sup>5</sup>       | 0.022 <sup>3</sup>         | 0                          |
|              | 2        | 182                   | 0.115                      |                            |
|              | 3        | 395                   | 0.250                      |                            |
| Heating      | All      | 31                    | 0                          | 0.167                      |
| <b>Total</b> | <b>1</b> | <b>66<sup>3</sup></b> | <b>0.022<sup>3</sup></b>   | <b>0.167</b>               |
|              | <b>2</b> | <b>212</b>            | <b>0.115</b>               |                            |
|              | <b>3</b> | <b>426</b>            | <b>0.250</b>               |                            |

\*Rounding error present

Savings for air source heat pumps (Table 3-12 and Table 3-14) apply a split baseline, based on participant responses to the process survey. For this evaluation 6.9% of air source heat pump participants stated their systems were “in good working order” and “not old”, and received early replacement energy savings based on a 10 SEER and 6.8 HSPF baseline heat pump.

<sup>5</sup> Tier 1 energy and demand savings include savings associated with program-required quality installation.



**Table 3-12: Inputs for Air Source Heat Pump Energy and Demand Savings**

| Input                                    | Units | Tier | Value                | Source             |
|--|-------|------|----------------------|--------------------|
| EFLH <sub>cool</sub>                     | Hours | All  | 752                  | Metering study     |
| EFLH <sub>heat</sub>                     | Hours | All  | 698                  | Metering study     |
| Capacity <sub>cool and heat</sub>        | kBtuh | 1    | 29.7                 | Population average |
|  |       | 2    | 30.2                 |                    |
|  |       | 3    | 32.8                 |                    |
| Early Replacement (ER%)                  | %     | All  | 6.9%                 | Process Survey     |
| SEER <sub>base, early replacement</sub>  | SEER  | All  | 10 <sup>6</sup>      | Mid-Atlantic TRM   |
| SEER <sub>base, replace on failure</sub> | SEER  | All  | 14                   | Code minimum       |
| SEER <sub>ee</sub>                       | SEER  | 1    | 14.2                 | Population average |
|  |       | 2    | 15.5                 |                    |
|  |       | 3    | 18.3                 |                    |
| HSPF <sub>base</sub>                     | HSPF  | All  | 6.8/8.2 <sup>4</sup> | Code minimum       |
| HSPF <sub>ee</sub>                       | HSPF  | 1    | 8.4                  | Population average |
|  |       | 2    | 8.8                  |                    |
|  |       | 3    | 9.7                  |                    |
| CF <sub>summer</sub>                     | n/a   | All  | 0.475                | Metering study     |
| CF <sub>winter</sub>                     | n/a   | All  | 0.588                | Metering study     |

Calculation of savings related to spilt baselines considers each scenario (early replacement and replace on failure) separately, and then calculates a spilt baseline by multiplying each component by the percentage of units that meet the conditions of a given scenario (Table 3-13).

<sup>6</sup> The results of the participant survey found 6.9% of Air Source Heat Pump Replacement participants considered their previous system was “in good working order”. An early replacement baseline of 10 SEER and 6.8 HSPF was applied to 6.9% of the population to reflect this finding.

Table 3-13: Algorithm for Split Baseline Savings

| Calculation                                   | Equation  |
|---|---|
| Early Replacement,<br>Cooling Energy Savings  | $\Delta kWh_{cool,ER} = EFLH_{cool} \times Cap_{cool} \times \left( \frac{1}{SEER_{base,ER}} - \frac{1}{SEER_{ee}} \right)$   |
| Replace on Failure,<br>Cooling Energy Savings | $\Delta kWh_{cool,ROF} = EFLH_{cool} \times Cap_{cool} \times \left( \frac{1}{SEER_{base,ROF}} - \frac{1}{SEER_{ee}} \right)$ |
| Heat Pump, Cooling<br>Energy Savings          | $\Delta kWh_{cool, split\ baseline} = \Delta kWh_{cool,ER} \times ER\% + \Delta kWh_{cool,ROF} \times (1 - ER\%)$             |

Table 3-14: Air Source Heat Pump Gross Verified Savings

| Season       | Tier     | Energy Savings (kWh)   | Summer Demand Savings (kW) | Winter Demand Savings (kW) |
|--------------|----------|------------------------|----------------------------|----------------------------|
| Cooling      | 1        | 73 <sup>7</sup>        | 0.046 <sup>5</sup>         | 0                          |
|              | 2        | 199                    | 0.126                      |                            |
|              | 3        | 463                    | 0.293                      |                            |
| Heating      | 1        | 98 <sup>5</sup>        | 0                          | 0.082 <sup>5</sup>         |
|              | 2        | 216                    |                            | 0.182                      |
|              | 3        | 463                    |                            | 0.390                      |
| <b>Total</b> | <b>1</b> | <b>171<sup>5</sup></b> | 0.046 <sup>5</sup>         | 0.082 <sup>5</sup>         |
|              | <b>2</b> | <b>415</b>             | 0.126                      | 0.182                      |
|              | <b>3</b> | <b>926</b>             | 0.293                      | 0.390                      |

### 3.4.2.2 Geothermal Heat Pump Savings Calculation

Geothermal heat pumps make use of constant ground temperature to provide heating and cooling and operate at higher efficiency levels than air source heat pumps. The Smart \$aver Program provides incentives for these systems to encourage participants to install higher efficiency HVAC systems in their homes. Geothermal heat pumps were excluded from the EFLH metering study; however, the evaluation team estimated savings based on the assumption that heating and cooling EFLH for a geothermal heat pump are equivalent to an air source heat pump.

<sup>7</sup> Tier 1 energy and demand savings include savings associated with program required quality installation

**Table 3-15: Algorithms for Geothermal Heat Pump Energy and Demand Savings**

| Calculation                   | Equation  |
|-------------------------------|---|
| Summer Cooling Energy Savings | $\Delta kWh_{cool} = EFLH_{cool} \times Cap_{cool} \times \left( \frac{1}{SEER_{base}} - \frac{1}{SEER_{ee}} \right)$                   |
| Summer Cooling Demand Savings | $\Delta kW_{cool} = Cap_{cool} \times \left( \frac{1}{SEER_{base}} - \frac{1}{SEER_{ee}} \right) \times CF_{cool}$                      |
| Winter Heating Energy Savings | $\Delta kWh_{heat} = EFLH_{heat} \times Cap_{heat} \times \left( \frac{1}{HSPF_{base}} - \frac{1}{COP_{retrofit} \times 3.412} \right)$ |
| Winter Heating Demand Savings | $\Delta kW_{heat} = Cap_{heat} \times \left( \frac{1}{HSPF_{base}} - \frac{1}{COP_{retrofit} \times 3.412} \right) \times CF_{heat}$    |
| Algorithm Reference           | Mid-Atlantic TRM, v6.0, May 2016  |

**Table 3-16: Inputs for Geothermal Heat Pump Gross Verified Savings**

| Input                             | Units | Value | Source             |
|-----------------------------------|-------|-------|--------------------|
| EFLH <sub>cool</sub>              | Hours | 752   | Metering study     |
| EFLH <sub>heat</sub>              | Hours | 698   | Metering study     |
| Capacity <sub>cool and heat</sub> | kBtuh | 49.6  | Population average |
| SEER <sub>base</sub>              | SEER  | 14    | Program minimum    |
| SEER <sub>ee</sub>                | SEER  | 24.2  | Population average |
| HSPF <sub>base</sub>              | HSPF  | 8.2   | Program minimum    |
| COP <sub>retrofit</sub>           | COP   | 3.7   | Assumed            |
| CF <sub>cool</sub>                | N/A   | 0.475 | Metering study     |
| CF <sub>heat</sub>                | N/A   | 0.588 | Metering study     |

**Table 3-17: Geothermal Heat Pump Gross Verified Savings**

| Season       | Energy Savings (kWh) | Summer Demand Savings (kW) | Winter Demand Savings (kW) |
|--------------|----------------------|----------------------------|----------------------------|
| Cooling      | 1,124                | 0.710                      | 1.274                      |
| Heating      | 1,513                |                            |                            |
| <b>Total</b> | <b>2,637</b>         |                            |                            |

### 3.4.2.3 Quality Installation Energy Savings

The Quality Installation (QI) measure provides HVAC technicians a process to ensure that new equipment is properly tuned and operating at a high efficiency level when installed. The QI process includes:

- Measuring the sub-cool or superheat charge of the condenser
  - System must be allowed to run for at least 15 minutes prior to measuring charge
- Measuring the liquid and suction line pressures
- Completing a return and supply enthalpy conversion
- Measuring static pressure in the return and supply ducts
- Measuring the system level airflow.

The HVAC technician uses these measurements to calculate a cooling capacity for the unit while in operation. The QI requires that the system performance achieve at least 90% of the net capacity as rated by the Air-conditioning, Heating, & Refrigeration Institute (AHRI).

QI is required for all Tier 1 HVAC units rebated through the Smart \$aver Program. For Tiers 2 and 3, an additional incentive is offered if the contractor completed the QI process.

The evaluation team based its verification of QI energy and demand savings estimates on a review of contractor submitted QI data collection sheets and metering data from the Duke Energy Carolinas EFLH study. Along with the program specific steps, secondary research was completed to provide an industry estimate for the level of energy savings expected when a QI process is implemented during the installation of new residential HVAC equipment.

The evaluation team completed a review of 210 QI data collection sheets from the program (70 each from the tier) provided by DEC. These sheets tracked the inputs and calculations completed by HVAC technicians as they installed a participant's new HVAC system and progressed through the QI process. The evaluation focused on the accuracy of the inputs and calculations on the QI data collection sheets to determine if the process was properly applied. Based on the review of these QI data sheets, 60% contained one or more of the following issues:

- Failure to achieve a calculated operational cooling capacity inside the 90%-110% range
- Application of an industry rule of thumb (airflow = 400 cfm/tom) instead of directly measuring the parameter
- Measurements taken below 60° F ambient air temperature on standard QI data collection forms

Based on this review the evaluation de-rated savings from the measure by 60% to reflect the issues discovered (Table 3-18).

**Table 3-18: Summary of Quality Installation De-rate Components**

| Quality Installation Measurement    | Count            |
|-------------------------------------|------------------|
| Cooling Capacity Outside of 90-110% | 71               |
| Airflow Rule of Thumb Applied       | 65               |
| QI Performed Below 60 °F            | 48               |
| Total QI Sheets with Issues         | 122 <sup>8</sup> |
| QI Data Sheets for Comparison       | 202              |
| <b>Savings De-rate Percentage</b>   | <b>60%</b>       |

Additionally, the evaluation team found 11% of the QIs were completed as 'Cold Weather Quality Installations' which is a simplified QI data collection process applied when ambient temperatures are below 70° F. Because the accuracy of charge readings of HVAC systems decreases as the ambient temperature falls below 70° F, the HVAC technician is not able to collect the charge data to needed to calculate the operating capacity of the system. Therefore, systems installed in these weather conditions cannot qualify for the program's QI process. Ultimately the evaluation team determined 11% of QIs were completed in these conditions. This finding did not influence the per unit energy and demand savings for QI measure, but the evaluation team did reduce the reported count of QI participants by 11% to reflect systems installed during cold weather (Table 3-19).

**Table 3-19: Summary of Quality Installation Cold Weather Installs**

| Quality Installation Data Type    | Count      |
|-----------------------------------|------------|
| Cold Weather Sheets Removed       | 25         |
| Total QI Data Sheet Reviewed      | 227        |
| <b>QI Participation Reduction</b> | <b>11%</b> |

The evaluation team based the verification of savings attributable to the QI measure on meter data collected during the Duke Energy Carolinas EFLH study. We estimated and compared the efficiency level (based on the ratio of kW/ton) of systems with and without QI and calculated improvements in efficiency from systems that received QI were attributed to the measure. This analysis found a SEER efficiency improvement of 1.37%, which when reduced by 60% (based on issues discovered on the QI data collection forms) provided a measure-level savings estimate of 0.54%. To quantify the impact this increased efficiency had on energy and demand savings, the evaluation team defined a QI efficiency level by increasing the program-level SEER and HSPF values by 0.54% and calculated the savings impact relative to the non-QI SEER and HSPF as detailed in Table 3-20 below.

<sup>8</sup> Some Quality Install data sheets included multiple issues so the values above do not sum to 122

**Table 3-20: Algorithms for Quality Installation Energy and Demand Savings**

| Calculation                   | Equation  |
|-------------------------------|---|
| Summer Cooling Energy Savings | $\Delta kWh_{cool} = EFLH_{cool} \times Cap_{cool} \times \left( \frac{1}{SEER_{ee}} - \frac{1}{(1 + ESF_{QI}) \times SEER_{ee}} \right)$ |
| Summer Cooling Demand Savings | $\Delta kW_{cool} = Cap_{cool} \times \left( \frac{1}{SEER_{ee}} - \frac{1}{(1 + ESF_{QI}) \times SEER_{ee}} \right) \times CF_{cool}$    |
| Winter Heating Energy Savings | $\Delta kWh_{heat} = EFLH_{heat} \times Cap_{heat} \times \left( \frac{1}{HSPF_{ee}} - \frac{1}{(1 + ESF_{QI}) \times HSPF_{ee}} \right)$ |
| Winter Heating Demand Savings | $\Delta kW_{heat} = Cap_{heat} \times \left( \frac{1}{HSPF_{ee}} - \frac{1}{(1 + ESF_{QI}) \times HSPF_{ee}} \right) \times CF_{heat}$    |
| Algorithm Reference           | Modified from Mid-Atlantic TRM, v6.0, May 2016  |

**Table 3-21: Inputs for Quality Installation Energy and Demand Savings**

| Input                             | Units | Tier | Value | Source             |
|-----------------------------------|-------|------|-------|--------------------|
| EFLH <sub>cool</sub>              | Hours | All  | 752   | Metering study     |
| EFLH <sub>heat</sub>              | Hours | All  | 698   | Metering study     |
| ESF <sub>QI</sub>                 | %     | All  | 0.54% | Metering study     |
| Capacity <sub>cool and heat</sub> | kBtuh | 1    | 29.7  | Population average |
|                                   |       | 2    | 30.2  |                    |
|                                   |       | 3    | 32.8  |                    |
| SEER <sub>base</sub>              | SEER  | All  | 14    | Code minimum       |
| SEER <sub>ee</sub>                | SEER  | 1    | 14.2  | Population average |
|                                   |       | 2    | 15.5  |                    |
|                                   |       | 3    | 18.3  |                    |
| HSPF <sub>base</sub>              | HSPF  | All  | 8.2   | Code minimum       |
| HSPF <sub>ee</sub>                | HSPF  | 1    | 8.4   | Population average |
|                                   |       | 2    | 8.8   |                    |
|                                   |       | 3    | 9.7   |                    |
| CF <sub>summer</sub>              | n/a   | All  | 0.475 | Metering study     |
| CF <sub>winter</sub>              | n/a   | All  | 0.588 | Metering study     |

**Table 3-22: Quality Installation Verified Savings**

| System                  | Tier           | Energy Savings (kWh) | Summer Demand Savings (kW) | Winter Demand Savings (kW) |
|-------------------------|----------------|----------------------|----------------------------|----------------------------|
| Central Air Conditioner | 1              | 10                   | 0.006                      | 0.000                      |
|                         | 2 and 3        | 8                    | 0.005                      | 0.000                      |
| Heat Pump               | 1 <sup>9</sup> | 13                   | 0.005                      | 0.011                      |
|                         | 2 and 3        | 21                   | 0.005                      | 0.011                      |

**3.4.2.4 Smart Thermostat Energy Savings**

Customers who installed an eligible central air conditioner or heat pump had the opportunity to receive a rebate for a qualifying smart thermostat. Because the thermostats were included only in conjunction with a rebated HVAC system, the evaluation team opted to analyze the energy savings impacts for thermostats based on an engineering algorithm informed by the metering analysis and secondary data. The evaluation developed its savings analysis based on estimating the cooling and heating consumption of the retrofitted HVAC system and applying an estimated energy savings factor (ESF) that accounts for the amount of reduced consumption caused by the smart thermostat. This same method and algorithm is provided in the 2015 Indiana TRM (see Table 3-23). The evaluation team did review the Mid-Atlantic TRM; however, that resource specified deemed savings rather than an algorithm that could leverage the primary data collected from the metering study.

**Table 3-23: Algorithms for Smart Thermostat Energy Savings**

| Calculation                   | Equation  |
|-------------------------------|---|
| Summer Cooling Energy Savings | $\Delta kWh_{cool} = EFLH_{cool} \times Cap_{cool} \times \left( \frac{1}{SEER_{ee}} \right) \times ESF_{cool}$ |
| Winter Heating Energy Savings | $\Delta kWh_{heat} = EFLH_{heat} \times Cap_{heat} \times \left( \frac{1}{HSPF_{ee}} \right) \times ESF_{heat}$ |
| Algorithm Reference           | Indiana TRM version 2.1, July 2015  |

As detailed in Table 3-24, the evaluation team applied system capacities, SEER and HSPF values, and EFLH based on the data collected from the metering study as well as from the participant database. The ESF was sourced from the 2015 Indiana TRM. The evaluation team consulted the 2017 Arkansas TRM due to its similar climate zone to the DEC territory; however, the sources used to calculate savings in the Arkansas TRM ultimately rely on similar sources cited in the Indiana TRM. Moreover, the evaluation team felt the savings algorithm suggested in the Indiana TRM was more robust and allowed us to leverage more participant data in calculating the estimated impact. Therefore, we chose that document to estimate the verified impacts for smart thermostats. Based on these assumptions, we estimated the savings impact of the smart thermostats as illustrated in Table 3-25.

Table 3-24: Inputs for Smart Thermostat Savings

| Input                             | Units | Tier | Value | Source             |
|-----------------------------------|-------|------|-------|--------------------|
| $EFLH_{cool}$                     | Hours | All  | 752   | Metering study     |
| $EFLH_{heat}$                     | Hours | All  | 698   | Metering study     |
| $ESF_{cool}$                      | %     | All  | 13.9% | 2015 Indiana TRM   |
| $ESF_{heat}$                      | %     | All  | 12.5% | 2015 Indiana TRM   |
| Capacity <sub>cool and heat</sub> | kBtuh | 1    | 29.7  | Population average |
|                                   |       | 2    | 30.2  |                    |
|                                   |       | 3    | 32.8  |                    |
| SEER <sub>ee</sub>                | SEER  | 1    | 14.2  | Population average |
|                                   |       | 2    | 15.5  |                    |
|                                   |       | 3    | 18.3  |                    |
| HSPF <sub>ee</sub>                | HSPF  | 1    | 8.4   | Population average |
|                                   |       | 2    | 8.8   |                    |
|                                   |       | 3    | 9.7   |                    |

Table 3-25: Smart Thermostat Verified Savings

| System                                     | Tier | Energy Savings (kWh) | Weighted Average Energy Savings (kWh) |
|--|------|----------------------|---------------------------------------|
| Smart Thermostat - Central Air Conditioner | 1    | 248                  | 211                                   |
|  | 2    | 214                  |                                       |
|  | 3    | 190                  |                                       |
| Smart Thermostat - Heat Pump               | 1    | 530                  | 499                                   |
|  | 2    | 503                  |                                       |
|  | 3    | 483                  |                                       |

### 3.4.3 Engineering Analysis

#### 3.4.3.1 Attic Insulation and Air Sealing

The evaluation considered attic insulation and air sealing data provided by the program database to inform savings calculations. Inputs for the insulation component of the measure included baseline and retrofit insulation R-values and attic area. HVAC system efficiency was assumed to be either SEER 13 or 10 and was modeled using a split baseline, determined by data in the 2016 Duke Energy RASS, to approximate system age across the DEC service area and apply a lower efficiency rating for older units. Validation of the estimated square footage data point showed many input that were inconsistent with the available attic area for a given home. This data appears to be inconsistently provided and for many projects the total home square footage is listed instead of attic insulation area. In order to adjust for this issue potential attic area was verified through the review of publically available housing information.



Adjustments were made by dividing the total home area by the number of stories and reducing attic area by a measure level adjustment factor.

To estimate the impacts of the attic insulation component of this measure, the evaluation team reviewed the savings algorithm from the Mid-Atlantic TRM; however, we found the stipulated algorithm provided lower results that are inconsistent with our expectations of savings from this measure. The evaluation team instead applied the algorithm provided by the Illinois TRM with weather data based on typical meteorological year (TMY3) in Charlotte, NC.

**Table 3-26: Algorithms for Attic Insulation Energy and Demand Savings**

| Calculation            | Equation   |
|------------------------|--|
| Cooling Energy Savings | $\Delta kWh_{cool} = CDD \times 24 \times Area \times DUA \times (1 - FramingFactor_{attic})$ $\times \left( \frac{1}{Rvalue_{base}} - \frac{1}{Rvalue_{retrofit}} \right) \times \frac{1}{\eta_{cool} \times 1000}$                     |
| Heating Energy Savings | $\Delta kWh_{heat} = HDD \times 24 \times Area \times (1 - FramingFactor_{attic}) \times ADJ_{attic}$ $\times \left( \frac{1}{Rvalue_{base}} - \frac{1}{Rvalue_{retrofit}} \right) \times \frac{1}{COP \times 3412} \times Ratio_{ASHP}$ |
| Summer Demand Savings  | $\Delta kW_{summer} = \frac{\Delta kWh_{cool}}{EFLH_{cool}} \times CF_{summer}$  |
| Winter Demand Savings  | $\Delta kW_{winter} = \frac{\Delta kWh_{heat}}{EFLH_{heat}} \times CF_{winter}$  |
| Algorithm Reference    | Illinois TRM, v5.0, June 2016  |

**Table 3-27: Inputs for Attic Insulation Energy and Demand Savings**

| Input                      | Units           | Value   | Source                                       |
|----------------------------|-----------------|---------|--|
| R <sub>base</sub>          | R-value         | 12.5    | Program database average                     |
| R <sub>retrofit</sub>      | R-value         | 40.1    | Program database average                     |
| Area                       | ft <sup>2</sup> | 1,268   | Program database average; secondary research |
| CDD                        | CDD             | 1,765   | TMY3 data                                    |
| HDD                        | HDD             | 2,389   | TMY3 data                                    |
| η <sub>cool</sub>          | SEER            | 10/13   | TRM  |
| COP                        | COP             | 1.7/1.9 | TRM  |
| HVAC Age Ratio, >10 years  | %               | 32%     | Duke Energy Carolinas 2016 RASS              |
| HVAC Age Ratio, ≤10 years  | %               | 68%     | Duke Energy Carolinas 2016 RASS              |
| ADJ <sub>attic</sub>       | %               | 80%     | TRM  |
| DUA                        | %               | 75%     | TRM  |
| Framing Factor             | %               | 7%      | TRM  |
| air source heat pump Ratio | %               | 47.8%   | DEC program database ratio                   |
| CF <sub>summer</sub>       | N/A             | 0.475   | Metering study                               |
| CF <sub>winter</sub>       | N/A             | 0.588   | Metering study                               |

**Table 3-28: Attic Insulation Gross Verified Savings**

| Season       | Energy Savings(kWh) | Summer Demand Savings (kW) | Winter Demand Savings (kW) |
|--------------|---------------------|----------------------------|----------------------------|
| Cooling      | 179                 | 0.113221                   | 0.211                      |
| Heating      | 251                 |                            |                            |
| <b>Total</b> | <b>430</b>          |                            |                            |

All participants who installed attic insulation were also required to air seal the attic plane to reduce air leakage from conditioned areas of the home. Savings for this component of the measure are separated from the insulation improvement and calculated using pre- and post-retrofit blower door results provided by the program database. Overall the program achieved an average air leakage reduction of 21% (Table 3-31) in-line with other Duke Energy territories (DEO – 24%, DEI – 21%). Air sealing improvements typically exhibit energy savings greater than the attic insulation portion of the measure, but that's not to the result for this evaluation. Given similar blower door inputs the variation is due to differences in energy savings algorithms provided by the regional TRM applied in each jurisdiction.

**Table 3-29: Algorithms for Air Sealing Energy and Demand Savings**

| Calculation            | Equation   |
|------------------------|--|
| Cooling Energy Savings | $\Delta kWh_{cool} = CDH \times DUA \times 60 \times 0.018 \times LM \times \frac{CFM50_{base} - CFM50_{retrofit}}{n - Factor} \times \frac{1}{\eta_{cool} \times 1000}$             |
| Heating Energy Savings | $\Delta kWh_{heat} = HDD \times 60 \times 24 \times 0.018 \times (CFM50_{base} - CFM50_{retrofit}) \times \frac{1}{COP \times 3412} \times Ratio_{ASHP} \times \frac{1}{n - Factor}$ |
| Summer Demand Savings  | $\Delta kW_{summer} = \frac{\Delta kWh_{cool}}{EFLH_{cool}} \times CF_{summer}$  |
| Winter Demand Savings  | $\Delta kW_{winter} = \frac{\Delta kWh_{heat}}{EFLH_{heat}} \times CF_{winter}$  |
| Algorithm Reference    | Mid-Atlantic TRM, v6.0, May 2016   |

**Table 3-30: Inputs for Air Sealing Energy and Demand Savings**

| Input                      | Units             | Value   | Source                          |
|----------------------------|-------------------|---------|---------------------------------|
| CFM <sub>base</sub>        | CFM <sub>50</sub> | 3,733   | Program database average        |
| CFM <sub>retrofit</sub>    | CFM <sub>50</sub> | 2,941   | Program database average        |
| n-Factor                   | N/A               | 16.7    | Secondary research              |
| CDH                        | CDH               | 12,948  | TMY3 data                       |
| HDD                        | HDD               | 2,389   | TMY3 data                       |
| DUA                        | Unitless          | 0.75    | Mid-Atlantic TRM                |
| η <sub>cool</sub>          | SEER              | 10/13   | Code minimum                    |
| COP                        | COP               | 1.7/1.9 | Mid-Atlantic TRM                |
| HVAC Age Ratio, >10 years  | %                 | 32%     | Duke Energy Carolinas 2016 RASS |
| HVAC Age Ratio, ≤10 years  | %                 | 68%     | Duke Energy Carolinas 2016 RASS |
| Air source heat pump Ratio | %                 | 47.8%   | DEC program database ratio      |
| CF <sub>summer</sub>       | N/A               | 0.475   | Metering study                  |
| CF <sub>winter</sub>       | N/A               | 0.588   | Metering study                  |

**Table 3-31: Air Sealing Gross Verified Savings**

| Season       | Energy Savings (kWh) | Summer Demand Savings (kW) | Winter Demand Savings (kW) |
|--------------|----------------------|----------------------------|----------------------------|
| Cooling      | 172                  | 0.108                      | 0.188                      |
| Heating      | 223                  |                            |                            |
| <b>Total</b> | <b>395</b>           |                            |                            |

**Table 3-32: Combined Attic Insulation and Air Sealing Gross Verified Savings**

| Season       | Energy Savings (kWh) | Summer Demand Savings (kW) | Winter Demand Savings (kW) |
|--------------|----------------------|----------------------------|----------------------------|
| Cooling      | 350                  | 0.221                      | 0.399                      |
| Heating      | 474                  |                            |                            |
| <b>Total</b> | <b>824</b>           |                            |                            |

**3.4.3.2 Variable Speed Pool Pumps**

Variable speed pool pumps save the participant energy by reducing flow rates through a pump and achieving significant energy savings. Reducing pump flow by 50% is expected to save 87% of the energy needed to operate the system. The algorithm use by the evaluation team and the associated parameters are presented in Table 3-33 and Table 3-34. Final verified gross savings are provided in Table 3-35.

While the Mid-Atlantic TRM provides deemed savings values for the variable speed pool pump measure, the evaluation team chose to apply data provided by the Duke Energy Carolinas Smart \$aver Program database to reduce the assumptions used and provide more accurate, program specific savings results. To apply this primary program data, we used the algorithm provided by the 2015 Indiana TRM estimates the consumption of a standard single speed pool pump, which applies an energy savings factor (ESF) based on expected usage of a variable speed motor.

**Table 3-33: Algorithms for Variable Speed Pool Pump Energy and Demand Savings**

| Calculation                   | Equation  |
|-------------------------------|---|
| Summer Cooling Energy Savings | $\Delta kWh = \frac{HP \times LF \times 0.746}{\eta_{pump}} \times \frac{Hrs}{Day} \times \frac{Days}{Year} \times ESF$ |
| Summer Demand Savings         | $\Delta kW_{summer} = \frac{\Delta kWh}{\frac{Hrs}{Day} \times \frac{Days}{Year}} \times CF_{summer}$                   |
| Algorithm Reference           | Indiana TRM v2.1, July 15, 2015   |

**Table 3-34: Inputs for Variable Speed Pool Pump Gross Verified Savings**

| Input                                    | Units      | Value | Source                   |
|--|------------|-------|--------------------------|
| HP                                       | Horsepower | 2.02  | Program database average |
| Load Factor                              | %          | 66%   | IN TRM                   |
| Pump Efficiency ( $\eta_{\text{pump}}$ ) | %          | 33%   | IN TRM                   |
| Hours of Use per Day, single speed pump  | Hours      | 6.0   | IN TRM                   |
| Days of Use per Year                     | Days       | 154   | Survey responses         |
| Energy Savings Factor                    | %          | 91%   | IN TRM                   |
| $CF_{\text{summer}}$                     | N/A        | 0.20  | IN TRM                   |

**Table 3-35: Variable Speed Pool Pump Gross Verified Savings**

| Energy Savings (kWh) | Summer Demand Savings (kW) | Winter Demand Savings (kW) |
|----------------------|----------------------------|----------------------------|
| 2,430                | 0.53                       | 0.000                      |

### 3.4.3.3 Duct Sealing

Duct sealing improves the distribution efficiency of a heating or cooling system by patching any openings in the duct system that prevent conditioned air from reaching its intended destination. This results in savings from an HVAC system that can operate less often and still maintain the consistent, comfortable temperature desired by the homeowner. The algorithms used by the evaluation team and the associated parameters are presented in Table 3-36 and Table 3-37. Final verified gross savings are provided in Table 3-38.

**Table 3-36: Algorithms for Duct Sealing Energy and Demand Savings**

| Calculation                   | Equation  |
|-------------------------------|---|
| Summer Cooling Energy Savings | $\Delta kWh_{\text{cool}} = EFLH_{\text{cool}} \times Cap_{\text{cool}} \times \frac{\Delta CFM_{25DL}}{\text{System CFM}} \times \frac{1}{\eta_{\text{cool}}}$                                 |
| Summer Cooling Demand Savings | $\Delta kWh_{\text{heat}} = EFLH_{\text{heat}} \times Cap_{\text{heat}} \times \frac{\Delta CFM_{25DL}}{\text{System CFM}} \times \frac{1}{COP \times 3,412} \times \text{Ratio}_{\text{ASHP}}$ |
| Winter Heating Energy Savings | $\Delta kW_{\text{summer}} = \frac{\Delta kWh_{\text{cool}}}{EFLH_{\text{cool}}} \times CF_{\text{summer}}$   |
| Winter Heating Demand Savings | $\Delta kW_{\text{winter}} = \frac{\Delta kWh_{\text{heat}}}{EFLH_{\text{heat}}} \times CF_{\text{winter}}$   |
| Algorithm Reference           | Mid-Atlantic TRM, v6.0, May 2016  |

**Table 3-37: Inputs for Duct Sealing Gross Verified Savings**

| Input                             | Units             | Value   | Source                          |
|-----------------------------------|-------------------|---------|---------------------------------|
| $\Delta\text{CFM}_{25}$           | $\text{CFM}_{25}$ | 134.6   | Program database                |
| System CFM                        | CFM               | 1,063   | Program database                |
| $\text{EFLH}_{\text{cool}}$       | Hours             | 752     | Metering study                  |
| $\text{EFLH}_{\text{heat}}$       | Hours             | 698     | Metering study                  |
| Capacity <sub>cool and heat</sub> | kBtuh             | 31.9    | Program database                |
| SEER                              | SEER              | 10/13   | Mid-Atlantic TRM                |
| COP                               | COP               | 2.0/2.3 | Mid-Atlantic TRM                |
| HVAC Age Ratio, >10 years         | %                 | 32%     | Duke Energy Carolinas 2016 RASS |
| HVAC Age Ratio, <=10 years        | %                 | 68%     | Duke Energy Carolinas 2016 RASS |
| $\text{CF}_{\text{cool}}$         | N/A               | 0.475   | Metering study                  |
| $\text{CF}_{\text{heat}}$         | N/A               | 0.588   | Metering study                  |

**Table 3-38: Duct Sealing Gross Verified Savings**

| Season       | Energy Savings (kWh) | Summer Demand Savings (kW) | Winter Demand Savings (kW) |
|--------------|----------------------|----------------------------|----------------------------|
| Cooling      | 256                  | 0.162                      | 0.153                      |
| Heating      | 182                  |                            |                            |
| <b>Total</b> | <b>438</b>           |                            |                            |

#### 3.4.3.4 Duct Insulation

Duct insulation reduces the thermal transfer of energy between the conditioned air in the duct system and the surrounding conditions, and reduces HVAC system operation. All the duct insulation measures are considered to be in the attic, outside conditioned space, where all heat transferred into or away from the conditioned air is considered outside the thermal envelope of the home. The algorithms used by the evaluation team and the associated parameters are presented in Table 3-39 and Table 3-40. Final verified gross savings are provided in Table 3-41.

**Table 3-39: Algorithms for Duct Insulation Energy and Demand Savings**

| Calculation            | Equation   |
|------------------------|--|
| Cooling Energy Savings | $\Delta kWh_{cool} = EFLH_{cool} \times Capacity \times Area \times \left( \frac{1}{Rvalue_{base}} - \frac{1}{Rvalue_{retrofit}} \right) \times \frac{1}{\eta_{cool} \times 1000}$             |
| Heating Energy Savings | $\Delta kWh_{heat} = EFLH_{heat} \times Capacity \times Area \times \left( \frac{1}{Rvalue_{base}} - \frac{1}{Rvalue_{retrofit}} \right) \times \frac{1}{COP \times 3412} \times Ratio_{ASHP}$ |
| Summer Demand Savings  | $\Delta kW_{summer} = \frac{\Delta kWh_{cool}}{EFLH_{cool}} \times CF_{summer}$  |
| Winter Demand Savings  | $\Delta kW_{winter} = \frac{\Delta kWh_{heat}}{EFLH_{heat}} \times CF_{winter}$  |
| Algorithm Reference    | Mid-Atlantic TRM, v6.0, May 2016   |

**Table 3-40: Inputs for Duct Insulation Gross Verified Savings**

| Input                             | Units           | Value   | Source                          |
|-----------------------------------|-----------------|---------|---------------------------------|
| R <sub>base</sub>                 | R-value         | 1       | Program database average        |
| R <sub>retrofit</sub>             | R-value         | 8       | Program database average        |
| Duct Diameter                     | ft              | 0.667   | Engineering assumption          |
| Duct Length                       | ft              | 100     | Engineering assumption          |
| Area                              | ft <sup>2</sup> | 209     | Calculated                      |
| Capacity <sub>cool and heat</sub> | kBtuh           | 31.9    | Program database                |
| EFLH <sub>cool</sub>              | hours           | 752     | Metering study                  |
| EFLH <sub>heat</sub>              | hours           | 698     | Metering study                  |
| η <sub>cool</sub>                 | SEER            | 10/13   | Mid-Atlantic TRM                |
| COP                               | COP             | 2.0/2.3 | Mid-Atlantic TRM                |
| HVAC Age Ratio, >10 years         | %               | 32%     | Duke Energy Carolinas 2016 RASS |
| HVAC Age Ratio, <=10 years        | %               | 68%     | Duke Energy Carolinas 2016 RASS |
| air source heat pump Ratio        | %               | 47.8%   | DEC program database ratio      |
| CF <sub>summer</sub>              | N/A             | 0.475   | Metering study                  |
| CF <sub>winter</sub>              | N/A             | 0.588   | Metering study                  |

**Table 3-41: Duct Insulation Gross Verified Savings**

| Season       | Energy Savings (kWh)* | Summer Demand Savings (kW) | Winter Demand Savings (kW) |
|--------------|-----------------------|----------------------------|----------------------------|
| Cooling      | 370                   | 0.234                      | 0.222                      |
| Heating      | 263                   |                            |                            |
| <b>Total</b> | <b>634</b>            |                            |                            |

\*rounding error present

### 3.4.4 Deemed Analysis

Due to low uncertainty on measure savings and low program participation the evaluation team applied deemed savings from the previous evaluation for the heat pump water heater.

#### 3.4.4.1 Heat Pump Water Heater

Energy and demand savings for heat pump water heaters are provided in Table 3-42.

**Table 3-42: Heat Pump Water Heater Gross Verified Savings**

| Energy Savings (kWh) | Summer Demand (kW) | Winter Demand (kW) |
|----------------------|--------------------|--------------------|
| 1,616                | 0.124              | 0.178              |

## 3.5 Targeted and Achieved Confidence and Precision

The Smart \$aver evaluation plan was developed with the goal of achieving a target goal of 10% relative precision at the 90% confidence interval for the program as a whole. As the program is composed of different measures, and the energy savings estimation approach varies by measure, the evaluation team assigned sampling, verification, and impact estimate effort among the program measures in accordance with the measures' contribution to total reported Smart \$aver savings. The evaluation team calculated the relative precision for each of these samples and combined the error bound to calculate a program-level relative precision. As presented in Table 3-43, the evaluation team reported confidence and precision for the program is +/- 9.6% at the 90% confidence level.

**Table 3-43: Targeted and Achieved Confidence and Precision**

| Program      | Targeted Confidence/Precision | Achieved Confidence/Precision |
|--------------|-------------------------------|-------------------------------|
| Smart \$aver | 90/10.0                       | 90/9.6                        |

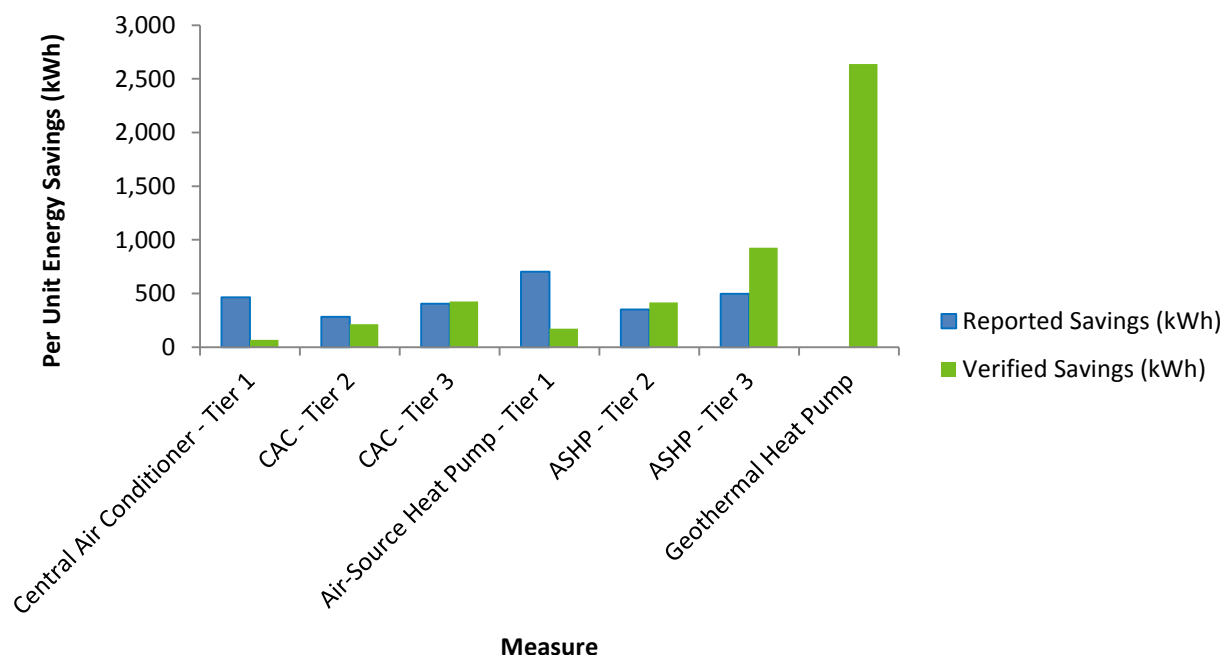
## 3.6 Results

Measure level, per unit energy savings values are detailed in Figure 3-5, Figure 3-6, Figure 3-7, and Table 3-44. The program's two most active measures in terms of participation, central air conditioners and air source heat pumps, realized a substantially lower per unit savings compared to the reported values. Also, the program did not provide a reported savings estimate

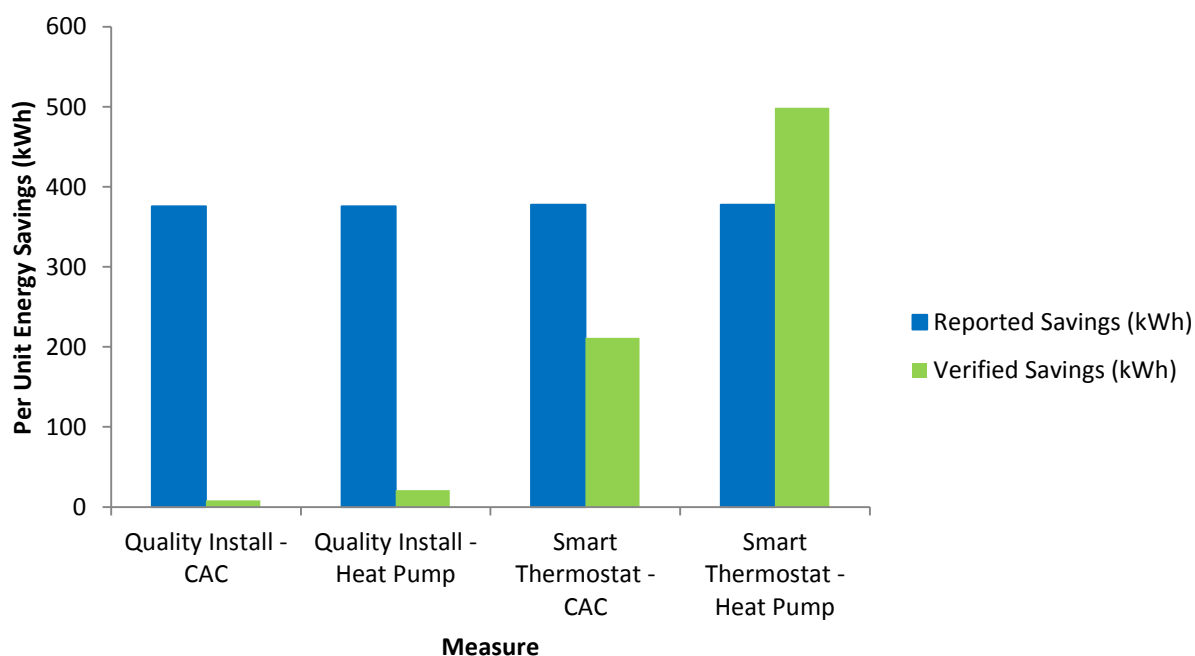


for ground source heat pumps. Therefore, the evaluation team deemed a 100% realization rate for this measure.

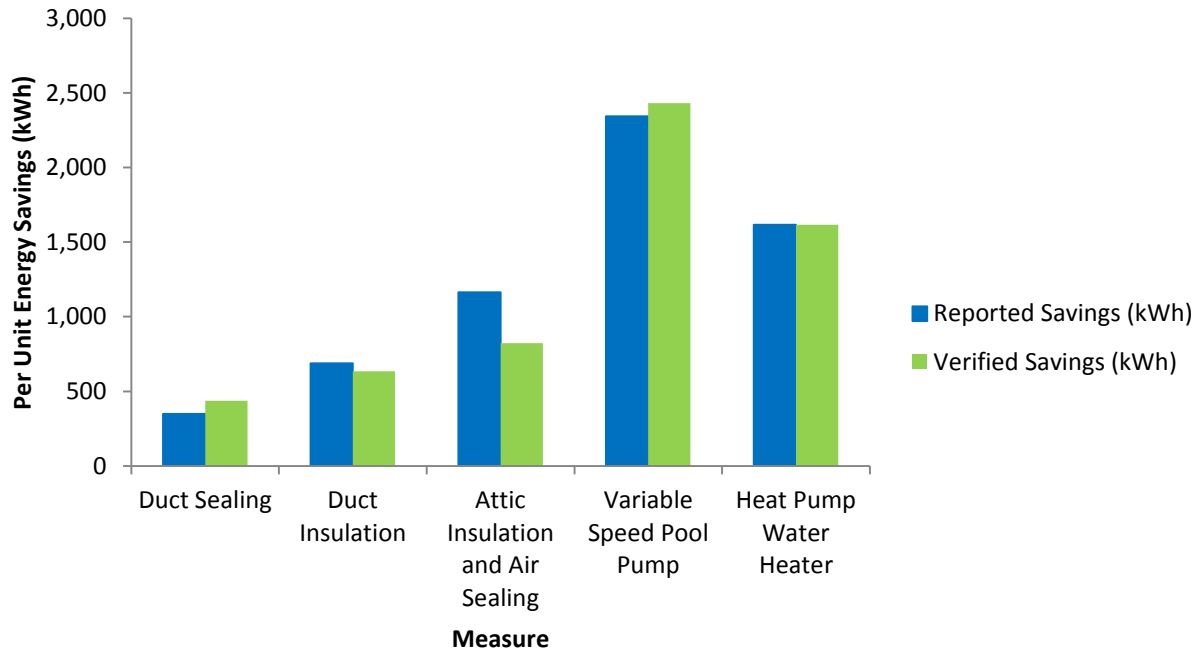
**Figure 3-5: HVAC Replacement Per Unit Energy Savings**



**Figure 3-6: HVAC Add-on Per Unit Energy Savings**



**Figure 3-7: Other Measures Per Unit Energy Savings**



**Table 3-44: Measure-Level Reported and Verified Gross Energy Savings**

| Measure                     | Tier    | Rebated Measures | Reported Energy Savings, per unit (kWh) | Realization Rate | Gross Verified Energy Savings, per unit (kWh) | Total Gross Verified Energy Savings (MWh) |
|-----------------------------|---------|------------------|---|------------------|---|---|
| Central Air Conditioner     | 1       | 723              | 464                                     | 14.3%            | 66  | 47,900                                    |
|                             | 2       | 4,679            | 283                                     | 75.1%            | 212   | 993,420                                   |
|                             | 3       | 867              | 404                                     | 105.5%           | 426   | 369,470                                   |
| Air Source Heat Pump        | 1       | 692              | 702                                     | 24.3%            | 171   | 118,164                                   |
|                             | 2       | 3,996            | 350                                     | 118.8%           | 415   | 1,659,605                                 |
|                             | 3       | 1,019            | 496                                     | 186.6%           | 926*  | 943,158                                   |
| Geothermal Heat Pump        | n/a     | 34               | 0                                       | 100.0%           | 2,637*  | 89,659                                    |
| Quality Install - CAC       | 2 and 3 | 1,989            | 376                                     | 2.2%             | 8   | 16,189                                    |
| Quality Install - Heat Pump | 2 and 3 | 1,251            | 376                                     | 5.6%             | 21  | 26,268                                    |
| Smart Thermostat - CAC      | n/a     | 2,938            | 377                                     | 56.0%            | 211   | 620,751                                   |
| Smart Thermostat - ASHP     | n/a     | 2,388            | 377                                     | 132.1%           | 499   | 1,194,014                                 |
| Variable Speed Pool Pump    | n/a     | 562              | 2,342                                   | 103.8%           | 2,430   | 1,365,841                                 |
| Attic Insulation & Air Seal | n/a     | 428              | 1,163                                   | 70.9%            | 824   | 352,838                                   |
| Duct Sealing                | n/a     | 163              | 350                                     | 125.1%           | 438   | 71,367                                    |
| Duct Insulation             | n/a     | 48               | 688                                     | 92.1%            | 634   | 30,420                                    |
| Heat Pump Water Heater      | n/a     | 40               | 1,616                                   | 100.0%           | 1,616   | 64,640                                    |
| <b>Total</b>                |         | <b>21,817</b>    |   | <b>83.0%</b>     |   | <b>7,960,401</b>                          |

\*The Smart \$aver program rebates geothermal heat pumps under Tier 3 HP. As a result, the planning kWh value for Tier 3 HP also includes savings from the Geothermal HP measure; calculated as the total kWh for Tier 3 HP + Total kWh for Geothermal HP divided by the total Tier 3 participation + total Geothermal HP participation = 980.8 kWh

The program realization rate of 83% is driven by a substantial reduction in savings for the quality installation measure. This issue also impacted the Tier 1 central air conditioners and Tier 1 air source heat pumps which include quality installation savings in their reported values and verified savings.

Table 3-45 and Table 3-46 provide the per unit and total verified gross demand savings for the summer and winter seasons. The program realization rates for summer and winter were 70.6% and 196.8%, respectively.

**Table 3-45: Measure-Level Reported and Verified Summer Demand Gross Savings<sup>9</sup>**

| Measure                     | Tier    | Rebated Measures | Reported Summer Demand Savings, per unit (kW) | Realization Rate | Gross Verified Summer Demand Savings, per unit (kW) | Total Gross Verified Summer Demand Savings (MW) |
|-----------------------------|---------|------------------|---|------------------|---|---|
| Central Air Conditioner     | 1       | 723              | 0.248   | 9.0%             | 0.022   | 16.25   |
|                             | 2       | 4,679            | 0.172   | 66.7%            | 0.115   | 537.02  |
|                             | 3       | 867              | 0.274   | 91.2%            | 0.250   | 216.66  |
| Air Source Heat Pump        | 1       | 692              | 0.216   | 21.4%            | 0.046   | 31.96   |
|                             | 2       | 3,996            | 0.117   | 107.5%           | 0.126   | 502.57  |
|                             | 3       | 1,019            | 0.176   | 165.8%           | 0.293*  | 298.06  |
| Geothermal Heat Pump        | n/a     | 34               | 0.000   | 100.0%           | 0.710*  | 24.16   |
| Quality Install - CAC       | 2 and 3 | 1,989            | 0.133   | 3.9%             | 0.005   | 10.23   |
| Quality Install - Heat Pump | 2 and 3 | 1,251            | 0.133   | 3.8%             | 0.005   | 6.31  |
| Smart Thermostat - CAC      | n/a     | 2,938            | 0.000   | 100.0%           | 0.000   | 0.00  |
| Smart Thermostat - ASHP     | n/a     | 2,388            | 0.000   | 100.0%           | 0.000   | 0.00  |
| Variable Speed Pool Pump    | n/a     | 562              | 0.590   | 89.3%            | 0.527   | 296.21  |
| Attic Insulation & Air Seal | n/a     | 428              | 0.184   | 120.0%           | 0.221   | 94.74   |
| Duct Sealing                | n/a     | 163              | 0.291   | 55.5%            | 0.162   | 26.36   |
| Duct Insulation             | n/a     | 48               | 0.573   | 40.9%            | 0.234   | 11.24   |
| Heat Pump Water Heater      | n/a     | 40               | 0.124   | 100.0%           | 0.124   | 4.96  |
| <b>Total</b>                |         | <b>21,817</b>    |   | <b>70.6%</b>     |   | <b>2,076.7</b>                                  |

\*The Smart \$aver program rebates geothermal heat pumps under Tier 3 HP. As a result, the planning Summer kW value for Tier 3 HP also includes savings from the Geothermal HP measure; calculated as the total Summer kW for Tier 3 HP + Total Summer kW for Geothermal HP divided by the total Tier 3 participation + total Geothermal HP participation = 0.306 kW

<sup>9</sup> Summer demand savings for all HVAC dependent measures are based on the summer coincident peak determined by the EFLH study.

**Table 3-46: Measure-Level Reported and Verified Winter Demand Gross Savings**

| Measure                     | Tier    | Rebated Measures | Reported Winter Demand Savings, per unit (kW) | Realization Rate | Gross Verified Winter Demand Savings, per unit (kW) | Total Gross Verified Winter Demand Savings (MW) |
|-----------------------------|---------|------------------|---|------------------|---|---|
| Central Air Conditioner     | 1       | 723              | 0.046   | 362.1%           | 0.167   | 120.44  |
|                             | 2       | 4,679            | 0.038   | 438.4%           | 0.167   | 779.47  |
|                             | 3       | 867              | -0.010  | n/a              | 0.167   | 144.43  |
| Air Source Heat Pump        | 1       | 692              | 0.251   | 32.8%            | 0.082   | 56.93   |
|                             | 2       | 3,996            | 0.144   | 126.4%           | 0.182   | 728.09  |
|                             | 3       | 1,019            | -0.046  | n/a              | 0.390*  | 397.18  |
| Geothermal Heat Pump        | n/a     | 34               | 0.000   | 100.0%           | 1.274*  | 43.33   |
| Quality Install - CAC       | 2 and 3 | 1,989            | 0.084   | 0.0%             | 0.000   | 0.00  |
| Quality Install - Heat Pump | 2 and 3 | 1,251            | 0.084   | 13.0%            | 0.011   | 13.71   |
| Smart Thermostat - CAC      | n/a     | 2,938            | 0.000   | 100.0%           | 0.000   | 0.00  |
| Smart Thermostat - ASHP     | n/a     | 2,388            | 0.000   | 100.0%           | 0.000   | 0.00  |
| Variable Speed Pool Pump    | n/a     | 562              | n/a   | 100.0%           | 0.000   | 0.00  |
| Attic Insulation & Air Seal | n/a     | 428              | 0.194   | 205.8%           | 0.399   | 170.94  |
| Duct Sealing                | n/a     | 163              | 0.000   | 100.0%           | 0.153   | 24.98   |
| Duct Insulation             | n/a     | 48               | 0.000   | 100.0%           | 0.222   | 10.65   |
| Heat Pump Water Heater      | n/a     | 40               | 0.178   | 100.0%           | 0.178   | 7.12  |
| <b>Total</b>                |         | <b>21,817</b>    |   | <b>196.8%</b>    |   | <b>2,497.1</b>                                  |

\*The Smart Saver program rebates geothermal heat pumps under Tier 3 HP. As a result, the planning Winter kW value for Tier 3 HP also includes savings from the Geothermal HP measure; calculated as the total Winter kW for Tier 3 HP + Total Winter kW for Geothermal HP divided by the total Tier 3 participation + total Geothermal HP participation = 0.418 kW

Table 3-47 and Table 3-48 present the reported and verified energy and demand savings for 2016.

**Table 3-47: 2016 Program Level Energy Savings**

| Measures Installed | Reported Energy (kWh) | Realization Rate | Gross Verified Energy (kWh) | Net-to-Gross Ratio | Net Verified Energy (kWh) |
|--------------------|-----------------------|------------------|-----------------------------|--------------------|---------------------------|
| 21,817             | 9,598,932             | 83.0%            | 7,960,401                   | 66.7%              | 5,308,068                 |

**Table 3-48: 2016 Program Level Demand Savings**

| Measurement   | Reported Demand (MW) | Realization Rate | Gross Verified Demand (MW) | Net-to-Gross Ratio | Net Verified Demand (MW) |
|---------------|----------------------|------------------|----------------------------|--------------------|--------------------------|
| Summer Demand | 2.94                 | 70.6%            | 2.08                       | 66.7%              | 1.38                     |
| Winter Demand | 1.27                 | 196.8%           | 2.50                       |                    | 1.67                     |

## 4 Net-to-Gross Methodology and Results

The evaluation team calculated the net savings, which are the amount of savings that occurred as a direct result of influence attributable to the program, by applying net-to-gross (NTG) adjustments to the gross savings. The evaluation team determined the NTG adjustment value via data collected from participant and trade ally surveys.

To calculate net savings, a NTG ratio must first be established. NTG consists of free ridership (FR) and spillover (SO). Free ridership refers to the portion of energy savings that participants would have achieved in the absence of the program through their own initiatives and expenditures (U.S. DOE, 2014).<sup>1</sup> Spillover refers to the program-induced adoption of measures by non-participants and participants who did not receive financial incentives or technical assistance for installations of measures supported by the program (U.S. DOE, 2014). The evaluation team used the following formula to calculate a NTG ratio:

$$NTG = 1 - FR + SO$$

Once the NTG ratio is established, the evaluation team used the following formula to calculate net savings:

$$Net\ Savings = Gross\ Savings * NTG$$

The evaluation team estimated nonparticipant spillover and quality install free ridership from trade ally survey data and estimated participant free ridership and spillover from participant surveys. The following sections describe how the evaluation team estimated participant free ridership and spillover values.

### 4.1 Free Ridership

Free ridership estimates how much the program influenced participants to make the energy saving improvements that the program incents, which is then used to adjust gross savings by the level of attribution the program is able to claim. Free ridership ranges from 0 to 1, with 0 being no free ridership (or, total program attribution), 1 being total free ridership (or, no program attribution) and values in between represent varying degrees of partial free ridership. The evaluation team used participant and trade ally survey data to inform free ridership estimates. Since an individual's free ridership may differ between different measure types, free ridership was first calculated individually for each measure associated with each participant survey respondent. Free ridership for the quality install measure was calculated in a similar respondent-level manner for trade allies. The evaluation team then used the respondent-measure-level free ridership values to derive a program-level free ridership estimate. This chapter describes this process.

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<sup>1</sup> The U.S. Department of Energy (DOE) (2014). *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures. Chapter 23: Estimating Net Savings: Common Practices*. Retrieved August 29, 2016 from [http://energy.gov/sites/prod/files/2015/02/f19/UMChapter23-estimating-net-savings\\_0.pdf](http://energy.gov/sites/prod/files/2015/02/f19/UMChapter23-estimating-net-savings_0.pdf)

### 4.1.1 Participant-Measure-Level Free Ridership

Participant-measure-level free ridership consists of two components – change (FRC) and influence (FRI) – which both range from 0 to .5.<sup>2</sup> The following formula uses these two components to calculate participant-measure-level free ridership:

$$FR = FRC + FRI$$

#### 4.1.1.1 Free Ridership Change

Free ridership change demonstrates what the participant would have likely done if the program had not provided an incentive for their energy upgrade. To determine this, the evaluation team asked participant survey respondents FRC questions specific to the measures they installed. The generic example below exemplifies how the evaluation team collected FRC data (see Appendix C for the measure-specific FRC questions in the participant survey).

*Q1. If you had not received a Duke Energy incentive for your [PIPE IN INCENTED MEASURE], which of the following is most likely: Would you have...? [READ ALL, SELECT ONE]*

1. *Not purchased a [PIPE IN INCENTED MEASURE]*
2. *Delayed purchasing a new [PIPE IN INCENTED MEASURE] for at least a year*
3. *Purchased a new [PIPE IN INCENTED MEASURE] but a less efficient or less expensive model*
4. *Bought the exact same [PIPE IN INCENTED MEASURE] anyway, and paid the full cost yourself*
5. *Or done something else, specify:\_\_\_\_\_*
98. *Don't know*
99. *Refused*

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<sup>2</sup> Since most quality install rebate participants were unaware of the quality installation rebates, we used trade ally survey data to estimate free ridership for the measure. See section 4.1.1.3 for quality install free ridership estimation methods.

For insulation<sup>3</sup> and replacement equipment with less efficient options,<sup>4</sup> the evaluation team asked a follow up question to respondents that reported the third response option above (purchased a less efficient or less expensive measure), as exemplified below:

Q2. [ASK IF Q1=3] You said you would have bought a [PIPE IN INCENTED MEASURE] that was less expensive or less energy efficient if you had not received the rebate or information from Duke Energy. Do you think it is more likely that you would have bought equipment that was...?

1. Almost as efficient as the one you bought, or
2. Significantly less efficient than the one you bought
98. Don't know
99. Refused

The evaluation team then assigned the following FRC values to each respondent for each rebated measure, based on their response to the questions above, as shown in the Table 4-1.

**Table 4-1: Free Ridership Change Values**

| Q1 Response   | Q2 Response  | FRC Value  |
|---|--|--|
| Not purchased a [MEASURE]   |  | 0.0  |
| Delayed purchasing a new [MEASURE] for at least a year                  |  | 0.0  |
| Purchased a new [MEASURE] but a less efficient or less expensive model  | Almost as efficient as the one you bought            | 0.375*   |
|   | Significantly less efficient than the one you bought | 0.125*   |
|   | Don't know / Refused                                 | 0.25*  |
| Bought the exact same [MEASURE] anyway, and paid the full cost yourself |  | 0.50   |
| Or done something else  |  | FRC values assigned on a case by case basis, depending on which pre-coded response item they most resemble |
| Don't know / Refused  |  | Measure average  |

\* Since the less efficient version would be a standard efficiency model (which serves as the baseline from which savings are claimed), these values are set to 0 for smart thermostats and pool pumps. Additionally, the values vary for ASHPs and CACs, based on replacement condition and incentive tier (Table 4-2).

3 Respondents that report they would have installed less insulation will then be asked to report how much less insulation they would have purchased in a percentage format (e.g.: 50% less). This reported value will be subtracted from 100% and then divided in half; the result will serve as their FRC value.

4 Since duct sealing is a service measure, as compared to an equipment measure, there is no less efficient version. Thus, the counterfactual for service measures would be to either: 1) not purchase the service, 2) wait a year or more to purchase the service, or 3) purchase the service without the assistance of a rebate. Accordingly, FRC values for service measures are either 0 (would have not purchased or would have waited a year or more to purchase) or .5 (would have purchased without assistance of a rebate). Also, since the less efficient/expensive version of pool pumps and wi-fi thermostats would be the baseline, 'purchased a different unit' responses result in a FRC value of 0.



Participants who replaced a broken HVAC system pose a particular challenge to NTG (or FRC, specifically): because there is an immediate space heating or cooling need, it is possible that free ridership could be higher for some in this group, as “replacement upon burnout” participants may be less likely to report they would not purchase or would delay purchasing a replacement measure (which are responses that traditionally garner FRC scores of 0). These issues expose the possibility of higher free ridership scores for “replacement upon burnout” participants when using the algorithm in Table 4-1. Since the counterfactual of taking no action is not a realistic scenario for “replacement upon burnout” participants, we used a special FRC algorithm for air source heat pump and central air conditioner participants that assigns FRC scores of 0 to certain “replacement upon burnout” participants that indicated they would bought a less expensive or less energy efficient heating or cooling system as their counterfactual response (Table 4-2). This is the most prudent approach since:

- 1) Tier 1 incentives are effectively ECM incentives, since Tier 1 only requires the code minimum for SEER standards.
- 2) Savings are calculated based on a code SEER level baseline assumption.
- 3) For “replacement upon burnout” participants, the most realistic counterfactual that would result in the least efficient outcome is installing a less efficient unit than the one they installed through the program – which would be a code unit in certain counterfactual scenarios.

As seen in Table 4-2, this unique FRC algorithm takes SEER level of the incented unit into account. “Replacement upon burnout” participants who installed units exceeding minimum program requirements that said they would have installed an “almost as efficient” unit reveal that the program did not motivate them to purchase a unit above code in the first place, but rather motivated them purchase an even more efficient unit than they would have otherwise. Thus, these “replacement upon burnout” participants are partial free riders (given that their counterfactual outcome would likely still be above code) and garner a FRC value of 0.375.

**Table 4-2: FRC Follow Up Values for Air-Source Heat Pumps and Central Air Conditioners**

| Follow Up Response                                   | Incentive Tier | Replacement Upon Burnout* | FRC Value |
|--|----------------|---------------------------|-----------|
| Almost as efficient as the one you bought            | 1              | Yes                       | 0         |
|  |                | No                        | 0.375     |
|  | 2 or 3         | Yes or No                 | 0.375     |
| Significantly less efficient than the one you bought | All            | Yes                       | 0         |
|  |                | No                        | 0.125     |
| Don't know / Refused                                 | 1              | Yes                       | 0         |
|  | 2 or 3         | Yes or No                 | 0.25      |

\* Replacement upon burnout represents respondents who indicated they replaced an “old” or “broken” unit.

The following tables show the count of respondents for each measure that chose each option in Table 4-1 or Table 4-2, as well as the resulting mean FRC value for each measure.

**Table 4-3: Free Ridership Change Values: Geothermal Heat Pump (n=1)**

| Q1 Response  | Q2 Response  | FRC Value                        | Count Choosing Option |
|--|--|----------------------------------|-----------------------|
| Not purchased a geothermal heat pump   |  | 0.0                              | 0                     |
| Delayed purchase for at least one year   |  | 0.0                              | 0                     |
| Bought a less expensive or less energy efficient heating and cooling system        | Almost as efficient as the one you bought            | 0.375                            | 0                     |
|  | Significantly less efficient than the one you bought | 0.125                            | 0                     |
|  | Don't know / Refused                                 | 0.25                             | 0                     |
| Bought the exact same geothermal heat pump anyway, and paid the full cost yourself |  | 0.50                             | 1                     |
| Or done something else   |  | Assigned on a case by case basis | 0                     |
| Don't know / Refused   |  | Measure average                  | 0                     |
| <b>Mean FRC value: geothermal heat pump</b>  |  | <b>0.50</b>                      |                       |

**Table 4-4: Free Ridership Change Values: Air Source Heat Pump (n=29)**

| Q1 Response  | Q2 Response  | Incentive Tier | Replacement Upon Burnout | FRC Value | Count Choosing Option |
|--|--|----------------|--------------------------|-----------|-----------------------|
| Not purchased an air source heat pump  | N/A  | N/A            | Yes or No                | 0.0       | 0                     |
| Delayed purchase for at least a year   | N/A  | N/A            | Yes or No                | 0.0       | 4                     |
| Bought a less expensive or less energy efficient heating and cooling system        | Almost as efficient as the one you bought            | 1              | Yes                      | 0.0       | 1                     |
|  |  |                | No                       | 0.375     | 0                     |
|  |  | 2 or 3         | Yes or No                | 0.375     | 2                     |
|  | Significantly less efficient than the one you bought | All            | Yes                      | 0.0       | 0                     |
|  |  |                | No                       | 0.125     | 1                     |
|  | Don't know / Refused                                 | 1              | Yes                      | 0.0       | 0                     |
|  |  | 2 or 3         | Yes or No                | 0.25      | 0                     |
| Bought the exact same air source heat pump anyway, and paid the full cost yourself | N/A  | N/A            | Yes or No                | 0.50      | 21                    |

| Q1 Response                                 | Q2 Response | Incentive Tier | Replacement Upon Burnout | FRC Value                        | Count Choosing Option |
|---|-------------|----------------|--------------------------|----------------------------------|-----------------------|
| Or done something else                      | N/A         | N/A            | Yes or No                | Assigned on a case by case basis | 0                     |
| Don't know / Refused                        | N/A         | N/A            | Yes or No                | Measure average                  | 0                     |
| <b>Mean FRC value: air source heat pump</b> |             |                |                          | <b>0.39</b>                      |                       |

**Table 4-5: Free Ridership Change Values: Central Air Conditioner (n=33)**

| Q1 Response   | Q2 Response  | Incentive Tier | Replacement Upon Burnout | FRC Value                        | Count Choosing Option |
|---|--|----------------|--------------------------|----------------------------------|-----------------------|
| Not purchased a central air conditioner   | N/A  | N/A            | Yes or No                | 0.0                              | 0                     |
| Delayed purchase for at least a year  | N/A  | N/A            | Yes or No                | 0.0                              | 2                     |
| Bought a less expensive or less energy efficient cooling system                       | Almost as efficient as the one you bought            | 1              | Yes                      | 0.0                              | 1                     |
|   |  |                | No                       | 0.375                            | 0                     |
|   |  | 2 or 3         | Yes or No                | 0.375                            | 2                     |
|   | Significantly less efficient than the one you bought | All            | Yes                      | 0.0                              | 1                     |
|   |  |                | No                       | 0.125                            | 0                     |
|   | Don't know / Refused                                 | 1              | Yes                      | 0.0                              | 0                     |
|   |  | 2 or 3         | Yes or No                | 0.25                             | 0                     |
| Bought the exact same central air conditioner anyway, and paid the full cost yourself | N/A  | N/A            | Yes or No                | 0.50                             | 23                    |
| Or done something else  | N/A  | N/A            | Yes or No                | Assigned on a case by case basis | 1                     |
| Don't know / Refused  | N/A  | N/A            | Yes or No                | Measure average                  | 3                     |
| <b>Mean FRC value: central air conditioner</b>  |  |                |                          | <b>0.42</b>                      |                       |

**Table 4-6: Free Ridership Change Values: Heat Pump Water Heater (n=1)**

| Q1 Response  | Q2 Response  | FRC Value                        | Count Choosing Option |
|--|--|----------------------------------|-----------------------|
| Not installed a heat pump water heater   |  | 0.0                              | 0                     |
| Postponed the purchase for at least one year   |  | 0.0                              | 0                     |
| Purchased a new heat pump water heater, but a less efficient or less expensive model | Almost as efficient as the one you bought            | 0.375                            | 0                     |
|  | Significantly less efficient than the one you bought | 0.125                            | 0                     |
|  | Don't know / Refused                                 | 0.25                             | 0                     |
| Bought the exact heat pump water heater anyway, and paid the full cost yourself      |  | 0.50                             | 1                     |
| Or done something else   |  | Assigned on a case by case basis | 0                     |
| Don't know / Refused   |  | Measure average                  | 0                     |
| <b>Mean FRC value: heat pump water heater</b>  |  | <b>0.50</b>                      |                       |

**Table 4-7: Free Ridership Change Values: Attic Insulation (n=5)**

| Q1 Response  | Q2 Response                  | FRC Value  | Count Choosing Option |
|--|------------------------------|--|-----------------------|
| Would not have done the attic insulation                     |                              | 0.0  | 0                     |
| Postponed attic insulation for at least one year             |                              | 0.0  | 3                     |
| Would have added less insulation                             | % less they would have added | reported value subtracted from 100% and then divided in half | 0                     |
| Done the exact same upgrade, and paid the full cost yourself |                              | 0.50   | 2                     |
| Or done something else                                       |                              | Assigned on a case by case basis                             | 0                     |
| Don't know / Refused   |                              | Measure average  | 0                     |
| <b>Mean FRC value: attic insulation</b>                      |                              | <b>0.20</b>  |                       |

**Table 4-8: Free Ridership Change Values: Duct Sealing (n=1)**

| Q1 Response  | FRC Value                        | Count Choosing Option |
|--|----------------------------------|-----------------------|
| Would not have done the duct sealing project                 | 0.0                              | 0                     |
| Postponed duct sealing project for at least one year         | 0.0                              | 1                     |
| Done the exact same upgrade, and paid the full cost yourself | 0.50                             | 0                     |
| Or done something else                                       | Assigned on a case by case basis | 0                     |
| Don't know / Refused   | Measure average                  | 0                     |
| <b>Mean FRC value: duct sealing</b>                          | <b>0.00</b>                      |                       |

**Table 4-9: Free Ridership Change Values: Pool Pump (n=4)**

| Q1 Response   | FRC Value                        | Count Choosing Option |
|---|----------------------------------|-----------------------|
| Not installed/replaced a pool pump                                    | 0.0                              | 0                     |
| Postponed the purchase for at least one year                          | 0.0                              | 0                     |
| Would have bought a less expensive or less energy efficient pool pump | 0.0                              | 2                     |
| Bought the exact pool pump anyway, and paid the full cost yourself    | 0.50                             | 2                     |
| Or done something else  | Assigned on a case by case basis | 0                     |
| Don't know / Refused  | Measure average                  | 0                     |
| <b>Mean FRC value: pool pump</b>                                      | <b>0.25</b>                      |                       |

**Table 4-10: Free Ridership Change Values: Smart Thermostat (n=32)**

| Q1 Response   | FRC Value                        | Count Choosing Option |
|---|----------------------------------|-----------------------|
| Not purchased wi-fi thermostat  | 0.0                              | 3                     |
| Postponed the purchase for at least one year                              | 0.0                              | 0                     |
| Would have bought a different type of thermostat                          | 0.0                              | 12                    |
| Bought the exact wi-fi thermostat anyway, and paid the full cost yourself | 0.50                             | 14                    |
| Or done something else  | Assigned on a case by case basis | 2                     |
| Don't know / Refused  | Measure average                  | 1                     |
| <b>Mean FRC value: pool pump</b>  | <b>0.24</b>                      |                       |

#### 4.1.1.2 Free Ridership Influence

Free ridership influence demonstrates how much influence the program had on a participant's decision to perform the incented energy upgrade. To determine this, the evaluation team asked participant survey respondents the following question, repeating this battery for each unique rebated measure associated with the respondent:

*I'm going to read a list of factors that might have influenced your decision to make the energy saving improvements to your property we have been talking about. For each factor, please indicate how influential it was in your decision, using a scale from 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential."*

*[INTERVIEWER NOTE: IF RESPONDENT SAYS 'NOT APPLICABLE; I DIDN'T GET/USE THAT,' THEN FOLLOW UP WITH: "So would you say it was "not at all influential?" AND PROBE TO CODE]*

*[PROGRAMMER: For each factor below input 0-10 scale and don't know and refused options.]*

- The rebate received*
- Information or advertisements from Duke Energy, including their website*
- Recommendation from your contractor*
- Did anything else influence you? If so, please specify: \_\_\_\_\_*

*[INTERVIEWER: PROBE IF UNCLEAR. RECORD VERBATIM RESPONSE]*

The evaluation team then selected the highest rated program-attributable item for each respondent and assigned the following FRI scores, depending on their high score value (Table 4-11).

**Table 4-11: Free Ridership Influence Values**

| Max Influence Rating | FRI Value       |
|----------------------|-----------------|
| 0                    | 0.5             |
| 1                    | 0.45            |
| 2                    | 0.4             |
| 3                    | 0.35            |
| 4                    | 0.3             |
| 5                    | 0.25            |
| 6                    | 0.2             |
| 7                    | 0.15            |
| 8                    | 0.1             |
| 9                    | 0.05            |
| 10                   | 0               |
| Don't know / Refused | Measure average |

Table 4-12 shows the count of respondents for each measure associated with each max influence rating and FRI value in Table 4 11, as well as the resulting mean max influence and FRI values for each measure.

**Table 4-12: Free Ridership Influence Values, by Measure**

| Max Influence Rating      | FRI Value       | Count with Max Influence Rating/FRI Value |  |                                |                    |                              |                              |                 |                         |
|---------------------------|-----------------|---|--|--------------------------------|--------------------|------------------------------|------------------------------|-----------------|-------------------------|
|                           |                 | Heat Pump (Air Source) (n=29)             | Attic Insulation and Air Sealing (n=5) | Central Air Conditioner (n=33) | Duct Sealing (n=1) | Heat Pump (Geothermal) (n=1) | Heat Pump Water Heater (n=1) | Pool Pump (n=4) | Smart Thermostat (n=32) |
| 0                         | 0.5             | 0   | 0                                      | 0                              | 0                  | 0                            | 0                            | 0               | 1                       |
| 1                         | 0.45            | 0   | 0                                      | 0                              | 0                  | 0                            | 0                            | 0               | 0                       |
| 2                         | 0.4             | 0   | 0                                      | 0                              | 0                  | 0                            | 0                            | 0               | 0                       |
| 3                         | 0.35            | 0   | 0                                      | 0                              | 0                  | 0                            | 0                            | 0               | 0                       |
| 4                         | 0.3             | 0   | 0                                      | 0                              | 0                  | 0                            | 0                            | 0               | 0                       |
| 5                         | 0.25            | 0   | 0                                      | 0                              | 0                  | 0                            | 0                            | 0               | 2                       |
| 6                         | 0.2             | 1   | 0                                      | 0                              | 0                  | 0                            | 1                            | 0               | 1                       |
| 7                         | 0.15            | 2   | 1                                      | 4                              | 0                  | 0                            | 0                            | 0               | 0                       |
| 8                         | 0.1             | 6   | 1                                      | 7                              | 0                  | 0                            | 0                            | 2               | 8                       |
| 9                         | 0.05            | 5   | 0                                      | 6                              | 0                  | 0                            | 0                            | 0               | 5                       |
| 10                        | 0               | 15  | 3                                      | 16                             | 1                  | 1                            | 0                            | 2               | 15                      |
| Don't know / Refused      | Measure average | 0   | 0                                      | 0                              | 0                  | 0                            | 0                            | 0               | 0                       |
| <b>Mean max influence</b> |                 | <b>9</b>                                  | <b>9</b>                               | <b>9</b>                       | <b>10</b>          | <b>10</b>                    | <b>6</b>                     | <b>9</b>        | <b>9</b>                |
| <b>Mean FRI score</b>     |                 | <b>0.05</b>                               | <b>0.05</b>                            | <b>0.05</b>                    | <b>0.00</b>        | <b>0.00</b>                  | <b>0.20</b>                  | <b>0.05</b>     | <b>0.07</b>             |



#### 4.1.1.3 Quality Install Free Ridership

As seen in the Process Evaluation Findings chapter, participants were largely unaware of that they received a rebate for the quality installation service. Given this finding and the measure's goal of influencing trade ally installation practices (as compared to consumer purchasing decisions), we used trade ally surveys to estimate free ridership for quality install. To inform free ridership estimates, we asked trade allies that performed quality installations the following questions:

*[Base: IF PERFORMED QUALITY INSTALLS]*

Q15. *As you may know, Duke Energy recently added "quality install" requirements for installations of heat pumps and air conditioners? Were you already doing all the techniques on the quality install check list prior to Duke requiring them?*

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

*[Base: IF Q15=1]*

Q16. *Prior to using Duke's quality install checklist, did you have a system in place to document that your installers were following these same quality install techniques?*

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

*[Base: IF Q15=1]*

Q17. *Prior to using Duke's quality install checklist, what specific quality install techniques were you using? Please be as specific as possible.*

*[Multiple response, do not read]*

- 1. System capacity
- 2. Airflow / static pressure
- 3. System CFM (cubic feet per minute)
- 4. Condenser measurements
- 5. Enthalpy conversion
- 6. Blower door tests
- 7. Duct blaster tests
- 96. Other, please specify: *[OPEN-ENDED RESPONSE]*
- 98. Don't know
- 99. Refused

Much like the participant-based free ridership algorithm, we used a two-component approach to estimate free ridership for quality install. Respondent-level free ridership is the result of summing FR\_A and FR\_B, both of which range from 0 to .5 (Figure 4-1). Trade allies that did not indicate they were using all the Duke Energy quality install techniques prior to the introduction of the Smart Saver quality install measure (Q15) received scores of 0 for both FR\_A and FR\_B, resulting in 0% free ridership for the measure. Trade allies that said yes to Q15 were scored as partial to full free riders, depending on their answers to Q16-Q17.

**Figure 4-1: Quality Installation Free Ridership Algorithm**

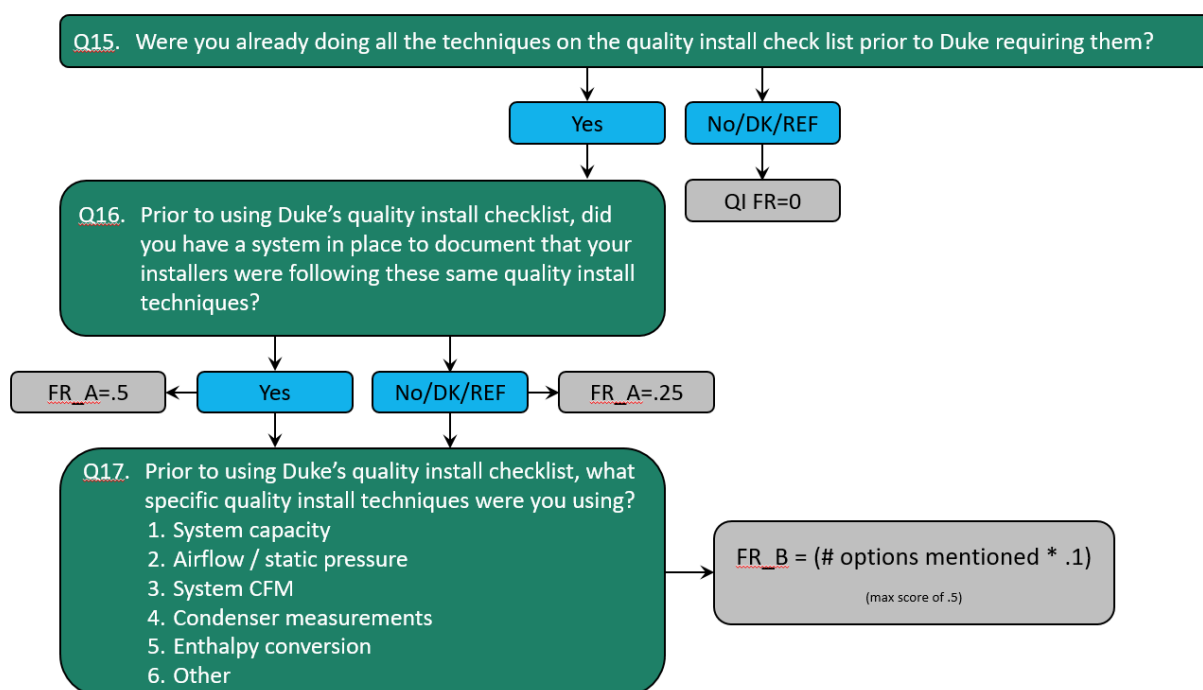


Table 4-13 shows the count of respondents associated with each FR\_A score in Figure 4-1, as well as the resulting mean FR\_A value for Quality Installation.

**Table 4-13: Quality Install FR\_A Values (n=28)**

| Q15 Response         | Q16 Response         | FR_A Value  | Count Choosing Option |
|----------------------|----------------------|-------------|-----------------------|
| No                   |                      | 0.0         | 5                     |
| Don't know / Refused |                      | 0.0         | 1                     |
| Yes                  | Yes                  | 0.5         | 19                    |
|                      | No                   | 0.25        | 3                     |
|                      | Don't know / Refused | 0.25        | 0                     |
| Mean QI FR_A value   |                      | <b>0.37</b> |                       |

Table 4-14 shows the count of respondents associated with each FR\_B score in Figure 4-1, as well as the resulting mean FR\_B value for Quality Installation.

**Table 4-14: Quality Install FR\_B Values (n=28)**

| Q17 Response                       | FR_B Value  | Count Choosing Option |
|------------------------------------|-------------|-----------------------|
| System capacity                    | +.1         | 4                     |
| Airflow / static pressure          | +.1         | 8                     |
| System CFM (cubic feet per minute) | +.1         | 1                     |
| Condenser measurements             | +.1         | 4                     |
| Enthalpy conversion                | +.1         | 3                     |
| Other                              | +.1         | 8                     |
| Q15=No / Don't know / Refused      | 0           | 6                     |
| <b>Mean QI FR_B value</b>          | <b>0.10</b> |                       |

The algorithm seen in Figure 4-1 resulted in free ridership scores for each trade ally that performed the quality installation measure. We then calculated a weighted average of the respondent-level scores to inform free ridership at the program level. We weighted respondent scores by the number of quality installation jobs each trade ally performed during the evaluation timeframe, resulting in a 0.63 FR score for the Quality Installation measure.

#### 4.1.2 Measure-Level Free Ridership

To provide additional insight and transparency into the free ridership analysis, the evaluation team summed the measure-specific FRC and FRI scores for each respondent resulting in participant-measure-level free ridership (FR) scores. The evaluation team used the participant-measure-level FR scores to calculate an average FR score for each measure type. Table 4-15 exhibits the resulting mean measure-level FR scores, and the number of respondents associated with each mean FR score.

While the measure-level FR scores provide additional detail behind the free ridership analysis, we note that the evaluation was not designed to provide statistically significant measure-level results but rather provide a program-level FR score based on data collected on all program measures (see section 4.1.3 below). Therefore, the measure-level FR scores presented in Table 4-15 should be interpreted as potentially indicative of the rate of FR present but with the caveat of large error bounds due to the low sample sizes. This is particularly applicable to geothermal heat pumps, attic insulation and air sealing, variable speed pool pumps, heat pump water heaters, and duct sealing. These measures comprised a very small percentage of overall program participation and savings and consequently fewer evaluation resources were dedicated to data collection for these measures. As these measures continue to mature in the program and increase their overall share to the impact of the program, additional evaluation resources should be dedicated to assessing the level of free ridership.

**Table 4-15: Measure-Level Free Ridership Scores**

| Measure                          |            | Count of respondents with measure | Mean FRC Score | Mean FRI Score | Mean FR Score |
|----------------------------------|------------|-----------------------------------|----------------|----------------|---------------|
| Central air conditioner          |            | 33                                | 0.42           | 0.05           | 0.47          |
| Heat pump                        | Air Source | 29                                | 0.39           | 0.05           | 0.43          |
|                                  | Geothermal | 1                                 | 0.50           | 0.00           | 0.50          |
| Attic insulation and air sealing |            | 5                                 | 0.20           | 0.05           | 0.25          |
| Variable speed pool pump         |            | 4                                 | 0.25           | 0.05           | 0.30          |
| Heat pump water heater           |            | 1                                 | 0.50           | 0.20           | 0.70          |
| Duct sealing                     |            | 1                                 | 0.00           | 0.00           | 0.00          |
| Smart Thermostat                 |            | 32                                | 0.24           | 0.07           | 0.31          |
| Quality Install*                 |            | 28                                | 0.37           | 0.10           | 0.63          |

\* Unlike other measures that report count of participants with the measure, Quality Install denotes Trade Ally sample size. Quality Install FR\_A is reported in the FRC column and FR\_B is reported in the FRI column. Note that FR\_A and FR\_B are unweighted, whereas the mean FR score is weighted by number of QI rebates. Thus, the simple sum of FR\_A and FR\_B does not equal the mean FR score for the measure.

### 4.1.3 Program-Level Free Ridership

Next, the evaluation team combined the measure-level FR scores into a program-level FR score. Table 4-16 shows the savings weights used to calculate the program-level FR score. Savings weights were calculated as follows:

$$\text{Savings Weight} = \frac{\text{Population N} * \text{Verified Savings}}{\text{Gross Program Savings}}$$

**Table 4-16: Measure-Level Free Ridership Scores and Savings Weights**

| Measure                          |            | Population N | Verified Savings (kWh) | Savings Share (weight) | Mean FR Score |
|----------------------------------|------------|--------------|------------------------|------------------------|---------------|
| Central air conditioner          |            | 6,269        | 225                    | 18%                    | 0.47          |
| Heat pump                        | Air Source | 5,707        | 477                    | 34%                    | 0.43          |
|                                  | Geothermal | 34           | 2,637                  | 1%                     | 0.50          |
| Attic insulation and air sealing |            | 428          | 824                    | 4%                     | 0.25          |
| Variable speed pool pump         |            | 562          | 2,430                  | 17%                    | 0.30          |
| Heat pump water heater           |            | 40           | 1,616                  | 1%                     | 0.70          |
| Duct sealing                     |            | 163          | 438                    | 1%                     | 0.00          |
| Smart Thermostat                 |            | 5,326        | 340                    | 23%                    | 0.31          |
| Quality Install*                 |            | 3,240        | 13                     | 1%                     | 0.63          |

The resulting program-level free ridership is 0.38. Given that the sampling strategy aimed to achieve a representative sample with 90/10 confidence/precision at the program level, the program-level free ridership score was applied to each measure.

## 4.2 Spillover

Spillover estimates energy savings from non-rebated energy improvements made outside of the program that are influenced by the program, and is used to adjust gross savings by the additional energy savings garnered and the level of attribution the program is able to claim for these non-rebated measures. Spillover ranges from 0 to infinity, with 0 being no spillover and values greater than 0 demonstrating the existence and magnitude of spillover.<sup>1</sup> The evaluation team used participant survey data and trade ally interview and survey data to estimate spillover: participants to inform participant spillover (PSO) and trade allies to inform nonparticipant spillover (NPSO). These two estimates are summed to calculate total program spillover (SO):

$$SO = PSO + NPSO$$

### 4.2.1 Participant Spillover

The evaluation team asked participant survey respondents to indicate what energy saving measures or services they had implemented since participating in the program to identify potential spillover (see the Participant Survey in Appendix C for the spillover battery). The evaluation team then asked participants to use a 1 to 10 scale, where 1 means “not at all influential” and 10 means “extremely influential,” to indicate how much influence Smart \$aver had on their decision to purchase these energy saving measures. This question was repeated for each non-rebated measure category a respondent reported implementing. Table 4-17 exhibits how much program influence, ranging from 0% to 100%, is associated with each scale response to the spillover influence question.

**Table 4-17: Participant Spillover Program Influence Values**

| Reported Smart \$aver Influence | Influence Value |
|---------------------------------|-----------------|
| 0                               | 0.0             |
| 1                               | 0.1             |
| 2                               | 0.2             |
| 3                               | 0.3             |
| 4                               | 0.4             |
| 5                               | 0.5             |
| 6                               | 0.6             |
| 7                               | 0.7             |
| 8                               | 0.8             |
| 9                               | 0.9             |
| 10                              | 1.00            |
| Don't know / Refused            | 0.00            |

<sup>1</sup> Spillover values can be interpreted as percentages, where 1=100%. Thus, a spillover value of .5 demonstrates a savings value of 50% of gross program savings.

The evaluation team used the measure-specific influence value to calculate the participant measure spillover (PMSO) for each measure that each participant reported. Participant measure spillover is calculated as follows:<sup>2</sup>

$$PMSO = \text{Deemed Measure Savings} * \text{Number Installed} * \text{Influence Value}$$

The evaluation team then summed all PMSO values and divided them by the participant sample's gross program savings to calculate the participant spillover estimate:

$$\text{Participant SO} = \frac{\sum PMSO}{\text{Participant Sample Gross Program Savings}}$$

This calculation resulted in a Participant SO (PSO) value of 0.02.

#### 4.2.2 Nonparticipant Spillover

Nonparticipant spillover refers to non-rebated program measures implemented by nonparticipants that were directly or indirectly influenced by the program. The evaluation team surveyed 58 trade allies to identify and measure nonparticipant spillover. The evaluation team asked trade allies how many non-rebated measures that they installed in program territory since August. The program savings attributed to these non-rebated measures were discounted by the trade ally's reported level of program influence on their practice of recommending these measures (Table 4-18), and the proportion of their clients with non-rebated measures that were not influenced by their recommendations. Nonparticipant spillover was calculated individually for each of the top three program-qualified measures that each surveyed trade ally installed during the evaluation timeframe.

**Table 4-18: Trade Ally Influence Values**

| Program Influence Rating | Influence Value       |
|--------------------------|-----------------------|
| 0                        | 0.0                   |
| 1                        | 0.1                   |
| 2                        | 0.2                   |
| 3                        | 0.3                   |
| 4                        | 0.4                   |
| 5                        | 0.5                   |
| 6                        | 0.6                   |
| 7                        | 0.7                   |
| 8                        | 0.8                   |
| 9                        | 0.9                   |
| 10                       | 1.0                   |
| Don't know / Refused     | Measure level average |

<sup>2</sup>Deemed savings for non-program spillover measures were referenced from the 2016 Mid-Atlantic TRM.

Thus, nonparticipant measure spillover is calculated as follows:<sup>3</sup>

$$NP \text{ Measure } SO = \text{Number of unrebated units installed} * \text{Program Influence} * (1 - \% \text{ of respondents not influenced by TA recommendation})$$

The evaluation team then summed all nonparticipant measure spillover values and divided them by the trade ally sample's gross program savings to calculate the program-level nonparticipant spillover estimate:

$$NPSO = \frac{\sum NP \text{ Measure } SO}{\text{Sample Program Savings}}$$

This calculation resulted in a NPSO value of 0.03.

### 4.2.3 Program-Level Spillover

The evaluation team summed the PSO and NPSO values to calculate the program-level SO value. This calculation resulted in program-level SO of 0.05.

## 4.3 Net-to-Gross

After combining all FR and SO estimates, NTG for the program is 0.67 (Table 4-19). The evaluation team applied the NTG ratio of 0.67 to program-wide verified gross savings to calculate DEC Smart \$aver net savings.

**Table 4-19: Net-to-Gross Results**

| Free Ridership | Spillover | NTG   |
|----------------|-----------|-------|
| 0.38           | 0.05      | 66.7% |

<sup>3</sup> NP Measure SO = nonparticipant spillover for a given measure type for a given trade ally. NRM = non-rebated measure count installed in DEC territory since August 2016. %NRM = percent of non-rebated measures.

## 5 Process Evaluation

### 5.1 Summary of Data Collection Activities

The process evaluation is based on telephone interviews and surveys with program and implementer staff, trade allies, and participants (Table 5-1).

**Table 5-1: Summary of Process Evaluation Data Collection Activities**

| Target Group                          | Method                   | Sample Size | Confidence/Precision |
|---------------------------------------|--------------------------|-------------|----------------------|
| Program and implementer staff         | Phone in-depth interview | 2           | N/A                  |
| High volume trade allies <sup>a</sup> | Phone in-depth interview | 5           | N/A                  |
| Trade allies (various rebate volumes) | Phone survey             | 58          | 90/10.3              |
| Participants                          | Phone survey             | 73          | 90/9.6               |

<sup>a</sup> High volume trade allies are companies in the top 20% of trade allies in terms of number of rebated measures, for a given campaign.

#### 5.1.1 Program and Implementer Staff

The evaluation team conducted interviews with the Smart \$aver Program Manager and a senior manager from the implementation staff in order to understand how the program was working and to capture their insights about the program's operations, challenges, expectations, and interactions with market actors.

#### 5.1.2 Trade Allies

Participating contractors – called “trade allies” – are the primary program delivery channel for Smart \$aver. In December of 2016, the evaluation team conducted five in-depth interviews with high volume Smart \$aver trade allies. The in-depth interviews primarily served to pre-test some questions designed for the subsequent trade ally surveys and to see if any additional unforeseen topics emerged that warranted inclusion in participant or trade ally surveys. After interviewing five trade allies and making some corresponding adjustments to the survey guide, the evaluation team surveyed 58 trade allies in February 2017, asking them about various program topics such as satisfaction with the program and program-related challenges (Table 5-2).



**Table 5-2: Trade Ally Research Objectives**

| Research Objectives  |
|--|
| Assess Trade Ally engagement with the program and how they and their customers heard of the program          |
| Assess program satisfaction  |
| Document Trade Ally program experience, including any challenges and opportunities for improving the program |
| Document Trade Ally perspective about the code changes and the future of the program                         |
| Gather data for Net-to-Gross spillover   |
| Ask about Trade Ally firmographics and customer characteristics  |
| Document program influence   |

The evaluation team contends that trade ally specializations (such as insulation, for example) can significantly shape trade ally experience with the program. The evaluation team monitored the measures that surveyed trade allies had experience with to ensure that the sample was diverse and representative in terms of measure experience. The distribution of the trade ally sample's measure experience generally reflects that of the larger trade ally population (Table 5-3).

**Table 5-3: Trade Ally Experience with Smart \$aver Measures in 2016**

| Measure                          | Number installed in evaluation timeframe | Number installed by TA survey sample | Number TA installers in survey sample |
|----------------------------------|--|--------------------------------------|---------------------------------------|
| Central Air Conditioner          | 6,269                                    | 831                                  | 44                                    |
| Air-Source Heat Pump             | 5,707                                    | 753                                  | 48                                    |
| Geothermal Heat Pump             | 428                                      | 11                                   | 4                                     |
| Attic Insulation and Air Sealing | 428                                      | 72                                   | 6                                     |
| Variable Speed Pool Pump         | 562                                      | 72                                   | 5                                     |
| Heat Pump Water Heater           | 40                                       | 2                                    | 2                                     |
| Duct Sealing                     | 163                                      | 9                                    | 2                                     |
| Duct Insulation                  | 48                                       | 4                                    | 3                                     |
| Smart Thermostat                 | 5,326                                    | 905                                  | 42                                    |
| Quality Install (Tier 2 and 3)   | 3,240                                    | 490                                  | 22                                    |

### 5.1.3 Participants

In July of 2017, the evaluation team surveyed 73 Smart \$aver participants who received rebates through the program. The purpose of this data collection activity was to obtain a more detailed understanding of the customer experience with the program, identify potential areas for program improvement, and collect data to inform NTG estimates. Table 5-4 documents the specific research objectives of the participant survey.

**Table 5-4: Participant Research Objectives**

| Research Objectives                                      |
|--|
| Assess program outreach and marketing                    |
| Document customer experience with the program            |
| Document reasons for participation and program influence |
| Gather feedback needed to estimate Net-to-Gross ratio    |
| Assess population segments the program is reaching       |

To ensure the results were applicable to the larger participant population, the evaluation team stratified the sample by measure type, thus ensuring that sampled participants were representative of the measures in the population (Table 5-5). Central air conditioners and air-source heat pumps were the most commonly installed measures, accounting for nearly all (90%) installations in the program. Aside from survey respondents that received add-on HVAC measures (smart thermostat or quality install), only one survey respondent received rebates for more than one measure. This respondent received rebates for attic insulation/air sealing and duct sealing, and was asked measure-specific questions for all measures they received rebates for.

**Table 5-5: Measures Installed by Participant Sample**

| Measure Installed              | Sample % (n=73) | Participant Population % |
|--------------------------------|-----------------|--------------------------|
| Central Air Conditioner        | 45%             | 47%                      |
| Air-Source Heat Pump           | 40%             | 43%                      |
| Attic Insulation & Air Sealing | 7%              | 3%                       |
| Pool Pump                      | 6%              | 4%                       |
| Geothermal Heat Pump           | 1%              | <1%                      |
| Heat Pump Water Heater         | 1%              | <1%                      |
| Duct Sealing                   | 1%              | 1%                       |
| Smart Thermostat               | 45%             | 62%                      |
| Quality Install                | 38%             | 38%                      |

## 5.2 Process Evaluation Findings

The following subsections describe program successes and challenges as well as opportunities for program improvement.

### 5.2.1 Trade Ally Perspective

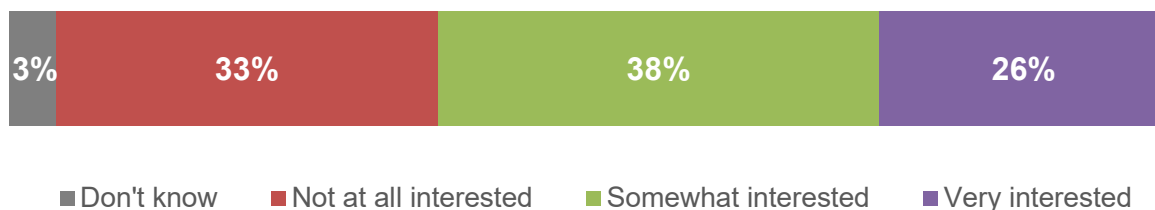
This section reports the results from trade ally surveys regarding their experience participating in the Smart \$aver program in the Duke Energy Carolinas jurisdiction.

#### 5.2.1.1 Training

We asked trade allies about their satisfaction with program training, as well as their suggestions for future training opportunities. Overall, trade allies were somewhat dissatisfied with program training opportunities (see Figure 5-10), with trade allies indicating they were dissatisfied because they had not received any program training.

When asked an open-ended question about what other training types they would be interested in, less than half (40%) of surveyed trade allies reported they would be interested in additional training opportunities. Specific training requests varied widely, including training about new rebates and programs offered by Duke Energy and how to fill out required paperwork. When specifically asked to use a 0 to 10 scale to demonstrate their interest in a training course on how to more effectively sell high efficiency equipment, the majority (64%) expressed at least minor interest in sales training (Figure 5-1).

**Figure 5-1: Interest in Sales Training (n=58)\***

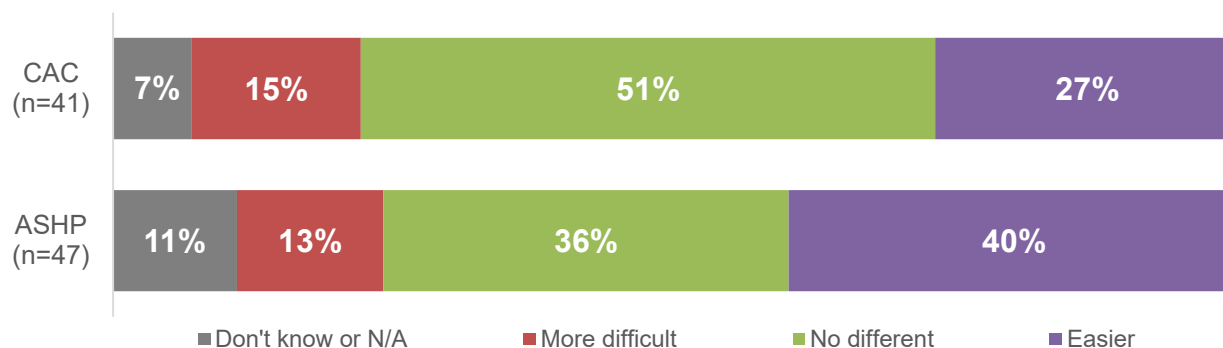


\* Respondents used a 0 to 10 scale, where 0 meant "Not at all interested" and 10 meant "Extremely interested." In the figure above, "Not very interested" represents those selecting "0" through "2", "Somewhat interested" represents those selecting "3" through "7," and "Very interested" represents those selecting "8" through "10."

#### 5.2.1.2 Code Changes

The U.S. Department of Energy revised the efficiency standard for air source heat pumps and central air conditioners; the new standard requires split system air source heat pumps and air conditioners to achieve a 14 SEER minimum for systems manufactured after January 1<sup>st</sup>, 2015. The revised standards for air source heat pumps and central air conditioners appear to have had moderate effect on sales in the region. About half (51%) of trade allies that installed central air conditioners said it is no easier or more difficult to sell 15 SEER central air conditioners following this code change. However, 40% (19 of 47) of surveyed trade allies that installed air source heat pumps through the program said that it is at least somewhat easier to sell 15 SEER air source heat pumps following the increases in minimum standards (Figure 5-2).

**Figure 5-2: Difference in Ease or Difficulty in Selling 15 SEER Central Air Conditioners & Air-Source Heat Pumps Since Code Change\***

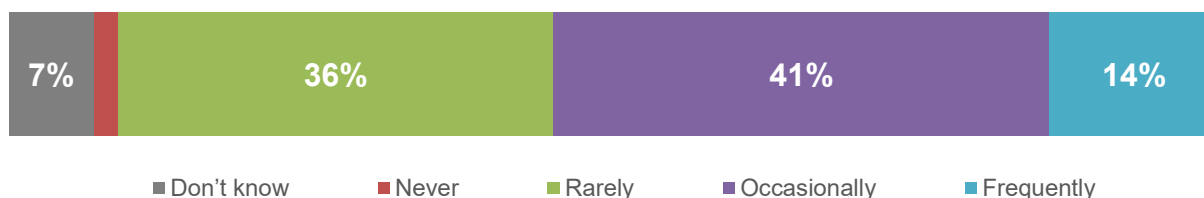


\* Excluded respondents who don't sell SEER 15.

### 5.2.1.3 Recruiting Customers into Smart \$aver

Trade ally survey data – which is further corroborated by participant survey data (see section 5.2.2.1) – reveals that trade allies are largely responsible for recruiting customers into the program. While over half of surveyed trade allies (55%) said that their customers “occasionally” or “frequently” ask about Smart \$aver rebates, over one-third (38%) said their customers never or rarely ask about the program (Figure 5-3).

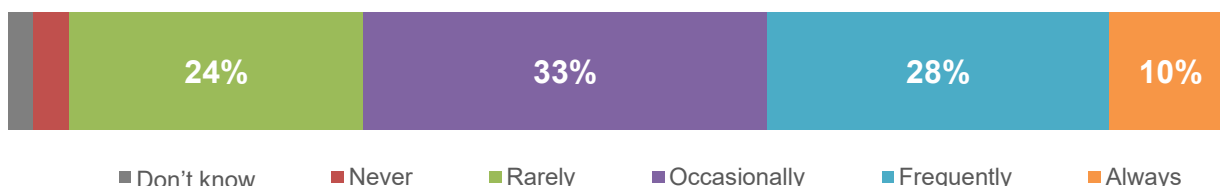
**Figure 5-3: How Often Customers Ask About Smart \$aver Rebates (n=58)**



Few trade allies (31%) were highly satisfied with DEC's marketing of the program (see Figure 5-10), with dissatisfied trade allies noting that DEC does not conduct enough Smart \$aver marketing. Participant survey results may help corroborate these trade ally reports, as few (6%) surveyed participants explicitly mentioned Duke Energy marketing materials as their source of program awareness. Thus, trade allies often need to educate their customers on the benefits of energy efficiency and the availability of Smart \$aver rebates to bring new households into the program.

### 5.2.1.4 Rebate Application Process

Smart \$aver transitioned to an online application system (called the “trade ally portal”) in April 2016. We asked trade allies how frequently they have experienced problems or frustrations using the new portal (Figure 5-4). Although most (95%) reported experiencing problems or frustrations with the rebate application process, less than two-fifths (38%) said this was “frequently” or “always.”

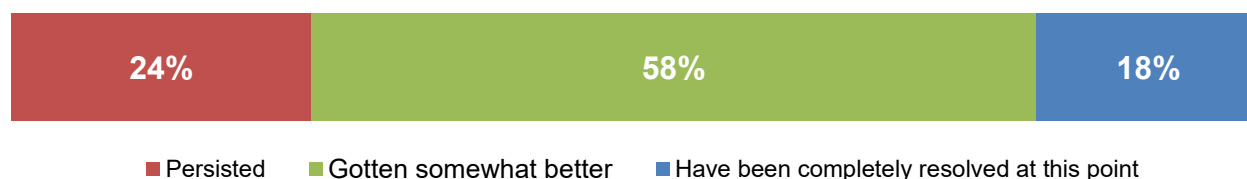
**Figure 5-4: Frequency of Experiencing Problems or Frustrations with Online Rebate Application Process (n=58)**

Trade allies that reported experiencing problems or frustrations with the rebate application process (n=55) typically mentioned struggles with uploading to the portal (be it applications or documentation) which can result in needing to resubmit, or indicated that the application process is overly burdensome (Table 5-6).

**Table 5-6: Problems and Frustrations with the Rebate Application Process (Multiple Responses Allowed)**

| Responses   | n=55 |
|---|------|
| Data entry and form upload problems / having to resubmit forms  | 55%  |
| Submission process is difficult, burdensome, or too lengthy     | 25%  |
| Stringent application requirements                              | 24%  |
| Rebate applications being rejected for unknown or vague reasons | 16%  |
| Lack of feedback from Duke regarding rebate status and problems | 16%  |
| Resolving application errors is burdensome                      | 13%  |
| Thermostat application issues                                   | 11%  |
| Quality Install checklist issues                                | 7%   |
| Rebate tracking issues  | 5%   |
| Misc. other   | 40%  |
| Don't know  | 2%   |

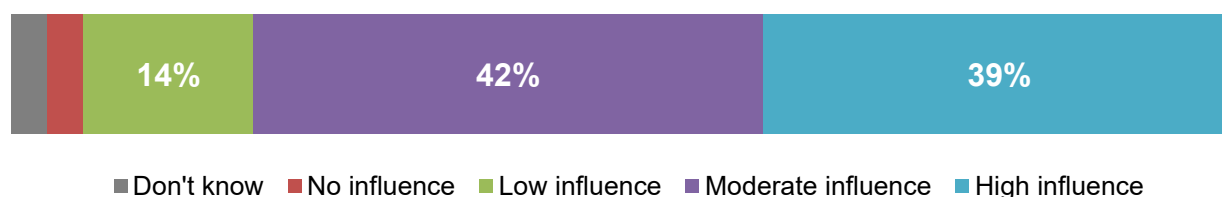
Echoing the prevalence of these problems and frustrations, the rebate application submission process had the highest level of dissatisfaction in the trade ally satisfaction battery (see Figure 5-10). However, over three-fourths (76%) of trade allies indicated that these problems have gotten at least somewhat better since the rollout of the new portal system (Figure 5-5).

**Figure 5-5: Trade Ally Perception of Portal Problems: Persisting vs. Improving (n=55)**

### 5.2.1.5 Program Influence on Trade Allies

Trade ally survey results reveal that the program is influencing energy efficiency contracting services offered by contractors in the trade ally network. Most (62%, or 36 of 58) surveyed trade allies reported their knowledge of energy efficient products and services had increased since they became involved with Smart \$aver, 39% of which said the program was highly influential on their increased knowledge (Figure 5-6).

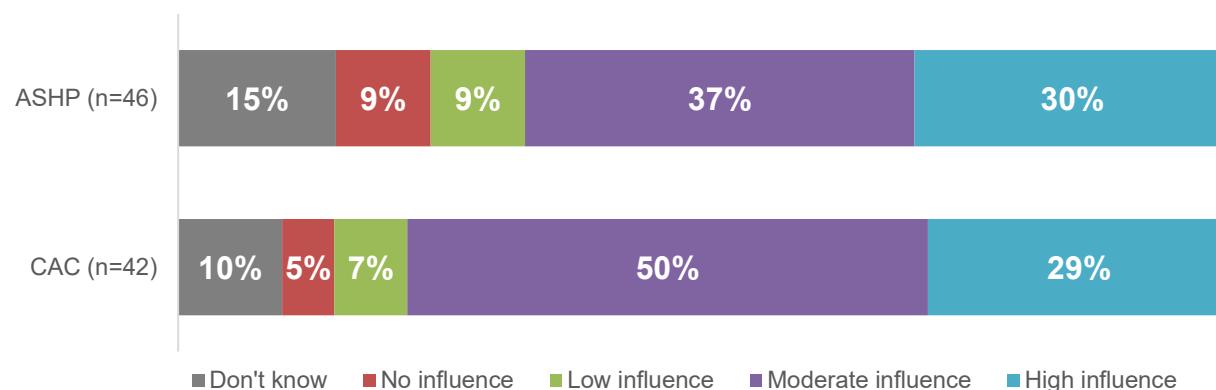
**Figure 5-6: Smart \$aver Influence on Increased Trade Ally Knowledge of Energy Efficient Products and Services (n=36)\***



\* Asked on a 0-10 scale, where 0 is "not at all influential" and 10 is "extremely influential." "No influence" represents trade allies that reported "0," low influence represents responses ranging from 1 to 3, moderate influence represents responses ranging from 4 to 7, and high influence represents responses ranging from 8 to 10.

Most HVAC trade allies reported that Smart \$aver has at least partially influenced their practice of recommending qualifying HVAC measures, with about two-thirds or more – depending on the measure – indicating Smart \$aver was moderately or highly influential (Figure 5-7).

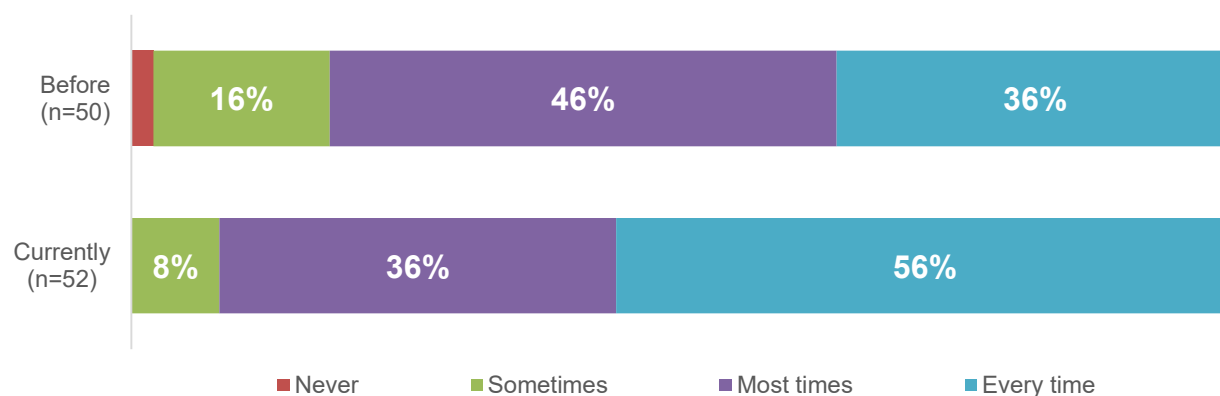
**Figure 5-7 Program Influence on Trade Ally Practice of Recommending Program Qualified Measure\***



\* Asked on a 0-10 scale, where 0 is "not at all influential" and 10 is "extremely influential." "No influence" represents trade allies that reported "0," low influence represents responses ranging from 1 to 3, moderate influence represents responses ranging from 4 to 7, and high influence represents responses ranging from 8 to 10. Each row only includes trade allies who had experience with the measure.

Further, survey data reveals that contractors recommend high efficiency equipment more frequently now compared to before they were a participating trade ally in Smart \$aver (Figure 5-8). Ultimately, surveyed trade allies revealed that over half of their central air conditioners (57%) or air source heat pumps (60%) installed in 2016 qualified for Smart \$aver rebates.

**Figure 5-8: Trade Ally Frequency of Recommending High Efficiency Equipment\***



\* Figure excludes "don't know" and "not applicable" responses. Only trade allies that install equipment measures (HVAC, water heat, and pool pumps) were asked these questions.

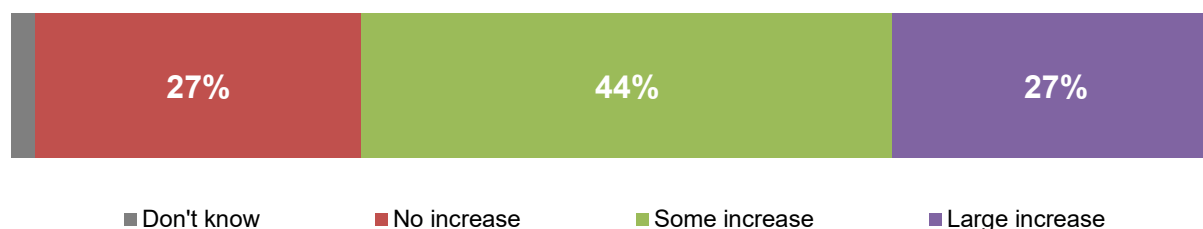
### 5.2.1.6 New Program Incentives

In April 2016, DEC added several new HVAC incentive offerings to the Smart \$aver program:

- Tiered HVAC incentives
- Smart thermostat
- Quality install (QI)

The tiered HVAC rebates increased sales of high SEER units, as almost three-fourths of trade allies that installed CACs (71%) or ASHPs (70%) reported that the higher incentives helped them sell more 15+ SEER units. The smart thermostat incentives also appear to be influential, as almost three-fourths (71%) of HVAC trade allies said they have experienced at least some increase in smart thermostat installations since the introduction of the new incentive offering (Figure 5-9).

**Figure 5-9: Smart \$aver Effect on Trade Ally Smart Thermostat Installation Volume (n=41)**



Almost 80% (22 of 28) of trade allies that performed quality installations reported they were already doing all the techniques on the quality install checklist prior to Duke Energy requiring them. Of these trade allies, most (19 of 22) said they had a system in place to document that their installers were following the same QI techniques. However, when trade allies were asked which specific QI techniques they previously used, only one mentioned all the primary components required in the Duke Energy QI checklist. Trade allies most commonly reported 'airflow and static pressure' as a previously used QI technique (mentioned by 8 of the 22 trade allies that reported previously using quality install techniques) (Table 5-7).

**Table 5-7: Previous Quality Install Techniques Used by Trade Allies (Multiple Responses Allowed)**

| Quality Install Technique | Count (n=22) |
|---------------------------|--------------|
| Airflow/static pressure*  | 8            |
| System capacity*          | 4            |
| Condenser measurements*   | 4            |
| Blower door tests         | 4            |
| Enthalpy conversion*      | 3            |
| System CFM*               | 1            |
| Other                     | 8            |
| Don't know                | 8            |

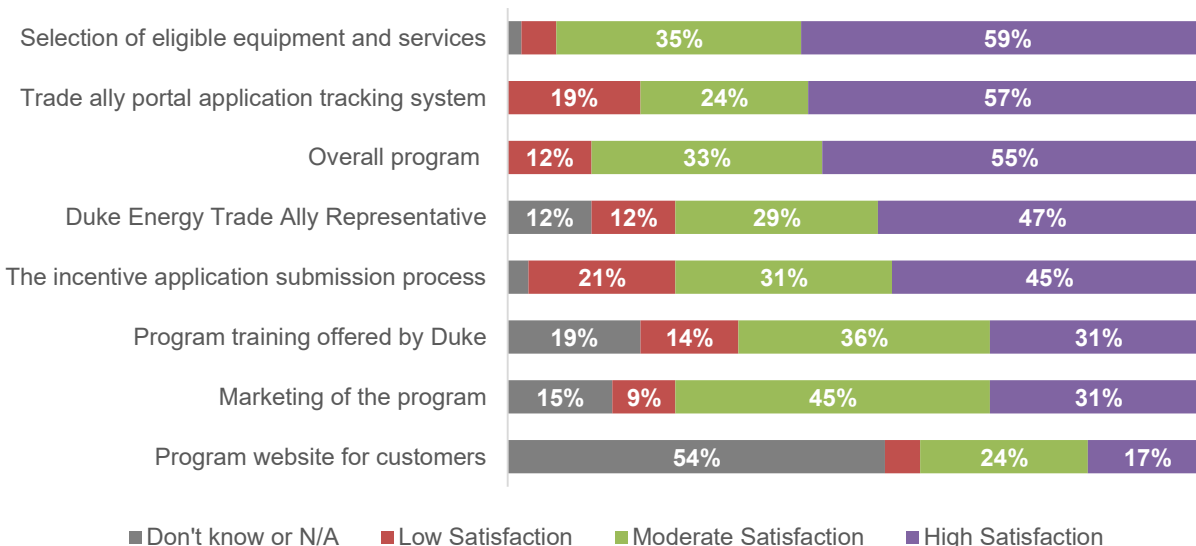
\*Primary components of the Duke Energy Quality Install checklist

When completing the quality installation checklist on Tier 2 and Tier 3 HVAC jobs, almost all (91%) trade allies reported they do not charge their customers extra on the invoice for the quality install process. Open-ended comments reveal trade allies are considerably frustrated with the quality install measure: almost three-quarters (71%) of trade allies said improvements were needed or offered criticisms about the 'lengthy and burdensome' process. Of those offering suggestions for improvement, common responses included eliminating the Tier 1 HVAC incentives or checklist altogether, reducing paperwork required for the quality install checklist to simplify the process, and compensating the contractors for their time completing the quality installation. Additional analysis revealed that the more experience the trade ally had with the measure, the less likely they were to criticize it. See Appendix C for full verbatim responses.

### 5.2.1.7 Satisfaction

Surveyed trade allies reported moderate satisfaction with several program elements (Figure 5-10). The incentive submission process and the application tracking system received the most dissatisfied ratings; dissatisfied trade allies elaborated they were dissatisfied with these items because the submission process is burdensome and rebate statuses are often inaccurate. Program training and DEC's marketing of the program also received low satisfaction ratings, with trade allies explaining they were not aware of their presence (that is, they felt program marketing and training opportunities were lacking). However, over half of trade allies reported high satisfaction with the selection of eligible equipment and services and the overall program.



**Figure 5-10: Trade Ally Satisfaction with Program Elements\* (n=58)**

\* Asked on a 0-10 scale, where 0 is "very dissatisfied," 5 is "neither satisfied nor dissatisfied," and 10 is "very satisfied." Figure exhibits percent with "high influence" ratings that range from 8 to 10.

### 5.2.1.8 Suggestions for Improvement

Despite their moderate satisfaction ratings, trade allies had few suggestions for program improvement, including:

- Continue improving and simplifying the online portal and incentive application process. Some trade allies offered specific suggestions to help streamline the process and enhance the accessibility of the portal, such as eliminating highly technical jargon, reducing unnecessary paperwork, and other general usability improvements.
- Simplify or eliminate the quality installation process. Most trade allies offered suggestions for improving the checklist, including: eliminating the Tier 1 QI requirement or checklist altogether, compensating the trade ally for their time completing the checklist, and reducing the amount of paperwork needed to shorten the processing time.
- Improve communication and customer service. Although almost half of trade allies reported high satisfaction with their trade ally representative, over 40% of trade allies reported low to moderate satisfaction due to lack of communication and accessibility.

### 5.2.2 Participant Experience

In July 2017, the evaluation team surveyed 73 Smart \$aver participants who received rebates through the program. Nearly all (95%) reported living at the residence where the work was performed, all of which reported owning their home. Nearly all (89%) reported living in a single-family detached home, followed by 6% living in a row or town house, 3% living in a factory manufactured single-family home, 1% living in a duplex, and 1% living in an apartment or condo building with four or more units (Table 5-8).

**Table 5-8: Participant Housing Type**

| Housing Type  | n=73        |
|---|-------------|
| Single-family detached home                         | 89%         |
| Row house or town house                             | 6%          |
| Factory manufactured single-family home             | 3%          |
| Duplex  | 1%          |
| Apartment or condo building with four or more units | 1%          |
| <b>Total</b>  | <b>100%</b> |

**5.2.2.1 Participant Awareness**

Trade allies are the primary way consumers learn about the program, as evidenced by more than three-quarters (77%) of participants citing their contractor as their source of program awareness (Table 5-9). A minority of participants may have heard about Smart \$aver via Duke Energy's marketing efforts, as several participants said they learned about the program from the internet (11%) or a mailer (8%).

**Table 5-9: Source of \$mart Saver Program Awareness (Multiple Responses Allowed)**

| Source of Program Awareness | n=73 |
|-----------------------------|------|
| Trade ally                  | 77%  |
| Online                      | 11%  |
| Mailer                      | 8%   |
| Duke Energy mentioned       | 6%   |
| Don't know                  | 6%   |
| Other                       | 6%   |

Respondents typically reported learning about energy efficient technologies from the internet, with about half (48%) of surveyed participants reporting going online to search for information regarding energy savings (Table 5-10). However, nearly one-quarter (22%) reported they do not typically search for information on how to save energy in their home.

**Table 5-10: Source of Energy Savings Information (Multiple Responses Allowed)**

| Source of Energy Savings Information   | n=73 |
|--|------|
| Online sources   | 48%  |
| Read utility information on how to save money                                  | 29%  |
| Go to utility website  | 25%  |
| In-store salespeople   | 1%   |
| Other  | 5%   |
| Not applicable – do not typically search for information on how to save energy | 22%  |
| Don't know   | 1%   |

### 5.2.2.2 Motivation to Participate

The evaluation team asked participants a series of questions to determine why they selected qualifying Smart \$aver measures. For those participants who installed equipment measures, the evaluation team asked about the condition of the previous equipment they replaced, and then asked why they chose an energy efficient version of that equipment.

Overall, a slight majority (60%) of participants reported replacing their equipment because it was “getting old” (Table 5-11). More than half (55%) replaced their equipment because it was broken or not working properly, and 3% did so even though it was in good working condition.

**Table 5-11: Condition of Previous HVAC Equipment**

| Condition of Previous System | Geothermal HP participant (n=1) | CAC participant (n=33) | ASHP participant (n=29) | Total (n=63) |
|------------------------------|---------------------------------|------------------------|-------------------------|--------------|
| Broken & old                 | 0                               | 6                      | 8                       | 14 (22%)     |
| Old & working                | 0                               | 0                      | 0                       | 0 (0%)       |
| Working [only response]      | 0                               | 0                      | 2                       | 2 (3%)       |
| Old [only response]          | 1                               | 19                     | 4                       | 24 (38%)     |
| Broken [only response]       | 0                               | 8                      | 13                      | 21 (33%)     |
| Other                        | 0                               | 0                      | 2                       | 2 (3%)       |
| No response                  | 0                               | 0                      | 0                       | 0 (0%)       |

\*n=63 includes participants that installed the following: air source heat pump, geothermal heat pump, OR central air conditioner.

The most commonly reported motivation for selecting highly efficient HVAC equipment over standard efficiency equipment was some form of monetary savings (52%), followed by wanting to take advantage of the cost savings and return on investment (26%) and a desire to consume less energy (18%) as summarized in Table 5-12.

**Table 5-12: Motivation for Installing Energy Efficient HVAC Equipment (Multiple Responses Allowed)**

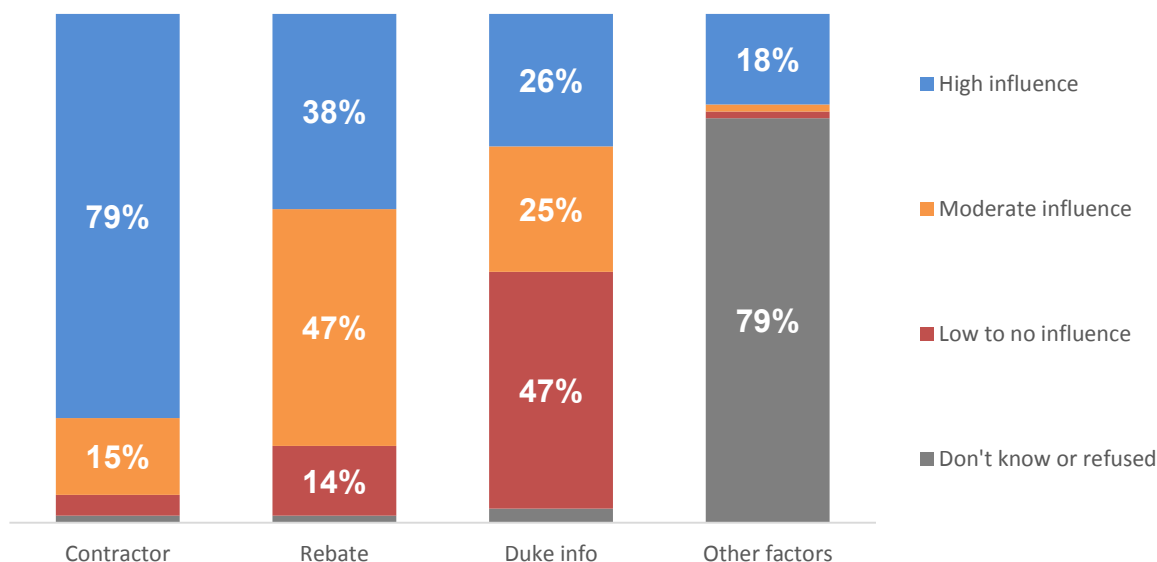
| Motivations   | n=63 |
|---|------|
| Monetary savings*                                       | 52%  |
| ROI & savings on energy bill                            | 26%  |
| To use less energy / make home more energy efficient    | 18%  |
| To help the environment                                 | 8%   |
| Interested in incentive / helped justify increased cost | 8%   |
| Wanted a quality system with low maintenance            | 3%   |
| Contractor recommendation                               | 5%   |
| Other   | 3%   |

\*Unclear if respondent is citing long term or upfront savings.

### 5.2.2.3 Program Influence

More than half (55%) of participants who purchased energy efficient equipment reported that recommendations from their contractor were highly influential in their decision to participate in the program (Figure 5-11). Contractors were much more influential than the Smart \$aver rebate, information, or advertisements. Other influential factors included recommendations from friends or family, increasing value of home for sale, or federal tax credits.

**Figure 5-11: Influential Factors in Decision to Purchase Efficient Measures\* (n=73)**



\* Participants were asked to rate each factor using a 0 to 10 scale where 0 meant "not at all influential," and 10 meant "extremely influential." Low influence represents responses ranging from 0 to 3, moderate influence represents responses ranging from 4 to 7, and high influence represents responses ranging from 8 to 10. This only includes influence of these factors on participants' decision to purchase a primary measure, not add-on measures (smart thermostats or quality installation). For more information on influence on add-on measures, see section 5.2.2.5.

Nearly one-third (30%, or 22 of 73) of participants reported being familiar with other DEC energy efficiency programs (Table 5-13). Participants were most aware of the HVAC rebates (6 mentions). Among the 22 respondents that were aware of other DEC rebates, nine reported receiving one or more of them.

**Table 5-13: Awareness and Participation in Other Duke Energy Programs (Multiple Responses Allowed)**

|   | Count Aware (n=73) |
|---|--------------------|
| Familiar with Other Duke Energy Rebates | 22                 |
| Other Smart \$aver Rebates              | 8                  |
| <i>HVAC</i>                             | 6                  |
| <i>Heat pump water heater</i>           | 2                  |
| <i>Pool pump</i>                        | 2                  |
| <i>Attic insulation and air seal</i>    | 1                  |
| <i>Duct sealing and insulation</i>      | 1                  |
| <i>Smart Thermostat</i>                 | 1                  |
| Other Duke Energy Rebates               | 14                 |
| <i>Discounted efficient lighting</i>    | 8                  |
| <i>In-home energy audit</i>             | 2                  |
| <i>Power manager</i>                    | 1                  |
| <i>Other</i>                            | 2                  |

Around one-third (30%) of participants reported purchasing other products or services to help save energy in their homes. However, very little of this resulted in attributable spillover savings as most (73%) said Smart \$aver had no influence on their subsequent energy upgrades.

#### 5.2.2.4 Participant Experience with the Program

About one-sixth (15%, or 11 of 71) of surveyed participants reported they contacted program staff with questions during the course of participating in the program. Of the 11 participants that contacted program staff, most (7 of 11) contacted them just once. Furthermore, of those participants who contacted staff, the majority (10 of 11) reported doing so via phone (Table 5-14).

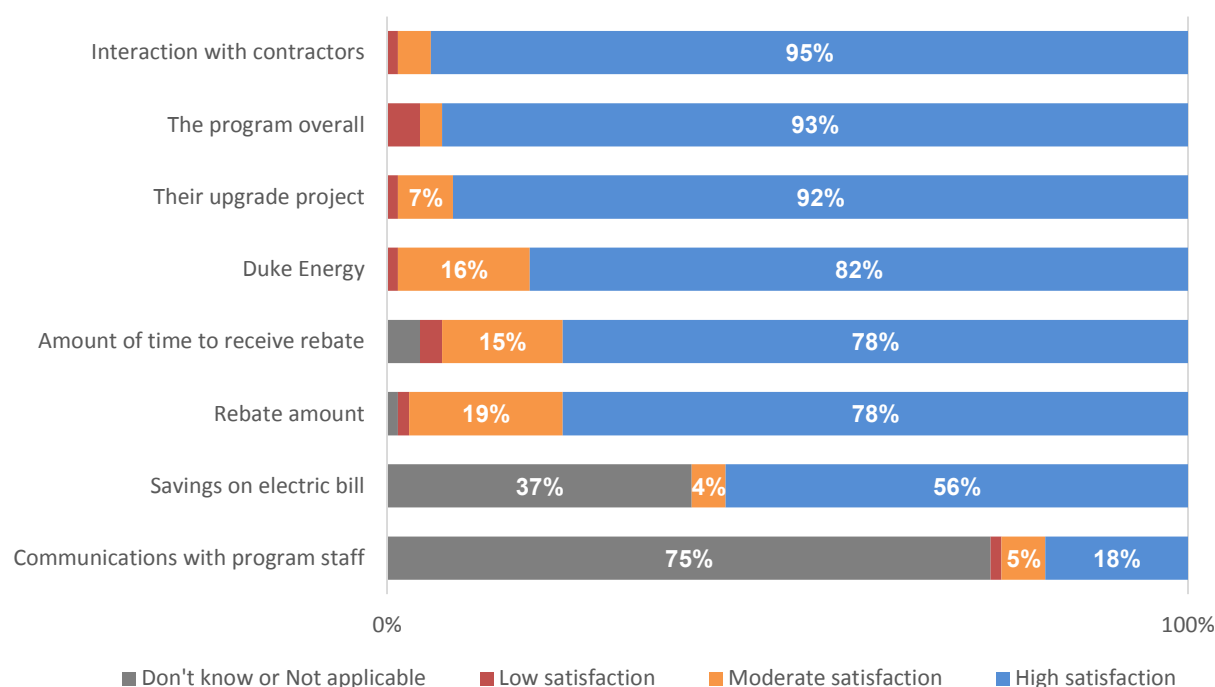
**Table 5-14: Contact with Program Staff (n=73)**

| Contact with Program Staff                              | Count     | Percent     |
|---|-----------|-------------|
| <b>Frequency of Contact</b>                             |           |             |
| Never   | 55        | 75%         |
| Once  | 11        | 15%         |
| Two or three times                                      | 6         | 8%          |
| Four times or more                                      | 1         | 1%          |
| <b>Total</b>  | <b>73</b> | <b>100%</b> |
| <b>Contact Type (Multiple Responses Allowed; n=18)*</b> |           |             |
| Phone   | 18        | 100%        |
| Email   | 1         | 5%          |

\* Includes those that indicated they contacted program staff at least once.

The majority of participants reported high satisfaction levels with most program elements (Figure 5-12). Nearly all (95%) reported being highly satisfied with their interaction with contractor. Furthermore, most participants reported being highly satisfied with their overall experience (93%) and results of their upgrade project (92%). Participants were comparably less satisfied with the rebate amount, and the amount of time to receive their rebate. Few participants noticed savings on their bill or interacted with program staff, but those who did tended to be highly satisfied.

**Figure 5-12: Participant Satisfaction with Program Elements\* (n=73)**



\* Participants were asked to rate each factor using a 0 to 10 scale where 0 meant "not at all satisfied," 5 meant "neither satisfied nor dissatisfied," and 10 meant "very satisfied." Low satisfaction represents responses ranging from 0 to 3, moderate satisfaction represents responses ranging from 4 to 7, and high satisfaction represents responses ranging from 8 to 10.

\* For this item, participants were asked to rate their overall satisfaction on a five-point scale, from "very dissatisfied" to "very satisfied." The Evaluation Team recoded responses to be comparable with other items in the series.

To further understand Smart \$aver's effect on participants attitudes towards Duke Energy, the evaluation team asked whether their participation in the program had a positive, neutral, or negative effect on their overall satisfaction with Duke Energy. Overall, participation was beneficial, with the majority (84%) of respondents reporting a positive effect, and just 1% reporting a negative effect (Table 5-15).

**Table 5-15: Effect of \$mart Saver Program on Participants Satisfaction with Duke Energy**

| Effect of Program on Satisfaction with Duke Energy | n=73        |
|--|-------------|
| Positive effect                                    | 84%         |
| No effect  | 15%         |
| Negative effect                                    | 1%          |
| <b>Total</b>                                       | <b>100%</b> |

Although savings were not a driving factor for participants' program satisfaction, the majority (62%) reported noticing savings on their electric bill since their last project was completed (Table 5-16).

**Table 5-16: Resulting Energy Savings on Electric Bill**

| Experienced Savings on Electric Bill            | n=73        |
|---|-------------|
| Yes, they noticed savings                       | 62%         |
| No - they looked but did not notice any savings | 10%         |
| No - they looked but it is too soon to tell     | 4%          |
| They didn't look                                | 14%         |
| Don't know                                      | 11%         |
| <b>Total</b>                                    | <b>100%</b> |

The evaluation team asked all respondents if they had any suggestions to improve the program. Among the 24 participants who provided a response, around one-quarter (6 of 324) reported wanting more customer outreach to increase awareness of the program (Table 5-17). An additional five respondents suggested improving the program description and instructions around how to receive the rebate.

**Table 5-17: Suggestions for Improving \$mart Saver Program (Multiple Responses Allowed)**

| Suggestions for Improving the Program                         | Count (n=24) |
|---|--------------|
| Raise awareness, perform more outreach                        | 6            |
| Improve program description/Instructions on how to get rebate | 5            |
| Expand rebates / offerings                                    | 5            |
| Improve customer service                                      | 1            |
| Use a check for rebates rather than gift card                 | 2            |
| Other   | 6            |

### 5.2.2.5 New HVAC Incentives

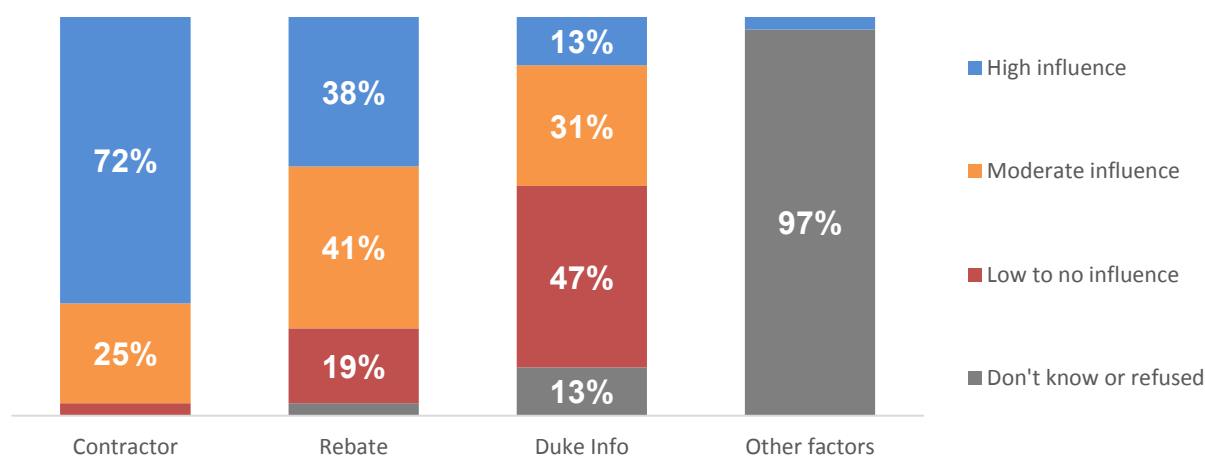
Most (97%) smart thermostat participants replaced non-programmable (50%) or standard programmable (47%) thermostats. Participants were motivated to replace their old thermostats with smart thermostats primarily because it was a 'package deal' and they liked the features (Table 5-18).

**Table 5-18: Participant Motivations for Installing Smart Thermostats (Multiple Responses Allowed)**

| Motivations            | (n=32) |
|------------------------|--------|
| Came as a package deal | 47%    |
| Thermostat features    | 38%    |
| Convenience            | 9%     |
| Rebate                 | 9%     |
| Don't know             | 6%     |

Nearly three quarters (72%) of participants that received a smart thermostat reported that recommendations from their contractor were highly influential in their decision to participate in the program (Figure 5-13). Participants rated their contractor as significantly more influential than the Smart \$aver rebate or DEC information on their decision to purchase a smart thermostat.

**Figure 5-13: Influence on Decision to Purchase a Smart Thermostat (n=32)**



Most (75%) quality install rebate recipients were not aware that they had received a rebate for the service. Of those that were aware of the rebate, most (6 of 7) said their contractors gave them a choice between a standard installation and quality installation and most (5 of 7) had heard of quality install before receiving the service. However, the quality install rebate had little influence on participant purchase decisions among those that were aware that they received the rebate for the quality installation service: most (6 of 7) said that if Duke had not offered a rebate for the service, they still would have demanded their contractor provide a quality installation even if they would have had to pay extra for the service.



## 6 Conclusions and Recommendations

Based on evaluation findings, the evaluation team concluded the following and provides several suggestions on how to improve the program:

**Conclusion 1: Trade allies are the driving force of the program, but there may be opportunities to improve their program experience and effectiveness.** Trade allies are the primary mechanism for bringing participants into the program, as they often upsell energy efficient systems to customers who have no prior awareness of the program during a time of immediate heating or cooling needs. However, trade ally satisfaction with certain program elements is relatively low, particularly: the application process and portal, program training, and the quality installation process and requirements.

**Recommendation: Look for ways to increase trade ally satisfaction and rebate volumes.** Trade allies are vital to the program's success. DEC should work with Blackhawk Engagement Solutions, the program implementer, to improve the trade ally experience and look for ways to increase trade ally effectiveness in the field.

- Potential strategies for increasing trade ally effectiveness (and simultaneously increasing trade ally satisfaction):
- Provide marketing materials to trade allies, such as co-op marketing
- Attempt to increase trade ally participation in training events. Potential strategies:
  - Align training offerings with trade ally content requests, particularly: sales, quality install, portal/application process, and program changes
  - Ensure training sessions occur during convenient periods during the year (i.e., non-peak seasons) and convenient times (breakfast meetings can be particularly successful).
- Potential strategies for improving TA (Trade Ally) satisfaction:
  - Continue improving portal system and simplifying the application process
  - Consider splitting incentives with TAs to compensate TAs for their time spent on Duke Energy processes. Shifting a small portion of the incentive to the trade ally is unlikely to negatively impact participation levels, as participants were only marginally influenced by the rebate and were instead mainly influenced by their contractor's recommendation (a finding which underscores the need to retain a strong trade ally network).

**Conclusion 2: Approximately 60% of sampled quality install sheets included issues.**

Trade allies complete quality install sheets detailing system measurements taken while on site. Upon review of a sample of quality install sheets, the evaluation team found several issues including:

- Math errors
- Calculated capacities below program requirement
- Rule of thumb CFM estimates instead of actual measurements
- Testing in sub-optimal conditions

These issues compromise the validity of the impact of quality installation and therefore the associated energy and demand savings cannot be verified.

- **Recommendations:**

- Establish additional internal QA/QC processes when reviewing submitted quality install sheets.
  - Work with trade allies to better understand issues encountered with the quality install sheets and to improve quality install reporting.

**Conclusion 3: The quality installation measure may have experienced some growing pains in its infancy.** Many trade allies expressed frustration with the 'complex and time consuming' quality install form, especially since they receive no compensation for completing it. These concerns may have limited the initial growth of the new measure:

- Tier 1 (which requires QI) was the least installed HVAC tier, amounting to about one-tenth of all HVAC units in the program.
- Less than one-third of Tier 2 and Tier 3 HVAC units received a QI rebate.
- **Recommendation: As DEC matures the quality installation measure, look for ways to retain, expand, and improve trade ally quality install practices.**
- Potential strategies for retaining and expanding trade ally quality installation practices:
  - Shift the quality install rebate to trade allies: trade ally dissatisfaction with the process may be mitigated by compensation.
  - Hold a round table meeting with trade allies to collaborate on a revised quality install process that better serves the needs of both parties: for DEC to generate cost-effective savings from the measure, the process must be minimally burdensome for trade allies so that they actively and accurately complete it

**Conclusion 4: New HVAC rebates and requirements are generating additional energy savings that would not have occurred naturally.** The new HVAC program components have resulted in increased trade ally sales of high SEER HVAC units and smart thermostats. Although comparatively less successful, quality installation rebates and requirements have encouraged a minority of trade allies to adopt new quality install techniques.

- **Recommendation 1:** Continue offering the new incentives:
  - tiered HVAC incentives
  - smart thermostats incentives
  - QI incentives (however, shift the rebate to trade allies)
- **Recommendation 2:** Continue looking for new program offerings that could generate additional savings

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## Appendix A Summary Form

### Smart \$aver Program

Completed EMV Fact Sheet

#### Description of program

The Smart \$aver program offers Duke Energy existing residential customers incentives for improving their home's energy efficiency through the installation of energy efficient heating, ventilating, and air conditioning (HVAC), quality installation of HVAC units, smart thermostats, pool pump, and water heating equipment replacements, duct sealing, duct insulation, and attic insulation with air sealing.

| Date                              | May1, 2016 – April 30, 2017  | Measure                     | Verified Net Savings (kWh) |
|-----------------------------------|------------------------------|-----------------------------|----------------------------|
| Region(s)                         | Carolinas                    | Central Air Conditioner     | 150                        |
| Evaluation Period                 | May 1, 2016 – April 30, 2017 | Air Source Heat Pump        | 318                        |
| Annual kWh Net Savings            | 5,308,068                    | Geothermal Heat Pump        | 1,758                      |
| Coincident kW Net Impact - Summer | 1,385                        | Quality Installation        | 9                          |
| Coincident kW Net Impact - Winter | 1,665                        | Smart Thermostat            | 227                        |
| Net-to-Gross Ratio                | 66.7%                        | Attic Insulation & Air Seal | 549                        |
| Process Evaluation                | Yes                          | Variable Speed Pool Pump    | 1,621                      |
| Previous Evaluation(s)            | N/A                          | Heat Pump Water Heater      | 1,078                      |
|                                   |                              | Duct Sealing                | 292                        |
|                                   |                              | Duct Insulation             | 423                        |

#### Evaluation Methodology

##### Impact Evaluation Activities

- 44 on-site metered systems
- 73 telephone surveys with participants

##### Impact Evaluation Findings

- Realization rate: 83.0%
- Net-to-gross: 66.7%

##### Process Evaluation Activities

- Program and implementation staff: interviews with one program staff and one implementation staff
- Trade Allies; 5 interviews with high volume contractors, surveys with a representative sample of 58 trade allies
- Participants; 73 telephone surveys of participating households.

##### Process Evaluation Findings

- Participants are highly satisfied with Smart \$aver.
- Smart \$aver influences energy efficiency contracting services.
- Trade allies are Smart \$aver's most successful marketing channel.
- Trade ally satisfaction is moderately low, particularly with: portal/application process and quality install process

## Appendix B Measure Impact Results

Table B-1 Program Year 2016 Verified Impacts by Measure

| Measure                     | Gross Energy Savings per unit (kWh) | Gross Summer Coincident Demand per unit (kW) | Gross Winter Coincident Demand per unit (kW) | Free Ridership | Spillover | Net to Gross Ratio | Measure Life |
|-----------------------------|-------------------------------------|--|--|----------------|-----------|--------------------|--------------|
| Central Air Conditioner     | 225                                 | 0.123  | 0.167  | 0.38           | 0.05      | 0.67               | 18           |
| Heat Pump                   | 490                                 | 0.149  | 0.213  |                |           |                    | 18           |
| Quality Install             | 13                                  | 0.005  | 0.004  |                |           |                    | 10           |
| Smart Thermostat            | 340                                 | 0.000  | 0.000  |                |           |                    | 11           |
| Attic Insulation & Air Seal | 824                                 | 0.221  | 0.399  |                |           |                    | 20           |
| Variable Speed Pool Pump    | 2,430                               | 0.527  | 0.000  |                |           |                    | 10           |
| Heat Pump Water Heater      | 1,616                               | 0.000  | 0.000  |                |           |                    | 10           |
| Duct Sealing                | 438                                 | 0.162  | 0.153  |                |           |                    | 18           |
| Duct Insulation             | 634                                 | 0.234  | 0.222  |                |           |                    | 20           |

## Appendix C Survey Instruments

### C.1 Trade Ally In Depth Interview

#### Introduction

Hi, I'm \_\_\_\_ calling from Research Into Action on behalf of Duke Energy Carolinas. We are evaluating the SMART \$AVER program and we are looking to speak with contractors like yourself who have been particularly active in the program. Our program records indicate that your firm completed several projects this year for which a customer received an incentive from Duke Energy Carolinas SMART \$AVER program, is that correct? And are you knowledgeable about those incented projects?

[If “no,” ask to speak to someone who is knowledgeable about SMART \$AVER work]

Your participation in this study is very important to Duke Energy Carolinas – this is your chance to tell us what is working well, what isn't, and how Duke Energy Carolinas can improve the program to better serve you and your customers. Do you have time to speak on the phone with me today about your experiences in the program?

Great. Rest assured, your answers will be kept strictly confidential and will not be tied to you or your firm. Is it okay if I record our conversation for note keeping purposes? [IF NEEDED: It is just so I can go back and clean up my notes after we are done talking, as to ensure I accurately captured everything you said.]

#### Background

- Q1. My records show your company provides [PIPE IN SERVICES OFFERED: HVAC, plumbing, shell] services through SMART \$AVER. Is that correct?
- Q2. Have you completed any **new construction** projects that received incentives from the Smart Saver program?

#### Awareness and Engagement

- Q3. How do you explain the value of energy efficiency upgrades to your customers? What are some successful strategies?
- Q4. [ASK IF INSTALLED HVAC] Thinking about all customers – including those that do and don't go through the program, what are the primary reasons your customers replace their HVAC equipment?

[ASK IF INSTALLED HPWH] Thinking about all customers – including those that do and don't go through the program, what are the primary reasons your customers replace their water heaters?

[ASK IF INSTALLED POOL PUMPS] Thinking about all customers – including those that do and don't go through the program, what are the primary reasons your customers install ENERGY STAR efficient pool pumps that are equipped with variable speed drives? What proportion of efficient pool pump sales are replacing used pool pumps (as compared to pool pumps that go into newly constructed pools)?

[ASK IF INSTALLED ATTIC/DUCT INSULATION] Thinking about all customers – including those that do and don't go through the program, what are the primary reasons your customers insulate and seal their attics and ducts?

- Q5. How did your company learn about the SMART \$AVER program?
- Q6. About what proportion of your SMART \$AVER customers knew about the program prior to you mentioning it? [IF NEEDED: about what proportion of your SMART \$AVER customers requested SMART \$AVER rebates before you had a chance to mention them?]
- Q7. Duke Energy conducts various marketing efforts to promote the SMART \$AVER program to your customers. Would you say the program has the right amount, too much, or too little marketing?
- Q8. How do you think Duke Energy Carolinas could improve their marketing and outreach efforts?
- Q9. What does your company do to market the SMART \$AVER program?
- Q10. How can Duke better support your SMART \$AVER marketing efforts?
- Q11. Have you attended any orientations or training events from Duke Energy Carolinas? If yes: What events did you attend? Did the training provide you with information you found useful? Is there anything that you wish had been discussed in the training, but was not?
- Q12. Would you like additional training opportunities to help your team more effectively sell rebated equipment? [*Probe: What type of training: sales/marketing training?*]
- Q13. Tell me about your thoughts and experiences with the new online application system. (How has it improved or worsened the application process?)
- Q14. Do you ever use the program's online portal for contractors for reasons other than submitting rebate applications? If so, for what? Is it helpful? Could it use improvement?
- Q15. A new company, Blackhawk Engagement Solutions, is implementing the program now (they take care of rebate application processing, fulfillment and the program call center). How has this affected your experience in the program, if at all?

Q16. How satisfied are you with your Duke Energy Trade Ally Representative? (IF NEEDED: Please explain why you said that)

### Trade Ally Program Experience

Q17. What are the challenges you've experienced in the program?

*Probes:*

- QA audit process (common fails? QA process is cumbersome?)
- Variety of measures offered
- Customer participation rates
- Rebate application process
- Delays
- Communications with Duke Energy and implementer
- Other

Q18. Do you have any suggestions on how to improve the program process?

### Program Satisfaction

Q19. What do you like best about the program?

Q20. What do you like least about the program?

### Market Changes

Q21. What new energy efficient technologies do you see taking off in the near future? What are your customers asking for? Are there any energy efficient technologies you think would sell better if Duke offered incentives for them? If so, what?

### HVAC Offerings [ASK IF HVAC CONTRACTOR]

As you may know, Duke Energy offers additional rebates for HVAC rebate customers who also install smart thermostats that connect to the internet.

Q22. Has this rebate affected the number of smart thermostats you install each year? If so, by how much?

Q23. How, if at all, has the smart thermostat rebate influenced you to recommend smart thermostats to your customers?

Q24. Do you think the smart thermostat rebate has any influence on a consumer's decision to replace their HVAC system?



Duke Energy now offers higher rebates for central air-conditioners and heat pumps that are above SEER 16.

Q25. Thinking of these higher incentives, how, if at all, have they helped you sell more central air-conditioners that are above SEER 16?

Q26. How, if at all, have the higher incentives helped you sell more air-source heat pumps that are above SEER 16?

Q27. Duke Energy also now offers higher rebates for “quality installs” of central air-conditioners and heat pumps. [IF NEEDED: On qualified HVAC replacement, a quality install checklist must be performed to ensure 90 percent net capacity has been achieved at time of installation as rated by AHRI.].

- a) Have you done any quality install rebate projects yet?
- b) How, if it all, has the “quality install” rebate changed the way you install heat pumps and air conditioners?
- c) What kind of metrics were you using previously to verify the system was correctly installed? (static pressure, rated capacity for system, etc.?)
- d) How did you all internally document quality installation metrics before the program provided the checklist?

Q28. How, if at all, has the “quality install” rebate changed the way you install air conditioners?

## Closing

Q49. Thanks so much for your time today. Are there any other comments you would like to provide?

## C.2 Trade Ally Survey

### Introduction

Hi, I’m \_\_\_\_ calling from Nexant on behalf of Duke Energy. May I speak with whomever is most knowledgeable about the rebated [MEASURE LIST] that your firm has installed through the Duke Energy Smart Saver rebate program?

*[If needed:]* I need to speak with someone who is knowledgeable about the sales and installation process – which is typically an installer or sales person]

*[Once appropriate contact is one phone]*

We want to get some feedback on how the Smart \$aver Duke Energy program is working for your firm - this is your chance to tell us what is working well, what isn't, and how Duke Energy can improve the program to better serve you and your customers. Is this a good time to talk?

[If needed:]

- The survey takes about 15 minutes, depending on how much we have to discuss.
- If now isn't a good time, when could I call you back?

Please note that this call may be monitored or recorded for quality assurance purposes. Rest assured, your answers will be confidential and not tied to you or your firm.

### Screening [Ask All]

[Base: All respondents]

S1. How many locations does your company have?

1. One
2. Two
3. Three
4. Four
5. Five
6. More than five [*Interviewer, make sure to record the exact number of locations if this option is checked:*] \_\_\_\_\_
98. Don't Know
99. Refusal

[ASK IF S1>1]

S2. We would like to talk today about the projects that were sold and installed by the [**PIPE IN ADDRESS**] location. Are you able to speak to the work associated with that location?

1. YES [CONTINUE]
2. NO [*Ask to speak with alternative appropriate person*]
98. Don't know [*Ask to speak with alternative appropriate person*]
99. Refused [*Thank and terminate*]

[*Read preface to all:*] Please note when I mention Duke I am referring only to Duke Energy Carolinas.

S3. Does your firm primarily focus on new construction or existing home projects?

1. New construction projects [*Thank and terminate*]
2. Existing homes
3. Both

- 98. Don't know [*Ask to speak with alternative appropriate person*]
- 99. Refused [*Thank and terminate, Record*]

### Sources of Program Awareness

[Base: All respondents]

Q1. How did you first hear about Duke Energy Smart \$aver rebate offers for HVAC equipment, variable speed pool pumps, insulation, and duct sealing?

- 1. Word-of-mouth (co-worker, another contractor)
- 2. Duke Energy website
- 3. Duke Energy program representative
- 4. TV/Radio/Newspaper/Billboard Ad
- 5. Event (home show, workshop, etc.)
- 6. Other, please specify: \_\_\_\_\_
- 98. Don't know
- 99. Refused

### Nonparticipant Spillover

[*READ PREFACE TO ALL:*]

Next, I will ask you some questions about the work your company did last year in Duke Energy territory, which is separate from Duke Energy Progress territory. When answering these questions, please only consider your work in Duke Energy territory, which includes communities in western North Carolina and the Northwestern parts of South Carolina.

[IF 0>1, DISPLAY:] [*Interviewer read:*] Remember, please only consider projects associated with the **[PIPE IN ADDRESS]** location when answering questions.

[START LOOP – LOOP THROUGH TOP THREE MOST INSTALLED MEASURE TYPES THAT TRADE ALLIES INSTALLED SINCE APRIL OF 2016]

[Base: All respondents]

Q2. Since August of 2016, about what proportion of the **[MEASURE]** jobs that your company did in Duke territory would have qualified for a Duke rebate? [If needed: Your best estimate is fine.] [*Interviewers: Record a number. if they give a range, record a mid-point of that range. For example, if they say 80 to 90%, input 85%.*]

- 1. [Record response]

[*Do not read:*]

- 98. Don't Know
- 99. Refused

[Base: All respondents]

Q3. And since August 2016, what percent of all your Duke rebate qualified [MEASURE] projects did you actually apply for a rebate? [If needed: Your best estimate is fine.]  
[Interviewers: Record a number. if they give a range, record a mid-point of that range. For example, if they say 80 to 90%, input 85%.]

1. [Record response]

[Do not read:]

98. Don't Know

99. Refused

Q4. About what proportion of your rebate qualifying [MEASURE] customers specifically requested the [MEASURE] on their own and were not influenced by your recommendation? [If needed: Your best estimate is fine.]

1. [Record percent]

[Do not read:]

98. Don't Know

99. Refused

Q5. Using a 0 to 10 scale, where 0 is "not at all influential" and 10 is "extremely influential," how much influence has the Duke program had on your business practice of recommending rebate qualifying [MEASURE] to your customers?

[SINGLE RESPONSE]

|     |                           |
|-----|---------------------------|
| 0.  | 0. Not all influential    |
| 1.  | 1.                        |
| 2.  | 2                         |
| 3.  | 3                         |
| 4.  | 4                         |
| 5.  | 5.                        |
| 6.  | 6.                        |
| 7.  | 7.                        |
| 8.  | 8.                        |
| 9.  | 9.                        |
| 10. | 10. Extremely influential |
| 98. | Don't Know                |
| 99. | Refused                   |

[END LOOP]

## Program Influence and Effects on TAs

[BASE: TRADE ALLIES THAT INSTALLED AIR SOURCE HEAT PUMPS, CENTRAL AIR CONDITIONERS, GEOTHERMAL HEAT PUMPS, POOL PUMPS, OR WATER HEATERS]

Q6. Thinking back to before you were involved in the Duke Energy program, how often did you recommend higher efficiency equipment that uses less energy than standard models to your customers? Would you say none of the time, some of the time, most of the time, or every time?

[SINGLE RESPONSE]

1. None of the time
2. Some of the time
3. Most of the time
4. Every time
97. Not applicable – I've been involved with the Duke program since starting in the industry/this company
98. Don't know
99. Refused

[BASE: TRADE ALLIES THAT INSTALLED AIR SOURCE HEAT PUMPS, CENTRAL AIR CONDITIONERS, GEOTHERMAL HEAT PUMPS, POOL PUMPS, OR WATER HEATERS]

Q7. And what about now? [*If needed*: Currently, how often do you recommend higher efficiency equipment that uses less energy than standard models to your customers? Would you say none of the time, some of the time, most of the time, or every time?]

[SINGLE RESPONSE. DO NOT READ]

1. None of the time
2. Some of the time
3. Most of the time
4. Every time
98. Don't know
99. Refused

[BASE: ALL RESPONDENTS]

Q8. Would you say your knowledge of energy efficient products and services has increased, decreased, or stayed about the same since you became involved with the program?

[SINGLE RESPONSE]

1. Increased
2. Decreased

- 3. Stayed about the same
- 98. Don't know
- 99. Refused

[ASK IF Q8 =1]

Q9. Using a 0 to 10 scale, where 0 is “not at all influential” and 10 is “extremely influential,” how much influence has Duke Energy program had on your increased knowledge of energy efficient products and services?

[SINGLE RESPONSE]

|     |                           |
|-----|---------------------------|
| 0.  | 0. Not all influential    |
| 1.  | 1.                        |
| 2.  | 2                         |
| 3.  | 3                         |
| 4.  | 4                         |
| 5.  | 5.                        |
| 6.  | 6.                        |
| 7.  | 7.                        |
| 8.  | 8.                        |
| 9.  | 9.                        |
| 10. | 10. Extremely influential |
| 98. | Don't Know                |
| 99. | Refused                   |

### Code Changes

[READ PREFACE IF CONTRACTOR INSTALLED CENTRAL AIR CONDITIONERS OR AIR SOURCE HEAT PUMPS]

As you may know, a new code for air conditioners and air source heat pumps was enforced in 2015 – the minimum SEER went from 13 to 14.

[Base: IF CONTRACTOR INSTALLED CENTRAL AIR CONDITIONERS]

Q10. How much more difficult or easier is it to sell 15 SEER central air conditioners now that the code is 14 SEER? Would you say it is: [READ FIRST FIVE RESPONSE OPTIONS:]

- 1. Much more difficult
- 2. Somewhat more difficult
- 3. No different
- 4. Somewhat easier
- 5. Much easier

[Do not read:]

- 97. Do not sell SEER 15
- 98. Don't know
- 99. Refused

[Base: IF CONTRACTOR INSTALLED AIR SOURCE HEAT PUMPS]

Q11. How much more difficult or easier is it to sell 15 SEER HVAC heat pumps now that the code is 14 SEER? Would you say it is:

[Read:]

- 1. Much more difficult
- 2. Somewhat more difficult
- 3. No different
- 4. Somewhat easier
- 5. Much easier

[Do not read:]

- 97. Do not sell SEER 15
- 98. Don't know
- 99. Refused

### New Incentives

[Base: IF CONTRACTOR INSTALLED SMART THERMOSTATS]

Q12. As you may know, Duke Energy offers a rebate for smart thermostats. By how much did your installations of smart thermostats increase since Duke began offering smart thermostat rebates? Would you say...

[Read:]

- 1. No increase
- 2. Some increase
- 3. A large increase

[Do not read:]

- 98. Don't know
- 99. Refused

[Base: IF CONTRACTOR INSTALLED CENTRAL AIR CONDITIONERS OR AIR SOURCE HEAT PUMPS]

[Before asking Q13 and Q14, read:] As you also may know, Duke Energy started to offer higher rebates for central air-conditioners and heat pumps that are above 14 SEER.

[Base: IF INSTALLED CACS]

Q13. Thinking of these higher incentives, did those help you sell more central air-conditioners that are 15 SEER or higher?

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[Base: IF INSTALLED AIR SOURCE HEAT PUMPS]

Q14. Thinking of these higher incentives, did those help you sell more air-source heat pumps that are 15 SEER or higher?

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[Base: IF PERFORMED QUALITY INSTALLS]

Q15. As you may know, Duke Energy recently added "quality install" requirements for installations of heat pumps and air conditioners? Were you already doing all the techniques on the quality install check list prior to Duke requiring them?

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[Base: IF Q15=1]

Q16. Prior to using Duke's quality install checklist, did you have a system in place to document that your installers were following these same quality install techniques?

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[Base: IF Q15=1]

Q17. Prior to using Duke's quality install checklist, what specific quality install techniques were you using? Please be as specific as possible.

[Multiple response, do not read:]



1. System capacity
2. Airflow / static pressure
3. System CFM (cubic feet per minute)
4. Condenser measurements
5. Enthalpy conversion
6. Blower door tests
7. Duct blaster tests
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[Base: IF PERFORMED QUALITY INSTALLS ON TIER 2 OR TIER 3 HVAC MEASURES]

Q18. I have a question about your Duke Energy tier 2 and tier 3 HVAC jobs – these are the ones where the quality installation check list is not required, so quality installations get the customer an additional \$60 rebate. Do you charge your customers extra on the invoice for completing the quality installation rebate checklist on tier 2 and tier 3 HVAC jobs?

1. Yes
2. No
98. Don't know
99. Refused

[Base: IF PERFORMED QUALITY INSTALLS]

Q19. Do you have any suggestions on how Duke Energy could improve the quality install requirements?

1. [Record response]
98. Don't know
99. Refused

### Challenges and Suggestions for Improvement

[Base: All respondents]

Q20. What energy efficient products, technologies, or services should be added to the Duke Energy Progress rebate program? [Do not read: Choose all that apply.] [MULTIPLE RESPONSE]

1. Modulating furnaces
2. Heat recovery ventilation (HRV) systems
3. Boilers
4. Furnaces equipped with electronically commutated motor (ECM) furnaces

- 5. Tankless water heaters
- 6. Humidifiers
- 7. Air handlers
- 8. Windows
- 9. Doors
- 10. No others should be added
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[Base: All respondents]

Q21. Have you attended any orientations or training events from Duke Energy Carolinas?

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[BASE: IF Q21=1]

Q22. What topics were covered in the last Duke Energy event you attended?

- 1. [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[BASE: IF Q21=1]

Q23. On a scale from 0 to 10, where 0 is "not at all helpful" and 10 is "extremely helpful," how helpful was the last Duke Energy event you attended?

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[Base: All respondents]

Q24. What types of training, if any, would you be interested in receiving from Duke Energy?

- 1. [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[Base: All respondents]

Q25. On a scale from 0 to 10, where 0 is “not at all interested” and 10 is “extremely interested,” how interested would you be in a training course on how to more effectively sell high efficiency equipment to your customers if it was offered by the program?

[SINGLE RESPONSE]

|     |                          |
|-----|--------------------------|
| 0.  | 0. Not all interested    |
| 1.  | 1.                       |
| 2.  | 2                        |
| 3.  | 3                        |
| 4.  | 4                        |
| 5.  | 5.                       |
| 6.  | 6.                       |
| 7.  | 7.                       |
| 8.  | 8.                       |
| 9.  | 9.                       |
| 10. | 10. Extremely interested |
| 98. | Don't Know               |
| 99. | Refused                  |

[Base: All respondents]

Q26. How often do your customers ask about the Duke Energy rebates before you've had the chance to bring them up? Would you say...

[Read:]

- 1. Never
- 2. Rarely
- 3. Occasionally
- 4. Frequently, or
- 5. Always

[Do not read:]

- 98. Don't Know
- 99. Refused

[Base: All respondents]

Q27. Since Duke transitioned to the online application system in April 2016, how frequently have you experienced problems or frustrations with the rebate application process? Would you say...

[Read:]

1. Never
2. Rarely
3. Occasionally
4. Frequently, or
5. Always

[Do not read:]

98. Don't Know
99. Refusal

[ASK IF Q27=2-5]

Q28. What types of problems or frustrations did you experience?

1. [Record response]

[Do not read:]

98. Don't Know
99. Refusal

[ASK IF Q27=2-5]

Q29. Overall, have these problems persisted or gotten better over time? Would you say these problems have:

[Read:]

1. Persisted
2. Gotten somewhat better, or
3. Have been completely resolved at this point

[Do not read:]

98. Don't Know
99. Refusal

[Base: All respondents]

Q30. Do you have any suggestions on how Duke Energy could improve the rebate application process?

1. [Record response]
98. Don't Know
99. Refusal

[Base: All respondents]

Q31. Do you have any suggestions on how Duke Energy could improve the project inspection process?

1. [Record response]  
[Do not read:]  
98. Don't Know  
99. Refusal

## Satisfaction

[Preamble:]

Thanks for your feedback so far, next I have some questions about your satisfaction with the program.

[Base: All respondents]

Q32. Please rate the extent to which you are satisfied with the following aspects of the program using a 0 to 10 scale where 0 means "very dissatisfied," 5 means "neither satisfied nor dissatisfied," and 10 means "very satisfied." How satisfied are you with:

|   |   |
|---|---|
| A | Program training offered by Duke Energy           |
| B | Your Duke Energy Trade Ally Representative        |
| C | The program website for customers                 |
| D | The trade ally portal application tracking system |
| E | The marketing of the program                      |
| F | The incentive application submission process      |
| G | The selection of eligible equipment and services  |
| H | The overall program                               |

[Single Response on Each A-H Item]

|     |                                       |
|-----|---------------------------------------|
| 0.  | 0. Very dissatisfied                  |
| 1.  | 1.                                    |
| 2.  | 2                                     |
| 3.  | 3                                     |
| 4.  | 4                                     |
| 5.  | 5. Neither satisfied nor dissatisfied |
| 6.  | 6.                                    |
| 7.  | 7.                                    |
| 8.  | 8.                                    |
| 9.  | 9.                                    |
| 10. | 10. Very satisfied                    |
| 97. | N/A                                   |
| 98. | Don't Know                            |
| 99. | Refused                               |

[BASE: ASK IF Q32 < 5]

**[PROGRAMMER'S NOTE: REPEAT Q33 FOR EACH STATEMENT FROM Q32 WHERE Q32<5]**

Q33. Please explain why you were dissatisfied with **[INSERT STATEMENT FROM Q32 A-H]**:

- 1. [Record response]
- 98. Don't Know
- 99. Refusal

## Closing

[Base: All respondents]

Q34. Thanks so much for your time today. Are there any other comments you would like to provide?

- 1. [Record response]

## C.3 Participant Survey

### Introduction

[READ IF CONTACT NAME IS KNOWN:] Hello, may I speak with \_\_\_\_\_. [READ IF NAME IS UNKNOWN] Hi, my name is \_\_\_\_\_ from Nexant. I'm calling on behalf of Duke Energy. Our records show that you received a rebate for **[LIST ALL MEASURES]** from the Duke Energy Smart \$aver Program.

[INTERVIEWER – IF PERSON ON PHONE IS UNAWARE OF THE REBATED WORK, ASK TO SPEAK WITH SOMEONE IN THE HOME WHO MIGHT RECALL RECEIVING A REBATE FROM DUKE ENERGY.]

IF PERSON ON PHONE SAYS THEY ARE RENTER (AND/OR THEIR LANDLORD OR PROPERTY MANAGER WAS RESPONSIBLE FOR THE PROJECT), ASK FOR LANDLORD/PROPERTY MANAGER'S NAME AND PHONE NUMBER AND USE THAT AS THE NEW POINT OF CONTACT]

Duke Energy would like your feedback about the work that was done to the home/property through the program as well as feedback on your experience with the program. Is now a good time to talk?

[IF NEEDED]: The survey will take about 10 to 15 minutes, depending on the details you have for us.

[IF NEEDED: SCHEDULE A TIME TO CALL THEM TO COMPLETE THE SURVEY]

Please note that this call may be monitored or recorded for quality assurance purposes.

### Building Type Confirmation

[ASK ALL]

Q1. I'm going to read a list of building types. Please stop me when I mention the building type that best describes the residence where this work was done. [READ LIST]

[SINGLE RESPONSE]

1. Single-family detached home [IF NEEDED: NOT A DUPLEX, TOWNHOME, OR APARTMENT; ATTACHED GARAGE IS OK]
2. Factory manufactured single family home
3. Row house or town house
4. Duplex
5. Triplex [IF NEEDED: building with three units]
6. Apartment or condo building with four or more units
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[PROGRAMMER: IF 0=1-2, BUILDING TYPE=SF. IF 0=3-6, BUILDING TYPE=OTHER. IF 0=96-99, USE PRE-CODED BUILDING TYPE FROM LIST]

### Sources of Program Information

[ASK ALL]

Q2. How did you hear about the Duke Energy Smart \$aver **rebate(s)** that you received?  
[RECORD VERBATIM]

[ASK ALL]

Q3. Are you familiar with other energy-efficiency rebates that Duke Energy offers, aside from the **[LIST ALL MEASURES THEY RECEIVED FROM SMART \$SAVER PROGRAM]** rebate(s)?

[SINGLE RESPONSE]

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[ASK IF 0= 1 (Yes)]

Q4. Which other rebates are you familiar with? *[Do not read list]* [PROGRAMMER:  
EXCLUDE THE REBATES THAT THEY RECEIVED FROM THE LIST BELOW]

[MULTIPLE RESPONSE]

- 1. Heat pump water heater rebate
- 2. Heating and cooling system rebate
- 3. Geothermal heat pump rebate
- 4. Smart Wi-Fi enabled thermostat rebate
- 5. Attic Insulation and Air Seal rebate
- 6. Duct sealing and insulation rebate
- 7. In-home energy audit
- 8. Pool pump rebate
- 9. Power Manager bill discounts (for allowing Duke Energy to ramp down air-conditioning during peak usage events)
- 10. Discounted efficient lighting (CFLs, LEDs, and specialty bulbs)
- 11. Other – please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[ASK IF 0= 1 (Yes)]

Q5. Have you received any of these other rebates?

[SINGLE RESPONSE]

- 1. Yes
- 2. No



- 98. Don't know
- 99. Refused

[ASK IF 0= 1 (Yes) AND Q4 <>98 OR 99 AND MORE THAN ONE ITEM SELECTED IN 0; IF ONLY ONE ITEM SELECTED IN 0 (AND Q4 <>98 OR 99) AND 0=1, AUTOCODE 0 RESPONSE FOR 0]

Q6. Which rebate(s) did you receive? *[Do not read list]*

[MULTIPLE RESPONSE]

- 1. Heat pump water heater rebate
- 2. Heating and cooling system rebate
- 3. Geothermal heat pump rebate
- 4. Smart Wi-Fi enabled thermostat rebate
- 5. Attic Insulation and Air Seal rebate
- 6. Duct sealing/insulation rebate
- 7. In-home energy audit
- 8. Pool pump rebate
- 9. Power Manager bill discounts (for allowing Duke Energy to ramp down air-conditioning during peak usage events)
- 10. Discounted efficient lighting (CFLs, LEDs, and specialty bulbs)
- 11. Other – please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

### Program Influence

[ASK IF 0= 1 (Yes)]

Q7. Did you receive the **[Insert rebated measures from 0]** before or after **[PROJECT #1 LIST]** work was done? [REPEAT THIS QUESTION FOR EACH REBATE OPTION SELECTED IN 0]

[SINGLE RESPONSE]

- 1. Before
- 2. After
- 3. Both before and after
- 4. At the same time
- 98. Don't know
- 99. Refused

[ASK IF 0= 2 or 3 ("After" or "Both before and after")]

- Q8. Using a scale from 0 to 10, where 0 means “Not at all influential” and 10 means “Extremely influential,” how influential was the rebate for **[PROJECT #1 LIST]** in your decision to take advantage of Duke Energy’s **[Insert response from 0]**? [REPEAT THIS QUESTION FOR EACH REBATE OPTION SELECTED IN 0 WHERE RESPONSE TO 0=2 (“After”) OR 0=3 (“Both before and after”)]

[SINGLE RESPONSE]

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Feb 25 2020

|     |                           |
|-----|---------------------------|
| 0.  | 0. Not all influential    |
| 1.  | 1.                        |
| 2.  | 2                         |
| 3.  | 3                         |
| 4.  | 4                         |
| 5.  | 5.                        |
| 6.  | 6.                        |
| 7.  | 7.                        |
| 8.  | 8.                        |
| 9.  | 9.                        |
| 10. | 10. Extremely influential |
| 98. | Don't Know                |
| 99. | Refused                   |

[ASK IF RESPONDENT HAS A **PROJECT #2 LIST**]

Q9. Using a scale from 0 to 10, where 0 means “Not at all influential” and 10 means “Extremely influential,” how influential was the rebate for [**PROJECT #1 LIST**] in your decision to take advantage of additional Duke Energy rebates for [**PROJECT #2 LIST**]?

[SINGLE RESPONSE]

|     |                           |
|-----|---------------------------|
| 0.  | 0. Not all influential    |
| 1.  | 1.                        |
| 2.  | 2                         |
| 3.  | 3                         |
| 4.  | 4                         |
| 5.  | 5.                        |
| 6.  | 6.                        |
| 7.  | 7.                        |
| 8.  | 8.                        |
| 9.  | 9.                        |
| 10. | 10. Extremely influential |
| 98. | Don't Know                |
| 99. | Refused                   |

### Motivations

We'd like to know what motivated you to complete the work we've been talking about that was rebated through the Duke Energy Smart \$aver Program.

[ASK IF AIR SOURCE HEAT PUMP, GEOTHERMAL HEAT PUMP, OR CENTRAL AIR CONDITIONER WAS INSTALLED]

Q10. [IF AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP WAS INSTALLED, READ:] Which of the following best describes the condition of the previous HVAC system that you replaced with a **[PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP]**?

[IF CENTRAL AIR CONDITIONER WAS INSTALLED, READ:] Which of the following best describes the condition of the previous air conditioner that you replaced?

[READ – MULTIPLE RESPONSE]

1. It was broken or malfunctioning
2. It was getting old, or
3. It was in good working condition

[Do not read:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

Q11. [ASK IF AIR SOURCE HEAT PUMP, GEOTHERMAL HEAT PUMP, OR CENTRAL AIR CONDITIONER WAS INSTALLED] Approximately, how many years old was the previous HVAC unit that you replaced with your new **[PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP]** [RECORD VERBATIM]

[ASK IF CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP, HEAT PUMP WATER HEATER WAS INSTALLED]

Q12. What motivated you to install an **energy efficient** system rather than a less efficient one that would use more energy? [RECORD VERBATIM]

Q13. [ASK IF CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP WAS INSTALLED] I'd like to know how you selected the specific make and model of the **[PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP]** you purchased. Would you say that you chose it...

[READ LIST; SINGLE RESPONSE]

1. Yourself, based entirely on your own research?
2. From a list of options provided by the contractor?
3. Because it was the only option recommended by your contractor?

[Do not read:]

96. In some other way, please specify: [RECORD OPEN-ENDED RESPONSE]

- 98. Don't know
- 99. Refused

Q14. [ASK IF CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP WAS INSTALLED] Suppose the contractor that installed your **[PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP]** did not offer high efficiency **[PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP]**s that qualify for Duke rebates. Which of the following is most likely what you would have done? [READ RESPONSE OPTIONS, SINGLE RESPONSE]

- 1. You would have installed the cheaper less efficient unit that would not have qualified for rebates if that's all your contractor offered, or
- 2. You would have looked for a contractor that could install a rebate-qualified high efficiency unit

[Do not read:]

- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[ASK IF SMART THERMOSTAT WAS INSTALLED]

Q15. Which of the following best describes the old thermostat that you replaced?

[READ – SINGLE RESPONSE]

- 1. Manual non-programmable thermostat,
- 2. Programmable thermostat that does not communicate with your wi-fi network, or
- 3. Programmable thermostat that communicates with your wi-fi network

[Do not read:]

- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[ASK IF SMART THERMOSTAT WAS INSTALLED]

Q16. Thinking of your old thermostat, at what temperature was that thermostat typically set in the winter?

- 1. Record temperature setting/response here: \_\_\_\_\_
- 98. Don't know
- 99. Refused

[ASK IF SMART THERMOSTAT WAS INSTALLED]

Q17. And what about your new wifi thermostat? At what temperature is the new thermostat typically set in the winter?

1. Record temperature setting/response here: \_\_\_\_\_
98. Don't know
99. Refused

[ASK IF SMART THERMOSTAT WAS INSTALLED]

Q18. If you used your old thermostat to control air conditioning, at what temperature was your old thermostat typically set in the summer for air conditioning?

1. Record temperature setting/response here: \_\_\_\_\_
2. Did not use my old thermostat to control air conditioning
98. Don't know
99. Refused

[ASK IF SMART THERMOSTAT WAS INSTALLED AND Q18<>2]

Q19. And what about your new wifi thermostat? At what temperature is the new thermostat typically set in the summer?

1. Record temperature setting/response here: \_\_\_\_\_
98. Don't know
99. Refused

[ASK IF SMART THERMOSTAT WAS INSTALLED]

Q20. What motivated you to install a wi-fi enabled thermostat? *[RECORD VERBATIM]*

[ASK IF HVAC TIER = 2 OR 3, AND QUALITY INSTALL REBATE WAS RECEIVED]

Q21. Program records show that you received an additional \$60 rebate for a quality installation from your contractor. This additional rebate was included on the VISA gift card you received in the mail from Duke Energy. This rebate was for additional work your contractor did to ensure that your new **[PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP]** was installed to run as efficiently as possible. Prior to today, were you aware that you received a quality installation rebate?

1. Yes
2. No

*[Do not read:]*

98. Don't know
99. Refused

[ASK IF Q21=1]

Q22. Prior to talking with the contractor that installed the **[PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP]**, were you aware of quality installation practices that ensure the **[PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP]** is installed to run as efficiently as possible?

1. Yes – I was already familiar with quality installation practices
2. No – I was not previously familiar with quality installation practices

[Do not read:]

96. Other, please specify: [[OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF Q21=1]

Q23. Did your contractor let you choose between a standard installation service that was not eligible for the additional rebate and a quality installation that would get you an additional rebate from Duke Energy?

1. Yes – they let me choose between standard and quality
2. No – they did not give me a choice

[Do not read:]

96. Other, please specify: [[OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[ASK IF HEAT PUMP WATER HEATER WAS INSTALLED]

Q24. Which of the following best describes the condition of the previous water heater that you replaced?

[READ – MULTIPLE RESPONSE]

1. It was broken or malfunctioning
2. It was getting old, or
3. It was in good working condition

[Do not read:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

Q25. [ASK IF HEAT PUMP WATER HEATER WAS INSTALLED] Approximately, how many years old was the previous water heater that you replaced with your new heat pump water heater? [RECORD VERBATIM]

[ASK IF HEAT PUMP WATER HEATER WAS INSTALLED]

Q26. Where did you install your new heat pump water heater?

1. Garage
2. Basement
3. Closet
4. Laundry room

[Do not read:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[ASK IF HEAT PUMP WATER HEATER WAS INSTALLED and IF Q26<>98 or 99]

Q27. Do you use your HVAC system to heat and cool the [PIPE IN ANSWER FROM Q26] where the heat pump water heater is located?

1. Yes
2. No

[Do not read:]

96. Other, please specify: [[OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

Q28. [ASK IF AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP WAS **NOT** INSTALLED] What type of system do you use to heat your home? [Multiple response allowed]

1. Heat pump
2. Electric baseboard heaters
3. Natural gas furnace
4. Plug in space heaters
5. Cadet wall heaters

[Do not read:]

96. Other, please specify: [[OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[ASK IF CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP WAS **NOT** INSTALLED]



Q29. What type of system do you use to cool your home? [Multiple response allowed]

1. Central air conditioner
2. Heat pump
3. Room/window air conditioner
4. Evaporative/swamp cooler
5. I do not have any air conditioning in my home

[Do not read:]

96. Other, please specify: [[OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[ASK IF HEAT PUMP WATER HEATER WAS INSTALLED]

Q30. What motivated you to install an **energy efficient** water heater rather than a less efficient one that would use more energy? [RECORD VERBATIM]

[ASK IF DUCT SEALING OR INSULATION WAS PERFORMED/INSTALLED]

Q31. What motivated you to [IF DUCT SEALING WAS PERFORMED, READ: repair your ductwork; IF ATTIC INSULATION WAS INSTALLED, READ: add insulation to your attic]? [RECORD VERBATIM]

[ASK IF POOL PUMP WAS INSTALLED]

Q32. What motivated you to install an ENERGY STAR pool pump? [RECORD VERBATIM]

[ASK IF POOL PUMP WAS INSTALLED]

Q33. Approximately what month do you first open your pool for the season?

1. January
2. February
3. March
4. April
5. May
6. June
7. July
8. August
9. September
10. October
11. November
12. December

[Do not read:]

96. Other, please specify: [OPEN-ENDED RESPONSE]

- 98. Don't know
- 99. Refused

[ASK IF POOL PUMP WAS INSTALLED]

Q34. Approximately what month do you close your pool for the season?

- 1. January
- 2. February
- 3. March
- 4. April
- 5. May
- 6. June
- 7. July
- 8. August
- 9. September
- 10. October
- 11. November
- 12. December

[Do not read:]

- 96. Other, please specify: [[OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

### Free-ridership

I'd like to ask a few questions about what you most likely would have done had you not received assistance from Duke Energy for the **[LIST ALL MEASURES]**.

[ASK IF THEY INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP]

Q35. Which of the following statements best describes the actions you would have taken if Duke Energy rebates and information were not available: *[READ LIST]*

[SINGLE RESPONSE]

- 1. Would not have installed the **[PIPE IN WHICHEVER WAS INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP]** and would have just continued using your old system
- 2. Would have postponed the purchase for at least one year
- 3. Would have bought a less expensive or less energy efficient system
- 4. Would have bought the exact same **[PIPE IN WHICHEVER WAS INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP]**, and paid the full cost yourself

[Do not read:]

- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[ASK IF Q35= 3]

Q36. You said you would have bought a/an **[PIPE IN WHICHEVER WAS INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP]** that was less expensive or less energy efficient if you had not received the rebate or information from Duke Energy. Do you think it is more likely that you would have bought equipment that was...?

- 1. Almost as efficient as the one you bought, or
- 2. Significantly less efficient than the one you bought

[Do not read:]

- 98. Don't know
- 99. Refused

[ASK IF Q21=1]

Q37. If Duke Energy did not offer the additional rebate for quality installation services, would you have allowed your contractor to perform a quality installation service that ensured the **[PIPE IN WHICHEVER WAS INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP]** was performing as efficiently as possible, even if it meant you had to pay more money?

[SINGLE RESPONSE]

- 1. Yes – I would have allowed quality installation if no rebates were available
- 2. No – I would not have allowed quality installation if no rebates were available

[Do not read:]

- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[ASK IF Q21=1]

Q38. If Duke Energy did not offer the additional rebate for quality installation services and your contractor did not offer you the service in their initial bid, would you have demanded that your contractor perform a quality installation service that ensured the **[PIPE IN WHICHEVER WAS INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP]** was performing as efficiently as possible, even if it meant you had to pay more money?

[SINGLE RESPONSE]

1. Yes – I would have demanded quality installation if no rebates were available and my contractor did not initially offer it
2. No – I would not have demanded quality installation if no rebates were available and my contractor did not initially offer it

[Do not read:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[ASK IF THEY INSTALLED: SMART THERMOSTAT]

Q39. Now we want to ask you about the smart thermostat you got with your **[PIPE IN WHICHEVER WAS INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP]**. Which of the following statements best describes the actions you would have taken if Duke Energy rebates and information were not available: [READ LIST]

[SINGLE RESPONSE]

1. Would not have purchased the wi-fi enabled thermostat
2. Would have postponed the purchase of the wi-fi thermostat for at least one year
3. Would have installed some other type of thermostat, or
4. Would have bought the exact same wi-fi thermostat, and paid the full cost yourself

[Do not read:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[ASK IF Q39=3]

Q40. What type of thermostat would you have bought then? Would you have bought...  
[READ]

1. A manual non-programmable thermostat, or
2. A programmable thermostat that is not wi-fi enabled

[Do not read:]

- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[ASK IF THEY INSTALLED: HEAT PUMP WATER HEATER]

Q41. Which of the following statements best describes the actions you would have taken if Duke Energy rebates and information were not available: [READ LIST]

[SINGLE RESPONSE]

- 1. Would not have replaced my water heater
- 2. Would have postponed the water heater replacement for at least one year
- 3. Would have bought a less expensive or less energy efficient water heater, or
- 4. Would have bought the exact same high efficiency Heat Pump Water Heater, and paid the full cost yourself

[Do not read:]

- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[ASK IF Q41=3]

Q42. You said you would have bought a water heater that was less expensive or less energy efficient if you had not received the rebate or information from Duke Energy. Do you think it is more likely that you would have bought equipment that was...?

- 1. Almost as efficient as the one you bought, or
- 2. Significantly less efficient than the one you bought

[Do not read:]

- 98. Don't know
- 99. Refused

[ASK IF THEY UPGRADED: ATTIC INSULATION]

Q43. Which of the following statements best describes the actions you would have taken if Duke Energy rebates and information were not available: [READ LIST]

[SINGLE RESPONSE]

- 1. Would not have done the attic insulation
- 2. Put off doing attic insulation for at least one year
- 3. Would have added less insulation
- 4. Would have done the exact same upgrade, and paid the full cost yourself

[Do not read:]

- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[ASK IF Q43=3]

Q44. You said you would have added less insulation if you had not received the rebate or information from Duke Energy. How much less insulation would you have purchased? Please answer in a percentage, such as "50% less."

- 1. [RECORD VERBATIM:] \_\_\_\_\_
- 98. Don't know
- 99. Refused

[ASK IF THEY DID DUCT SEALING]

Q45. Which of the following statements best describes the actions you would have taken if Duke Energy rebates and information were not available: [READ LIST]

[SINGLE RESPONSE]

- 1. Would not have had ducts sealed, insulated, or repaired
- 2. Would have postponed the work for at least one year
- 3. Would have had the exact same work done, and paid the full cost yourself

[Do not read:]

- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[ASK IF THEY INSTALLED A VARIABLE SPEED POOL PUMP]

Q46. Which of the following statements best describes the actions you would have taken if Duke Energy rebates and information were not available: [READ LIST]

[SINGLE RESPONSE]

- 1. Would not have installed or replaced the pool pump
- 2. Would have postponed the installation of the pool pump for at least one year
- 3. Would have bought a less expensive or less energy efficient pool pump, or
- 4. Would have had the exact same high efficiency pool pump installed, and paid the full cost yourself

[Do not read:]

- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

[ASK ALL]

Q47. Using a scale from 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential” how influential were the following factors on your decision to purchase the [MEASURE]? *How influential was...*

[INTERVIEWER NOTE: IF RESPONDENT SAYS ‘NOT APPLICABLE; I DIDN’T GET/USE THAT,’ THEN FOLLOW UP WITH: “So would you say it was “not at all influential?” AND PROBE TO CODE] [MATRIX QUESTION: SCALE]

| Elements   | 0 –<br>Not at all<br>influential | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 –<br>Extremely<br>influential | 98<br>DK | 99<br>RF |
|--|----------------------------------|---|---|---|---|---|---|---|---|---|----------------------------------|----------|----------|
| The rebate you received  |                                  |   |   |   |   |   |   |   |   |   |                                  |          |          |
| Information or advertisements from Duke Energy, including their website  |                                  |   |   |   |   |   |   |   |   |   |                                  |          |          |
| Recommendation from your contractor  |                                  |   |   |   |   |   |   |   |   |   |                                  |          |          |
| Did anything else influence you? If so, please specify:<br>_____[INTERVIEWER: PROBE IF<br>UNCLEAR. RECORD VERBATIM RESPONSE] |                                  |   |   |   |   |   |   |   |   |   |                                  |          |          |

[PROGRAMMER: REPEAT Q47 FOR EACH MEASURE IN MEASURE LIST. WHEN REPEATING, CALLERS CAN USE ABBREVIATED LANGUAGE (E.G.: “AND FOR THE INSULATION, HOW INFLUENTIAL WAS...”)]

### Spillover

Q48. Since receiving your rebate from Duke Energy for the [LIST ALL SMART \$AVER MEASURES], have you purchased any other products or services to help save energy in your home?

1. Yes
2. No
98. Don't know

[If Q48= 1]

Q49. What **products** have you purchased and installed to help save energy in your home?

[Do not read list. After each response, ask, “Anything else?”] [MULTIPLE RESPONSE]

1. Bought energy efficient appliances
2. Moved into an ENERGY STAR home [VERIFY: “Is Duke Energy still your gas or electricity utility?” Yes/No]
3. Bought efficient heating or cooling equipment
4. Bought efficient windows

5. Added insulation
6. Sealed air leaks in windows, walls, or doors
7. Sealed or insulated ducts
8. Bought LEDs
9. Bought CFLs
10. Installed an energy efficient water heater
11. None – no other actions taken [EXCLUSIVE ANSWER]
96. Other, please specify: \_\_\_\_\_
98. Don't know [EXCLUSIVE ANSWER]

[ASK IF Q49<>11, 98, OR 99]

Q50. Did you get a rebate from Duke Energy for any of those products or services? If so, which ones? [MULTIPLE RESPONSE]

|   |
|---|
| [LOGIC] Item  |
| [IF Q49.1 IS SELECTED] 1. Bought energy efficient appliances            |
| [IF Q49.2 IS SELECTED] 2. Moved into an ENERGY STAR home                |
| [IF Q49.3 IS SELECTED] 3. Bought efficient heating or cooling equipment |
| [IF Q49.4 IS SELECTED] 4. Bought efficient windows                      |
| [IF Q49.5 IS SELECTED] 5. Bought additional insulation                  |
| [IF Q49.6 IS SELECTED] 6. Sealed air leaks in windows, walls, or doors  |
| [IF Q49.7 IS SELECTED] 7. Sealed or insulated ducts                     |
| [IF Q49.8 IS SELECTED] 8. Bought LEDs                                   |
| [IF Q49.9 IS SELECTED] 9. Bought CFLs                                   |
| [IF Q49.10 IS SELECTED] 10. Installed an energy efficient water heater  |
| [IF Q49.96 IS SELECTED] [Q49 open ended response]                       |
| I did not get any Duke rebates [EXCLUSIVE ANSWER]                       |
| Don't know [EXCLUSIVE ANSWER]   |

[ASK IF ANY ITEM IN Q49 WAS SELECTED]

Q51. On a scale of 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential”, how much influence did the [LIST ALL SMART \$AVER MEASURES] rebate have on your decision to...

[MATRIX QUESTION: SCALE]



| [LOGIC] Item   | Response           |
|--|--------------------|
| [IF Q49.1 IS SELECTED] 1. Buy energy efficient appliances            | 0-10 scale with DK |
| [IF Q49.2 IS SELECTED] 2. Move into an ENERGY STAR home              | 0-10 scale with DK |
| [IF Q49.3 IS SELECTED] 3. Buy efficient heating or cooling equipment | 0-10 scale with DK |
| [IF Q49.4 IS SELECTED] 4. Buy efficient windows                      | 0-10 scale with DK |
| [IF Q49.5 IS SELECTED] 5. Buy additional insulation                  | 0-10 scale with DK |
| [IF Q49.6 IS SELECTED] 6. Seal air leaks in windows, walls, or doors | 0-10 scale with DK |
| [IF Q49.7 IS SELECTED] 7. Seal or insulate ducts                     | 0-10 scale with DK |
| [IF Q49.8 IS SELECTED] 8. Buy LEDs                                   | 0-10 scale with DK |
| [IF Q49.9 IS SELECTED] 9. Buy CFLs                                   | 0-10 scale with DK |
| [IF Q49.10 IS SELECTED] 10. Install an energy efficient water heater | 0-10 scale with DK |
| [IF Q49.96 IS SELECTED] <b>[Q49 open ended response]</b>             | 0-10 scale with DK |

[ASK IF Q49.1 IS SELECTED AND Q51.1 <> 0]

Q52. What kinds of appliance(s) did you buy?

[Do not read list] [MULTIPLE RESPONSE]

1. Refrigerator
2. Stand-alone Freezer
3. Dishwasher
4. Clothes washer
5. Clothes dryer
6. Oven
7. Microwave
96. Other, please specify: \_\_\_\_\_
98. Don't know
99. Refused

[ASK IF Q52 = 1-96]

Q53. Was the [INSERT Q52 RESPONSE] an ENERGY STAR or high-efficiency model?

[SINGLE RESPONSE]

1. Yes
2. No
98. Don't know
99. Refused

[REPEAT THIS QUESTION FOR EACH ITEM MENTIONED IN Q52]

[ASK IF Q52 = 5]

Q54. Does the new clothes dryer use natural gas?

1. Yes - it uses natural gas
2. No – does not use natural gas
98. Don't know
99. Refused

[ASK IF Q49.3 IS SELECTED AND Q51.3 > 0]

Q55. What type of heating or cooling equipment did you buy?

[Do not read list] [MULTIPLE RESPONSE]

1. Central air conditioner
2. Window/room air conditioner unit
3. Wall air conditioner unit
4. Air source heat pump
5. Geothermal heat pump
6. Boiler
7. Furnace
8. Wifi-enabled thermostat
96. Other, please specify: \_\_\_\_\_
98. Don't know
99. Refused

[ASK IF Q55= 6-7]

Q56. Does the new [INSERT Q55 RESPONSE] use natural gas?

1. Yes - it uses natural gas
2. No – does not use natural gas
98. Don't know
99. Refused

[ASK IF Q55= 1-7, 96]

Q57. Was the [INSERT Q55 RESPONSE] an ENERGY STAR or high-efficiency model?

[SINGLE RESPONSE]

1. Yes
2. No

APPENDIX C

SURVEY INSTRUMENTS

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- 98. Don't know
- 99. Refused

[REPEAT THIS QUESTION FOR EACH ITEM MENTIONED IN Q55, EXCLUDING wifi-enabled thermostat]

[ASK IF Q49.4 IS SELECTED AND Q51.4 > 0]

Q58. How many windows did you install?

- 1. [RECORD VERBATIM \_\_\_\_\_]
- 98. Don't know
- 99. Refused

[ASK IF Q49.5 IS SELECTED AND Q51.5 > 0]

Q59. Did you add insulation to your attic, walls, or below the floor?

[Do not read list] [MULTIPLE RESPONSE]

- 1. Attic
- 2. Walls
- 3. Below the floor
- 98. Don't know
- 99. Refused

[ASK IF Q59<>98-99]

[PROGRAMMER: REPEAT Q60 FOR EACH ITEM MENTIONED IN Q59]

Q60. Approximately what proportion of the [ITEM MENTIONED IN Q59] space did you add insulation?

- 1. [RECORD VERBATIM AS % - INPUT MID-POINT IF RANGE IS OFFERED:]  
\_\_\_\_\_ [IF NEEDED: *Your best estimate is fine*]
- 2. Don't know
- 99. Refused

[ASK IF Q49.8 IS SELECTED AND Q51.8 > 0]

Q61. How many of LEDs did you install in your property?

- 1. [RECORD VERBATIM:] \_\_\_\_\_ [IF NEEDED: *Your best estimate is fine*]
- 2. Don't know
- 99. Refused

[ASK IF Q49.9 IS SELECTED AND Q51.9 > 0]

Q62. How many of CFLs did you install in your property?

1. [RECORD VERBATIM:] \_\_\_\_\_ [IF NEEDED: *Your best estimate is fine*]
2. Don't know
99. Refused

[ASK IF Q49.10 IS SELECTED AND Q51.10 > 0]

Q63. Does the new water heater use natural gas?

1. Yes - it uses natural gas
2. No – does not use natural gas
98. Don't know
99. Refused

[ASK IF Q49.10 IS SELECTED AND Q51.10 > 0]

Q64. Which of the following water heaters did you purchase? [*read list*]

1. A traditional water heater with a large tank that holds the hot water
2. A tankless water heater that provides hot water on demand
3. A solar water heater
4. Other, please specify: \_\_\_\_\_
98. Don't know
99. Refused

[ASK IF Q49.10 IS SELECTED AND Q51.10 > 0]

Q65. Is the new water heater an ENERGY STAR model?

[SINGLE RESPONSE]

1. Yes
2. No
98. Don't know
99. Refused

### How They Search for EE Information

[ASK ALL]

Q66. Where do you typically search for information on how to save energy in your property?

[*Do not read list*] [MULTIPLE RESPONSE]

1. Online – read reviews about products
2. Go to utility website

3. Read my utility information – it has tips on how to save energy
4. Go to the store and talk to salespeople
5. Look for ENERGY STAR logo on products
96. Other, please specify: [OPEN-ENDED RESPONSE]
97. Not applicable – I don't typically search for information on how to save energy in my home/property
98. Don't know
99. Refused

### Program Satisfaction and Challenges

The next few questions are about your satisfaction with the program.

[ASK ALL]

- Q67. Using a 0 to 10 scale where 0 means “very dissatisfied,” 5 means “neither satisfied nor dissatisfied,” and 10 means “very satisfied,” how satisfied were you with the rebate amount for [**LAST PROJECT**]? [SINGLE RESPONSE]

|     |                                       |
|-----|---------------------------------------|
| 0.  | 0. Very dissatisfied.                 |
| 1.  | 1.                                    |
| 2.  | 2                                     |
| 3.  | 3                                     |
| 4.  | 4                                     |
| 5.  | 5. Neither satisfied nor dissatisfied |
| 6.  | 6.                                    |
| 7.  | 7.                                    |
| 8.  | 8.                                    |
| 9.  | 9.                                    |
| 10. | 10. Very satisfied                    |
| 97. | N/A                                   |
| 98. | Don't Know                            |
| 99. | Refused                               |

[ASK ALL]

- Q68. How satisfied were you with how long it took to receive that rebate? Please use a 0 to 10 scale where 0 means “very dissatisfied,” 5 means “neither satisfied nor dissatisfied,” and 10 means “very satisfied.” [SINGLE RESPONSE]

|     |                                       |
|-----|---------------------------------------|
| 0.  | 0. Very dissatisfied.                 |
| 1.  | 1.                                    |
| 2.  | 2                                     |
| 3.  | 3                                     |
| 4.  | 4                                     |
| 5.  | 5. Neither satisfied nor dissatisfied |
| 6.  | 6.                                    |
| 7.  | 7.                                    |
| 8.  | 8.                                    |
| 9.  | 9.                                    |
| 10. | 10. Very satisfied                    |
| 97. | N/A                                   |
| 98. | Don't Know                            |
| 99. | Refused                               |

[ASK IF Q68<5 (Somewhat to Very Dissatisfied)]

Q69. Why did you give that rating? \_\_\_\_\_ [RECORD VERBATIM]

[ASK ALL]

Q70. In the course of participating in the Duke Smart \$aver program, how often did you contact Duke Energy or program staff with questions?

[Do not read list] [SINGLE RESPONSE]

- 1. Never
- 2. Once
- 3. 2 or 3 times
- 4. 4 times or more
- 98. Don't know
- 99. Refused

[ASK IF Q70 = 2-4]

Q71. How did you contact them?

[Do not read list] [MULTIPLE RESPONSE]

- 1. Phone
- 2. Email
- 3. Fax
- 4. Letter
- 5. In person

- 98. Don't know
- 99. Refused

[ASK IF Q70 =2-4]

Q72. Using that same scale, how satisfied were you with these communications?

*[INTERVIEWER NOTE: REPEAT SCALE IF NECESSARY: Please use a 0 to 10 scale where 0 means "very dissatisfied," 5 means "neither satisfied nor dissatisfied," and 10 means "very satisfied."]*

[SINGLE RESPONSE]

|     |                                       |
|-----|---------------------------------------|
| 0.  | 0. Very dissatisfied.                 |
| 1.  | 1.                                    |
| 2.  | 2                                     |
| 3.  | 3                                     |
| 4.  | 4                                     |
| 5.  | 5. Neither satisfied nor dissatisfied |
| 6.  | 6.                                    |
| 7.  | 7.                                    |
| 8.  | 8.                                    |
| 9.  | 9.                                    |
| 10. | 10. Very satisfied                    |
| 97. | N/A                                   |
| 98. | Don't Know                            |
| 99. | Refused                               |

[ASK IF Q72<5 (Somewhat to Very Dissatisfied)]

Q73. Why did you give that rating? \_\_\_\_\_ [RECORD VERBATIM]

[ASK ALL]

Q74. Have you noticed any savings on your electric bill since the [LAST PROJECT] project?

[SINGLE RESPONSE]

- 1. Yes, they noticed savings
- 2. No - They looked but **did not** notice any savings
- 3. No - They looked but it is too soon to tell
- 4. They didn't look
- 98. Don't know
- 99. Refused

[ASK IF Q74= Yes (if noticed savings)]

Q74\_B. How satisfied are you with any savings you noticed on your electric bill since the [**LAST PROJECT**] project? *[INTERVIEWER NOTE: REPEAT SCALE IF NECESSARY: Please use a 0 to 10 scale where 0 means “very dissatisfied,” 5 means “neither satisfied nor dissatisfied,” and 10 means “very satisfied.”]*

[SINGLE RESPONSE]

|     |                                       |
|-----|---------------------------------------|
| 0.  | 0. Very dissatisfied.                 |
| 1.  | 1.                                    |
| 2.  | 2                                     |
| 3.  | 3                                     |
| 4.  | 4                                     |
| 5.  | 5. Neither satisfied nor dissatisfied |
| 6.  | 6.                                    |
| 7.  | 7.                                    |
| 8.  | 8.                                    |
| 9.  | 9.                                    |
| 10. | 10. Very satisfied                    |
| 97. | N/A                                   |
| 98. | Don't Know                            |
| 99. | Refused                               |

[ASK ALL]

Q75. How satisfied are you with your [**LAST PROJECT**] project? *[INTERVIEWER NOTE: REPEAT SCALE IF NECESSARY: Please use a 0 to 10 scale where 0 means “very dissatisfied,” 5 means “neither satisfied nor dissatisfied,” and 10 means “very satisfied.”]*  
*[INTERVIEWER NOTE: IF RESPONDENT SAYS ‘TOO SOON TO TELL,’ THEN FOLLOW UP WITH: “So would you say you are “Neither satisfied nor dissatisfied?” or you just don’t know yet AND PROBE TO CODE]*

[SINGLE RESPONSE]



|     |                                       |
|-----|---------------------------------------|
| 0.  | 0. Very dissatisfied.                 |
| 1.  | 1.                                    |
| 2.  | 2                                     |
| 3.  | 3                                     |
| 4.  | 4                                     |
| 5.  | 5. Neither satisfied nor dissatisfied |
| 6.  | 6.                                    |
| 7.  | 7.                                    |
| 8.  | 8.                                    |
| 9.  | 9.                                    |
| 10. | 10. Very satisfied                    |
| 97. | N/A                                   |
| 98. | Don't Know                            |
| 99. | Refused                               |

[ASK IF Q75<5 (Somewhat to Very Dissatisfied)]

Q76. Why did you give that rating?

- 1. [RECORD VERBATIM] \_\_\_\_\_
- 98. Don't know
- 99. Refused

[ASK ALL]

Q77. How satisfied are you with the interaction with the contractors who worked on the [LAST PROJECT] project? [INTERVIEWER NOTE: REPEAT SCALE IF NECESSARY: Please use a 0 to 10 scale where 0 means "very dissatisfied," 5 means "neither satisfied nor dissatisfied," and 10 means "very satisfied."]

[SINGLE RESPONSE]

|     |                                       |
|-----|---------------------------------------|
| 0.  | 0. Very dissatisfied.                 |
| 1.  | 1.                                    |
| 2.  | 2                                     |
| 3.  | 3                                     |
| 4.  | 4                                     |
| 5.  | 5. Neither satisfied nor dissatisfied |
| 6.  | 6.                                    |
| 7.  | 7.                                    |
| 8.  | 8.                                    |
| 9.  | 9.                                    |
| 10. | 10. Very satisfied                    |
| 97. | N/A                                   |
| 98. | Don't Know                            |
| 99. | Refused                               |

[ASK IF Q77 < 5 (Somewhat to Very Dissatisfied)]

Q78. Why did you give that rating?

- 1. [RECORD VERBATIM] \_\_\_\_\_
- 98. Don't know
- 99. Refused

Q79. How satisfied you are with Duke Energy's overall performance as your electricity supplier? [INTERVIEWER NOTE: REPEAT SCALE IF NECESSARY: Please use a 0 to 10 scale where 0 means "very dissatisfied," 5 means "neither satisfied nor dissatisfied," and 10 means "very satisfied."]

[SINGLE RESPONSE]

|     |                                       |
|-----|---------------------------------------|
| 0.  | 0. Very dissatisfied.                 |
| 1.  | 1.                                    |
| 2.  | 2                                     |
| 3.  | 3                                     |
| 4.  | 4                                     |
| 5.  | 5. Neither satisfied nor dissatisfied |
| 6.  | 6.                                    |
| 7.  | 7.                                    |
| 8.  | 8.                                    |
| 9.  | 9.                                    |
| 10. | 10. Very satisfied                    |
| 97. | N/A                                   |
| 98. | Don't Know                            |
| 99. | Refused                               |

Q80. Would you say that your participation in Duke Energy Smart \$aver Rebate Program has had a positive effect, a negative effect, or no effect on your overall satisfaction with Duke Energy?

- 1. Negative effect
- 2. No effect
- 3. Positive effect
- 98. Don't know
- 99. Refused

[ASK ALL]

Q81. Finally, if you were rating your overall satisfaction with the Duke Energy Smart \$aver Rebate Program, would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied? [SINGLE RESPONSE]

- 1. Very satisfied
- 2. Somewhat satisfied
- 3. Neither satisfied nor dissatisfied
- 4. Somewhat dissatisfied
- 5. Very dissatisfied
- 98. Don't Know
- 99. Refused

[ASK IF Q81 = 4 or 5]

Q82. Why do you give that rating? \_\_\_\_\_

[ASK ALL]

Q83. Do you have any suggestions to improve Duke Energy's Smart \$aver Program?

1. [YES, *RECORD VERBATIM*] \_\_\_\_\_
2. No
98. Don't know
99. Refused

### Demographics/Property Characteristics

Finally, I just need to ask you some questions about the residence where the rebated work was done.

[ASK ALL]

Q84. Do you live at this residence where the work was performed?

1. Yes
2. No
99. Refused

[ASK IF Q84=2]

Q85. Are you a property manager or an owner of the residence where the work was performed?

1. Owner
2. Property manager
96. Other, please specify: [OPEN-ENDED RESPONSE]
99. Refused

[ASK IF Q84=1]

Q86. Do you own or rent this residence?

[SINGLE RESPONSE]

1. Own
2. Rent
98. Don't know
99. Refused

[ASK IF Q86=Rent]

Q87. Do you pay your own electric bill or is it included in your rent? [*DO NOT READ*]

[SINGLE RESPONSE]

- 1. Pay own bill
- 2. Included in rent
- 98. Don't know
- 99. Refused

[ASK ALL]

Q88. Approximately when was this residence first built? [*DO NOT READ*]

[SINGLE RESPONSE]

- 1. Before 1960
- 2. 1960-1969
- 3. 1970-1979
- 4. 1980-1989
- 5. 1990-1999
- 6. 2000-2005
- 7. 2006-2010
- 8. 2011-2015
- 9. 2016
- 98. Don't know
- 99. Refused

[ASK ALL]

Q89. Excluding unfinished basements, how many square feet is the residence?

- 1. NUMERICAL OPEN END [RANGE 0-99,999] \_\_\_\_\_
- 98. Don't know
- 99. Refused

[ASK IF Q89=Don't Know or Refused]

Q90. Would you estimate the residence is about: [*READ LIST*]

[SINGLE RESPONSE]

- 1. less than 1,000 sqft
- 2. 1,001-2,000 sqft
- 3. 2,001-3,000 sqft
- 4. 3,001-4,000 sqft
- 5. 4,001-5,000 sqft
- 6. Greater than 5,000 sqft
- 98. Don't know

99. Refused

[ASK ALL]

Q91. Does the primary heating system at the residence run on... [READ]

[SINGLE RESPONSE]

1. Electricity
2. Natural Gas (not propane)
3. Liquid propane gas
4. Fuel Oil
5. Wood
6. Or something else, please specify: [OPEN-ENDED RESPONSE]

[Do not read list:]

98. Don't know
99. Refused

[ASK ALL]

Q92. I'm going to read a list of income ranges. Please stop me when I reach the range that includes your annual household income. [READ LIST]

[SINGLE RESPONSE]

1. Less than \$25,000
2. \$25,000 to less than \$50,000
3. \$50,000 to less than \$75,000
4. \$75,000 to less than \$100,000
5. \$100,000 to less than \$150,000
6. \$150,000 or more
98. Don't know
99. Refused

That is all of the questions I have for you today. Thank you very much for your time

## Appendix D Participant Survey Results

This section reports the results from each question in the participant survey. Since the results reported in this appendix represent the “raw” data (that is, none of the open-ended responses have been coded and none of the scale questions have been binned), some values may be different from those reported in the Process Evaluation Findings chapter (particularly: percentages in tables with Other categories and scale response questions). Only respondents who completed the survey are included in the following results.

Q1. I’m going to read a list of building types. Please stop me when I mention the building type that best describes the residence where this work was done.

| Response Option                                     | Percent (n=73) |
|---|----------------|
| Single-family detached home                         | 89%            |
| Factory manufactured single family home             | 3%             |
| Row house or town house                             | 5%             |
| Duplex  | 1%             |
| Triplex   | 0%             |
| Apartment or condo building with four or more units | 1%             |
| Other   | 0%             |
| Don't know  | 0%             |
| Refused   | 0%             |

Q2. How did you hear about the Duke Energy Smart \$aver rebate(s) that you received?

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| Response Option  | Count (n=73) |
|--|--------------|
| Airworks told us about it when they came out.  | 1            |
| Company that did hvac system did everything through Duke Energy for us.  | 1            |
| Company that installed the unit.   | 1            |
| conbtractor  | 1            |
| contractor   | 1            |
| contratcor   | 4            |
| Doesn't remember anything about the rebate.  | 1            |
| Don't remember.  | 1            |
| From let see aimes receiving and plumping put it in.   | 1            |
| From my neighbor.  | 1            |
| From my vendor, the people the air conditioning folks.   | 1            |
| From the air conditioner installers.   | 1            |
| from the contractor  | 1            |
| from the installer   | 1            |
| From the installer.  | 1            |
| From the people that installed the air conditioning.   | 1            |
| from the pool installer  | 1            |
| from thje contractor   | 1            |
| Guy that puts the heat and air in the units, told us about it.   | 1            |
| hvac installer   | 1            |
| I believe I read it on the internet when I was researching pool pumps.   | 1            |
| I Don't know, unless it was applied for by the person who put it in.   | 1            |
| I don't remember that.   | 1            |
| I got an energy efficient heat pump and they called me about it.   | 1            |
| I got one for my AC and one for my pump.   | 1            |
| I picked it up from a mailer. The contractor I used was recommended by Duke.   | 1            |
| I think it was the sales person who told us when he was writing up the contract for the new AC.                                  | 1            |
| I think the Guy that installed our HVAC  | 1            |
| I was in need in repair and they were going to stop making the freon. The guy that came for the repair told me about the rebate. | 1            |
| In the duke energy bill and the contractor that did the work.  | 1            |
| insert in the statement  | 1            |
| It was actually through the person that installed the equipment.   | 1            |
| It was through my AC guy. He's the one who mentioned it and did it.  | 1            |
| mailer   | 1            |
| on the internet  | 1            |



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| Response Option   | Count (n=73) |
|---|--------------|
| on the my energy alert  | 1            |
| One: Online from Duke Energy Website because I moved from FL and got a rebate from that utility company |              |
| Two: The contractor that I got the AC unit through mentioned it.  | 1            |
| Read about it online. Also, the people that installed it said we would get a rebate.                    | 1            |
| Repairman from All Seasons told us about it.  | 1            |
| the company   | 1            |
| the contractor  | 1            |
| The Contractor  | 1            |
| The contractor told me.   | 1            |
| The guy that put the heat in, the brotham brothers.   | 1            |
| The people that put the AC in   | 1            |
| the person who installed the HVAC   | 1            |
| The website, the Duke Energy Website.   | 2            |
| Through a vendor at our job.  | 1            |
| Through our installer, hvac company.  | 1            |
| Through the company that installed the air conditioner  | 1            |
| Through the company that installed the unit.  | 1            |
| through the contractor  | 1            |
| Through the contractor  | 1            |
| Through the contractor that did the work  | 1            |
| Through the heating and air company.  | 1            |
| through the HVAC company  | 1            |
| Through the installers. The sales people.   | 1            |
| Through the patterson, company that installed the air conditioning for the heat pump.                   | 1            |
| through the representative that did the install   | 1            |
| through the vendor  | 1            |
| through the contractor  | 1            |
| unknown   | 1            |
| We found out about it from the Heating and AC contractor  | 1            |
| website   | 1            |
| went online   | 1            |

Q3. Are you familiar with other energy-efficiency rebates that Duke Energy offers, aside from the [LIST ALL MEASURES THEY RECEIVED FROM SMART \$AVER PROGRAM] rebate(s)?

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| Response Option | Percent (n=73) |
|-----------------|----------------|
| Yes             | 30%            |
| No              | 70%            |
| Don't know      | 0%             |
| Refused         | 0%             |

Q4. [If Q3=YES] Which other rebates are you familiar with?

| Response Option  | Percent (n=22)* |
|--|-----------------|
| Heat pump water heater rebate  | 9%              |
| Heating and cooling system rebate  | 14%             |
| Geothermal heat pump rebate  | 14%             |
| Smart Wi-Fi enabled thermostat rebate  | 5%              |
| Attic insulation and air seal rebate   | 5%              |
| Duct sealing/insulation rebate   | 5%              |
| In-home energy audit   | 9%              |
| Pool pump rebate   | 9%              |
| Power Manager bill discounts (for allowing Duke Energy to ramp down air conditioning during peak usage events) | 5%              |
| Discounted efficient lighting (CFLs, LEDs, and specialty bulbs)  | 36%             |
| Other  | 9%              |
| Don't know   | 5%              |
| Refused  | 0%              |

\* Multiple responses allowed.

| Verbatim Other Response   | Count (n=3) |
|---------------------------|-------------|
| Solar Power               | 1           |
| Washers, things like that | 1           |

Q5. [If Q3=YES] Have you received any of these other rebates?

| Response Option | Percent (n=22) |
|-----------------|----------------|
| Yes             | 36%            |
| No              | 59%            |
| Don't know      | 5%             |
| Refused         | 0%             |

Q6. [If Q5=YES and Q4&lt;&gt;DON'T KNOW OR REFUSED] Which rebate(s) did you receive?

| Response Option | Percent (n=9) |
|-----------------|---------------|
|-----------------|---------------|

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| Response Option | Percent (n=?) |
|-----------------|---------------|
| Not asked*      | 100%          |

\* Due to a programming error, this question was not asked.

- Q7. [If Q5=YES] Did you receive the [INSERT REBATED MEASURES FROM Q6] before or after [PROJECT #1 LIST] work was done? [REPEAT THIS QUESTION FOR EACH REBATE OPTION SELECTED IN Q6]

| Response Option | Percent (n=?) |
|-----------------|---------------|
| Not asked*      | 100%          |

\* Due to a programming error, this question was not asked.

- Q8. [IF Q7=AFTER OR Q7=BOTH BEFORE AND AFTER] Using a scale from 0 to 10, where 0 means "Not at all influential" and 10 means "Extremely influential," how influential was the rebate for [PROJECT #1 LIST] in your decision to take advantage of Duke Energy's [INSERT RESPONSE FROM Q6]? [REPEAT THIS QUESTION FOR EACH REBATE OPTION SELECTED IN Q6 WHERE RESPONSE TO Q7=AFTER OR Q7=BOTH BEFORE AND AFTER]

| Response Option | Percent (n=?) |
|-----------------|---------------|
| Not asked*      | 100%          |

\* Due to a programming error, this question was not asked.

- Q9. [ASK IF RESPONDENT HAS A PROJECT #2 LIST] Using a scale from 0 to 10, where 0 means "Not at all influential" and 10 means "Extremely influential," how influential was the rebate for [PROJECT#1 LIST] in your decision to take advantage of additional Duke Energy rebates for [PROJECT#2 LIST]?

| Response Option | Percent (n=73) |
|-----------------|----------------|
| Not asked*      | 100%           |

\* No respondents met display logic condition.

- Q10. [ASK IF AIR SOURCE HEAT PUMP, GEOTHERMAL HEAT PUMP, OR CENTRAL AIR CONDITIONER WAS INSTALLED]

Which of the following best describes the condition of the previous HVAC system that you replaced with a [PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP]?

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| Response Option                  | Percent (n=30)* |
|----------------------------------|-----------------|
| It was broken or malfunctioning  | 70%             |
| It was getting old, or           | 43%             |
| It was in good working condition | 7%              |
| Other                            | 7%              |
| Don't know                       | 0%              |
| Refused                          | 0%              |

\* Multiple responses allowed.

| Verbatim Other Response                      | Count (n=2) |
|--|-------------|
| It was a space heater that it was replacing. | 1           |
| It was undersized for the house.             | 1           |

[IF CENTRAL AIR CONDITIONER WAS INSTALLED] Which of the following best describes the condition of the previous air conditioner that you replaced?

| Response Option                  | Percent (n=33)* |
|----------------------------------|-----------------|
| It was broken or malfunctioning  | 42%             |
| It was getting old, or           | 76%             |
| It was in good working condition | 0%              |
| Other                            | 0%              |
| Don't know                       | 0%              |
| Refused                          | 0%              |

\* Multiple responses allowed.

Q11. [ASK IF AIR SOURCE HEAT PUMP, GEOTHERMAL HEAT PUMP, OR CENTRAL AIR CONDITIONER WAS INSTALLED] Approximately, how many years old was the previous HVAC unit that you replaced with your new [PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP]?

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| Verbatim Response                    | Count (n=63) |
|--------------------------------------|--------------|
| 10                                   | 5            |
| 10 year old                          | 1            |
| 10 years                             | 1            |
| 10 years roughly                     | 1            |
| 11                                   | 1            |
| 12                                   | 1            |
| 12 years old                         | 1            |
| 13                                   | 4            |
| 14                                   | 1            |
| 15                                   | 5            |
| 16                                   | 1            |
| 16 years old                         | 1            |
| 17                                   | 2            |
| 17 or 18 years old                   | 1            |
| 17+ years old.                       | 1            |
| 18                                   | 5            |
| 18 years old                         | 1            |
| 20                                   | 7            |
| 20 years old                         | 1            |
| 20 years old.                        | 1            |
| 21 or 22                             | 1            |
| 23                                   | 2            |
| 24                                   | 1            |
| 25                                   | 1            |
| 26                                   | 1            |
| 29                                   | 1            |
| 30                                   | 1            |
| 30 years old and still working fine. | 1            |
| 4                                    | 1            |
| 5                                    | 1            |
| 8                                    | 2            |
| 9.5                                  | 1            |
| approx 15 years                      | 1            |
| approximately 20                     | 1            |
| Doesn't know                         | 1            |
| it was 2002 or 2003                  | 1            |
| probably 18 or 19                    | 1            |

| Verbatim Response | Count (n=63) |
|-------------------|--------------|
| probably 7        | 1            |
| unknown           | 1            |

- Q12. [ASK IF CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP WAS INSTALLED] What motivated you to install an energy efficient system rather than a less efficient one that would use more energy?

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| Verbatim Response  | Count (n=63) |
|--|--------------|
| Always looking for the best energy-efficiency regardless of what it is.  | 1            |
| Because it was old.  | 1            |
| Because of all the dang money we were spending on electricity. We were tired of paying so much on our energy bill.                 | 1            |
| Because the one I had was propane and propane is expensive.  | 1            |
| Because what they offered. It was able to do what we need it to do.  | 1            |
| cost   | 1            |
| Cost   | 3            |
| cost and better for the environment  | 1            |
| cost and efficiency made sense   | 1            |
| Cost savings   | 1            |
| Cost savings.  | 1            |
| cut cost   | 1            |
| Fact that we were upgrading, might as well choose one that uses less energy.   | 1            |
| Get a cheaper deal each month and one that would last longer.  | 1            |
| Guess the main reason was the actual rebate.   | 1            |
| I plan to stay in this house and I know I can recoup the cost through energy efficiency for both the AC and the Furnace.           | 1            |
| I try to go with something that's more efficient.  | 1            |
| It's what was recommended by the AC company.   | 1            |
| Just having a better system, and having a cheaper cost system. I Don't know they put it one that was not what it should have been. | 1            |
| Just the energy efficiency.  | 1            |
| Just to be more energy efficient.  | 1            |
| Just to save money.  | 1            |
| Long-Term Savings  | 1            |
| Lower Bill, Better for Environment.  | 1            |
| Lower bills and more consistent cooling.   | 1            |
| makes sense for rverybody  | 1            |
| Money!   | 1            |
| Our bills were really really high.   | 1            |
| Over the long-haul, end up being cheaper   | 1            |
| price  | 1            |
| Read through a lot of things about energy savings, Long term savings   | 1            |
| save money   | 4            |
| Save Money   | 1            |
| save money and energy  | 1            |
| save money and to help with the environment  | 1            |

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| Verbatim Response  | Count (n=63) |
|--|--------------|
| Save Money, Save Energy, No brainer!   | 1            |
| Save money.  | 1            |
| Save on my energy bill.  | 1            |
| Saving   | 1            |
| saving on the cost   | 1            |
| savings  | 1            |
| savings and the rebate   | 1            |
| smaller bills  | 1            |
| Smarter Long Term Investment.  | 1            |
| That's a no-brainer.   | 1            |
| The cost and be cheaper, and better for environment and would've got the rebate.                           | 1            |
| The one that made the most sense to me.  | 1            |
| the return on the investment is good   | 1            |
| The sales person who came out told us the options we had.  | 1            |
| the savings  | 1            |
| to make the home more efficient  | 1            |
| to save money  | 1            |
| To save money and cut down our cost.   | 1            |
| Try to be conservative, recycle things.  | 1            |
| Try to do that on anything that has good energy star ratings, try to do that on all electrical appliances. | 1            |
| wanted it to be dependable.  | 1            |
| We got a good deal on it.  | 1            |
| We wanted to save energy.  | 1            |

Q13. [ASK IF CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP WAS INSTALLED] I'd like to know how you selected the specific make and model of the [PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP] you purchased. Would you say that you chose it...

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| Response Option  | Percent (n=63) |
|--|----------------|
| Yourself, based entirely on your own research?                 | 24%            |
| From a list of options provided by the contractor?             | 57%            |
| Because it was the only option recommended by your contractor? | 13%            |
| Other  | 6%             |
| Don't know   | 0%             |
| Refused  | 0%             |

| Verbatim Other Response   | Count (n=4) |
|---|-------------|
| Combination of my own research and the several options provided by contractor.      | 1           |
| I just asked the contractor what the best unit to buy, he said it was the best one. | 1           |
| talked with a neighbor  | 1           |
| Refused   | 1           |

- Q14. [ASK IF CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP WAS INSTALLED] Suppose the contractor that installed your [PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP] did not offer high efficiency [PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP]s that qualify for Duke rebates. Which of the following is most likely what you would have done?

| Response Option  | Percent (n=63) |
|--|----------------|
| You would have installed the cheaper, less efficient, unit that would not have qualified for rebates if that's all your contractor offered, or | 14%            |
| You would have looked for a contractor that could install a rebate-qualified high efficiency unit  | 84%            |
| Other  | 2%             |
| Don't know   | 0%             |
| Refused  | 0%             |

| Verbatim Other Response | Count (n=1) |
|-------------------------|-------------|
| Just kept old unit      | 1           |

- Q15. [ASK IF SMART THERMOSTAT INSTALLED] Which of the following best describes the old thermostat that you replaced?

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| Response option   | Percent (n=32) |
|---|----------------|
| Manual non-programmable thermostat,   | 50%            |
| Programmable thermostat that does not communicate with your Wi-Fi network, or | 47%            |
| Programmable thermostat that communicates with your Wi-Fi network             | 3%             |
| Other   | 0%             |
| Don't know  | 0%             |
| Refused   | 0%             |

Q16. [ASK IF SMART THERMOSTAT INSTALLED] Thinking of your old thermostat, at what temperature was that thermostat typically set in the winter?

| Verbatim Response | Count (n=32) |
|-------------------|--------------|
| 55                | 1            |
| 60                | 1            |
| 64                | 1            |
| 65                | 3            |
| 66                | 1            |
| 67                | 1            |
| 68                | 2            |
| 69                | 1            |
| 69-70             | 1            |
| 69-71             | 1            |
| 70                | 8            |
| 72                | 6            |
| 74                | 1            |
| 75                | 1            |
| 76-77             | 1            |
| Don't know        | 2            |

Q17. [ASK IF SMART THERMOSTAT INSTALLED] And what about your new wi-fi thermostat? At what temperature is the new thermostat typically set in the winter?

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| Verbatim Response | Count (n=32) |
|-------------------|--------------|
| 55                | 1            |
| 60                | 1            |
| 64                | 1            |
| 65                | 2            |
| 65-66             | 1            |
| 66                | 2            |
| 67                | 1            |
| 68                | 4            |
| 69                | 1            |
| 69-70             | 1            |
| 70                | 5            |
| 72                | 5            |
| 76-77             | 1            |
| Don't know        | 6            |

- Q18. [ASK IF SMART THERMOSTAT INSTALLED] If you used your old thermostat to control air conditioning, at what temperature was your old thermostat typically set in the summer for air conditioning?

| Verbatim Response   | Count (n=32) |
|---|--------------|
| 68  | 2            |
| 70  | 5            |
| 71  | 1            |
| 71-72   | 1            |
| 72  | 5            |
| 73  | 1            |
| 74  | 7            |
| 75  | 2            |
| 76  | 1            |
| 76-77   | 1            |
| 77  | 1            |
| 78  | 2            |
| Did not use my old thermostat to control air conditioning | 1            |
| Don't know  | 2            |

- Q19. [ASK IF SMART THERMOSTAT INSTALLED AND Q18<>DID NOT USE MY OLD THERMOSTAT TO CONTROL AIR CONDITIONING] And what about your new wi-fi thermostat? At what temperature is the new thermostat typically set in the summer?

| Verbatim Response | Count (n=31) |
|-------------------|--------------|
| 65                | 1            |
| 68-72             | 1            |
| 69-71             | 1            |
| 70                | 4            |
| 71-72             | 1            |
| 72                | 3            |
| 73                | 1            |
| 74                | 9            |
| 75                | 2            |
| 76                | 2            |
| 77                | 2            |
| 77-78             | 1            |
| 78                | 2            |
| 79                | 1            |

Q20. [ASK IF SMART THERMOSTAT INSTALLED] What motivated you to install a wi-fi enabled thermostat?

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| Verbatim Response   | Count (n=32) |
|---|--------------|
| amazing convenience and different options   | 1            |
| background as IT. to make it more comfortable   | 1            |
| Better rebate with that.  | 1            |
| came with the heat pump   | 1            |
| came with the system  | 1            |
| came with the unit  | 1            |
| came with the unit  | 2            |
| Came with the unit  | 1            |
| Convenience and More Energy Efficient.  | 1            |
| Convenient.   | 1            |
| Future technology I guess.  | 1            |
| I didn't know it was Wi-fi.   | 1            |
| I don't have Wi-fi, I guess it just came with it.   | 1            |
| I Don't know, I don't understand all these terms.   | 1            |
| I honestly Don't know. It was an option and I took it. I like the idea of being able to control the temp with my phone. | 1            |
| I thought it would work better, as far as the programs and all that.  | 1            |
| I wasn't interested in the Wi-fi part of it. Just that it was high efficiency. Just that it was programmable.           | 1            |
| it came with the system   | 1            |
| It came with the unit.  | 1            |
| It was recommended by the contractor.   | 1            |
| Just a suggestion through the installer.  | 1            |
| keeping up with the times   | 1            |
| Loved the fact that control it from anywhere in the house.  | 1            |
| nothing   | 1            |
| Really only one that was offered to us.   | 1            |
| So that we could get it on the phone and turn it up when we're away.  | 1            |
| That was just what came with it.  | 1            |
| That way we could do it on vacation if we had to adjust anything. More accessible.                                      | 1            |
| Things I've been reading about them. It's the only way to go  | 1            |
| unsure  | 1            |
| We didn't choose that, it was just the one that was recommended.  | 1            |

Q21. [ASK IF HVAC TIER=2 OR 3, AND QUALITY INSTALL REBATE WAS RECEIVED]  
Program records show that you received an additional \$60 rebate for a quality installation from your contractor. This additional rebate was included on the VISA gift card you received in the mail from Duke Energy. This rebate was for additional work

your contractor did to ensure that your new [PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP] was installed to run as efficiently as possible. Prior to today, were you aware that you received a quality installation rebate?

| Response Option | Percent (n=28) |
|-----------------|----------------|
| Yes             | 25%            |
| No              | 68%            |
| Don't know      | 7%             |
| Refused         | 0%             |

- Q22. [ASK IF Q21=YES] Prior to talking with the contractor that installed the [PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP], were you aware of quality installation practices that ensure the [PIPE IN WHICHEVER WAS INSTALLED: AIR SOURCE HEAT PUMP, CENTRAL AIR CONDITIONER, OR GEOTHERMAL HEAT PUMP] is installed to run as efficiently as possible?

| Response Option  | Percent (n=7) |
|--|---------------|
| Yes – I was already familiar with quality installation practices       | 71%           |
| No – I was not previously familiar with quality installation practices | 29%           |
| Don't know   | 0%            |
| Refused  | 0%            |

- Q23. [ASK IF Q21=YES] Did your contractor let you choose between a standard installation service that was not eligible for the additional rebate and a quality installation that would get you an additional rebate from Duke Energy?

| Response Option                                       | Percent (n=7) |
|---|---------------|
| Yes – they let me choose between standard and quality | 86%           |
| No – they did not give me a choice                    | 14%           |
| Don't know  | 0%            |
| Refused   | 0%            |

- Q24. [ASK IF HEAT PUMP WATER HEATER WAS INSTALLED] Which of the following best describes the condition of the previous water heater that you replaced?

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| Response Option                  | Percent (n=1) |
|----------------------------------|---------------|
| It was broken or malfunctioning  | 0%            |
| It was getting old, or           | 100%          |
| It was in good working condition | 0%            |
| Other                            | 0%            |
| Don't know                       | 0%            |
| Refused                          | 0%            |

- Q25. [ASK IF HEAT PUMP WATER HEATER WAS INSTALLED] Approximately, how many years old was the previous water heater that you replaced with your new heat pump water heater?

| Verbatim Response | Count (n=1) |
|-------------------|-------------|
| 16                | 1           |

- Q26. [ASK IF HEAT PUMP WATER HEATER WAS INSTALLED] Where did you install your new heat pump water heater?

| Response Option | Percent (n=1) |
|-----------------|---------------|
| Garage          | 0%            |
| Basement        | 0%            |
| Closet          | 0%            |
| Laundry Room    | 0%            |
| Other           | 100%          |
| Don't know      | 0%            |
| Refused         | 0%            |

| Verbatim Other Response | Count (n=1) |
|-------------------------|-------------|
| Crawl space             | 1           |

- Q27. [ASK IF HEAT PUMP WATER HEATER WAS INSTALLED AND IF Q26 <> DON'T KNOW OR REFUSED] Do you use your HVAC system to heat and cool the [PIPE IN ANSWER FROM Q26] where the heat pump water heater is located?

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| Response Option | Percent (n=1) |
|-----------------|---------------|
| Yes             | 0%            |
| No              | 100%          |
| Other           | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

Q28. [ASK IF AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP WAS NOT INSTALLED] What type of system do you use to heat your home?

| Response Option            | Percent (n=43)* |
|----------------------------|-----------------|
| Heat pump                  | 30%             |
| Electric baseboard heaters | 2%              |
| Natural gas furnace        | 74%             |
| Plug in space heaters      | 0%              |
| Cadet wall heaters         | 0%              |
| Other                      | 7%              |
| Don't know                 | 0%              |
| Refused                    | 0%              |

\* Multiple responses allowed.

| Verbatim Other Response | Count (n=3) |
|-------------------------|-------------|
| forced air              | 1           |
| Geothermal              | 1           |
| Propane heater.         | 1           |

Q29. [ASK IF CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP, OR GEOTHERMAL HEAT PUMP WAS NOT INSTALLED] What type of system do you use to cool your home?

| Response Option                               | Percent (n=10)* |
|---|-----------------|
| Central air conditioner                       | 60%             |
| Heat pump                                     | 30%             |
| Room/window air conditioner                   | 0%              |
| Evaporative/swamp cooler                      | 0%              |
| Other   | 10%             |
| Don't know                                    | 0%              |
| Refused                                       | 0%              |
| I do not have any air conditioning in my home | 0%              |

\* Multiple responses allowed.



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| Verbatim Other Response | Count (n=1) |
|-------------------------|-------------|
| Geothermal              | 1           |

- Q30. [ASK IF HEAT PUMP WATER HEATER WAS INSTALLED] What motivated you to install an energy efficient water heater rather than a less efficient one that would use more energy?

| Verbatim Response                              | Count (n=1) |
|--|-------------|
| switched to solar and it would save more money | 1           |

- Q31. [ASK IF DUCT SEALING OR ATTIC INSULATION WAS PERFORMED/INSTALLED] What motivated you to [IF DUCT SEALING WAS PERFORMED, READ: repair your ductwork; IF ATTIC INSULATION WAS INSTALLED, READ: add insulation to your attic]?

*Duct Sealing*

| Verbatim Response | Count (n=1) |
|-------------------|-------------|
| needed to be done | 1           |

*Attic Insulation*

| Verbatim Response   | Count (n=5) |
|---|-------------|
| need it   | 1           |
| needed to be done   | 1           |
| power bills were way high and wanted to lower the bills. A/C was really old | 1           |
| the bills were too high   | 1           |
| Well, I knew it was thin. I just took the opportunity to handle it          | 1           |

- Q32. [ASK IF POOL PUMP WAS INSTALLED] What motivated you to install an ENERGY STAR pool pump?

| Verbatim Response  | Count (n=4) |
|--|-------------|
| efficiency savings and the rebate from Duke help with the decision                               | 1           |
| Just doing the math on it and having a single speed pump as opposed to an energy efficient pump. | 1           |
| lower the bills. recommended by the pool company   | 1           |
| the rebate   | 1           |

- Q33. [ASK IF POOL PUMP WAS INSTALLED] Approximately what month do you first open your pool for the season?

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| Response Option | Percent (n=4) |
|-----------------|---------------|
| January         | 0%            |
| February        | 0%            |
| March           | 0%            |
| April           | 0%            |
| May             | 50%           |
| June            | 0%            |
| July            | 0%            |
| August          | 0%            |
| September       | 0%            |
| October         | 0%            |
| November        | 0%            |
| December        | 0%            |
| Other           | 50%           |
| Don't know      | 0%            |
| Refused         | 0%            |

| Verbatim Response | Count (n=2) |
|-------------------|-------------|
| Year round        | 2           |

Q34. [ASK IF POOL PUMP WAS INSTALLED] Approximately what month do you close your pool for the season?

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| Response Option | Percent (n=4) |
|-----------------|---------------|
| January         | 0%            |
| February        | 0%            |
| March           | 0%            |
| April           | 0%            |
| May             | 0%            |
| June            | 0%            |
| July            | 0%            |
| August          | 0%            |
| September       | 0%            |
| October         | 25%           |
| November        | 25%           |
| December        | 0%            |
| Other           | 25%           |
| Don't know      | 0%            |
| Refused         | 25%           |

| Verbatim Response | Count (n=1) |
|-------------------|-------------|
| Year round        | 1           |

I'd like to ask a few questions about what you most likely would have done had you not received assistance from Duke Energy Carolinas for the [LIST ALL MEASURES].

Q35. [ASK IF THEY INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP] Which of the following statements best describes the actions you would have taken if Duke Energy Carolinas rebates and information were not available:

| Response Option   | Percent (n=63) |
|---|----------------|
| Would not have installed the [Measure]  | 0%             |
| Would have postponed the purchase for at least one year                                     | 10%            |
| Would have bought a less expensive or less energy efficient system                          | 13%            |
| Would have bought the exact same high efficiency [Measure], and paid the full cost yourself | 71%            |
| Other   | 2%             |
| Don't know  | 3%             |
| Refused   | 0%             |

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| Verbatim Other Response               | Count (n=1) |
|---------------------------------------|-------------|
| Would have just kept shopping around. | 1           |

- Q36. [ASK IF Q35=WOULD HAVE BOUGHT A LESS EXPENSIVE OR LESS ENERGY EFFICIENT HEATING AND COOLING SYSTEM] You said you would have bought a/an [PIPE IN WHICHEVER WAS INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP] that was less expensive or less energy efficient if you had not received the rebate or information from Duke Energy Carolinas. Do you think it is more likely that you would have bought equipment that was...?

| Response Option                                      | Percent (n=8) |
|--|---------------|
| Almost as efficient as the one you bought, or        | 75%           |
| Significantly less efficient than the one you bought | 25%           |
| Don't know   | 0%            |
| Refused  | 0%            |

- Q37. [ASK IF Q21=YES] If Duke Energy did not offer the additional rebate for quality installation services, would you have allowed your contractor to perform a quality installation service that ensured the [PIPE IN WHICHEVER WAS INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP] was performing as efficiently as possible, even if it meant you had to pay more money?

| Response Option   | Percent (n=7) |
|---|---------------|
| Yes – I would have allowed quality installation if no rebates were available    | 71%           |
| No – I would not have allowed quality installation if no rebates were available | 14%           |
| Other   | 0%            |
| Don't know  | 0%            |
| Refused   | 14%           |

- Q38. [ASK IF Q21=YES] If Duke Energy did not offer the additional rebate for quality installation services and your contractor did not offer you the service in their initial bid, would you have demanded that your contractor perform a quality installation service that ensured the [PIPE IN WHICHEVER WAS INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP] was performing as efficiently as possible, even if it meant you had to pay more money?

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| Response Option   | Percent (n=7) |
|---|---------------|
| Yes – I would have demanded quality installation if no rebates were available and my contractor did not initially offer it    | 86%           |
| No – I would not have demanded quality installation if no rebates were available and my contractor did not initially offer it | 0%            |
| Other   | 0%            |
| Don't know  | 0%            |
| Refused   | 14%           |

Q39. [ASK IF THEY INSTALLED: SMART THERMOSTAT] Now we want to ask you about the smart thermostat you got with your [PIPE IN WHICHEVER WAS INSTALLED: CENTRAL AIR CONDITIONER, AIR SOURCE HEAT PUMP OR GEOTHERMAL HEAT PUMP]. Which of the following statements best describes the actions you would have taken if Duke Energy Carolinas rebates and information were not available:

| Response Option  | Percent (n=32) |
|--|----------------|
| Would not have purchased the Wi-Fi enabled thermostat                              | 9%             |
| Would have postponed the purchase of the Wi-Fi thermostat for at least one year    | 0%             |
| Would have installed some other type of thermostat, or                             | 38%            |
| Would have bought the exact same Wi-Fi thermostat, and paid the full cost yourself | 44%            |
| Other  | 6%             |
| Don't know   | 3%             |
| Refused  | 0%             |

| Verbatim Other Response   | Count (n=2) |
|---|-------------|
| I would have got whatever thermostat that went with the system            | 1           |
| This was the only option. Only model available for the HVAC we purchased. | 1           |

Q40. [ASK IF Q39=WOULD HAVE INSTALLED SOME OTHER TYPE OF THERMOSTAT] What type of thermostat would you have bought then? Would you have bought...

| Response Option                                     | Percent (n=12) |
|---|----------------|
| A manual non-programmable thermostat, or            | 17%            |
| A programmable thermostat that is not Wi-Fi enabled | 83%            |
| Other   | 0%             |
| Don't know  | 0%             |
| Refused   | 0%             |

Q41. [ASK IF THEY INSTALLED: HEAT PUMP WATER HEATER] Which of the following statements best describes the actions you would have taken if Duke Energy Carolinas rebates and information were not available:

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| Response Option  | Count (n=1) |
|--|-------------|
| Would not have replaced my water heater  | 0%          |
| Would have postponed the water heater replacement for at least one year                                  | 0%          |
| Would have bought a less expensive or less energy efficient water heater, or                             | 0%          |
| Would have bought the exact same high efficiency Heat Pump Water Heater, and paid the full cost yourself | 100%        |
| Other  | 0%          |
| Don't know   | 0%          |
| Refused  | 0%          |

[ASK IF Q41=WOULD HAVE BOUGHT A LESS EXPENSIVE OR LESS ENERGY EFFICIENT WATER HEATER]

Q42. You said you would have bought a water heater that was less expensive or less energy efficient if you had not received the rebate or information from Duke Energy Carolinas. Do you think it is more likely that you would have bought equipment that was...?

| Response Option | Percent (n=1) |
|-----------------|---------------|
| Not asked*      | 100%          |

\* No respondents met display logic condition.

[ASK IF THEY UPGRADED: ATTIC INSULATION]

Q43. Which of the following statements best describes the actions you would have taken if Duke Energy Carolinas rebates and information were not available:

| Response Option   | Count (n=5) |
|---|-------------|
| Would not have done the attic insulation                                | 0%          |
| Put off doing attic insulation for at least one year                    | 60%         |
| Would have added less insulation  | 0%          |
| Would have done the exact same upgrade, and paid the full cost yourself | 40%         |
| Other   | 0%          |
| Don't know  | 0%          |
| Refused   | 0%          |

[ASK IF Q43=WOULD HAVE ADDED LESS INSULATION]

Q44. You said you would have added less insulation if you had not received the rebate or information from Duke Energy Carolinas. How much less insulation would you have purchased? Please answer in a percentage, such as "50% less."

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| Response Option | Percent (n=5) |
|-----------------|---------------|
| Not asked*      | 100%          |

\* No respondents met display logic condition.

## [ASK IF THEY DID DUCT SEALING]

Q45. Which of the following statements best describes the actions you would have taken if Duke Energy Carolinas rebates and information were not available:

| Response Option  | Count (n=2) |
|--|-------------|
| Would not have had ducts sealed or repaired                              | 0%          |
| Would have postponed the work for at least one year                      | 50%         |
| Would have had the exact same work done, and paid the full cost yourself | 50%         |
| Other  | 0%          |
| Don't know   | 0%          |
| Refused  | 0%          |

## [ASK IF THEY INSTALLED A VARIABLE SPEED POOL PUMP]

Q46. Which of the following statements best describes the actions you would have taken if Duke Energy Carolinas rebates and information were not available:

| Response Option  | Count (n=4) |
|--|-------------|
| Would not have installed or replaced the pool pump   | 0%          |
| Would have postponed the installation of the pool pump for at least one year                       | 0%          |
| Would have bought a less expensive or less energy efficient pool pump, or                          | 50%         |
| Would have had the exact same high efficiency pool pump installed, and paid the full cost yourself | 50%         |
| Other  | 0%          |
| Don't know   | 0%          |
| Refused  | 0%          |

## [ASK ALL]

Q47. Using a scale from 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential” how influential were the following factors on your decision to purchase the [MEASURE]? How influential was...

*Air-Source Heat Pump*

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| Response Option | Percent (n=29) |   |                                     |       |
|-----------------|----------------|---|-------------------------------------|-------|
|                 | Rebate         | Information or advertisements from Duke Energy Carolinas, including their website | Recommendation from your contractor | Other |
| 0               | 7%             | 34%   | 0%                                  | 0%    |
| 1               | 0%             | 3%  | 0%                                  | 0%    |
| 2               | 0%             | 3%  | 0%                                  | 0%    |
| 3               | 3%             | 7%  | 0%                                  | 0%    |
| 4               | 3%             | 0%  | 0%                                  | 0%    |
| 5               | 24%            | 7%  | 3%                                  | 0%    |
| 6               | 7%             | 7%  | 7%                                  | 0%    |
| 7               | 7%             | 7%  | 7%                                  | 3%    |
| 8               | 10%            | 14%   | 17%                                 | 0%    |
| 9               | 14%            | 3%  | 21%                                 | 3%    |
| 10              | 24%            | 10%   | 45%                                 | 10%   |
| Don't know      | 0%             | 3%  | 0%                                  | 41%   |
| Refused         | 0%             | 0%  | 0%                                  | 41%   |

| Verbatim Other Descriptor   | Count (n=5) |
|---|-------------|
| A neighbor that used the contractor.  | 1           |
| dependability and expected maintenance on the unit  | 1           |
| I needed to fix the old one and they weren't sure if that would help. They said I needed a new one. | 1           |
| It was a good perk or a bonus to know I was getting a rebate.                                       | 1           |
| Online and different sources giving information.  | 1           |

*Attic Insulation and Air Sealing*



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| Response Option | Percent (n=5) |   |                                     |       |
|-----------------|---------------|---|-------------------------------------|-------|
|                 | Rebate        | Information or advertisements from Duke Energy Carolinas, including their website | Recommendation from your contractor | Other |
| 0               | 0%            | 20%   | 40%                                 | 0%    |
| 1               | 0%            | 0%  | 0%                                  | 0%    |
| 2               | 0%            | 0%  | 0%                                  | 0%    |
| 3               | 0%            | 0%  | 0%                                  | 0%    |
| 4               | 0%            | 0%  | 0%                                  | 0%    |
| 5               | 0%            | 20%   | 0%                                  | 0%    |
| 6               | 40%           | 0%  | 0%                                  | 0%    |
| 7               | 20%           | 20%   | 0%                                  | 0%    |
| 8               | 20%           | 20%   | 0%                                  | 0%    |
| 9               | 0%            | 0%  | 0%                                  | 0%    |
| 10              | 20%           | 20%   | 40%                                 | 0%    |
| Don't know      | 0%            | 0%  | 20%                                 | 100%  |
| Refused         | 0%            | 0%  | 0%                                  | 0%    |

*Central Air Conditioner*

| Response Option | Percent (n=33) |   |                                     |       |
|-----------------|----------------|---|-------------------------------------|-------|
|                 | Rebate         | Information or advertisements from Duke Energy Carolinas, including their website | Recommendation from your contractor | Other |
| 0               | 9%             | 24%   | 0%                                  | 3%    |
| 1               | 0%             | 6%  | 0%                                  | 0%    |
| 2               | 3%             | 6%  | 0%                                  | 0%    |
| 3               | 6%             | 9%  | 0%                                  | 0%    |
| 4               | 3%             | 3%  | 0%                                  | 0%    |
| 5               | 21%            | 6%  | 6%                                  | 0%    |
| 6               | 9%             | 12%   | 0%                                  | 0%    |
| 7               | 15%            | 6%  | 9%                                  | 0%    |
| 8               | 15%            | 12%   | 21%                                 | 3%    |
| 9               | 6%             | 3%  | 18%                                 | 6%    |
| 10              | 9%             | 9%  | 45%                                 | 15%   |
| Don't know      | 3%             | 3%  | 0%                                  | 55%   |
| Refused         | 0%             | 0%  | 0%                                  | 18%   |

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| Verbatim Other Descriptor                                  | Count (n=9) |
|--|-------------|
| Fact that the system broke and were looking to replace it. | 1           |
| How energy efficient it was.                               | 1           |
| Needing it to replace before the summer.                   | 1           |
| Neighbor got same information                              | 1           |
| no   | 1           |
| Past experience with the product.                          | 1           |
| Rebate from contractor as well as Duke Energy.             | 1           |
| Very high monthly bills and the age of our old unit.       | 1           |
| We needed a new AC.  | 1           |

*Duct Sealing*

| Response Option | Percent (n=1) |   |                                     |       |
|-----------------|---------------|---|-------------------------------------|-------|
|                 | Rebate        | Information or advertisements from Duke Energy Carolinas, including their website | Recommendation from your contractor | Other |
| 0               | 0%            | 0%  | 0%                                  | 0%    |
| 1               | 0%            | 0%  | 0%                                  | 0%    |
| 2               | 0%            | 0%  | 0%                                  | 0%    |
| 3               | 0%            | 0%  | 0%                                  | 0%    |
| 4               | 0%            | 0%  | 0%                                  | 0%    |
| 5               | 100%          | 0%  | 0%                                  | 0%    |
| 6               | 0%            | 0%  | 0%                                  | 0%    |
| 7               | 0%            | 0%  | 0%                                  | 0%    |
| 8               | 0%            | 0%  | 0%                                  | 0%    |
| 9               | 0%            | 0%  | 0%                                  | 0%    |
| 10              | 0%            | 100%  | 100%                                | 0%    |
| Don't know      | 0%            | 0%  | 0%                                  | 100%  |
| Refused         | 0%            | 0%  | 0%                                  | 0%    |

*Geothermal Heat Pump*

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| Response Option | Percent (n=1) |   |                                     |       |
|-----------------|---------------|---|-------------------------------------|-------|
|                 | Rebate        | Information or advertisements from Duke Energy Carolinas, including their website | Recommendation from your contractor | Other |
| 0               | 0%            | 100%  | 0%                                  | 0%    |
| 1               | 0%            | 0%  | 0%                                  | 0%    |
| 2               | 0%            | 0%  | 0%                                  | 0%    |
| 3               | 0%            | 0%  | 0%                                  | 0%    |
| 4               | 0%            | 0%  | 0%                                  | 0%    |
| 5               | 100%          | 0%  | 0%                                  | 0%    |
| 6               | 0%            | 0%  | 0%                                  | 0%    |
| 7               | 0%            | 0%  | 0%                                  | 0%    |
| 8               | 0%            | 0%  | 0%                                  | 0%    |
| 9               | 0%            | 0%  | 0%                                  | 0%    |
| 10              | 0%            | 0%  | 100%                                | 0%    |
| Don't know      | 0%            | 0%  | 0%                                  | 100%  |
| Refused         | 0%            | 0%  | 0%                                  | 0%    |

*Smart Thermostat*

| Response Option | Percent (n=32) |  |                                     |       |
|-----------------|----------------|--|-------------------------------------|-------|
|                 | Rebate         | Information or advertisements from Duke Energy Carolinas including their website | Recommendation from your contractor | Other |
| 0               | 9%             | 34%  | 3%                                  | 0%    |
| 1               | 0%             | 0%   | 0%                                  | 0%    |
| 2               | 3%             | 6%   | 0%                                  | 0%    |
| 3               | 6%             | 6%   | 0%                                  | 0%    |
| 4               | 0%             | 0%   | 0%                                  | 0%    |
| 5               | 25%            | 6%   | 13%                                 | 0%    |
| 6               | 9%             | 6%   | 6%                                  | 0%    |
| 7               | 6%             | 19%  | 6%                                  | 0%    |
| 8               | 9%             | 6%   | 25%                                 | 3%    |
| 9               | 6%             | 3%   | 13%                                 | 0%    |
| 10              | 22%            | 3%   | 34%                                 | 0%    |
| Don't know      | 3%             | 9%   | 0%                                  | 69%   |
| Refused         | 0%             | 0%   | 0%                                  | 28%   |

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| Verbatim Other Descriptor | Count (n=1) |
|---------------------------|-------------|
| Research and information  | 1           |

*Pool Pump*

| Response Option | Percent (n=4) |   |                                     |       |
|-----------------|---------------|---|-------------------------------------|-------|
|                 | Rebate        | Information or advertisements from Duke Energy Carolinas, including their website | Recommendation from your contractor | Other |
| 0               | 0%            | 50%   | 25%                                 | 0%    |
| 1               | 25%           | 0%  | 0%                                  | 0%    |
| 2               | 0%            | 0%  | 0%                                  | 0%    |
| 3               | 0%            | 0%  | 0%                                  | 0%    |
| 4               | 0%            | 0%  | 0%                                  | 0%    |
| 5               | 0%            | 25%   | 0%                                  | 0%    |
| 6               | 0%            | 0%  | 0%                                  | 0%    |
| 7               | 25%           | 25%   | 0%                                  | 0%    |
| 8               | 50%           | 0%  | 25%                                 | 0%    |
| 9               | 0%            | 0%  | 0%                                  | 0%    |
| 10              | 0%            | 0%  | 50%                                 | 25%   |
| Don't know      | 0%            | 0%  | 0%                                  | 75%   |
| Refused         | 0%            | 0%  | 0%                                  | 0%    |

| Verbatim Other Descriptor         | Count (n=1) |
|-----------------------------------|-------------|
| Research on different pool pumps. | 1           |

*Heat Pump Water Heater*

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| Response Option | Percent (n=1) |   |                                     |       |
|-----------------|---------------|---|-------------------------------------|-------|
|                 | Rebate        | Information or advertisements from Duke Energy Carolinas, including their website | Recommendation from your contractor | Other |
| 0               | 0%            | 100%  | 0%                                  | 0%    |
| 1               | 0%            | 0%  | 0%                                  | 0%    |
| 2               | 0%            | 0%  | 0%                                  | 0%    |
| 3               | 100%          | 0%  | 0%                                  | 0%    |
| 4               | 0%            | 0%  | 0%                                  | 0%    |
| 5               | 0%            | 0%  | 0%                                  | 0%    |
| 6               | 0%            | 0%  | 100%                                | 0%    |
| 7               | 0%            | 0%  | 0%                                  | 0%    |
| 8               | 0%            | 0%  | 0%                                  | 0%    |
| 9               | 0%            | 0%  | 0%                                  | 0%    |
| 10              | 0%            | 0%  | 0%                                  | 0%    |
| Don't know      | 0%            | 0%  | 0%                                  | 100%  |
| Refused         | 0%            | 0%  | 0%                                  | 0%    |

*Quality Installation*

| Response Option | Percent (n=28) |   |                                     |       |
|-----------------|----------------|---|-------------------------------------|-------|
|                 | Rebate         | Information or advertisements from Duke Energy Carolinas, including their website | Recommendation from your contractor | Other |
| 0               | 21%            | 39%   | 7%                                  | 4%    |
| 1               | 0%             | 4%  | 0%                                  | 0%    |
| 2               | 4%             | 0%  | 0%                                  | 0%    |
| 3               | 4%             | 4%  | 0%                                  | 0%    |
| 4               | 0%             | 4%  | 0%                                  | 0%    |
| 5               | 7%             | 4%  | 0%                                  | 0%    |
| 6               | 7%             | 4%  | 4%                                  | 0%    |
| 7               | 0%             | 0%  | 7%                                  | 0%    |
| 8               | 18%            | 11%   | 21%                                 | 4%    |
| 9               | 11%            | 11%   | 14%                                 | 0%    |
| 10              | 21%            | 11%   | 36%                                 | 11%   |
| Don't know      | 7%             | 11%   | 11%                                 | 50%   |
| Refused         | 0%             | 0%  | 0%                                  | 32%   |

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| Verbatim Other Descriptor   | Count (n=4) |
|---|-------------|
| Brand   | 1           |
| High efficiency.  | 1           |
| Inefficiency of the unit and the high cost for Duke Energy with the unit. | 1           |
| Word of Mouth.  | 1           |

Q48. Since receiving your rebate from Duke Energy Carolinas for the [LIST ALL SMART \$AVER MEASURES], have you purchased any other products or services to help save energy in your home?

| Response Option | Percent (n=73) |
|-----------------|----------------|
| Yes             | 30%            |
| No              | 70%            |
| Don't know      | 0%             |
| Refused         | 0%             |

[If Q48=YES]

Q49. What products have you purchased and installed to help save energy in your home?

| Response Option   | Percent (n=22) |
|---|----------------|
| Bought energy efficient appliances  | 14%            |
| Moved into an ENERGY STAR home [VERIFY: Duke Energy still your gas or electricity utility?] | 0%             |
| Bought efficient heating or cooling equipment   | 14%            |
| Bought efficient windows  | 0%             |
| Added insulation  | 5%             |
| Sealed air leaks in windows, walls, or doors  | 5%             |
| Bought LEDs   | 45%            |
| Bought CFLs   | 5%             |
| Installed an energy efficient water heater  | 14%            |
| Sealed or insulated ducts   | 0%             |
| None - no other actions taken   | 0%             |
| Other   | 14%            |
| Don't know  | 0%             |
| Refused   | 0%             |

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| Verbatim Other Responses  | Count (n=3) |
|---------------------------|-------------|
| Dish washer               | 1           |
| High efficiency pool pump | 1           |
| solar panels              | 1           |

Q50. [ASK IF Q49<>NONE, DON'T KNOW, OR REFUSED] Did you get a rebate from Duke Energy for any of those products or services? If so, which ones?

| Response Option                               | Percent (n=22)* |
|---|-----------------|
| Bought energy efficient appliances            | 0%              |
| Moved into an ENERGY STAR home                | 0%              |
| Bought efficient heating or cooling equipment | 9%              |
| Bought efficient windows                      | 0%              |
| Bought additional insulation                  | 0%              |
| Sealed air leaks in windows, walls, or doors  | 0%              |
| Sealed or insulated ducts                     | 0%              |
| Bought LEDs                                   | 14%             |
| Bought CFLs                                   | 5%              |
| Installed an energy efficient water heater    | 0%              |
| Other   | 9%              |
| I did not get any Duke rebates                | 59%             |
| Don't know                                    | 9%              |
| Refused                                       | 0%              |

\* Multiple responses allowed.

Q51. [ASK IF ANY ITEM IN Q49 WAS SELECTED] On a scale of 0 to 10, where 0 means “not at all influential” and 10 means “extremely influential”, how much influence did the [LIST ALL SMART \$AVER MEASURES] rebate have on your decision to...

*Buy Efficient Heating or Cooling Equipment*

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| Response Option | Percent (n=3) |
|-----------------|---------------|
| 0               | 67%           |
| 1               | 0%            |
| 2               | 0%            |
| 3               | 0%            |
| 4               | 0%            |
| 5               | 33%           |
| 6               | 0%            |
| 7               | 0%            |
| 8               | 0%            |
| 9               | 0%            |
| 10              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

*Buy Additional Insulation*

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| Response Option | Percent (n=1) |
|-----------------|---------------|
| 0               | 100%          |
| 1               | 0%            |
| 2               | 0%            |
| 3               | 0%            |
| 4               | 0%            |
| 5               | 0%            |
| 6               | 0%            |
| 7               | 0%            |
| 8               | 0%            |
| 9               | 0%            |
| 10              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

*Sealed air leaks in windows, walls, or doors*

| Response Option | Percent (n=1) |
|-----------------|---------------|
| 0               | 100%          |
| 1               | 0%            |
| 2               | 0%            |
| 3               | 0%            |
| 4               | 0%            |
| 5               | 0%            |
| 6               | 0%            |
| 7               | 0%            |
| 8               | 0%            |
| 9               | 0%            |
| 10              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

*Buy LEDs*

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| Response Option | Percent (n=10) |
|-----------------|----------------|
| 0               | 70%            |
| 1               | 0%             |
| 2               | 0%             |
| 3               | 0%             |
| 4               | 0%             |
| 5               | 10%            |
| 6               | 0%             |
| 7               | 0%             |
| 8               | 10%            |
| 9               | 0%             |
| 10              | 0%             |
| Don't know      | 10%            |
| Refused         | 0%             |

*Buy CFLs*

| Response Option | Percent (n=1) |
|-----------------|---------------|
| 0               | 100%          |
| 1               | 0%            |
| 2               | 0%            |
| 3               | 0%            |
| 4               | 0%            |
| 5               | 0%            |
| 6               | 0%            |
| 7               | 0%            |
| 8               | 0%            |
| 9               | 0%            |
| 10              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

*Installed an energy efficient water heater*

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| Response Option | Percent (n=3) |
|-----------------|---------------|
| 0               | 67%           |
| 1               | 0%            |
| 2               | 0%            |
| 3               | 0%            |
| 4               | 0%            |
| 5               | 0%            |
| 6               | 0%            |
| 7               | 33%           |
| 8               | 0%            |
| 9               | 0%            |
| 10              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

*Other*

| Response Option | Percent (n=3) |
|-----------------|---------------|
| 0               | 33%           |
| 1               | 0%            |
| 2               | 0%            |
| 3               | 0%            |
| 4               | 0%            |
| 5               | 33%           |
| 6               | 0%            |
| 7               | 0%            |
| 8               | 0%            |
| 9               | 0%            |
| 10              | 33%           |
| Don't know      | 0%            |
| Refused         | 0%            |

Q52. [ASK IF Q49.1 IS SELECTED AND Q51.1<>0 – NOT AT ALL INFLUENTIAL] What kinds of appliance(s) did you buy?

| Response Option     | Percent (n=1) |
|---------------------|---------------|
| Refrigerator        | 0%            |
| Stand-alone Freezer | 0%            |
| Dishwasher          | 0%            |
| Clothes washer      | 0%            |
| Clothes dryer       | 0%            |
| Oven                | 0%            |
| Microwave           | 0%            |
| Other               | 100%          |
| Don't know          | 0%            |
| Refused             | 0%            |

| Verbatim Other Response | Count (n=1) |
|-------------------------|-------------|
| TV                      | 1           |

Q53. [ASK IF Q52<>DON'T KNOW OR REFUSED] Was the [INSERT Q52 RESPONSE] an ENERGY STAR or high-efficiency model?

#### Television

| Response Option | Percent (n=1) |
|-----------------|---------------|
| Yes             | 100%          |
| No              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

Q54. [ASK IF Q52=CLOTHES DRYER] Does the new clothes dryer use natural gas?

| Response Option | Percent (n=1) |
|-----------------|---------------|
| Not asked*      | 100%          |

\* No respondents met display logic condition.

Q55. [ASK IF Q49 BOUGHT EFFICIENT HEATING OR COOLING EQUIPMENT IS SELECTED AND Q51 FOR EFFICIENT HEATING OR COOLING EQUIPMENT > 0]  
What type of heating or cooling equipment did you buy?

| Response Option                  | Percent (n=1) |
|----------------------------------|---------------|
| Central air conditioner          | 100%          |
| Window/room air conditioner unit | 0%            |
| Air source heat pump             | 0%            |
| Geothermal heat pump             | 0%            |
| Boiler                           | 0%            |
| Furnace                          | 0%            |
| Wi-Fi enabled thermostat         | 0%            |
| Wall air conditioner unit        | 0%            |
| Other                            | 0%            |
| Don't know                       | 0%            |
| Refused                          | 0%            |

[ASK IF Q55=BOILER OR FURNACE]

Q56. Does the new [INSERT Q55 RESPONSE] use natural gas?

| Response Option | Percent (n=1) |
|-----------------|---------------|
| Not asked*      | 100%          |

\* No respondents met display logic condition.

[ASK IF Q55&lt;&gt;DON'T KNOW OR REFUSED]

Q57. Was the [INSERT Q55 RESPONSE] an ENERGY STAR or high-efficiency model?

*Central Air Conditioner*

| Response Option | Percent (n=1) |
|-----------------|---------------|
| Yes             | 100%          |
| No              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

Q58. [ASK IF Q49 BOUGHT EFFICIENT WINDOWS IS SELECTED AND Q51 WINDOWS &gt; 0] How many windows did you install?

| Response Option | Percent (n=22) |
|-----------------|----------------|
| Not asked*      | 100%           |

\* No respondents met display logic condition.

Q59. [ASK IF Q49 ATTIC INSULATION IS SELECTED AND Q51 FOR ATTIC INSULATION &gt; 0] Did you add insulation to your attic, walls, or below the floor?

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| Response Option | Percent (n=1) |
|-----------------|---------------|
| Not asked*      | 100%          |

\* No respondents met display logic condition.

Q60. [ASK IF Q59<>DON'T KNOW OR REFUSED] Approximately what proportion of the [ITEM MENTIONED IN Q59] space did you add insulation?

| Response Option | Percent (n=1) |
|-----------------|---------------|
| Not asked*      | 100%          |

\* No respondents met display logic condition.

Q61. [ASK IF Q49 LEDS IS SELECTED AND Q51 FOR LEDS > 0] How many of LEDs did you install in your property?

| Verbatim Other Response | Count (n=3) |
|-------------------------|-------------|
| 12                      | 1           |
| 27                      | 1           |
| Don't know              | 1           |

Q62. [ASK IF Q49 CFLS IS SELECTED AND Q51 FOR CFLS > 0] How many of CFLs did you install in your property?

| Response Option | Percent (n=1) |
|-----------------|---------------|
| Not asked*      | 100%          |

\* No respondents met display logic condition.

Q63. [ASK IF Q49 WATER HEATER IS SELECTED AND Q51 FOR WATER HEATER > 0]  
Does the new water heater use natural gas?

| Response Option | Percent (n=1) |
|-----------------|---------------|
| Yes             | 100%          |
| No              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

Q64. [ASK IF Q49 WATER HEATER IS SELECTED AND Q51 FOR WATER HEATER > 0]  
Which of the following water heaters did you purchase? [read list]

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| Response Option   | Percent (n=1) |
|---|---------------|
| A traditional water heater with a large tank that holds the hot water | 100%          |
| A tankless water heater that provides hot water on demand             | 0%            |
| A solar water heater  | 0%            |
| Other, please specify:  | 0%            |
| Don't know  | 0%            |
| Refused   | 0%            |

Q65. [ASK IF Q49 WATER HEATER IS SELECTED AND Q51 FOR WATER HEATER > 0] Is the new water heater an ENERGY STAR model?

| Response Option | Percent (n=1) |
|-----------------|---------------|
| Yes             | 100%          |
| No              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

Q66. Where do you typically search for information on how to save energy in your property?

| Response Option  | Percent (n=73)* |
|--|-----------------|
| Online - read reviews about products   | 48%             |
| Go to utility website  | 25%             |
| Read my utility information - it has tips on how to save energy                          | 29%             |
| Go to the store and talk to salespeople  | 1%              |
| Look for ENERGY STAR logo on products  | 3%              |
| Other, please specify:   | 5%              |
| N/A - I don't typically search for information on how to save energy in my home/property | 22%             |
| Don't know   | 1%              |
| Refused  | 0%              |

\* Multiple responses allowed.

| Verbatim Other Response                                | Count (n=4) |
|--|-------------|
| Google   | 1           |
| Information from Electrician, builders and contractors | 1           |
| Someone from Duke Energy gave information once.        | 1           |
| talk to neighbors                                      | 1           |

- Q67. Using a 0 to 10 scale where 0 means “very dissatisfied,” 5 means “neither satisfied nor dissatisfied,” and 10 means “very satisfied,” how satisfied were you with the rebate amount for [LAST PROJECT]?

| Response Option | Percent (n=73) |
|-----------------|----------------|
| 0               | 1%             |
| 1               | 0%             |
| 2               | 0%             |
| 3               | 0%             |
| 4               | 3%             |
| 5               | 10%            |
| 6               | 5%             |
| 7               | 1%             |
| 8               | 11%            |
| 9               | 8%             |
| 10              | 59%            |
| N/A             | 0%             |
| Don't know      | 1%             |
| Refused         | 0%             |

- Q68. How satisfied were you with how long it took to receive that rebate? Please use a 0 to 10 scale where 0 means “very dissatisfied,” 5 means “neither satisfied nor dissatisfied,” and 10 means “very satisfied.”



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| Response Option | Percent (n=73) |
|-----------------|----------------|
| 0               | 0%             |
| 1               | 0%             |
| 2               | 0%             |
| 3               | 3%             |
| 4               | 1%             |
| 5               | 8%             |
| 6               | 3%             |
| 7               | 3%             |
| 8               | 15%            |
| 9               | 12%            |
| 10              | 51%            |
| N/A             | 1%             |
| Don't know      | 3%             |
| Refused         | 0%             |

Q69. [ASK IF Q68 IS SOMEWHAT TO VERY DISSATISFIED] Why did you give that rating?

| Verbatim Response   | Count (n=3) |
|---|-------------|
| It's strange the contractor said it would take 4-5 weeks to get the rebate. It took much longer to get it.  | 1           |
| Contractor said it would be a rebate check, we got a visa gift card. Would be nice to just get a credit on our power bill because that's what we're using the visa gift card for. We would prefer a check or that amount of credit applied to our duke energy bill.                       |             |
| Took over a month and a half or two months I think.   | 1           |
| Waiting for my rebate, three weeks go buy and I called.   | 1           |
| They dont know what I'm talking about. I was on the phone for 3 hours talking with 4 employees of duke. When I got the rebate it came from Raleigh and I told a supervisor, Williams, that she needed to inform her customer service about the rebates and about the Smart Saver Program. |             |

Q70. In the course of participating in the Duke Smart \$aver program, how often did you contact Duke Energy or program staff with questions?

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| Response Option | Percent (n=73) |
|-----------------|----------------|
| Never           | 75%            |
| Once            | 15%            |
| 2 or 3 times    | 8%             |
| 4 or more times | 1%             |
| Don't know      | 0%             |
| Refused         | 0%             |

Q71. [ASK IF Q70=MORE THAN NEVER] How did you contact them?

| Response Option | Percent (n=18)* |
|-----------------|-----------------|
| Phone           | 100%            |
| Email           | 6%              |
| Fax             | 0%              |
| Letter          | 0%              |
| In person       | 0%              |
| Don't know      | 0%              |
| Refused         | 0%              |

\* Multiple responses allowed.

Q72. [ASK IF Q70 > NEVER] Using that same scale, how satisfied were you with these communications? *[INTERVIEWER NOTE: REPEAT SCALE IF NECESSARY: Please use a 0 to 10 scale where 0 means "very dissatisfied," 5 means "neither satisfied nor dissatisfied," and 10 means "very satisfied."]*

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| Response Option | Percent (n=18) |
|-----------------|----------------|
| 0               | 6%             |
| 1               | 0%             |
| 2               | 0%             |
| 3               | 0%             |
| 4               | 0%             |
| 5               | 11%            |
| 6               | 0%             |
| 7               | 11%            |
| 8               | 11%            |
| 9               | 11%            |
| 10              | 50%            |
| N/A             | 0%             |
| Don't know      | 0%             |
| Refused         | 0%             |

Q73. [ASK IF Q72 IS SOMEWHAT TO VERY DISSATISFIED] Why did you give that rating?

| Verbatim Response   | Count (n=1) |
|---|-------------|
| Because nobody knew about the Smart Saver Program. It's called communication with your employees. It's like NOBODY knew what I was talking about. | 1           |

Q74. Have you noticed any savings on your electric bill since the [LAST PROJECT] project?

| Response Option                                  | Percent (n=73) |
|--|----------------|
| Yes, they noticed savings                        | 62%            |
| No - They looked, but did not notice any savings | 10%            |
| No - They looked, but it is too soon to tell     | 4%             |
| They didn't look                                 | 14%            |
| Don't know                                       | 11%            |
| Refused  | 0%             |

Q74\_B. [ASK IF Q74=YES, NOTICED SAVINGS] How satisfied are you with any savings you noticed on your electric bill since the [LAST PROJECT] project?

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| Response Option | Percent (n=45) |
|-----------------|----------------|
| 0               | 0%             |
| 1               | 0%             |
| 2               | 0%             |
| 3               | 0%             |
| 4               | 0%             |
| 5               | 0%             |
| 6               | 0%             |
| 7               | 7%             |
| 8               | 29%            |
| 9               | 4%             |
| 10              | 58%            |
| Don't know      | 0%             |
| Refused         | 2%             |

Q75. How satisfied are you with your [LAST PROJECT] project?

| Response Option | Percent (n=73) |
|-----------------|----------------|
| 0               | 0%             |
| 1               | 0%             |
| 2               | 0%             |
| 3               | 1%             |
| 4               | 0%             |
| 5               | 1%             |
| 6               | 1%             |
| 7               | 4%             |
| 8               | 11%            |
| 9               | 12%            |
| 10              | 68%            |
| Don't know      | 0%             |
| Refused         | 0%             |

Q76. [ASK IF Q75 IS SOMEWHAT TO VERY DISSATISFIED] Why did you give that rating?

| Verbatim Response        | Count (n=1) |
|--------------------------|-------------|
| the company was not good | 100%        |

Q77. How satisfied are you with the interaction with the contractors who worked on the [LAST PROJECT] project?

| Response Option | Percent (n=73) |
|-----------------|----------------|
| 0               | 0%             |
| 1               | 0%             |
| 2               | 1%             |
| 3               | 0%             |
| 4               | 1%             |
| 5               | 0%             |
| 6               | 0%             |
| 7               | 3%             |
| 8               | 7%             |
| 9               | 16%            |
| 10              | 71%            |
| Don't know      | 0%             |
| Refused         | 0%             |

Q78. [ASK IF Q77 IS SOMEWHAT TO VERY DISSATISFIED] Why did you give that rating?

| Verbatim Response   | Count (n=2) |
|---|-------------|
| The company couldn't keep the same workers on the job.<br>They made mistakes.<br>They didn't do it right and had to be called back out.<br>They caused damage to the house and made cracks in the and knocked some of the siding off. | 1           |
| They did make me aware of the replacement for the duct work rebate and after I called them about it they told me the inspection would be more than the rebate amount and refused to do it.  | 1           |

Q79. How satisfied you are with Duke Energy's overall performance as your electricity supplier?

| Response Option | Percent (n=73) |
|-----------------|----------------|
| 0               | 0%             |
| 1               | 0%             |
| 2               | 0%             |
| 3               | 1%             |
| 4               | 0%             |
| 5               | 0%             |
| 6               | 4%             |
| 7               | 12%            |
| 8               | 12%            |
| 9               | 14%            |
| 10              | 56%            |
| N/A             | 0%             |
| Don't know      | 0%             |
| Refused         | 0%             |

Q80. Would you say that your participation in Duke Energy Carolinas Smart \$aver Rebate Program has had a positive effect, a negative effect, or no effect on your overall satisfaction with Duke Energy?

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| Response Option | Percent (n=73) |
|-----------------|----------------|
| Negative effect | 1%             |
| No effect       | 15%            |
| Positive effect | 84%            |
| Don't know      | 0%             |
| Refused         | 0%             |

Q81. Finally, if you were rating your overall satisfaction with the Duke Energy Smart \$aver Rebate Program, would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied?

| Response Option                    | Percent (n=73) |
|------------------------------------|----------------|
| Very satisfied                     | 77%            |
| Somewhat satisfied                 | 16%            |
| Neither satisfied nor dissatisfied | 3%             |
| Somewhat dissatisfied              | 4%             |
| Very dissatisfied                  | 0%             |
| Don't know                         | 0%             |
| Refused                            | 0%             |

Q82. [ASK IF Q81=SOMEWHAT OR VERY DISSATISFIED] Why do you give that rating?

| Verbatim Response  | Count (n=3) |
|--|-------------|
| Because I am very disappointed in the Thermostat. It's memory is having a negative impact on the environment of my house. I would prefer just a straight programmable thermostat like I had before, but I'd like to be able to control it through Wi-fi.<br>I would like someone to call me about my thermostat. | 1           |
| Because there should be a higher value than \$300 when you buy an entire system. I put in a heat pump with propane backup and an AC to the tune of \$14,000 and I think a \$300 rebate is kinda cheap.<br>In Delaware, the rebate I got was around \$2,500 for a complete Heater/AC system.                      | 1           |
| I don't want the prepaid debit card.   | 1           |

Q83. Do you have any suggestions to improve Duke Energy's Smart \$aver Program?

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| Verbatim Response  | Count (n=25) |
|--|--------------|
| As long as the contractors notify the customer about the rebates.  | 1            |
| I guess DUKE sends news letters so that customers know about the rebates. TV and Commercials don't help me at all. I do get letters from DUKE that I read once in a while, like the light bulb rebates.                                    |              |
| Communication with their employees. So when someone calls with questions about the rebate, they know who to send them to.  | 1            |
| Depending on the price and size of unit, that you are going to have a furnace or ac or both, or even a water heater, even of those major appliances, it would be nice to have a price range and base that cost on the rebate you received. | 1            |
| get more rebates and give a better LED   | 1            |
| get with the Acosta Vendors about the additional savings and don't give them the option to participate or not  | 1            |
| getting more information out to the public   | 1            |
| give out rebate checks instead of Cards  | 1            |
| Guess if anything, the only thing I would recommend is to have a pamphlet of some type about LED Bulbs, and other things.  | 1            |
| Just keep doing what they're doing. If products come along, the rebate was a great idea. It was an expensive project and the rebate helped out a lot.  |              |
| That will encourage people to get a newer system.  | 1            |
| Keep the good work up  | 1            |
| larger rebate  | 1            |
| Make it easier for their contractors to submit the info needed to get the rebate and if an error is made let the contractors resubmit it   | 1            |
| make it more available to people   | 1            |
| make more noticeable   | 1            |
| make the surveys shorter   | 1            |
| More availability of auditors or assessors in the western part of North Carolina. I'm in the mountains next to TN.   | 1            |
| Only thing would suggest on Monthly Bill, what the temperature was during the time. Like to see something that would allow him to evaluate how efficient my unit is.   | 1            |
| show where the big rebates are   | 1            |
| that they check out who they recommend   | 1            |
| The contractor was not aware Duke was not sending checks. Better information between contractors and Duke Energy.  | 1            |
| The only thing that was a surprise that the rebate card more like a credit card, and not a cash rebate. The card itself could not be exchanged for cash.   | 1            |
| They could promote a little bit more. If you don't go online, I Don't know, just think they could a little bit more promotion on it.   | 1            |
| Think when I bought my washer and dryer, never heard if she qualified for anything with it.  | 1            |
| Wasn't aware of a lot of it because they were just moving into the area. Just was  | 1            |



## APPENDIX D

## PARTICIPANT SURVEY RESULTS

| Verbatim Response   | Count (n=25) |
|---|--------------|
| following the advice of our contractors. Smart Thermostat was replaced with a different type of thermostat after. |              |
| Don't know  | 1            |

Q84. Do you live at this residence where the work was performed?

| Response Option | Percent (n=73) |
|-----------------|----------------|
| Yes             | 95%            |
| No              | 4%             |
| Refused         | 1%             |

Q85. [ASK IF Q84=NO] Are you a property manager or an owner of the residence where the work was performed?

| Response Option  | Percent (n=3) |
|------------------|---------------|
| Owner            | 67%           |
| Property manager | 33%           |
| Other            | 0%            |
| Refused          | 0%            |

Q86. [ASK IF Q84=YES] Do you own or rent this residence?

| Response Option | Percent (n=69) |
|-----------------|----------------|
| Own             | 100%           |
| Rent            | 0%             |
| Don't know      | 0%             |
| Refused         | 0%             |

Q87. [ASK IF Q86=RENT] Do you pay your own electric bill or is it included in your rent

| Response Option | Percent (n=69) |
|-----------------|----------------|
| Not asked*      | 100%           |

\* No respondents met display logic condition.

Q88. Approximately when was this residence first built?

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PARTICIPANT SURVEY RESULTS

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| Response Option | Percent (n=73) |
|-----------------|----------------|
| Before 1960     | 12%            |
| 1960-1969       | 7%             |
| 1970-1979       | 16%            |
| 1980-1989       | 11%            |
| 1990-1999       | 29%            |
| 2000-2005       | 14%            |
| 2006-2010       | 8%             |
| 2011-2015       | 0%             |
| 2016-2017       | 0%             |
| Don't know      | 3%             |
| Refused         | 0%             |

Q89. Excluding unfinished basements, how many square feet is the residence?

| Verbatim Response | Count (n=73) |
|-------------------|--------------|
| 1000              | 2            |
| 1100              | 1            |
| 1200              | 2            |
| 1260              | 1            |
| 1380              | 1            |
| 1400              | 2            |
| 1425              | 1            |
| 1490              | 1            |
| 1500              | 2            |
| 1553              | 1            |
| 1576              | 1            |
| 1590              | 1            |
| 1600              | 3            |
| 1700              | 2            |
| 1800              | 4            |
| 1898              | 1            |
| 1900              | 1            |
| 1950              | 1            |
| 1990              | 1            |
| 2000              | 4            |
| 2150              | 1            |
| 2200              | 1            |

## APPENDIX D

## PARTICIPANT SURVEY RESULTS

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| Verbatim Response | Count (n=73) |
|-------------------|--------------|
| 2300              | 2            |
| 2384              | 1            |
| 2400              | 1            |
| 2500              | 2            |
| 2600              | 1            |
| 2700              | 6            |
| 2800              | 1            |
| 2900              | 1            |
| 3000              | 4            |
| 3100              | 2            |
| 3200              | 2            |
| 3500              | 1            |
| 3600              | 1            |
| 3700              | 1            |
| 4000              | 2            |
| 4800              | 1            |
| 5000              | 1            |
| 5800              | 1            |
| 6000              | 1            |
| Don't know        | 6            |

Q90. [ASK IF Q89=DON'T KNOW OR REFUSED] Would you estimate the residence is about:

| Response Option            | Percent (n=6) |
|----------------------------|---------------|
| less than 1,000 sq. ft.    | 0%            |
| 1,001-2,000 sq. ft.        | 17%           |
| 2,001-3,000 sq. ft.        | 33%           |
| 3,001-4,000 sq. ft.        | 17%           |
| 4,001-5,000 sq. ft.        | 0%            |
| Greater than 5,000 sq. ft. | 0%            |
| Don't know                 | 33%           |
| Refused                    | 0%            |

Q91. Does the primary heating system at the residence run on...

## APPENDIX D

## PARTICIPANT SURVEY RESULTS

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| Response Option           | Percent (n=73) |
|---------------------------|----------------|
| Electricity               | 53%            |
| Natural Gas (not propane) | 41%            |
| Liquid propane gas        | 4%             |
| Fuel Oil                  | 0%             |
| Wood                      | 0%             |
| Or something else         | 1%             |
| Don't know                | 0%             |
| Refused                   | 0%             |

| Verbatim Response | Count (n=1) |
|-------------------|-------------|
| Geothermal        | 1           |

- Q92. I'm going to read a list of income ranges. Please stop me when I reach the range that includes your annual household income.

| Response Option                  | Percent (n=73) |
|----------------------------------|----------------|
| Less than \$25,000               | 4%             |
| \$25,000 to less than \$50,000   | 8%             |
| \$50,000 to less than \$75,000   | 14%            |
| \$75,000 to less than \$100,000  | 11%            |
| \$100,000 to less than \$150,000 | 14%            |
| \$150,000 or more                | 16%            |
| Don't know                       | 3%             |
| Refused                          | 30%            |

## Appendix E Trade Ally Survey Results

This section reports the results from each question in the trade ally survey. Since the results reported in this appendix represent the “raw” data (that is, none of the open-ended responses have been coded and none of the scale questions have been binned), some values may be different from those reported in the Process Evaluation Findings chapter (particularly: percentages in tables with Other categories and scale response questions). Only respondents who completed the survey are included in the following results.

S1. How many locations does your company have?

| Response Option | Percent (n=58) |
|-----------------|----------------|
| One             | 85%            |
| Two             | 15%            |
| Three           | 0%             |
| Four            | 0%             |
| Five            | 0%             |
| More than five  | 0%             |
| Don't know      | 0%             |

S2. [Ask if S1 > ONE] We would like to talk today about the projects that were sold and installed by the [PIPE IN ADDRESS] location. Are you able to speak to the work associated with that location?

| Response Option | Percent (n=9) |
|-----------------|---------------|
| Yes             | 100%          |
| No              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

S3. Does your firm primarily focus on new construction or existing home projects?

| Response Option           | Percent (n=58) |
|---------------------------|----------------|
| Existing Homes            | 78%            |
| New construction projects | 22%            |
| Don't know                | 0%             |
| Refused                   | 0%             |

- Q1. How did you first hear about Duke Energy Smart \$aver rebate offers for HVAC equipment, variable speed pool pumps, insulation, and duct sealing?

| Response Option                               | Percent (n=58) |
|---|----------------|
| Word-of-mouth (co-worker, another contractor) | 14%            |
| Duke Energy website                           | 2%             |
| Duke Energy program representative            | 26%            |
| TV/Radio/Newspaper/Billboard Ad               | 0%             |
| Event   | 2%             |
| Other   | 17%            |
| Don't know                                    | 40%            |
| Refused                                       | 0%             |

| Verbatim Other Response                        | Count (n=10) |
|--|--------------|
| were already filing them when I started        | 1            |
| Through Pump Manufactures                      | 1            |
| They were doing it when I started 3 years ago. | 1            |
| The boss got us enrolled                       | 1            |
| Sense we've been in business                   | 1            |
| Followed in from an old program.               | 1            |
| Email or letter. It's been so long ago.        | 1            |
| Been doing it sense employee first started.    | 1            |
| Already in place when I started working here   | 1            |
| Already in place over a year when I started    | 1            |

- Q2. Since August 2016, about what proportion of the [MEASURE] projects that your company did in Duke territory would have qualified for a Duke rebate?

*Central Air Conditioners*

| Verbatim Responses | Count (n=42) |
|--------------------|--------------|
| 0%                 | 1            |
| 10%                | 1            |
| 20%                | 2            |
| 25%                | 3            |
| 30%                | 2            |
| 33%                | 1            |
| 40%                | 5            |
| 50%                | 7            |
| 60%                | 1            |
| 70%                | 2            |
| 80%                | 6            |
| 85%                | 4            |
| 90%                | 2            |
| 99.9%              | 1            |
| 100%               | 2            |
| Don't know         | 2            |

*Air Source Heat Pumps*

| Verbatim Responses | Count (n=46) |
|--------------------|--------------|
| 0%                 | 1            |
| 10%                | 3            |
| 20%                | 1            |
| 25%                | 4            |
| 30%                | 1            |
| 33%                | 1            |
| 40%                | 3            |
| 50%                | 7            |
| 60%                | 1            |
| 70%                | 1            |
| 75%                | 2            |
| 80%                | 6            |
| 85%                | 3            |
| 90%                | 4            |
| 100%               | 6            |
| Don't know         | 2            |

*Attic Insulation & Air Sealing*

| Verbatim Responses | Count (n=5) |
|--------------------|-------------|
| 5%                 | 1           |
| 10%                | 1           |
| 15%                | 1           |
| 25%                | 1           |
| 40%                | 1           |

*Pool Pumps*

| Verbatim Responses | Count (n=5) |
|--------------------|-------------|
| 50%                | 1           |
| 80%                | 1           |
| 85%                | 1           |
| 95%                | 1           |
| Don't know         | 1           |

*Heat Pump Water Heater*

| Verbatim Responses | Count (n=3) |
|--------------------|-------------|
| 15%                | 1           |
| 40%                | 1           |
| 100%               | 1           |

*Geothermal Heat Pump*

| Verbatim Responses | Count (n=4) |
|--------------------|-------------|
| 0%                 | 1           |
| 90%                | 1           |
| 100%               | 1           |
| Don't know         | 1           |

*Duct Sealing*

| Verbatim Responses | Count (n=4) |
|--------------------|-------------|
| 25%                | 1           |
| 40%                | 1           |
| 100%               | 1           |
| Don't know         | 1           |

Q3. And since August 2016, what percent of all your Duke rebate qualified [MEASURE] projects did you actually apply for a rebate? [If needed: Your best estimate is fine.]



*Central Air Conditioners*

| Verbatim Responses | Count (n=42) |
|--------------------|--------------|
| 0%                 | 1            |
| 5%                 | 1            |
| 30%                | 2            |
| 50%                | 1            |
| 55%                | 1            |
| 70%                | 1            |
| 80%                | 2            |
| 90%                | 3            |
| 100%               | 28           |
| Don't know         | 2            |

*Air Source Heat Pumps*

| Verbatim Responses | Count (n=46) |
|--------------------|--------------|
| 0%                 | 1            |
| 5%                 | 2            |
| 20%                | 1            |
| 25%                | 1            |
| 50%                | 1            |
| 70%                | 1            |
| 85%                | 1            |
| 90%                | 4            |
| 95%                | 2            |
| 100%               | 29           |
| Don't know         | 3            |

*Attic Insulation and Air Sealing*

| Verbatim Responses | Count (n=5) |
|--------------------|-------------|
| 15%                | 1           |
| 80%                | 1           |
| 95%                | 1           |
| 100%               | 2           |

*Pool Pumps*

| Verbatim Responses | Count (n=5) |
|--------------------|-------------|
| 100%               | 4           |
| Don't know         | 1           |

*Heat Pump Water Heaters*

| Verbatim Responses | Count (n=3) |
|--------------------|-------------|
| 10%                | 1           |
| 100%               | 2           |

*Geothermal Heat Pumps*

| Verbatim Responses | Count (n=4) |
|--------------------|-------------|
| 0%                 | 1           |
| 100%               | 2           |
| Don't know         | 1           |

*Duct Sealing*

| Verbatim Responses | Count (n=4) |
|--------------------|-------------|
| 10%                | 1           |
| 15%                | 1           |
| 95%                | 1           |
| 100%               | 1           |

- Q4. About what proportion of your rebate qualifying [MEASURE] customers specifically requested the [MEASURE] on their own and were not influenced by your recommendation?

*Central Air Conditioners*

| Verbatim Responses | Count (n=42) |
|--------------------|--------------|
| 0%                 | 10           |
| 2%                 | 1            |
| 5%                 | 5            |
| 10%                | 1            |
| 15%                | 1            |
| 20%                | 2            |
| 25%                | 1            |
| 40%                | 1            |
| 50%                | 3            |
| 60%                | 1            |
| 75%                | 1            |
| 80%                | 1            |
| 85%                | 1            |
| 90%                | 2            |
| 100%               | 2            |
| Don't know         | 9            |

*Air Source Heat Pumps*

| Verbatim Responses | Count (n=46) |
|--------------------|--------------|
| 0%                 | 9            |
| 1%                 | 1            |
| 2%                 | 2            |
| 3%                 | 1            |
| 5%                 | 2            |
| 10%                | 3            |
| 15%                | 1            |
| 20%                | 2            |
| 25%                | 2            |
| 30%                | 1            |
| 50%                | 5            |
| 75%                | 2            |
| 80%                | 1            |
| 90%                | 1            |
| 100%               | 2            |
| Don't know         | 10           |

*Attic Insulation and Air Sealing*

| Verbatim Responses | Count (n=5) |
|--------------------|-------------|
| 25%                | 1           |
| 50%                | 2           |
| 75%                | 1           |
| 80%                | 1           |

*Pool Pumps*

| Verbatim Responses | Count (n=5) |
|--------------------|-------------|
| 0%                 | 1           |
| 2%                 | 1           |
| 50%                | 1           |
| 80%                | 1           |
| Don't know         | 1           |

*Heat Pump Water Heaters*

| Verbatim Responses | Count (n=3) |
|--------------------|-------------|
| 0%                 | 2           |
| 10%                | 1           |

*Geothermal Heat Pumps*

| Verbatim Responses | Count (n=4) |
|--------------------|-------------|
| 0%                 | 1           |
| 50%                | 1           |
| 60%                | 1           |
| Don't know         | 1           |

*Duct Sealing*

| Verbatim Responses | Count (n=4) |
|--------------------|-------------|
| 25%                | 1           |
| 30%                | 1           |
| 60%                | 1           |
| 75%                | 1           |

- Q5. Using a 0 to 10 scale, where 0 is “not at all influential” and 10 is “extremely influential,” how much influence has the Duke program had on your business practice of recommending rebate qualifying [MEASURE] to your customers?

*Central Air Conditioners*

| Response Option | Percent (n=42) |
|-----------------|----------------|
| 0               | 5%             |
| 1               | 5%             |
| 2               | 0%             |
| 3               | 2%             |
| 4               | 5%             |
| 5               | 19%            |
| 6               | 17%            |
| 7               | 10%            |
| 8               | 7%             |
| 9               | 10%            |
| 10              | 12%            |
| Don't know      | 10%            |
| Refused         | 0%             |

*Air Source Heat Pumps*

| Response Option | Percent (n=46) |
|-----------------|----------------|
| 0               | 9%             |
| 1               | 4%             |
| 2               | 2%             |
| 3               | 2%             |
| 4               | 0%             |
| 5               | 17%            |
| 6               | 11%            |
| 7               | 9%             |
| 8               | 13%            |
| 9               | 4%             |
| 10              | 13%            |
| Don't know      | 15%            |
| Refused         | 0%             |

*Attic Insulation and Air Sealing*

| Response Option | Percent (n=5) |
|-----------------|---------------|
| 0               | 0%            |
| 1               | 0%            |
| 2               | 0%            |
| 3               | 0%            |
| 4               | 40%           |
| 5               | 60%           |
| 6               | 0%            |
| 7               | 0%            |
| 8               | 0%            |
| 9               | 0%            |
| 10              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

*Pool Pumps*

| Response Option | Percent (n=5) |
|-----------------|---------------|
| 0               | 0%            |
| 1               | 0%            |
| 2               | 20%           |
| 3               | 0%            |
| 4               | 0%            |
| 5               | 0%            |
| 6               | 20%           |
| 7               | 0%            |
| 8               | 20%           |
| 9               | 20%           |
| 10              | 20%           |
| Don't know      | 0%            |
| Refused         | 0%            |

*Heat Pump Water Heaters*

| Response Option | Percent (n=3) |
|-----------------|---------------|
| 0               | 33%           |
| 1               | 0%            |
| 2               | 0%            |
| 3               | 33%           |
| 4               | 0%            |
| 5               | 33%           |
| 6               | 0%            |
| 7               | 0%            |
| 8               | 0%            |
| 9               | 0%            |
| 10              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

*Geothermal Heat Pumps*

| Response Option | Percent (n=4) |
|-----------------|---------------|
| 0               | 0%            |
| 1               | 0%            |
| 2               | 25%           |
| 3               | 0%            |
| 4               | 0%            |
| 5               | 25%           |
| 6               | 0%            |
| 7               | 0%            |
| 8               | 0%            |
| 9               | 0%            |
| 10              | 0%            |
| Don't know      | 50%           |
| Refused         | 0%            |

*Duct Sealing*

| Response Option | Percent (n=4) |
|-----------------|---------------|
| 0               | 25%           |
| 1               | 0%            |
| 2               | 0%            |
| 3               | 0%            |
| 4               | 25%           |
| 5               | 25%           |
| 6               | 0%            |
| 7               | 25%           |
| 8               | 0%            |
| 9               | 0%            |
| 10              | 0%            |
| Don't know      | 0%            |
| Refused         | 0%            |

- Q6. [ASK IF CONTRACTOR INSTALLED AIR SOURCE HEAT PUMPS, CENTRAL AIR CONDITIONERS, GEOTHERMAL HEAT PUMPS, POOL PUMPS, OR WATER HEATERS] Thinking back to before you were involved in the Duke Energy program, how often did you recommend higher efficiency equipment that uses less energy than standard models to your customers? Would you say none of the time, some of the time, most of the time, or every time?

| Response Option   | Percent (n=53) |
|---|----------------|
| None of the time  | 2%             |
| Some of the time  | 15%            |
| Most of the time  | 43%            |
| Every time  | 34%            |
| Not applicable – I've been involved with the Duke program since starting in the industry/this company | 4%             |
| Don't know  | 2%             |
| Refused   | 0%             |

- Q7. [ASK IF CONTRACTOR INSTALLED AIR SOURCE HEAT PUMPS, CENTRAL AIR CONDITIONERS, GEOTHERMAL HEAT PUMPS, POOL PUMPS, OR WATER HEATERS] And what about now?



| Response Option   | Percent (n=53) |
|---|----------------|
| None of the time  | 0%             |
| Some of the time  | 7%             |
| Most of the time  | 36%            |
| Every time  | 55%            |
| Not applicable – I've been involved with the Duke program since starting in the industry/this company | 0%             |
| Don't know  | 2%             |
| Refused   | 0%             |

- Q8. Would you say your knowledge of energy efficient products and services has increased, decreased, or stayed about the same since you became involved with the program?

| Response Option       | Percent (n=58) |
|-----------------------|----------------|
| Increased             | 62%            |
| Stayed about the same | 36%            |
| Decreased             | 0%             |
| Don't know            | 2%             |
| Refused               | 0%             |

- Q9. [Ask if Q8=INCREASED] Using a 0 to 10 scale, where 0 is “not at all influential” and 10 is “extremely influential,” how much influence has the Duke Energy program had on your increased knowledge of energy efficient products and services?

| Response Option | Percent (n=36) |
|-----------------|----------------|
| 0               | 3%             |
| 1               | 0%             |
| 2               | 8%             |
| 3               | 6%             |
| 4               | 0%             |
| 5               | 14%            |
| 6               | 3%             |
| 7               | 25%            |
| 8               | 17%            |
| 9               | 8%             |
| 10              | 14%            |
| Don't know      | 3%             |
| Refused         | 0%             |

- Q10. [ASK IF CONTRACTOR INSTALLED CENTRAL AIR CONDITIONERS] How much more difficult or easier is it to sell 15 SEER central air conditioners now that the code is 14 SEER?

| Response Option         | Percent (n=41) |
|-------------------------|----------------|
| Much more difficult     | 0%             |
| Somewhat more difficult | 15%            |
| No different            | 51%            |
| Somewhat easier         | 15%            |
| Much easier             | 12%            |
| Don't sell SEER 15      | 2%             |
| Don't know              | 5%             |
| Refused                 | 0%             |

- Q11. [ASK IF CONTRACTOR INSTALLED AIR SOURCE HEAT PUMPS] How much more difficult or easier is it to sell 15 SEER HVAC heat pumps now that the code is 14 SEER?

| Response Option         | Percent (n=47) |
|-------------------------|----------------|
| Much more difficult     | 2%             |
| Somewhat more difficult | 11%            |
| No different            | 36%            |
| Somewhat easier         | 28%            |
| Much easier             | 13%            |
| Don't sell SEER 15      | 2%             |
| Don't know              | 8%             |
| Refused                 | 0%             |

- Q12. [ASK IF CONTRACTOR INSTALLED SMART THERMOSTATS] As you may know, Duke Energy offers a rebate for smart thermostats. By how much did your installations of smart thermostats increase since Duke began offering smart thermostat rebates? Would you say...

| Response Option  | Percent (n=41) |
|------------------|----------------|
| No increase      | 27%            |
| Some increase    | 44%            |
| A large increase | 27%            |
| Don't know       | 2%             |
| Refused          | 0%             |

- Q13. [ASK IF CONTRACTOR INSTALLED CENTRAL AIR CONDITIONERS] Thinking of these higher incentives, did those help you sell more central air-conditioners that are 15 SEER or higher?

| Response Option | Percent (n=41) |
|-----------------|----------------|
| Yes             | 71%            |
| No              | 24%            |
| Don't know      | 5%             |
| Refused         | 0%             |

- Q14. [ASK IF CONTRACTOR INSTALLED AIR SOURCE HEAT PUMPS] Thinking of these higher incentives, did those help you sell more air-source heat pumps that are 15 SEER or higher?

| Response Option | Percent (n=47) |
|-----------------|----------------|
| Yes             | 70%            |
| No              | 21%            |
| Don't know      | 9%             |
| Refused         | 0%             |

- Q15. [ASK IF CONTRACTOR PERFORMED QUALITY INSTALLS] As you may know, Duke Energy recently added "quality install" requirements for installations of heat pumps and air conditioners? Were you already doing all the techniques on the quality install check list prior to Duke requiring them?

| Response Option | Percent (n=28) |
|-----------------|----------------|
| Yes             | 79%            |
| No              | 18%            |
| Don't know      | 3%             |
| Refused         | 0%             |

- Q16. [Ask if Q15=YES] Prior to using Duke's quality install checklist, did you have a system in place to document that your installers were following these same quality install techniques?

| Response Option | Percent (n=22) |
|-----------------|----------------|
| Yes             | 86%            |
| No              | 14%            |
| Don't know      | 0%             |
| Refused         | 0%             |

- Q17. [Ask if Q15=YES] Prior to using Duke's quality install checklist, what specific quality install techniques were you using? Please be as specific as possible.

| Response Option         | Percent (n=22) |
|-------------------------|----------------|
| Airflow/static pressure | 36%            |
| Blower door tests       | 18%            |
| System capacity         | 18%            |
| Condenser measurements  | 18%            |
| Enthalpy conversion     | 14%            |
| Duct blaster tests      | 9%             |
| System CFM              | 5%             |
| Other                   | 36%            |
| Don't Know              | 36%            |

- Q18. [ASK IF CONTRACTOR PERFORMED QUALITY INSTALLS ON TIER 2 OR 3 HVAC MEASURES] Do you charge your customers extra on the invoice for completing the quality installation rebate checklist on tier 2 and tier 3 HVAC jobs?

| Response Option | Percent (n=23) |
|-----------------|----------------|
| Yes             | 4%             |
| No              | 91%            |
| Don't know      | 4%             |
| Refused         | 0%             |

- Q19. [ASK IF CONTRACTOR PERFORMED QUALITY INSTALLS] Do you have any suggestions on how Duke Energy could improve the quality install requirements?

| Response Option | Percent (n=28) |
|-----------------|----------------|
| Yes             | 71%            |
| Don't know      | 25%            |
| Refused         | 4%             |

## APPENDIX E

## TRADE ALLY SURVEY RESULTS

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| Verbatim Responses  | Count (n=20) |
|---|--------------|
| When it first came out. There was only one check sheet for all seasons. I like that there are two sheets for different seasons. It's easier to get the rebate processed.  | 1            |
| They should be more lenient. Sometimes we get apps back from customers and everything has to match with dates. It's difficult to get anything through that's 14 SEER.   | 1            |
| the only thing I have is when I submit the info for the customer and then it takes 8-10 weeks to process. If there is a problem with the application you contact the Customer and us. If you contacted us before customer so we could fix the issue   | 1            |
| Stop doing the quality install checklist. That's at the engineering level, not the installation level. I am a licensed contractor, most guys don't have their own license. The processing center is slow, inaccurate, and not very efficient. Go back to the one page fax or email that completed the process. Also, when the contractor got paid.  | 1            |
| No. the software is kinda difficult when uploading and putting information in. So much that we don't enter the quality pledge. We've ran into too many cases where it was not completed correctly.  | 1            |
| No  | 1            |
| Make it easier. Do away with the enthalpy requirements.   | 1            |
| make it easier. Add more options to the checklist and prorating if added  | 1            |
| Make it easier to enter into the computer. If you don't want to offer a rebate for a 14 SEER, don't offer a rebate for a quality installation for that 14 SEER.   | 1            |
| it would be nice to have guidelines where we would need to be so we know if the customer qualifies  | 1            |
| It is tedious to scan all the documents and put them in. It's a lot of time to input the data to Duke. It would be nicer if the guys in the field could upload the information and get it done there. Like an app on their phone. We do the quality install on each rebate qualified installation, regardless if it's required or not. It would be good if Duke paid the contractor for the extra work and time we are putting into the rebates.  | 1            |
| If there was an app where it could all be submitted   | 1            |
| I believe the amount of time it takes to complete the rebates... We don't get anything as a company. It's difficult when you have 200 installs. It's time consuming and the company doesn't want to hire a specific person for just rebates. The existing employees have to be used to process the rebates. Very time consuming.  | 1            |
| Get rid of it. It takes too long. It's a 2 1/2 hour process.  | 1            |
| Do away with it. Minimize paperwork sense we're, in essence, working for free for the customer. The less paperwork we're doing for free, the more we would be willing to push the higher efficiency stuff. It would be good to compensate the contractors because we are doing a lot of excessive work and paperwork.   | 1            |
| Do away with it. It would stop the install department from extra work. It has slowed down the install department. It has really made a hardship on the installation department. If you would give the contractor something for all the extra work.  | 1            |
| Biggest problem we're having is when we start a house without AC for several days. The AC load is so big inside the house, when you let it run an hour, we will run 160% to 190% capacity above, the requirement is between 80%-180%. To not charge them extra, it's not feasible for us to come back to check it again because duke doesn't give the contractor any incentive. It's a losing proposition. A lot of times we don't do the QI test on the 15 and 16 SEER because we've had the numbers being so wild with the crazy temperatures. We lose the money on a service call if we go | 1            |

| Verbatim Responses  | Count (n=20) |
|---|--------------|
| back out there to get the customer an extra \$75.   |              |
| Have people who understand the industry creating the process. change the time frame when the inspection needs to be done.   | 1            |
| Give the dealers something back like you used to  | 1            |
| Give the company that's doing the rebate some of the rebate. Do away with the quality checklist because it's time consuming. Scanning, putting it in the document, submitting it, attaching is very time consuming. | 1            |

Q20. What energy efficient products, technologies, or services should be added to the Duke Energy rebate program?

| Response Option                          | Percent (n=58)* |
|--|-----------------|
| Modulating furnaces                      | 2%              |
| Heat recovery ventilation systems        | 2%              |
| Boilers                                  | 0%              |
| Electronically commutated motor furnaces | 3%              |
| Tankless water heaters                   | 5%              |
| humidifiers                              | 2%              |
| air handlers                             | 3%              |
| Windows                                  | 2%              |
| Doors                                    | 0%              |
| No others should be added                | 38%             |
| Other                                    | 34%             |
| Don't Know                               | 21%             |
| Refused                                  | 0%              |

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| Verbatim Other Responses   | Count (n=20) |
|--|--------------|
| Wifi Thermostat ONLY (without HVAC)  | 1            |
| Tier rating for SEER. Keep it easy   | 1            |
| Solar and the geothermal split system  | 1            |
| Solar  | 1            |
| Solar  | 1            |
| Pool water heaters   | 1            |
| Package products, because most don't achieve the HSPF minimum requirements even though they're 14 or 15 SEER | 1            |
| More Programmable Thermostats, Air filtration systems  | 1            |
| More models of Smart Thermostats   | 1            |
| mini split heat pumps  | 1            |
| Lighting for the pools   | 1            |
| LED swimming pool lights   | 1            |
| Energy Audits, figure out what they (Duke) need on Smart Installations                                       | 1            |
| Drop the 14 SEER and make efficiency requirements higher   | 1            |
| Douglas Mini-Splits  | 1            |
| dealer incentive   | 1            |
| Crawl Space Insulation   | 1            |
| being able to upload copies of the bill so the info matches  | 1            |
| Attic Fan/Ventilation  | 1            |
| 14 SEER without Quality Installation requirement.  | 1            |

Q21. Have you attended any orientations or training events from DEC?

| Response Option | Percent (n=58) |
|-----------------|----------------|
| Yes             | 33%            |
| No              | 67%            |
| Don't know      | 0%             |
| Refused         | 0%             |

Q22. [Ask if Q21=YES] What topics were covered in the last Duke Energy event you attended?



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## TRADE ALLY SURVEY RESULTS

| Verbatim Responses   | Count (n=19) |
|--|--------------|
| When the new changes at the first of the year, when they implemented the new rebate system                                   | 1            |
| What was being input on the QI   | 1            |
| What qualified for the rebates   | 1            |
| Trade ally portal  | 1            |
| The rebates. How to file them and how much trouble we were having to get through   | 1            |
| The new rebate system  | 1            |
| the administrative part of the website   | 1            |
| Submitting the rebate. Went over the new program.  | 1            |
| New programs coming out, what is required, educational programs, courses.  | 1            |
| Just about rebates   | 1            |
| It was about the Duke rebates and how they worked and how things were processed. And how the system was supposed to operate. | 1            |
| Hydraulics and energy consumption on pool pumps.   | 1            |
| heat pump water heater. went over other programs   | 1            |
| General Knowledge and Best sales Practices.  | 1            |
| Duct testing and heat pump training.   | 1            |
| Duct sealing   | 1            |
| Duct sealing   | 1            |
| Different qualifying equipment and the general proceeds on how it works  | 1            |
| Don't know   | 1            |

Q23. [Ask if Q21=YES] On a scale from 0 to 10, how helpful was the last Duke Energy event you attended?

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| Response Option | Percent (n=19) |
|-----------------|----------------|
| 0               | 0%             |
| 1               | 5%             |
| 2               | 0%             |
| 3               | 0%             |
| 4               | 5%             |
| 5               | 16%            |
| 6               | 0%             |
| 7               | 10%            |
| 8               | 16%            |
| 9               | 0%             |
| 10              | 47%            |
| Don't know      | 0%             |
| Refused         | 0%             |

Q24. What types of training, if any, would you be interested in receiving from Duke Energy?

| Response Option           | Percent (n=58) |
|---------------------------|----------------|
| Offered verbatim response | 47%            |
| Don't know                | 50%            |
| Refused                   | 3%             |

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| Verbatim Responses  | Count (n=27) |
|---|--------------|
| Would like training on all the programs. I would feel like a good training on BPI. It would be good to have air flow training                                 | 1            |
| When you update things it would be nice to have a class that would go over that. Also if it is rejected I would like a class going over what we can do.       | 1            |
| We would like training on going over the different systems  | 1            |
| Training about the rebates. To make sure we're updated.   | 1            |
| Thermal class and refresher courses where a contractor could come in and talk   | 1            |
| Selling points about rebates. Other rebates related to HVAC industry. Up-and-Coming rebate information.   | 1            |
| Sales for efficiency purposes. Benefits for customer. Technology that is out on Variable speed pump equipment   | 1            |
| Requirements  | 1            |
| Open to anything  | 1            |
| Nothing   | 1            |
| None  | 1            |
| None  | 1            |
| None  | 1            |
| Net Zero Information.   | 1            |
| More training on energy efficiency.   | 1            |
| More paperwork information and more information about the energy efficient products.  | 1            |
| More of the rebate information. Some of the rebates are very vague.   | 1            |
| More information for the contractors about when there will be changes and how to adapt to those changes.  | 1            |
| Love to know when the programs change. Have notification there.   | 1            |
| Installation or service.  | 1            |
| How to market the program better  | 1            |
| Equipment selection. Class for installers to perform the quality install checklist.   | 1            |
| Energy efficiency and how they would like the process done. What duke energy is looking for in an installation  | 1            |
| Energy consumption training   | 1            |
| Duct sealing certification  | 1            |
| Any and all. The past training has been good.   | 1            |
| Any communication. When you started this up, we had 2 meetings to understand the rebate processing. There's a LOT that cannot be done on the contractors end. | 1            |

Q25. On a scale from 0 to 10, how interested would you be in a training course on how to effectively sell high efficiency equipment to your customers if it was offered by the program?

| Response Option | Percent (n=58) |
|-----------------|----------------|
| 0               | 19%            |
| 1               | 9%             |
| 2               | 5%             |
| 3               | 5%             |
| 4               | 2%             |
| 5               | 14%            |
| 6               | 2%             |
| 7               | 15%            |
| 8               | 5%             |
| 9               | 3%             |
| 10              | 17%            |
| Don't know      | 3%             |
| Refused         | 0%             |

Q26. How often do your customers ask about the Duke Energy rebates before you've had the chance to bring them up? Would you say...

| Response Option | Percent (n=58) |
|-----------------|----------------|
| Never           | 2%             |
| Rarely          | 36%            |
| Occasionally    | 41%            |
| Frequently      | 14%            |
| Always          | 0%             |
| Don't know      | 7%             |
| Refused         | 0%             |

- Q27. Since Duke transitioned to the online application system in April 2016, how frequently have you experienced problems or frustrations with the rebate application process? Would you say...

| Response Option | Percent (n=58) |
|-----------------|----------------|
| Never           | 3%             |
| Rarely          | 24%            |
| Occasionally    | 33%            |
| Frequently      | 28%            |
| Always          | 10%            |
| Don't know      | 2%             |
| Refused         | 0%             |

- Q28. [Ask if Q27=RARELY, OCCASIONALLY, FREQUENTLY, OR ALWAYS] What types of problems or frustrations did you experience?

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| Verbatim Responses   | Count (n=55) |
|--|--------------|
| A couple quality installation checklist issues with the 14 SEER. This may have been an issue on our end.   | 1            |
| Don't know   | 1            |
| When we first started, getting everyone on the same page was difficult.  | 1            |
| The online process is frustrating. It's easier now. To get the documentation in the thermostat is where we've struggled. Not being able to go in and attach information later. Info was entered, but it was frustrating you could not edit it.   | 1            |
| Rebates declining for no reason  | 1            |
| Right now, I have 4 that say "attention required" and I have to call a Duke representative, Aaron, to find out exactly what's wrong. It just tells me "Invalid reason, the smart thermostat number cannot be validated". Before, when I would send in a thermostat, we were just using the complete model number. Now we need to enter it "exactly as they appear on the product list". It's a simple fix, but I need to look twice. "The quality installation did not meet program requirements". If they would tell exactly why something would not qualify so I did not have to contact Aaron, it would save a lot of time. I think we should not have to call someone for every reason it says "Attention Required". Give us a reason on your website WHY the rebate needs attention. Contractor contacts Aaron at Duke, then Aaron has to contact Blackhawk. Then Blackhawk needs to respond to Aaron and he can get back to me. This takes a lot longer than it should. We should be working directly with the vendor that gives the rebates. I have a rebate we did 5/10/17 that says "Attention required-Rejected-The account holder name does not match the application name" Glen vs Glenn was the only issue with this. I sent the account number in with this application but it was still rejected because of an extra N in the customer name Glen. | 1            |
| Always kicking out application saying not enough info.   | 1            |
| Submitting the rebates   | 1            |
| Rejections are bring sent out before resolved. sounds like there may be a glitch   | 1            |
| There were issues with model numbers and rebates not going through. Customers call back to ask where there rebates were. Some issue with Insurance not updating.   | 1            |
| It is very frustrating to start with. then you need to resubmit. So you resubmit and it wouldn't do anything. If you click resubmit, it would not work, so you had to start over. It's gotten better, but the old system was easier in some ways. I like the online, without paper.  | 1            |
| If it declined the application, or said it had an issue, it never told you exactly what the issue was. Simple things like the name on the paperwork being husband and wife, and the bill was just the husband would not work. I misspelled an address once, and I had to call Duke instead of just seeing what the problem was and fixing it online.   | 1            |
| Feedback information from Duke as far as status and delay of rebates.  | 1            |
| All the attachments are time consuming.  | 1            |
| Mostly with Quality Checks and 14 SEER.  | 1            |
| It needs attention and we call Duke and find out we're not able to complete the rebate on our side. Calling duke takes a lot of time. Tracking. Status Updates on OLD rebates that still say "in review". The system went down for a week or two for a manual update, we should get a warning if you're going to update the system.  | 1            |
| It's the inability to change something that's been input within 48 hours. As soon as I enter a rebate, I might get a call from an installer to change the name or address. I cannot change the info for 48 hours. Once I update something, regarding MY Account, it takes days or up to a week before I can  | 1            |

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| Verbatim Responses   | Count (n=55) |
|--|--------------|
| submit rebates or receive referrals. It's like someone needs to approve it at Duke. This mostly affects referrals.   |              |
| When you switch from winter to spring it would take a while to get the different checklist up  | 1            |
| Applications were not showing up   | 1            |
| The last one I had needed a qualified thermostat. When I called customer service, they said it was qualified, but the price was messed up in the system. Customer service fixed it for me. It usually has to do with the thermostat.   | 1            |
| The process was a little slow at times.  | 1            |
| Sending in/Scanning info that is sent and has never been received. Lost information.   | 1            |
| Wouldn't accept the application and said it wasn't right.  | 1            |
| No guide to the quality installation process. It requires certain things that you need to test at certain times of the year according to outdoor temp. No guide to CFM, I just have to guess the numbers because Duke doesn't tell where to test the CFMs  | 1            |
| Confusion with the system would enter info and it would say it was unfinished  | 1            |
| Just when I'd go back to track the process, it'd say it would need more paperwork. When I was uploading, I had to split up the files instead of processing it all in one file.   | 1            |
| Homeowners were getting things sent saying there was an issue with the rebate.   | 1            |
| Mostly just the beginning, when we were trying to switch the program over. When it was initially setup, you could get an extra rebate for a certain thermostat. The system kept asking me to submit specific paperwork for a thermostat that the customer did not order.   | 1            |
| Started before 2016. Thought we'd never get the first few rebates to process.  | 1            |
| Never got an email about an issue  | 1            |
| Just once I could not get the site to load. Just an issue with Cookies and Cache, I think. Once it didn't accept a serial number and kicked back an application.   | 1            |
| Incorrect info provided and having trouble getting it corrected.   | 1            |
| It kept adding more requirements that you had to have on the paperwork that needed to qualify. Kept adding things that need to be on there. The paper that we'd fax was much easier than using the scanner. When you're limited on time, having to scan and then upload to a computer is frustrating. The address and names are VERY PICKY and would kick back, then we need to call to address the issue. It should be more human friendly, simpler to find discrepancies. Husbands/Wives is the same thing. If the husband on the power bill and both are on the rebate, it will kick it back and we have to call to get an answer on the issue. We don't get paid for the rebate. There's no incentive for the contractor, but we need to do them because the customer wants the savings. | 1            |
| When you try to track a rebate, part of its missing. Information is wrong. Double rebates, duplicated applications, then the application would be gone. Would not take specific wording. Have a hard time uploading documents, as well.  | 1            |
| You have to upload everything, scan it, put the QI think and invoice together and then upload it.  | 1            |
| Losing paperwork on Dukes side. Denying claims that were properly done. Paying out less than what the claim was. Long time delays between completing a claim and finding out if it was accepted. Many frustrated customers who didn't receive their claim that they were supposed to, in a timely fashion. It's really hard to have customers angry with us when it was Duke who was being slow on the process.  | 1            |

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| Verbatim Responses  | Count (n=55) |
|---|--------------|
| After you fill out the application, it takes about 30 days to get it back. Sometimes I would end up duplicating the application because it would take so long. It's very unforgiving because it will cancel the rebate after 60 days. 1 or 2 things that are not entered will reject the rebate.                          | 1            |
| When things get denied that should not be denied. They get kicked out and when I call Duke, they say "that shouldn't have been denied" and then approve. Whenever I call, except one, it has been erroneously denied. The one I messed up on was because the homeowners name was different from the account holder.       | 1            |
| Estimation work. Insurance certificates. Quality Checklist, filling out and submitting it. If the customer didn't want the WiFi thermostat, Duke would reject the refund. The communication back and forth is horrible. The ease of uploading files is not user friendly.   | 1            |
| When we first started using it was rejecting a lot of applications saying need more details. When we called, I was told it was a glitch   | 1            |
| It took Duke 2 months to create our profile so we could submit rebates. It took 6-7 phone calls and 1 to management to realize the IT issue was on Dukes end. I had to get special approval to get expired rebates approved because of the IT issue. I had several customers upset because of the delay on their rebates. | 1            |
| The initial onset is having a hard time adding a new user. The referral program is harder to navigate   | 1            |
| Giving me errors when accessing the application   | 1            |
| What we see says the application was accepted and paid but the customer gets a letter saying it's rejected.   | 1            |
| I didn't know the server was going to be down for updates. I didn't get any notification. When I was trying to do my billing, I could not.  | 1            |
| Having to submit new paperwork for things that were already submitted in the online portal.   | 1            |
| First, it was in a foreign language. Asking for additional paperwork that I had already submitted. On follow-up, it takes forever for DUKE to respond to the submission, it gets too close to the deadline. They say it takes 24 hours, but in reality, it takes 2-3 weeks to get back.                                   | 1            |
| Getting the whole program setup. It kept getting pushed back. But now it works just fine.   | 1            |
| There was quite a while where I had to go to different browsers to get it to work because I couldn't stay logged in.  | 1            |
| Would not let me submit all the way. Would say it was submitted but would not be in my portfolio  | 1            |
| The portal and when you scan a document they want you to send in.   | 1            |
| Names not matching on the accounts  | 1            |
| Worst part is that it would not go anywhere. I called and was told to use Google Chrome instead of Internet Explorer. As long as I get my numbers in right, it works smooth.  | 1            |
| Can't enter the information. System is down.  | 1            |
| Thermostat model number cannot be validated.  | 1            |

Q29. [Ask if Q27=RARELY, OCCASIONALLY, FREQUENTLY, OR ALWAYS] Overall, have these problems persisted or gotten better over time?



| Response Option                             | Percent (n=55) |
|---|----------------|
| Persisted                                   | 24%            |
| Gotten somewhat better                      | 58%            |
| Have been completely resolved at this point | 18%            |
| Don't know                                  | 0%             |
| Refused                                     | 0%             |

Q30. Do you have any suggestions on how Duke Energy could improve the rebate application process?

| Response Option           | Percent (n=58) |
|---------------------------|----------------|
| Verbatim response offered | 62%            |
| Don't know                | 33%            |
| Refused                   | 5%             |

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| Verbatim Responses  | Count (n=36) |
|---|--------------|
| Allow things to be attached or addendum to be done.   | 1            |
| Have better training for your employees   | 1            |
| Let the home owner do the application like they did before. Keep the contractors out of it because we are not compensated for any of these rebates. Let the homeowner fill out the information. Contractor can give the homeowner the Model, Serial number, and invoice and the home owner can send in the information. | 1            |
| If it is duke energy or duke progress it should be the same application.  | 1            |
| Makes the system faster   | 1            |
| Make the customers file instead of the contractor.  | 1            |
| Not have to do a checklist for 14 SEER. Add more programmable thermostats that are applicable. The duct work should be a little more lenient.   | 1            |
| Keep the questions on the rebate application worded similarly, or more simple. E.X. There's a question on the pool pump application regarding the horsepower on Old and New that is hard to determine which line I am supposed to put the information for the old pump or the information on the new pump.              | 1            |
| Pay the company that's submitting it. Go back to the rebate for the contractor.   | 1            |
| More leniency on quality checklist being submitted with applications.   | 1            |
| Give it back to the customer. Let the customer submit it. Contractor puts the equipment on the form and hands the form to the customer. Take it out of the hands of the contractor.   | 1            |
| Make it more human friendly. Make the requirements be more user friendly and not kick back because simple things like the names don't match exactly.  | 1            |
| Maybe try to get the software to work better.   | 1            |
| If you'd stop the QI, it would speed it up a whole lot. I've scanned over 50 rebates this morning, double checked everything, and it takes a LOT OF TIME.   | 1            |
| Go back to the old way that worked. Go back to the one page that was faxed in with the customer name, number, what was installed and an AHRI number. The claims department is the problem. All the things that are requested are way over the top and at the engineering level, not the installer level.                | 1            |
| It asks what the total cost is, this is not necessary information, then you ask for the price of the thermostat, but we price our jobs as a whole. There are redundant and ridiculous questions on the online forms. They don't have anything to do with efficiency or SEER rating.                                     | 1            |
| Streamline the process. There's 4 documents I have to scan and that takes a lot of time.  | 1            |
| Less paperwork. Be more user friendly. Less work for the contractor. Compensate the contractor for the extra time. Go back to faxing the paperwork.   | 1            |
| wait until the application process has been looked at before rejecting the application  | 1            |
| If the customer doesn't qualify, would be nice to be able to delete the application.  | 1            |
| Scanning and uploading was hard at first. I've gotten used to it and it works just fine when the scanner works.   | 1            |
| Pay the contractors some of the rebate as well. Especially because we have to do the rebate paperwork. We interact if the customer has any questions.   | 1            |
| It would be great if there were some kind of check system where it would validate the info immediately  | 1            |

| Verbatim Responses  | Count (n=36) |
|---|--------------|
| Give the contractor back the incentive  | 1            |
| Easier use of the portal.   | 1            |
| Giving the option to upload sheets electronically   | 1            |
| Shorter Forms.  | 1            |
| When there's a problem (like checking a box or if something doesn't match) with an application, make it easier to fix it online instead of calling Duke to get it corrected.  | 1            |
| I feel that it's redundant to answer electronic questions in the applications. They're the same as the paperwork. That's not good time management to be required to submit them on paper AND be required to submit them electronically within the application online.                   | 1            |
| Making an app where you can scan the equipment tags. automatically input AHRI   | 1            |
| If it is just A/c only make it so it bypasses the indoor info   | 1            |
| Be more detailed in what the rebate is for. Not so many choices.  | 1            |
| The whole Visa Gift Card Card Thing. I've had 1/2 of my customers contact us again wondering when they filed, when they'll get the rebate, when it was completed, when it was sent. I have to have the customer give Duke a call to get the information because it's been over 6 weeks. | 1            |
| Downsizing what needs to be submitted   | 1            |
| Make it faster. Faster turn around for processing and rejecting (if applicable). Respond back to the contractor when a customer gets paid a rebate. Make it more clear to the contractor when, and how much, a rebate has been paid to the customer.                                    | 1            |
| They could go back to giving the contractor money as well as the customer.  | 1            |

Q31. Do you have any suggestions on how Duke Energy could improve the project inspection process?

| Response Option           | Percent (n=58) |
|---------------------------|----------------|
| Verbatim response offered | 19%            |
| Don't know                | 76%            |
| Refused                   | 5%             |

| Verbatim Responses  | Count (n=11) |
|---|--------------|
| It requires a lot of data and man hours and it isn't worth it to do it  | 1            |
| No  | 1            |
| None  | 1            |
| No  | 1            |
| None  | 1            |
| I don't think I've ever had them inspect one of my project.   | 1            |
| Stop it! We usually do a load calculation to make sure we're welling the right equipment. If the SEER rating is there, the ECM motor is there, there's no need for an inspection. | 1            |
| None  | 1            |
| I think most of it works really well. It would be nice if there was an auto-fill option on the website.   | 1            |
| I don't know too much about it.   | 1            |
| Nope  | 1            |

- Q32. Please rate the extent to which you are satisfied with the following aspects of the program using a 0 to 10 scale. How satisfied are you with:

*Program training offered by Duke*

| Response Option | Percent (n=58) |
|-----------------|----------------|
| 0               | 3%             |
| 1               | 2%             |
| 2               | 2%             |
| 3               | 2%             |
| 4               | 5%             |
| 5               | 24%            |
| 6               | 7%             |
| 7               | 5%             |
| 8               | 10%            |
| 9               | 3%             |
| 10              | 17%            |
| N/A             | 12%            |
| Don't know      | 3%             |
| Refused         | 0%             |

*Your Duke energy trade ally representative*

| Response Option | Percent (n=58) |
|-----------------|----------------|
| 0               | 10%            |
| 1               | 12%            |
| 2               | 0%             |
| 3               | 0%             |
| 4               | 0%             |
| 5               | 29%            |
| 6               | 3%             |
| 7               | 9%             |
| 8               | 7%             |
| 9               | 5%             |
| 10              | 34%            |
| N/A             | 5%             |
| Don't know      | 7%             |
| Refused         | 0%             |

*The program website for customers*

| Response Option | Percent (n=58) |
|-----------------|----------------|
| 0               | 2%             |
| 1               | 0%             |
| 2               | 2%             |
| 3               | %              |
| 4               | 2%             |
| 5               | 10%            |
| 6               | 2%             |
| 7               | 12%            |
| 8               | 3%             |
| 9               | 3%             |
| 10              | 10%            |
| N/A             | 19%            |
| Don't know      | 34%            |
| Refused         | 0%             |

*The trade ally portal applications tracking system*

| Response Option | Percent (n=58) |
|-----------------|----------------|
| 0               | 3%             |
| 1               | 3%             |
| 2               | 3%             |
| 3               | 0%             |
| 4               | 9%             |
| 5               | 5%             |
| 6               | 5%             |
| 7               | 14%            |
| 8               | 19%            |
| 9               | 12%            |
| 10              | 26%            |
| N/A             | 0%             |
| Don't know      | 0%             |
| Refused         | 0%             |

*The marketing of the program*

| Response Option | Percent (n=58) |
|-----------------|----------------|
| 0               | 2%             |
| 1               | 0%             |
| 2               | 0%             |
| 3               | 3%             |
| 4               | 3%             |
| 5               | 29%            |
| 6               | 5%             |
| 7               | 10%            |
| 8               | 12%            |
| 9               | 2%             |
| 10              | 17%            |
| N/A             | 7%             |
| Don't know      | 9%             |
| Refused         | 0%             |

*The incentive applications submission process*

| Response Option | Percent (n=58) |
|-----------------|----------------|
| 0               | 3%             |
| 1               | 2%             |
| 2               | 3%             |
| 3               | 3%             |
| 4               | 9%             |
| 5               | 10%            |
| 6               | 5%             |
| 7               | 16%            |
| 8               | 16%            |
| 9               | 7%             |
| 10              | 22%            |
| N/A             | 2%             |
| Don't know      | 2%             |
| Refused         | 0%             |

*The selection of eligible equipment and services*

| Response Option | Percent (n=58) |
|-----------------|----------------|
| 0               | 0%             |
| 1               | 2%             |
| 2               | 0%             |
| 3               | 0%             |
| 4               | 3%             |
| 5               | 14%            |
| 6               | 9%             |
| 7               | 12%            |
| 8               | 24%            |
| 9               | 5%             |
| 10              | 29%            |
| N/A             | 0%             |
| Don't know      | 2%             |
| Refused         | 0%             |

*The overall program*

| Response Option | Percent (n=58) |
|-----------------|----------------|
| 0               | 2%             |
| 1               | 3%             |
| 2               | 5%             |
| 3               | 2%             |
| 4               | 0%             |
| 5               | 9%             |
| 6               | 5%             |
| 7               | 19%            |
| 8               | 21%            |
| 9               | 14%            |
| 10              | 21%            |
| N/A             | 0%             |
| Don't know      | 0%             |
| Refused         | 0%             |

Q33. [ASK IF ANY ANSWER IN Q32 < 5] Please explain why you were dissatisfied with:

*Program training offered by Duke Energy*

| Verbatim Response  | Count (n=8) |
|--|-------------|
| I don't know that I've been offered training for it. I don't know what you're talking about. | 1           |
| Didn't even know it was there.   | 1           |
| Never had any offered to me. I didn't know it existed.                                       | 1           |
| I have never received any training or any notification about it.                             | 1           |
| See previous answer.   | 1           |
| There isn't really any training. I haven't received any training.                            | 1           |
| They haven't provided any within the last year.  | 1           |
| Don't know   | 1           |

*Your Duke energy trade ally representative*



APPENDIX E

TRADE ALLY SURVEY RESULTS

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| Verbatim Response   | Count (n=7) |
|---|-------------|
| I don't know who he is. Lack of communication with me or our company.                                       | 1           |
| Didn't even know that I had one.  | 1           |
| They don't return calls or emails. I'm not sure who it is because it changes regularly.                     | 1           |
| That's the company that handles the rebates. It's awful now. The feedback, website, insurance is difficult. | 1           |
| Never had any contact with him. Emailed 3 times and got no response.  | 1           |
| I haven't from anybody  | 1           |
| Not aware they exist.   | 1           |

*The program website for customers*

| Verbatim Response | Count (n=3) |
|-------------------|-------------|
| Don't know        | 1           |
| Don't know        | 1           |
| Ease of use.      | 1           |

*The trade ally portal applications tracking system*

| Verbatim Response  | Count (n=11) |
|--|--------------|
| Slow Process   |              |
| It's not up to date. It doesn't report. It's just not accurate.  |              |
| Mostly because of the length of time to get a response if it was been approved. If it does not get approved, it's been 30 days and gets entirely rejected after 60 days.   |              |
| It's just not correct. I have to call in a lot and then they put the application on hold for days. I end up calling a lot.   |              |
| Ease of use. Not user friendly. Upload hard.   |              |
| If it's in review, it won't tell you why. I don't know why applications pass or fail.  |              |
| Don't know   |              |
| Some have gotten to be taken care of, but mostly never gets updated on my end.   |              |
| needs more information. It needs when the customer has been paid   |              |
| It takes a little while to upload, if there is information put in wrong, can't go back and fix it. Doesn't tell me what is wrong all the time, most the time I have to call. The way it wants us to fix things is silly. |              |
| It doesn't show that the customer has been paid their rebate. The rebates just seem to disappear and I am unable to find that they've been processed.  |              |

*The marketing of the program*

APPENDIX E

TRADE ALLY SURVEY RESULTS

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| Verbatim Response  | Count (n=5) |
|--|-------------|
| Don't know   | 1           |
| Don't know   | 1           |
| Never seen any marketing.                                | 1           |
| hasn't really looked at the website                      | 1           |
| I've never seen marketing as a customer or a contractor. | 1           |

*The incentive applications submission process*

| Verbatim Response  | Count (n=12) |
|--|--------------|
| Don't know   | 1            |
| It just doesn't take what I put in there.  | 1            |
| I can change that to a 5 of 10. The submission is fine, the requirements are inadequate.   | 1            |
| Slow Process. Inaccurate. False Results. People I know FOR A FACT that qualify that don't get the rebate, then the contractor looks like a liar.   | 1            |
| Some of the questions don't seem relevant.   | 1            |
| Ease of use. Difficult sense last switch to new rebate company   | 1            |
| The other way was so simple. For us to not get any compensation, except a referral (which I have not received), this takes the installers 1 hour extra and takes 45 minutes in paperwork to submit the rebate. | 1            |
| It's a pain in the butt. It's extra work I need to do to get a rebate for the customer and I don't get anything out of it. It's extra work to do.  | 1            |
| not sure if you will be accepted   | 1            |
| they require a lot of information.   | 1            |
| It's redundant. I upload hand written paperwork that's identical to the electronic application. Considering the number of applications our company submits.  | 1            |
| It takes too dang long. It's very tedious.   | 1            |

*The selection of eligible equipment and services*

| Verbatim Response   | Count (n=3) |
|---|-------------|
| Don't know  | 1           |
| Because of the quality installation program for extra money. It's too time consuming. It costs the contractor more money than Duke is offering the customer. It costs us too much labor. You should just do away with the quality installation program. | 1           |
| I don't feel that 14 SEER equipment should get a rebate. Also there are other thermostats out there that are not the list. The heat pump package unit should be included.   | 1           |

*The overall program*

APPENDIX E

TRADE ALLY SURVEY RESULTS

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| Verbatim Response   | Count (n=7) |
|---|-------------|
| It was easy to deal with when you were using good-sense to submit applications. The PDF applications were much easier. If anything is wrong, now, it really makes this frustrating.   | 1           |
| I don't think there's enough marketing. It's too difficult for any product under 15 SEER  | 1           |
| Too much of a hassle. Unhappy customers. Slow. Bad results. Too complicated. NO incentive for contractors.  | 1           |
| I've been here for 2 years, a guy applied for a rebate in Feb 2015 and he didn't get his rebate until late spring 2016. He would call me every three weeks. I would call duke and get different answers from different representatives. Despite the many re-submissions and reasons, he finally got his rebate. From a company standpoint, you put all the work on the contractor and the contractor needs to pay to do your rebate application. You don't give an incentive to the contractor. | 1           |
| Ease of use. Difficult sense last switch to new rebate company  | 1           |
| it is a big hassle. Every time something is wrong they send a card to the customer  | 1           |
| Quality Inspection Process is really the killer. It takes too much time to complete.  | 1           |

Q34. Thanks so much for your time today. Are there any other comments you would like to provide?

| Verbatim Response  | Count (n=13) |
|--|--------------|
| What is a Duke energy contracted truck?? I see smaller vans that says "Duke Energy Contracted" and they're not just meter readers, they were doing something else. I don't know what they were doing.  | 1            |
| We already try to sell higher end stuff. This is just extra work we are doing to get the customer money. You can't go from paying someone to do something to making it WAY harder and not paying them anymore.   | 1            |
| they ought to offer the dealer some incentive like they before for doing all the paperwork.  | 1            |
| Sometimes our customers get a pre-paid visa card, sometimes a check. It would be nice to know what determined which one they will receive so that we can tell our customers. For people who are not as technologically enhanced, a check would be MUCH NICER than a VISA card.   | 1            |
| Please start paying the contractors for the rebate paperwork and making sure the installations are done correctly. This all takes time. Do away with the 14 SEER rebates and start at a higher SEER level.   | 1            |
| on the portal when it says it is in review it could give more of an explanation on if it was completed and when the card was mailed  | 1            |
| My experience is that most HVAC companies will offer their own rebates because of the Quality Install process. The percentages and calculations that Duke is asking for is very redundant and pointless. Because the contractors are supposed to have the inspection done by the county, the quality install process is not necessary. | 1            |
| It would be nice if Duke would offer incentive the people that install the rebated equipment.  | 1            |
| I'm very upset that my employer has to pay me a salary to process the rebates and he gets no compensation for it.  | 1            |
| I wish you would provide an incentive to the contractor. I wish you hadn't taken our incentive because it is extra work. We should be paid for the time it takes us to submit the rebate   | 1            |

APPENDIX E

TRADE ALLY SURVEY RESULTS

| Verbatim Response  | Count (n=13) |
|--|--------------|
| paperwork.   |              |
| give money back to the dealers   | 1            |
| A lot of the time when someone else gets the job they will send us a thing that requires us to look at their reference number. On the paper it says "Loss". When I check it, it shows that the people never call us to give them a quote. That is just wording. Marketing can improve. We get a lot of referrals but we don't have a lot of people that call us. Put a check box that asks the customer if they would like us to call them or not. That will improve rebates and business for contractors. | 1            |
| Get rid of the quality checklist/quality inspection.   | 1            |

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Duke Energy Carolinas, LLC  
Vintage 2017 Actual for January 1, 2017 to December 31, 2017  
Docket Number E-7, Sub 1230  
Load Impacts and Estimated Revenue Requirements, excluding Lost Revenue by Program

|  | System kW Reduction -<br>Summer Peak | System Energy<br>Reduction (kWh) | A<br>System NPV of<br>Avoided Cost | B<br>System Cost | C = (A-B) *11.5%<br>Earned Utility Incentive | D= B+C<br>System Cost Plus Incentive | E<br>NC Retail kWh Sales Allocation<br>Factor (Miller Exhibit 5 pg. 1)          | NC Residential Revenue Requirement<br>D * E |
|--|--------------------------------------|----------------------------------|------------------------------------|------------------|--|--------------------------------------|---|---|
| <b>Residential Programs</b>  |                                      |                                  |                                    |                  |  |                                      |   |   |
| <b>EE Programs</b>   |                                      |                                  |                                    |                  |  |                                      |   |   |
| 1 Appliance Recycling Program  | -                                    | -                                | \$ -                               | \$ 5,307         | \$ (610)                                     | \$ 4,697                             | 72.8087506%   | \$ 3,420                                    |
| 2 Energy Efficiency Education  | 1,393                                | 5,932,086                        | 3,597,724                          | 2,077,611        | 174,813                                      | 2,252,424                            | 72.8087506%   | 1,639,962                                   |
| 3 Energy Efficient Appliances and Devices                                  | 24,605                               | 137,909,103                      | 105,352,687                        | 30,340,728       | 8,626,375                                    | 38,967,103                           | 72.8087506%   | 28,371,461                                  |
| 4 Residential – Smart Saver Energy Efficiency Program                      | 1,850                                | 6,712,977                        | 7,287,263                          | 7,403,327        | (13,347)                                     | 7,389,980                            | 72.8087506%   | 5,380,552                                   |
| 5 Income Qualified Energy Efficiency and Weatherization Assistance         | 771                                  | 5,341,624                        | 3,185,867                          | 5,505,992        | -  | 5,505,992                            | 72.8087506%   | 4,008,844                                   |
| 6 Multi-Family Energy Efficiency   | 2,056                                | 19,038,529                       | 13,539,656                         | 3,168,422        | 1,192,692                                    | 4,361,114                            | 72.8087506%   | 3,175,272                                   |
| 7 Energy Assessments   | 1,040                                | 7,720,549                        | 6,602,773                          | 2,909,098        | 424,773                                      | 3,333,871                            | 72.8087506%   | 2,427,350                                   |
| 8 Subtotal   | 31,715                               | 182,654,868                      | \$ 139,565,970                     | \$ 51,410,486    | \$ 10,404,695                                | \$ 61,815,181                        |   | \$ 45,006,861                               |
| 9 My Home Energy Report (1)  | 79,070                               | 311,368,855                      | 21,728,369                         | 13,812,250       | 910,354                                      | 14,722,603                           | 72.8087506%   | 10,719,344                                  |
| 10 Total for Residential Energy Efficiency Programs                        | 110,786                              | 494,023,724                      | \$ 161,294,339                     | \$ 65,222,736    | \$ 11,315,049                                | \$ 76,537,785                        |   | \$ 55,726,205                               |
|  |                                      |                                  |                                    |                  |  |                                      | NC Residential Peak Demand<br>Allocation Factor (Miller Exhibit 5<br>pg. 1)     | D11* E11                                    |
| 11 SubTotal DSM Programs (2)   | 846,941                              | 2,943,906                        | 105,087,510                        | \$ 29,822,652    | \$ 8,655,459                                 | \$ 38,478,111                        | 33.8075104%   | \$ 13,008,491                               |
| 12 Total DSM Programs  |                                      |                                  |                                    |                  |  |                                      |   | 13,008,491                                  |
| 13 Total Residential Revenue Requirement                                   |                                      |                                  |                                    |                  |  |                                      |   | \$ 68,734,696                               |
|  |                                      |                                  |                                    |                  |  |                                      | NC Non-Residential Revenue Requirement  |   |
|  |                                      |                                  |                                    |                  |  |                                      |   | D * E                                       |
| <b>Non-Residential Programs</b>  |                                      |                                  |                                    |                  |  |                                      |   |   |
| <b>EE Programs</b>   |                                      |                                  |                                    |                  |  |                                      |   |   |
| 14 Non Residential Smart Saver Custom Energy Assessments                   | 1,627                                | 15,791,732                       | \$ 10,272,302                      | \$ 2,139,875     | \$ 935,229                                   | \$ 3,075,104                         | 72.8087506%   | \$ 2,238,945                                |
| 15 Non Residential Smart Saver Custom                                      | 6,010                                | 40,609,855                       | 34,693,083                         | 7,304,838        | 3,149,648                                    | 10,454,486                           | 72.8087506%   | 7,611,781                                   |
| 16 Non Residential Smart Saver Energy Efficient Food Service Products      | 112                                  | 1,383,542                        | 959,251                            | 306,488          | 75,068                                       | 381,556                              | 72.8087506%   | 277,806                                     |
| 17 Non Residential Smart Saver Energy Efficient HVAC Products              | 894                                  | 2,954,877                        | 2,958,336                          | 1,560,769        | 160,720                                      | 1,721,489                            | 72.8087506%   | 1,253,395                                   |
| 18 Non Residential Smart Saver Energy Efficient Lighting Products          | 47,322                               | 270,572,885                      | 240,054,511                        | 66,689,770       | 19,936,945                                   | 86,626,715                           | 72.8087506%   | 63,071,829                                  |
| 19 Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 687                                  | 4,806,849                        | 3,070,044                          | 528,937          | 292,227                                      | 821,164                              | 72.8087506%   | 597,879                                     |
| 20 Non Residential Smart Saver Energy Efficient IT Products                | -                                    | 2,945                            | 523                                | 61,215           | (6,980)                                      | 54,235                               | 72.8087506%   | 39,488                                      |
| 21 Non Residential Smart Saver Energy Efficient Process Equipment Products | 99                                   | 651,289                          | 530,295                            | 162,413          | 42,306                                       | 204,719                              | 72.8087506%   | 149,054                                     |
| 22 Non Residential Smart Saver Performance Incentive                       | 3                                    | 12,373                           | 8,958                              | 320,559          | (35,834)                                     | 284,725                              | 72.8087506%   | 207,305                                     |
| 23 Small Business Energy Saver   | 17,263                               | 90,297,362                       | 63,169,894                         | 17,350,972       | 5,269,176                                    | 22,620,148                           | 72.8087506%   | 16,469,447                                  |
| 24 Smart Energy in Offices   | 2,138                                | 10,272,154                       | 1,067,480                          | 891,010          | 20,294                                       | 911,304                              | 72.8087506%   | 663,509                                     |
| 25 Business Energy Report  | 3                                    | 42,398                           | 696                                | 126,680          | -  | 126,680                              | 72.8087506%   | 92,234                                      |
| 26 Sub-Total for Non-Residential Energy Efficiency Programs                | 76,158                               | 437,398,260                      | \$ 356,785,373                     | \$ 97,443,527    | \$ 29,838,800                                | \$ 127,282,328                       |   | \$ 92,672,672                               |
| 27 Total for Non-Residential Energy Efficiency Programs                    |                                      |                                  |                                    |                  |  |                                      |   | \$ 92,672,672                               |
|  |                                      |                                  |                                    |                  |  |                                      | NC Non-Residential Peak Demand<br>Allocation Factor (Miller Exhibit 5<br>pg. 1) | D24*E24                                     |
| 28 Total DSM Programs(2)   | 846,941                              | 2,943,906                        | \$ 105,087,510                     | \$ 29,822,652    | \$ 8,655,459                                 | \$ 38,478,111                        | 40.0747013%   | \$ 15,419,988                               |
| 29 Total Non-Residential DSM Programs                                      |                                      |                                  |                                    |                  |  |                                      |   | 15,419,988                                  |
| 30 Total Non-Residential Revenue Requirement                               |                                      |                                  |                                    |                  |  |                                      |   | \$ 108,092,661                              |
|  |                                      |                                  |                                    |                  |  |                                      | NC Retail Peak Demand<br>Allocation Factor (Miller Exhibit 5<br>pg. 1)          | D29* E29                                    |
| <b>Total DSM Program Breakdown</b>   |                                      |                                  |                                    |                  |  |                                      |   |   |
| 31 Power Manager (Residential)   | 501,118                              | -                                | \$ 61,074,105                      | \$ 14,021,500    | \$ 5,411,050                                 | \$ 19,432,549                        | -   |   |
| 32 EnergyWise for Business (Non-Residential)                               | 5,453                                | 2,943,906                        | \$ 2,530,761                       | \$ 2,484,618     | \$ 5,306                                     | \$ 2,489,924                         | -   |   |
| 33 Power Share CallOption (Non-Residential)                                | -                                    | -                                | \$ -                               | \$ -             | \$ -   | \$ -                                 | -   |   |
| 34 Power Share (Non-Residential)   | 340,369                              | -                                | \$ 41,482,644                      | \$ 13,316,535    | \$ 3,239,103                                 | \$ 16,555,638                        | -   |   |
| 35 Total DSM   | 846,941                              | 2,943,906                        | \$ 105,087,510                     | \$ 29,822,652    | \$ 8,655,459                                 | \$ 38,478,111                        | 73.8822117%   | \$ 28,428,479                               |

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintage  
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Duke Energy Carolinas  
Evans Exhibit 1  
Vintage 2018 True Up - January 1, 2018 to December 31, 2018  
Docket Number E-7, Sub 1230  
Load Impacts and Estimated Revenue Requirements by Program

|   | A                                       | B                                | C                              | D              | E                | F             | G                             | H  |                             |                                       |               |
|---|---|----------------------------------|--------------------------------|----------------|------------------|---------------|-------------------------------|--|-----------------------------|---------------------------------------|---------------|
|   |   |                                  |                                | = (A-B)*C      | = (B+D)          |               |                               |  |                             |                                       |               |
|   | System kW<br>Reduction - Summer<br>Peak | System Energy<br>Reduction (kWh) | System NPV of Avoided<br>Costs | Total Cost     | Shared Savings % | Incentive     | System Revenue<br>Requirement | NC Retail kWh Sales<br>Allocation Factor | NC Allocation<br>Factor (2) | NC Residential Revenue<br>Requirement |               |
| Residential Programs  |   |                                  |                                |                |                  |               |                               |  |                             |                                       |               |
| EE Programs   |   |                                  |                                |                |                  |               |                               |  |                             |                                       |               |
| 1 Energy Efficiency Education   | 967                                     | 5,530,707                        | \$ 2,863,507                   | \$ 1,992,260   | 11.5%            | \$ 100,193    | \$ 2,092,453                  | 72.7130507%                              | E1 * F1                     | \$ 1,521,487                          |               |
| 2 Energy Efficient Appliances and Devices                             | 32,802                                  | 195,213,017                      | \$ 135,857,936                 | \$ 42,687,244  | 11.5%            | \$ 10,714,630 | \$ 53,401,873                 | 72.7130507%                              | E2 * F2                     | \$ 38,830,131                         |               |
| 3 HVAC Energy Efficiency  | 1,640                                   | 6,367,174                        | \$ 7,088,531                   | \$ 6,955,146   | 11.5%            | \$ 15,339     | \$ 6,970,485                  | 72.7130507%                              | E3 * F3                     | \$ 5,068,453                          |               |
| 4 Income Qualified Energy Efficiency and Weatherization Assistance    | 888                                     | 6,845,653                        | \$ 4,253,631                   | \$ 6,490,735   | 0.0%             | \$ -          | \$ 6,490,735                  | 72.7130507%                              | E4 * F4                     | \$ 4,719,611                          |               |
| 5 Multi-Family Energy Efficiency                                      | 2,303                                   | 21,288,910                       | \$ 13,857,877                  | \$ 3,604,921   | 11.5%            | \$ 1,179,090  | \$ 4,784,011                  | 72.7130507%                              | E5 * F5                     | \$ 3,478,601                          |               |
| 6 Energy Assessments  | 929                                     | 7,716,668                        | \$ 5,756,902                   | \$ 2,836,229   | 11.5%            | \$ 335,877    | \$ 3,172,106                  | 72.7130507%                              | E6 * F6                     | \$ 2,306,535                          |               |
| 7 Total for Residential Conservation Programs                         | 39,528                                  | 242,962,129                      | \$ 169,678,386                 | \$ 64,566,534  |                  | \$ 12,345,130 | \$ 76,911,664                 |  |                             | \$ 55,924,818                         |               |
| 8 My Home Energy Report (1)   | 95,887                                  | 344,759,844                      | \$ 22,684,688                  | \$ 12,765,286  | 11.5%            | \$ 1,140,731  | \$ 13,906,017                 | 72.7130507%                              | E8 * F8                     | \$ 10,111,489                         |               |
| 9 Total Residential Conservation and Behavioral Programs              | 135,416                                 | 587,721,974                      | \$ 192,363,074                 | \$ 77,331,820  |                  | \$ 13,485,861 | \$ 90,817,681                 |  |                             | \$ 66,036,307                         |               |
| NC Residential Peak Demand Allocation Factor                          |   |                                  |                                |                |                  |               |                               |  |                             |                                       |               |
| 10 PowerManager   | 533,506                                 | -                                | \$ 61,924,152                  | \$ 14,423,610  | 11.5%            | \$ 5,462,562  | \$ 19,886,172                 | 73.6287551%                              | 43.675154%                  | (E10+E26) *F10 *G10                   | \$ 12,360,454 |
| 11 Total Residential  | 668,922                                 | 587,721,974                      | \$ 254,287,226                 | \$ 91,755,430  |                  | \$ 18,948,423 | \$ 110,703,853                |  |                             | \$ 78,396,761                         |               |
| Non-Residential Programs  |   |                                  |                                |                |                  |               |                               |  |                             |                                       |               |
| EE Programs   |   |                                  |                                |                |                  |               |                               |  |                             |                                       |               |
| 12 Non Residential Smart Saver Custom Technical Assessments           | 13                                      | 83,588                           | \$ 67,306                      | \$ 407,293     | 11.5%            | \$ (39,099)   | \$ 368,195                    | 72.7130507%                              | E12 * F12                   | \$ 267,726                            |               |
| 13 Non Residential Smart Saver Custom                                 | 4,054                                   | 30,333,040                       | \$ 23,322,046                  | \$ 6,068,902   | 11.5%            | \$ 1,984,112  | \$ 8,053,013                  | 72.7130507%                              | E13 * F13                   | \$ 5,855,592                          |               |
| 14 Non Residential Smart Saver Energy Efficient Food Service Products | 59                                      | 741,466                          | \$ 431,679                     | \$ 235,605     | 11.5%            | \$ 22,549     | \$ 258,153                    | 72.7130507%                              | E14 * F14                   | \$ 187,711                            |               |
| 15 Non Residential Smart Saver Energy Efficient HVAC Products         | 893                                     | 2,908,386                        | \$ 2,810,168                   | \$ 1,620,748   | 11.5%            | \$ 136,783    | \$ 1,757,531                  | 72.7130507%                              | E16 * F16                   | \$ 1,277,955                          |               |
| 16 Non Residential Smart Saver Energy Efficient Lighting Products     | 31,556                                  | 178,171,791                      | \$ 146,534,847                 | \$ 25,872,380  | 11.5%            | \$ 13,876,184 | \$ 39,748,564                 | 72.7130507%                              | E17 * F17                   | \$ 28,902,393                         |               |
| 17 Non Residential Energy Efficient Pumps and Drives Products         | 421                                     | 2,669,016                        | \$ 1,617,749                   | \$ 277,785     | 11.5%            | \$ 154,096    | \$ 431,881                    | 72.7130507%                              | E18 * F18                   | \$ 314,034                            |               |
| 18 Non Residential Energy Efficient ITEE                              | -                                       | 17,639                           | \$ 3,025                       | \$ 36,875      | 11.5%            | \$ (3,893)    | \$ 32,982                     | 72.7130507%                              | E19 * F19                   | \$ 23,982                             |               |
| 19 Non Residential Energy Efficient Process Equipment Products        | 75                                      | 331,222                          | \$ 226,725                     | \$ 67,509      | 11.5%            | \$ 18,310     | \$ 85,819                     | 72.7130507%                              | E20 * F20                   | \$ 62,402                             |               |
| 20 Non Residential Smart Saver Performance Incentive                  | 168                                     | 3,271,186                        | \$ 1,671,793                   | \$ 479,610     | 11.5%            | \$ 137,101    | \$ 616,711                    | 72.7130507%                              | E21 * F21                   | \$ 448,429                            |               |
| 21 Small Business Energy Saver  | 13,374                                  | 76,696,523                       | \$ 46,832,942                  | \$ 15,977,993  | 11.5%            | \$ 3,548,319  | \$ 19,526,312                 | 72.7130507%                              | E22 * F22                   | \$ 14,198,177                         |               |
| 22 Smart Energy in Offices  | 310                                     | 1,488,592                        | \$ 143,285                     | \$ 219,748     | 11.5%            | \$ (8,793)    | \$ 210,954                    | 72.7130507%                              | E23 * F23                   | \$ 153,391                            |               |
| 23 Total for Non-Residential Conservation Programs                    | 50,922                                  | 296,712,448                      | \$ 223,661,565                 | \$ 51,264,448  |                  | \$ 19,825,668 | \$ 71,090,116                 |  |                             | \$ 51,691,792                         |               |
| NC Non-Residential Peak Demand Allocation Factor                      |   |                                  |                                |                |                  |               |                               |  |                             |                                       |               |
| 24 EnergyWise for Business  | 7,999                                   | 2,599,904                        | \$ 2,279,967                   | \$ 3,062,816   | 11.5%            | \$ (90,028)   | \$ 2,972,789                  |  |                             |                                       |               |
| 25 PowerShare   | 332,631                                 | -                                | \$ 36,012,817                  | \$ 12,922,977  | 11.5%            | \$ 2,655,332  | \$ 15,578,309                 |  |                             |                                       |               |
| 26 Total for Non-Residential DSM Programs                             | 340,629                                 | 2,599,904                        | \$ 38,292,784                  | \$ 15,985,794  |                  | \$ 2,565,304  | \$ 18,551,097                 | 73.6287551%                              | 56.324846%                  | (E10+E26) *F26 *G26                   | \$ 15,940,429 |
| 27 Total Non Residential  | 391,552                                 | 299,312,352                      | \$ 261,954,349                 | \$ 67,250,242  |                  | \$ 22,390,972 | \$ 89,641,214                 |  |                             | \$ 67,632,221                         |               |
| 28 Total All Programs   | 1,060,474                               | 887,034,326                      | \$ 516,241,575                 | \$ 159,005,671 |                  | \$ 41,339,396 | \$ 200,345,067                |  |                             | \$ 146,028,982                        |               |

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintages  
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Duke Energy Carolinas  
Evans Exhibit 1  
Vintage 2019 True Up - January 1, 2019 to December 31, 2019  
Docket Number E-7, Sub 1230  
Load Impacts and Estimated Revenue Requirements by Program

|   | A                                    | B                                | C                              | D              | E                | F             | G                             | H   |                             |   |               |
|---|--------------------------------------|----------------------------------|--------------------------------|----------------|------------------|---------------|-------------------------------|---|-----------------------------|---|---------------|
|   |                                      |                                  |                                | =(A-B)*C       | =(B+D)           |               |                               |   |                             |   |               |
| Residential Programs  | System kW Reduction<br>- Summer Peak | System Energy<br>Reduction (kWh) | System NPV of Avoided<br>Costs | Total Cost     | Shared Savings % | Incentive     | System Revenue<br>Requirement | NC Retail kWh Sales<br>Allocation Factor            | NC Allocation<br>Factor (2) | NC Residential Revenue<br>Requirement     |               |
| EE Programs   |                                      |                                  |                                |                |                  |               |                               |   |                             |   |               |
| 1 Energy Efficiency Education   | 841                                  | 6,713,787                        | \$ 2,519,645                   | \$ 1,644,077   | 11.5%            | \$ 100,690    | \$ 1,744,767                  | 73.0903918%   | E1 * F1                     | \$ 1,275,257                              |               |
| 2 Energy Efficient Appliances and Devices                             | 31,803                               | 187,351,705                      | \$ 102,051,327                 | \$ 40,433,533  | 11.5%            | \$ 7,086,046  | \$ 47,519,579                 | 73.0903918%   | E2 * F2                     | \$ 34,732,247                             |               |
| 3 HVAC Energy Efficiency  | 2,029                                | 7,329,114                        | \$ 7,079,940                   | \$ 7,402,907   | 11.5%            | \$ (37,141)   | \$ 7,365,766                  | 73.0903918%   | E3 * F3                     | \$ 5,383,667                              |               |
| 4 Income Qualified Energy Efficiency and Weatherization Assistance    | 1,074                                | 8,782,273                        | \$ 3,570,760                   | \$ 7,344,325   | 0.0%             | \$ -          | \$ 7,344,325                  | 73.0903918%   | E4 * F4                     | \$ 5,367,996                              |               |
| 5 Multi-Family Energy Efficiency                                      | 2,649                                | 24,086,174                       | \$ 11,891,700                  | \$ 3,681,262   | 11.5%            | \$ 944,200    | \$ 4,625,463                  | 73.0903918%   | E5 * F5                     | \$ 3,380,769                              |               |
| 6 Energy Assessments  | 946                                  | 7,886,916                        | \$ 4,413,585                   | \$ 3,153,757   | 11.5%            | \$ 144,880    | \$ 3,298,637                  | 73.0903918%   | E6 * F6                     | \$ 2,410,987                              |               |
| 7 Total for Residential Conservation Programs                         | 39,343                               | 242,149,969                      | \$ 131,526,956                 | \$ 63,659,861  |                  | \$ 8,238,676  | \$ 71,898,537                 |   |                             | \$ 52,550,923                             |               |
| 8 My Home Energy Report (1)   | 91,387                               | 328,439,103                      | \$ 23,361,954                  | \$ 10,558,344  | 11.5%            | \$ 1,472,415  | \$ 12,030,759                 | 73.0903918%   | E8 * F8                     | \$ 8,793,329                              |               |
| 9 Total Residential Conservation and Behavioral Programs              | 130,729                              | 570,589,071                      | \$ 154,888,911                 | \$ 74,218,205  |                  | \$ 9,711,091  | \$ 83,929,296                 |   |                             | \$ 61,344,252                             |               |
|   |                                      |                                  |                                |                |                  |               |                               | NC Residential Peak<br>Demand Allocation Factor     |                             |   |               |
| 10 PowerManager   | 568,235                              | -                                | \$ 69,783,157                  | \$ 13,386,942  | 11.5%            | \$ 6,485,565  | \$ 19,872,507                 | 74.2414264%   | 45.955615%                  | (E10+E26) *F10 *G10                       | \$ 13,583,508 |
| 11 Total Residential  | 698,965                              | 570,589,071                      | \$ 224,672,068                 | \$ 87,605,147  |                  | \$ 16,196,656 | \$ 103,801,803                |   |                             | \$ 74,927,760                             |               |
|   |                                      |                                  |                                |                |                  |               |                               |   |                             |   |               |
|   | System kW Reduction<br>- Summer Peak | System Energy<br>Reduction (kWh) | System NPV of Avoided<br>Costs | Total Cost     | Shared Savings % | Incentive     | System Revenue<br>Requirement | NC Retail kWh Sales<br>Allocation Factor            |                             | NC Non-Residential Revenue<br>Requirement |               |
| Non-Residential Programs  |                                      |                                  |                                |                |                  |               |                               |   |                             |   |               |
| EE Programs   |                                      |                                  |                                |                |                  |               |                               |   |                             |   |               |
| 12 Non Residential Smart Saver Custom Technical Assessments           | 148                                  | 1,930,762                        | \$ 691,285                     | \$ 296,006     | 11.5%            | \$ 45,457     | \$ 341,463                    | 73.0903918%   | E12 * F12                   | \$ 249,577                                |               |
| 13 Non Residential Smart Saver Custom                                 | 10,109                               | 52,522,612                       | \$ 35,884,367                  | \$ 8,873,872   | 11.5%            | \$ 3,106,207  | \$ 11,980,079                 | 73.0903918%   | E13 * F13                   | \$ 8,756,287                              |               |
| 14 Non Residential Smart Saver Energy Efficient Food Service Products | 76                                   | 870,041                          | \$ 364,227                     | \$ 339,996     | 11.5%            | \$ 2,787      | \$ 342,782                    | 73.0903918%   | E14 * F14                   | \$ 250,541                                |               |
| 15 Non Residential Smart Saver Energy Efficient HVAC Products         | 1,367                                | 5,950,986                        | \$ 4,481,911                   | \$ 2,208,364   | 11.5%            | \$ 261,458    | \$ 2,469,822                  | 73.0903918%   | E16 * F16                   | \$ 1,805,202                              |               |
| 16 Non Residential Smart Saver Energy Efficient Lighting Products     | 28,280                               | 149,658,444                      | \$ 97,967,602                  | \$ 20,834,766  | 11.5%            | \$ 8,870,276  | \$ 29,705,042                 | 73.0903918%   | E17 * F17                   | \$ 21,711,532                             |               |
| 17 Non Residential Energy Efficient Pumps and Drives Products         | 166                                  | 1,043,899                        | \$ 510,415                     | \$ 189,172     | 11.5%            | \$ 36,943     | \$ 226,115                    | 73.0903918%   | E18 * F18                   | \$ 165,268                                |               |
| 18 Non Residential Energy Efficient ITEE                              | -                                    | 8,442                            | \$ 1,038                       | \$ 44,335      | 11.5%            | \$ (4,979)    | \$ 39,355                     | 73.0903918%   | E19 * F19                   | \$ 28,765                                 |               |
| 19 Non Residential Energy Efficient Process Equipment Products        | 84                                   | 540,487                          | \$ 310,293                     | \$ 119,843     | 11.5%            | \$ 21,902     | \$ 141,745                    | 73.0903918%   | E20 * F20                   | \$ 103,602                                |               |
| 20 Non Residential Smart Saver Performance Incentive                  | 391                                  | 4,545,995                        | \$ 2,238,186                   | \$ 785,165     | 11.5%            | \$ 167,097    | \$ 952,262                    | 73.0903918%   | E21 * F21                   | \$ 696,012                                |               |
| 21 Small Business Energy Saver  | 9,196                                | 53,674,194                       | \$ 25,661,729                  | \$ 11,421,399  | 11.5%            | \$ 1,637,638  | \$ 13,059,037                 | 73.0903918%   | E22 * F22                   | \$ 9,544,901                              |               |
| 22 Smart Energy in Offices  | -                                    | -                                | \$ -                           | \$ -           | 11.5%            | \$ -          | \$ -                          | 73.0903918%   | E23 * F23                   | \$ -                                      |               |
| 23 Total for Non-Residential Conservation Programs                    | 49,817                               | 270,745,861                      | \$ 168,111,054                 | \$ 45,112,917  |                  | \$ 14,144,786 | \$ 59,257,703                 |   |                             | \$ 43,311,687                             |               |
|   |                                      |                                  |                                |                |                  |               |                               | NC Non-Residential Peak<br>Demand Allocation Factor |                             |   |               |
| 24 EnergyWise for Business  | 11,598                               | 2,704,118                        | \$ 2,728,428                   | \$ 3,687,462   | 11.5%            | \$ (110,289)  | \$ 3,577,173                  | 74.2414264%   | 54.044385%                  | (E10+E26) *F26 *G26                       | \$ 15,974,377 |
| 25 PowerShare   | 342,590                              | -                                | \$ 42,072,382                  | \$ 13,022,816  | 11.5%            | \$ 3,340,700  | \$ 16,363,516                 |   |                             | \$ 59,286,064                             |               |
| 26 Total for Non-Residential DSM Programs                             | 354,188                              | 2,704,118                        | \$ 44,800,810                  | \$ 16,710,278  |                  | \$ 3,230,411  | \$ 19,940,689                 |   |                             | \$ 15,974,377                             |               |
| 27 Total Non Residential  | 404,005                              | 273,449,978                      | \$ 212,911,864                 | \$ 61,823,195  |                  | \$ 17,375,197 | \$ 79,198,392                 |   |                             | \$ 59,286,064                             |               |
| 28 Total All Programs   | 1,102,970                            | 844,039,050                      | \$ 437,583,932                 | \$ 149,428,343 |                  | \$ 33,571,853 | \$ 183,000,195                |   |                             | \$ 134,213,824                            |               |

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintages

(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak



Duke Energy Carolinas  
Evans Exhibit 1  
Vintage 2020 Estimate - January 1, 2021 to December 31, 2021  
Docket Number E-7, Sub 1230  
Load Impacts and Estimated Revenue Requirements by Program

|   | A                                       | B                                       | C                                | D                              | E              | F                | G             | H                             |   |                             |   |                |
|---|---|---|----------------------------------|--------------------------------|----------------|------------------|---------------|-------------------------------|---|-----------------------------|---|----------------|
|   |   |   |                                  | =(A-B)*C                       | =(B+D)         |                  |               |                               |   |                             |   |                |
|   | System kW<br>Reduction - Summer<br>Peak | System kW<br>Reduction - Winter<br>Peak | System Energy<br>Reduction (kWh) | System NPV of Avoided<br>Costs | Total Cost     | Shared Savings % | Incentive     | System Revenue<br>Requirement | NC Retail kWh Sales<br>Allocation Factor                    | NC Allocation<br>Factor (2) | NC Residential Revenue<br>Requirement     |                |
| <b>Residential Programs</b>   |   |   |                                  |                                |                |                  |               |                               |   |                             |   |                |
| <b>EE Programs</b>  |   |   |                                  |                                |                |                  |               |                               |   |                             |   |                |
| 1 Energy Efficiency Education Program for Schools                         | 997                                     | 1,407                                   | 7,951,567                        | \$ 3,022,045                   | \$ 2,315,055   | 11.5%            | \$ 81,304     | \$ 2,396,358                  | 73.0903918%   |                             | E2 * F2                                   | \$ 1,751,508   |
| 2 Energy Efficient Appliances and Devices                                 | 9,790                                   | 5,988                                   | 56,621,851                       | \$ 26,094,584                  | \$ 10,615,734  | 11.5%            | \$ 1,780,068  | \$ 12,395,802                 | 73.0903918%   |                             | E3 * F3                                   | \$ 9,060,140   |
| 3 HVAC Energy Efficiency  | 1,347                                   | 1,284                                   | 5,570,374                        | \$ 4,513,202                   | \$ 5,936,054   | 11.5%            | \$ (163,628)  | \$ 5,772,426                  | 73.0903918%   |                             | E4 * F4                                   | \$ 4,219,089   |
| 4 Income Qualified Energy Efficiency and Weatherization Assistance        | 1,635                                   | 1,798                                   | 8,977,504                        | \$ 5,244,432                   | \$ 8,077,022   | 0.0%             | \$ -          | \$ 8,077,022                  | 73.0903918%   |                             | E5 * F5                                   | \$ 5,903,527   |
| 5 Multi-Family Energy Efficiency  | 2,983                                   | 4,947                                   | 28,264,645                       | \$ 14,210,714                  | \$ 4,853,158   | 11.5%            | \$ 1,076,119  | \$ 5,929,277                  | 73.0903918%   |                             | E6 * F6                                   | \$ 4,333,732   |
| 6 Energy Assessments  | 1,778                                   | 1,264                                   | 14,921,390                       | \$ 7,542,872                   | \$ 6,105,383   | 11.5%            | \$ 165,311    | \$ 6,270,694                  | 73.0903918%   |                             | E7 * F7                                   | \$ 4,583,275   |
| 7 Total for Residential Conservation Programs                             | 18,528                                  | 16,688                                  | 122,307,332                      | \$ 60,627,849                  | \$ 37,902,406  |                  | \$ 2,939,174  | \$ 40,841,580                 |   |                             |   | \$ 29,851,271  |
| 8 My Home Energy Report (1)   | 94,985                                  | 39,714                                  | 342,160,803                      | \$ 22,825,595                  | \$ 12,932,554  | 11.5%            | \$ 1,137,700  | \$ 14,070,254                 | 73.0903918%   |                             | E9 * F9                                   | \$ 10,284,004  |
| 9 Total Residential Conservation and Behavioral Programs                  | 113,514                                 | 56,402                                  | 464,468,135                      | \$ 83,453,445                  | \$ 50,834,960  |                  | \$ 4,076,874  | \$ 54,911,833                 |   |                             |   | \$ 40,135,274  |
|   |   |   |                                  |                                |                |                  |               |                               | <b>NC Residential Peak<br/>Demand Allocation Factor</b>     |                             |   |                |
| 10 PowerManager   | 658,987                                 | -                                       | -                                | \$ 82,948,182                  | \$ 20,427,903  | 11.5%            | \$ 7,189,832  | \$ 27,617,735                 | 74.2414264%   | 45.9556149%                 | (E11+E29)*F11 *G11                        | \$ 17,221,124  |
| 11 Total Residential  | 772,501                                 | 56,402                                  | 464,468,135                      | \$ 166,401,626                 | \$ 71,262,862  |                  | \$ 11,266,706 | \$ 82,529,568                 |   |                             |   | \$ 57,356,398  |
|   |   |   |                                  |                                |                |                  |               |                               |   |                             |   |                |
|   | System kW<br>Reduction - Summer<br>Peak | System kW<br>Reduction - Winter<br>Peak | System Energy<br>Reduction (kWh) | System NPV of Avoided<br>Costs | Total Cost     | Shared Savings % | Incentive     | System Revenue<br>Requirement | NC Retail kWh Sales<br>Allocation Factor                    |                             | NC Non-Residential Revenue<br>Requirement |                |
| <b>Non-Residential Programs</b>   |   |   |                                  |                                |                |                  |               |                               |   |                             |   |                |
| <b>EE Programs</b>  |   |   |                                  |                                |                |                  |               |                               |   |                             |   |                |
| 12 Non Residential Smart Saver Custom Technical Assessments               | 626                                     | 626                                     | 5,482,371                        | \$ 2,779,419                   | \$ 1,106,646   | 11.5%            | \$ 192,369    | \$ 1,299,015                  | 73.0903918%   |                             | E13 * F13                                 | \$ 949,455     |
| 13 Non Residential Smart Saver Custom                                     | 7,579                                   | 7,579                                   | 53,115,768                       | \$ 29,177,559                  | \$ 10,192,972  | 11.5%            | \$ 2,183,228  | \$ 12,376,199                 | 73.0903918%   |                             | E14 * F14                                 | \$ 9,045,813   |
| 14 Non Residential Smart Saver Energy Efficient Food Service Products     | 212                                     | 196                                     | 4,280,461                        | \$ 1,428,585                   | \$ 1,057,658   | 11.5%            | \$ 42,657     | \$ 1,100,315                  | 73.0903918%   |                             | E16 * F16                                 | \$ 804,224     |
| 15 Non Residential Smart Saver Energy Efficient HVAC Products             | 1,118                                   | 439                                     | 3,698,306                        | \$ 2,369,564                   | \$ 1,732,792   | 11.5%            | \$ 73,229     | \$ 1,806,021                  | 73.0903918%   |                             | E17 * F17                                 | \$ 1,320,028   |
| 16 Non Residential Smart Saver Energy Efficient Lighting Products         | 27,805                                  | 26,034                                  | 156,866,525                      | \$ 94,718,674                  | \$ 24,280,837  | 11.5%            | \$ 8,100,351  | \$ 32,381,188                 | 73.0903918%   |                             | E18 * F18                                 | \$ 23,667,537  |
| 17 Non Residential Smart Saver Energy Efficient Pumps and Drives Products | 429                                     | 424                                     | 2,717,418                        | \$ 1,234,566                   | \$ 424,983     | 11.5%            | \$ 93,102     | \$ 518,085                    | 73.0903918%   |                             | E19 * F19                                 | \$ 378,671     |
| 18 Non Residential Energy Efficient ITE                                   | -                                       | -                                       | 272,355                          | \$ 28,640                      | \$ 47,381      | 11.5%            | \$ (2,155)    | \$ 45,226                     | 73.0903918%   |                             | E20 * F20                                 | \$ 33,056      |
| 19 Non Residential Energy Efficient Process Equipment Products            | 186                                     | 206                                     | 877,998                          | \$ 382,954                     | \$ 117,383     | 11.5%            | \$ 30,541     | \$ 147,924                    | 73.0903918%   |                             | E21 * F21                                 | \$ 108,118     |
| 20 Non Residential Smart Saver Performance Incentive                      | 1,701                                   | 1,701                                   | 14,901,572                       | \$ 7,088,559                   | \$ 2,365,586   | 11.5%            | \$ 543,142    | \$ 2,908,728                  | 73.0903918%   |                             | E22 * F22                                 | \$ 2,126,000   |
| 21 Small Business Energy Saver  | 9,404                                   | 5,944                                   | 50,790,447                       | \$ 23,817,495                  | \$ 11,026,688  | 11.5%            | \$ 1,470,943  | \$ 12,497,630                 | 73.0903918%   |                             | E23 * F23                                 | \$ 9,134,567   |
| 22 Total for Non-Residential Conservation Programs                        | 49,060                                  | 43,150                                  | 293,003,221                      | \$ 163,026,017                 | \$ 52,352,927  |                  | \$ 12,727,405 | \$ 65,080,332                 |   |                             |   | \$ 47,567,470  |
|   |   |   |                                  |                                |                |                  |               |                               | <b>NC Non-Residential Peak<br/>Demand Allocation Factor</b> |                             |   |                |
| 23 EnergyWise for Business  | 20,801                                  | -                                       | 2,557,568                        | \$ 3,489,310                   | \$ 5,981,812   | 11.5%            | \$ (286,638)  | \$ 5,695,174                  |   |                             |   |                |
| 24 PowerShare   | 344,454                                 | 664                                     | -                                | \$ 43,471,361                  | \$ 13,743,409  | 11.5%            | \$ 3,418,714  | \$ 17,162,124                 |   |                             |   |                |
| 25 Total for Non-Residential DSM Programs                                 | 365,255                                 | 664                                     | 2,557,568                        | \$ 46,960,671                  | \$ 19,725,221  |                  | \$ 3,132,077  | \$ 22,857,298                 | 74.2414264%   | 54.0443851%                 | (E11+E29) *F29 *G29                       | \$ 20,252,260  |
| 26 Total Non Residential  | 414,316                                 | 43,814                                  | 295,560,789                      | \$ 209,986,688                 | \$ 72,078,147  |                  | \$ 15,859,482 | \$ 87,937,630                 |   |                             |   | \$ 67,819,730  |
| 27 Total All Programs   | 1,186,817                               | 100,217                                 | 760,028,924                      | \$ 376,388,314                 | \$ 143,341,010 |                  | \$ 27,126,188 | \$ 170,467,198                |   |                             |   | \$ 125,176,128 |

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintages  
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Duke Energy Carolinas, LLC  
For the Period January 1, 2017 - December 31, 2021  
Docket Number E-7, Sub 1230  
North Carolina Net Lost Revenue Estimates for Vintages 2017 - 2021

| Line | Vintage 2017<br>Residential   | 2017 <sup>(a)</sup> | 2018          | 2019          | 2020         | 2021 | Total      |
|------|---|---------------------|---------------|---------------|--------------|------|------------|
| 1    | Residential Energy Assessments  | \$ 198,264          | \$ 274,951    | \$ 178,148    | \$ 66,827    | \$   | 718,191    |
| 2    | My Home Energy Report   | 14,455,527          | -             | -             | -            |      | 14,455,527 |
| 3    | Energy Efficient Appliances and Devices                                 | 3,386,885           | 5,134,538     | 3,329,346     | 1,366,974    |      | 13,217,743 |
| 4    | Residential – Smart Saver Energy Efficiency Program                     | 197,134             | 264,823       | 171,558       | 62,120       |      | 695,635    |
| 5    | Appliance Recycle Program   | -                   | -             | -             | -            |      | -          |
| 6    | Income Qualified Energy Efficiency and Weatherization Assistance        | 141,450             | 210,612       | 136,514       | 55,631       |      | 544,208    |
| 7    | Multi-Family Energy Efficiency  | 535,154             | 743,597       | 478,801       | 177,645      |      | 1,935,197  |
| 8    | Energy Efficiency Education   | 165,283             | 221,302       | 143,362       | 49,313       |      | 579,260    |
| 9    | Total Lost Revenues   | 19,079,697          | 6,849,823     | 4,437,730     | 1,778,511    |      | 32,145,761 |
| 10   | Lost Revenue Decrement Pending Rate Case Implementation                 | -                   | -             | -             | 289,930      |      | 289,930    |
| 11   | Found Residential Revenues *  | -                   | -             | -             | -            |      | -          |
| 12   | Net Lost Residential Revenues   | \$ 19,079,697       | \$ 6,849,823  | \$ 4,437,730  | \$ 1,488,581 | \$   | 31,855,831 |
|      |   |                     |               |               |              |      |            |
|      | Non-Residential   | 2017 <sup>(a)</sup> | 2018          | 2019          | 2020         | 2021 | Total      |
| 13   | Nonresidential Smart Saver Custom Energy Assessments                    | \$ 220,191          | \$ 358,289    | \$ 366,388    | \$ 143,464   | \$   | 1,088,332  |
| 14   | Non Residential Smart Saver Custom                                      | 435,407             | 871,334       | 901,545       | 368,351      |      | 2,576,637  |
| 15   | Energy Management Information Services                                  | -                   | -             | -             | -            |      | -          |
| 16   | Non Residential Smart Saver Energy Efficient Food Service Products      | 28,410              | 40,771        | 41,428        | 12,007       |      | 122,616    |
| 17   | Non Residential Smart Saver Energy Efficient HVAC Products              | 61,639              | 110,255       | 110,083       | 43,442       |      | 325,419    |
| 18   | Non Residential Smart Saver Energy Efficient Lighting Products          | 6,200,869           | 10,299,304    | 10,366,805    | 3,645,665    |      | 30,512,643 |
| 19   | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 58,808              | 127,509       | 132,526       | 61,892       |      | 380,734    |
| 20   | Non Residential Smart Saver Energy Efficient IT Products                | 82                  | 162           | 162           | 61           |      | 468        |
| 21   | Non Residential Smart Saver Energy Efficient Process Equipment Products | 8,160               | 12,172        | 12,410        | 3,804        |      | 36,547     |
| 22   | Non Residential Smart Saver Performance Incentive                       | 66                  | 774           | 759           | 442          |      | 2,041      |
| 23   | Small Business Energy Saver   | 2,203,337           | 3,774,927     | 3,785,763     | 1,381,942    |      | 11,145,969 |
| 24   | Smart Energy in Offices   | 209,310             | 149,382       | -             | -            |      | 358,692    |
| 25   | Business Energy Report  | -                   | -             | -             | -            |      | -          |
| 26   | EnergyWise for Business   | 85,268              | 158,514       | 158,671       | 65,096       |      | 467,549    |
| 27   | Total Lost Revenues   | 9,511,547           | 15,903,393    | 15,876,541    | 5,726,167    |      | 47,017,648 |
| 28   | Lost Revenue Decrement Pending Rate Case Implementation                 | -                   | -             | -             | 926,185      |      | 926,185    |
| 29   | Found Non-Residential Revenues *  | -                   | -             | -             | -            |      | -          |
| 30   | Net Lost Non-Residential Revenues                                       | \$ 9,511,547        | \$ 15,903,393 | \$ 15,876,541 | \$ 4,799,982 | \$   | 46,091,463 |

\* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

| Line | Vintage 2018  |                     |               |               |              |              | Total         |
|------|---|---------------------|---------------|---------------|--------------|--------------|---------------|
|      | Residential   | 2017 <sup>(a)</sup> | 2018          | 2019          | 2020         | 2021         |               |
| 31   | Residential Energy Assessments  |                     | \$ 204,097    | \$ 359,848    | \$ 210,787   | \$ -         | \$ 774,732    |
| 32   | My Home Energy Report   |                     | 15,751,701    | -             | -            | -            | 15,751,701    |
| 33   | Energy Efficient Appliances and Devices                                 |                     | 4,299,434     | 9,243,154     | 5,414,309    | -            | 18,956,897    |
| 34   | Residential – Smart Saver Energy Efficiency Program                     |                     | 161,443       | 324,295       | 189,962      | -            | 675,700       |
| 35   | Appliance Recycle Program   |                     | -             | -             | -            | -            | -             |
| 36   | Income Qualified Energy Efficiency and Weatherization Assistance        |                     | 154,376       | 340,042       | 199,184      | -            | 693,602       |
| 37   | Multi-Family Energy Efficiency  |                     | 500,533       | 1,108,252     | 649,218      | -            | 2,258,002     |
| 38   | Energy Efficiency Education   |                     | 128,311       | 265,267       | 155,385      | -            | 548,962       |
| 39   | Total Lost Revenues   | -                   | 21,199,894    | 11,640,858    | 6,818,844    | -            | 39,659,596    |
| 40   | Lost Revenue Decrement Pending Rate Case Implementation                 |                     | -             | -             | 1,608,585    | -            | 1,608,585     |
| 41   | Found Residential Revenues *  |                     | -             | -             | -            | -            | -             |
| 42   | Net Lost Residential Revenues   | \$ -                | \$ 21,199,894 | \$ 11,640,858 | \$ 5,210,259 | \$ -         | \$ 38,051,011 |
|      |   |                     |               |               |              |              |               |
|      | Non-Residential   | 2017 <sup>(a)</sup> | 2018          | 2019          | 2020         | 2021         | Total         |
| 43   | Nonresidential Smart Saver Custom Energy Assessments                    |                     | \$ 212        | \$ 866        | \$ 671       | \$ 300       | \$ 2,049      |
| 44   | Non Residential Smart Saver Custom                                      |                     | 462,774       | 773,959       | 599,124      | 134,979      | 1,970,835     |
| 45   | Energy Management Information Services                                  |                     | -             | -             | -            | -            | -             |
| 46   | Non Residential Smart Saver Energy Efficient Food Service Products      |                     | 14,117        | 22,612        | 17,505       | 3,772        | 58,006        |
| 47   | Non Residential Smart Saver Energy Efficient HVAC Products              |                     | 50,245        | 116,447       | 90,192       | 30,218       | 287,102       |
| 48   | Non Residential Smart Saver Energy Efficient Lighting Products          |                     | 4,102,094     | 6,719,187     | 5,203,682    | 1,182,368    | 17,207,330    |
| 49   | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  |                     | 66,649        | 87,662        | 67,855       | 8,628        | 230,793       |
| 50   | Non Residential Smart Saver Energy Efficient IT Products                |                     | 185           | 876           | 678          | 317          | 2,056         |
| 51   | Non Residential Smart Saver Energy Efficient Process Equipment Products |                     | 6,501         | 10,498        | 8,128        | 1,776        | 26,903        |
| 52   | Non Residential Smart Saver Performance Incentive                       |                     | 20,243        | 84,759        | 65,573       | 29,373       | 199,948       |
| 53   | Small Business Energy Saver   |                     | 1,776,069     | 3,462,894     | 2,681,778    | 765,602      | 8,686,343     |
| 54   | Smart Energy in Offices   |                     | 39,733        | 3,847         | -            | -            | 43,580        |
| 55   | Business Energy Report  |                     | -             | -             | -            | -            | -             |
| 56   | EnergyWise for Business   |                     | 66,282        | 120,486       | 93,316       | 24,695       | 304,779       |
| 57   | Total Lost Revenues   | -                   | 6,605,105     | 11,404,093    | 8,828,500    | 2,182,027    | 29,019,725    |
| 58   | Lost Revenue Decrement Pending Rate Case Implementation                 |                     | -             | -             | 1,574,142    | -            | 1,574,142     |
| 59   | Found Non-Residential Revenues *  |                     | -             | -             | -            | -            | -             |
| 60   | Net Lost Non-Residential Revenues                                       | \$ -                | \$ 6,605,105  | \$ 11,404,093 | \$ 7,254,358 | \$ 2,182,027 | \$ 27,445,583 |

\* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

| Line | Vintage 2019  |                     |      |               |              |               |               |
|------|---|---------------------|------|---------------|--------------|---------------|---------------|
|      | Residential   | 2017 <sup>(a)</sup> | 2018 | 2019          | 2020         | 2021          | Total         |
| 61   | Residential Energy Assessments  |                     |      | \$ 195,756    | \$ 277,275   | \$ 160,688    | \$ 633,719    |
| 62   | My Home Energy Report   |                     |      | 16,556,381    | -            | -             | 16,556,381    |
| 63   | Energy Efficient Appliances and Devices                                 |                     |      | 4,884,189     | 6,969,929    | 4,117,409     | 15,971,527    |
| 64   | Residential – Smart Saver Energy Efficiency Program                     |                     |      | 192,394       | 297,957      | 176,553       | 666,904       |
| 65   | Appliance Recycle Program   |                     |      | -             | -            | -             | -             |
| 66   | Income Qualified Energy Efficiency and Weatherization Assistance        |                     |      | 220,072       | 313,091      | 179,201       | 712,365       |
| 67   | Multi-Family Energy Efficiency  |                     |      | 645,327       | 911,703      | 503,312       | 2,060,342     |
| 68   | Energy Efficiency Education   |                     |      | 148,216       | 260,619      | 155,168       | 564,003       |
| 69   | Total Lost Revenues   | -                   |      | 22,842,336    | 9,030,574    | 5,292,331     | 37,165,240    |
| 70   | Lost Revenue Decrement Pending Rate Case Implementation                 |                     |      |               | 866,360      |               | 866,360       |
| 71   | Found Residential Revenues *  |                     |      | -             | -            | -             | -             |
| 72   | Net Lost Residential Revenues   | \$ -                |      | \$ 22,842,336 | \$ 8,164,214 | \$ 5,292,331  | \$ 36,298,880 |
|      |   |                     |      |               |              |               |               |
|      | Non-Residential   | 2017 <sup>(a)</sup> | 2018 | 2019          | 2020         | 2021          | Total         |
| 73   | Nonresidential Smart Saver Custom Energy Assessments                    |                     |      | \$ 83,809     | \$ 87,137    | \$ 87,137     | \$ 258,083    |
| 74   | Non Residential Smart Saver Custom                                      |                     |      | 872,916       | 1,892,292    | 1,892,292     | 4,657,500     |
| 75   | Energy Management Information Services                                  |                     |      |               |              |               |               |
| 76   | Non Residential Smart Saver Energy Efficient Food Service Products      |                     |      | 11,399        | 22,027       | 22,027        | 55,453        |
| 77   | Non Residential Smart Saver Energy Efficient HVAC Products              |                     |      | 156,513       | 369,527      | 369,527       | 895,568       |
| 78   | Non Residential Smart Saver Energy Efficient Lighting Products          |                     |      | 3,333,966     | 5,782,387    | 5,782,387     | 14,898,740    |
| 79   | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  |                     |      | 20,742        | 40,055       | 40,055        | 100,851       |
| 80   | Non Residential Smart Saver Energy Efficient IT Products                |                     |      | 250           | 448          | 448           | 1,145         |
| 81   | Non Residential Smart Saver Energy Efficient Process Equipment Products |                     |      | 15,405        | 20,738       | 20,738        | 56,882        |
| 82   | Non Residential Smart Saver Performance Incentive                       |                     |      | 24,374        | 119,631      | 119,631       | 263,637       |
| 83   | Small Business Energy Saver   |                     |      | 1,334,037     | 2,334,068    | 2,334,068     | 6,002,173     |
| 84   | Smart Energy in Offices   |                     |      | -             | -            | -             | -             |
| 85   | Business Energy Report  |                     |      | -             | -            | -             | -             |
| 86   | EnergyWise for Business   |                     |      | 62,574        | 126,345      | 126,345       | 315,263       |
| 87   | Total Lost Revenues   | -                   |      | 5,915,986     | 10,794,655   | 10,794,655    | 27,505,296    |
| 88   | Lost Revenue Decrement Pending Rate Case Implementation                 |                     |      |               | 1,448,109    |               | 1,448,109     |
| 89   | Found Non-Residential Revenues *  |                     |      | -             | -            | -             | -             |
| 90   | Net Lost Non-Residential Revenues                                       | \$ -                |      | \$ 5,915,986  | \$ 9,346,546 | \$ 10,794,655 | \$ 26,057,187 |

\* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

| Line | Vintage 2020<br>Residential                                      |                     |      |      |               |              | Total         |
|------|--|---------------------|------|------|---------------|--------------|---------------|
|      |  | 2017 <sup>(a)</sup> | 2018 | 2019 | 2020          | 2021         |               |
| 91   | Residential Energy Assessments                                   |                     |      |      | 161,966       | 289,779      | \$ 451,745    |
| 92   | My Home Energy Report  |                     |      |      | 14,686,468    | -            | 14,686,468    |
| 93   | Energy Efficient Appliances and Devices                          |                     |      |      | 1,237,431     | 1,982,233    | 3,219,664     |
| 94   | Residential – Smart Saver Energy Efficiency Program              |                     |      |      | 263,183       | 498,132      | 761,315       |
| 95   | Appliance Recycle Program  |                     |      |      | -             | -            | -             |
| 96   | Income Qualified Energy Efficiency and Weatherization Assistance |                     |      |      | 103,534       | 362,395      | 465,930       |
| 97   | Multi-Family Energy Efficiency                                   |                     |      |      | 496,249       | 939,264      | 1,435,513     |
| 98   | Energy Efficiency Education                                      |                     |      |      | 146,751       | 423,675      | 570,426       |
| 99   | Total Lost Revenues  | -                   | -    | -    | 17,095,583    | 4,495,479    | 21,591,062    |
| 100  | Lost Revenue Decrement Pending Rate Case Implementation          |                     |      |      | 2,428,488     | -            | 2,428,488     |
| 101  | Found Residential Revenues *                                     |                     |      |      | -             | -            | -             |
| 102  | Net Lost Residential Revenues                                    | \$ -                | \$ - | \$ - | \$ 14,667,095 | \$ 4,495,479 | \$ 19,162,574 |

| Line | Non-Residential   |                     |      |      |              |              | Total         |
|------|---|---------------------|------|------|--------------|--------------|---------------|
|      |   | 2017 <sup>(a)</sup> | 2018 | 2019 | 2020         | 2021         |               |
| 103  | Nonresidential Smart Saver Custom Energy Assessments                    |                     |      |      | \$ 136,414   | \$ 250,432   | \$ 386,846    |
| 104  | Non Residential Smart Saver Custom                                      |                     |      |      | 1,201,984    | 2,299,277    | 3,501,261     |
| 105  | Energy Management Information Services                                  |                     |      |      | -            | -            | -             |
| 106  | Non Residential Smart Saver Energy Efficient Food Service Products      |                     |      |      | 93,624       | 138,074      | 231,698       |
| 107  | Non Residential Smart Saver Energy Efficient HVAC Products              |                     |      |      | 61,819       | 83,451       | 145,269       |
| 108  | Non Residential Smart Saver Energy Efficient Lighting Products          |                     |      |      | 3,029,908    | 4,219,711    | 7,249,619     |
| 109  | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  |                     |      |      | 94,651       | 147,632      | 242,283       |
| 110  | Non Residential Smart Saver Energy Efficient IT Products                |                     |      |      | 6,639        | 10,148       | 16,786        |
| 111  | Non Residential Smart Saver Energy Efficient Process Equipment Products |                     |      |      | 12,061       | 17,544       | 29,605        |
| 112  | Non Residential Smart Saver Performance Incentive                       |                     |      |      | 402,902      | 726,898      | 1,129,800     |
| 113  | Small Business Energy Saver   |                     |      |      | 955,245      | 1,413,098    | 2,368,343     |
| 114  | Smart Energy in Offices   |                     |      |      | -            | -            | -             |
| 115  | Business Energy Report  |                     |      |      | -            | -            | -             |
| 116  | EnergyWise for Business   |                     |      |      | 46,148       | 70,456       | 116,603       |
| 117  | Total Lost Revenues   | -                   | -    | -    | 6,041,394    | 9,376,721    | 15,418,115    |
| 118  | Lost Revenue Decrement Pending Rate Case Implementation                 |                     |      |      | 858,201      | -            | 858,201       |
| 119  | Found Non-Residential Revenues *  |                     |      |      | -            | -            | -             |
| 120  | Net Lost Non-Residential Revenues                                       | \$ -                | \$ - | \$ - | \$ 5,183,193 | \$ 9,376,721 | \$ 14,559,914 |

\* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

| Line | Vintage 2021  |                     |      |      |      |               | Total         |
|------|---|---------------------|------|------|------|---------------|---------------|
|      | Residential   | 2017 <sup>(a)</sup> | 2018 | 2019 | 2020 | 2021          |               |
| 121  | Residential Energy Assessments  |                     |      |      |      | 390,315       | \$ 390,315    |
| 122  | My Home Energy Report   |                     |      |      |      | 22,036,642    | 22,036,642    |
| 123  | Energy Efficient Appliances and Devices                                 |                     |      |      |      | 1,461,671     | 1,461,671     |
| 124  | Residential – Smart Saver Energy Efficiency Program                     |                     |      |      |      | 141,218       | 141,218       |
| 125  | Appliance Recycle Program   |                     |      |      |      | -             | -             |
| 126  | Income Qualified Energy Efficiency and Weatherization Assistance        |                     |      |      |      | 211,920       | 211,920       |
| 127  | Multi-Family Energy Efficiency  |                     |      |      |      | 748,492       | 748,492       |
| 128  | Energy Efficiency Education   |                     |      |      |      | 215,041       | 215,041       |
| 129  | Total Lost Revenues   | -                   |      | -    | -    | 25,205,298    | 25,205,298    |
| 130  | Found Residential Revenues *  |                     |      |      |      | -             | -             |
| 131  | Net Lost Residential Revenues   | \$ -                |      | \$ - | \$ - | \$ 25,205,298 | \$ 25,205,298 |
|      |   |                     |      |      |      |               |               |
|      | Non-Residential   | 2017 <sup>(a)</sup> | 2018 | 2019 | 2020 | 2021          | Total         |
| 132  | Nonresidential Smart Saver Custom Energy Assessments                    |                     |      |      |      | \$ 93,807     | \$ 93,807     |
| 133  | Non Residential Smart Saver Custom                                      |                     |      |      |      | 986,152       | 986,152       |
| 134  | Energy Management Information Services                                  |                     |      |      |      | -             | -             |
| 135  | Non Residential Smart Saver Energy Efficient Food Service Products      |                     |      |      |      | 107,100       | 107,100       |
| 136  | Non Residential Smart Saver Energy Efficient HVAC Products              |                     |      |      |      | 87,660        | 87,660        |
| 137  | Non Residential Smart Saver Energy Efficient Lighting Products          |                     |      |      |      | 3,741,050     | 3,741,050     |
| 138  | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  |                     |      |      |      | 56,674        | 56,674        |
| 139  | Non Residential Smart Saver Energy Efficient IT Products                |                     |      |      |      | 5,557         | 5,557         |
| 140  | Non Residential Smart Saver Energy Efficient Process Equipment Products |                     |      |      |      | 14,632        | 14,632        |
| 141  | Non Residential Smart Saver Performance Incentive                       |                     |      |      |      | 265,513       | 265,513       |
| 142  | Small Business Energy Saver   |                     |      |      |      | 953,671       | 953,671       |
| 143  | Smart Energy in Offices   |                     |      |      |      | -             | -             |
| 144  | Business Energy Report  |                     |      |      |      | -             | -             |
| 145  | EnergyWise for Business   |                     |      |      |      | 48,898        | 48,898        |
| 146  | Total Lost Revenues   | -                   |      | -    | -    | 6,360,715     | 6,360,715     |
| 147  | Found Non-Residential Revenues *  |                     |      |      |      | -             | -             |
| 148  | Net Lost Non-Residential Revenues                                       | \$ -                |      | \$ - | \$ - | \$ 6,360,715  | \$ 6,360,715  |

\* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

| Line | Vintage 2021<br>Residential                                      |      |                     |      |      |      |      | Total |
|------|--|------|---------------------|------|------|------|------|-------|
|      |  | 2016 | 2017 <sup>(a)</sup> | 2018 | 2019 | 2020 | 2021 |       |
| 149  | Residential Energy Assessments                                   |      |                     |      |      |      | \$   | -     |
| 150  | My Home Energy Report  |      |                     |      |      |      |      | -     |
| 151  | Energy Efficient Appliances and Devices                          |      |                     |      |      |      |      | -     |
| 152  | Residential – Smart Saver Energy Efficiency Program              |      |                     |      |      |      |      | -     |
| 153  | Appliance Recycle Program  |      |                     |      |      |      |      | -     |
| 154  | Income Qualified Energy Efficiency and Weatherization Assistance |      |                     |      |      |      |      | -     |
| 155  | Multi-Family Energy Efficiency                                   |      |                     |      |      |      |      | -     |
| 156  | Energy Efficiency Education                                      |      |                     |      |      |      |      | -     |
| 157  | Total Lost Revenues  | -    | -                   | -    | -    | -    | -    | -     |
| 158  | Found Residential Revenues *                                     | -    | -                   | -    | -    | -    | -    | -     |
| 159  | Net Lost Residential Revenues                                    | \$ - | \$ -                | \$ - | \$ - | \$ - | \$ - | \$ -  |

| Line | Non-Residential   |              |                     |               |              |      |      | Total         |
|------|---|--------------|---------------------|---------------|--------------|------|------|---------------|
|      |   | 2016         | 2017 <sup>(a)</sup> | 2018          | 2019         | 2020 | 2021 |               |
| 160  | Nonresidential Smart Saver Custom Energy Assessments                    | \$ 199,079   | \$ 389,585          | \$ 318,658    | \$ 114,463   |      | \$   | 1,021,784     |
| 161  | Non Residential Smart Saver Custom                                      | 914,009      | 1,703,790           | 1,398,549     | 481,717      |      |      | 4,498,065     |
| 162  | Energy Management Information Services                                  | -            | -                   | -             | -            |      |      | -             |
| 163  | Non Residential Smart Saver Energy Efficient Food Service Products      | 24,889       | 66,328              | 54,035        | 24,113       |      |      | 169,365       |
| 164  | Non Residential Smart Saver Energy Efficient HVAC Products              | 46,952       | 103,028             | 83,640        | 32,091       |      |      | 265,711       |
| 165  | Non Residential Smart Saver Energy Efficient Lighting Products          | 2,925,514    | 6,589,455           | 5,321,493     | 2,084,521    |      |      | 16,920,983    |
| 166  | Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 38,898       | 66,558              | 54,453        | 16,625       |      |      | 176,534       |
| 167  | Non Residential Smart Saver Energy Efficient IT Products                | 59,904       | 75,403              | 61,613        | 9,592        |      |      | 206,512       |
| 168  | Non Residential Smart Saver Energy Efficient Process Equipment Products | 4,731        | 10,652              | 8,811         | 3,508        |      |      | 27,702        |
| 169  | Non Residential Smart Saver Performance Incentive                       |              |                     |               |              |      |      | -             |
| 170  | Small Business Energy Saver   | 2,145,932    | 4,346,981           | 3,511,109     | 1,244,128    |      |      | 11,248,149    |
| 171  | Smart Energy in Offices   | 227,062      | 418,553             | -             | -            |      |      | 645,616       |
| 172  | Business Energy Report  | -            | -                   | -             | -            |      |      | -             |
| 173  | EnergyWise for Business   | 15,922       | 36,788              | 29,639        | 11,725       |      |      | 94,074        |
| 174  | Total Lost Revenues   | 6,602,893    | 13,807,121          | 10,841,999    | 4,022,482    | -    | -    | 35,274,494    |
| 175  | Found Non-Residential Revenues *  | -            | -                   | -             | -            | -    | -    | -             |
| 176  | Net Lost Non-Residential Revenues                                       | \$ 6,602,893 | \$ 13,807,121       | \$ 10,841,999 | \$ 4,022,482 | \$ - | \$ - | \$ 35,274,494 |

\* Found Revenues - See Evans Exhibit 4

(a) Lost revenues were estimated by applying forecasted lost revenue rates for residential and non-residential customers to state specific forecasted program participation.

Duke Energy Carolinas, LLC  
For the Period January 1, 2019 - December 31, 2019  
Docket Number E-7 Sub 1230  
Actual Program Costs for Vintage Years 2017, 2018 , 2019

|    |  | Carolinas System - 12<br>months Ended<br>12/31/2017 | Carolinas System - 12<br>months Ended<br>12/31/2018 | Carolinas System - 12<br>months Ended<br>12/31/2019 |
|----|--|---|---|---|
| 1  | Residential Energy Assessments                                   | 2,909,098   | 2,836,229   | 3,153,757   |
| 2  | My Home Energy Report  | 13,812,250  | 12,765,286  | 10,558,344  |
| 3  | Energy Efficient Appliances and Devices                          | 30,340,728  | 42,687,244  | 40,433,533  |
| 4  | Residential – Smart Saver Energy Efficiency Program              | 7,403,327   | 6,955,146   | 7,402,907   |
| 5  | Appliance Recycle Program  | 5,307   | -   | -   |
| 6  | Income Qualified Energy Efficiency and Weatherization Assistance | 5,505,992   | 6,490,735   | 7,344,325   |
| 7  | Multi family Energy Efficiency                                   | 3,168,422   | 3,604,921   | 3,681,262   |
| 8  | Energy Efficiency Education                                      | 2,077,611   | 1,992,260   | 1,644,077   |
| 9  | Nonresidential Smart Saver Custom Energy Assessments             | 2,139,875   | 407,293   | 296,006   |
| 10 | Energy Management Information Systems                            |   |   |   |
| 11 | Non-Residential Smart Saver Custom                               | 7,304,838   | 6,068,902   | 8,873,872   |
| 12 | Non-Residential Smart Saver Performance Incentive                | 320,559   | 479,610   | 785,165   |
| 13 | Non-Residential Energy Efficient Food Service Products           | 306,488   | 235,605   | 339,996   |
| 14 | Non-Residential Smart Saver Energy Efficient HVAC Products       | 1,560,769   | 1,620,748   | 2,208,364   |
| 15 | Non-Residential Smart Saver Energy Efficient Lighting Products   | 66,689,770  | 25,872,380  | 20,834,766  |
| 16 | Nonresidential Energy Efficient Pumps and Drives Products        | 528,937   | 277,785   | 189,172   |
| 17 | Nonresidential Energy Efficient ITEE                             | 61,215  | 36,875  | 44,335  |
| 18 | Nonresidential Energy Efficient Process Equipment Products       | 162,413   | 67,509  | 119,843   |
| 19 | Smart Energy In Offices  | 891,010   | 219,748   | -   |
| 20 | Small Business Energy Saver                                      | 17,350,972  | 15,977,993  | 11,421,399  |
| 21 | Business Energy Report   | 126,680   | -   | -   |
| 22 | Power Manager  | 14,021,500  | 14,423,610  | 13,386,942  |
| 23 | EnergyWise for Business  | 2,484,618   | 3,062,816   | 3,687,462   |
| 24 | Power Share  | 13,316,535  | 12,922,977  | 13,022,816  |
| 25 |  |   |   |   |
| 26 | <b>Total Energy Efficiency &amp; Demand Side Program Costs</b>   | <b>\$ 192,488,915</b>                               | <b>\$ 159,005,671</b>                               | <b>\$ 149,428,343</b>                               |
| 27 | NC Allocation Factor for EE programs                             | 72.8087506%   | 72.7130507%   | 73.0903918%   |
| 28 | NC Allocation Factor for DSM programs-Residential                | 33.8075104%   | 32.1574721%   | 34.1181040%   |
| 29 | NC Allocation Factor for DSM programs-Non-Residential            | 40.0747013%   | 41.4712829%   | 40.1233224%   |
| 30 | Residential Energy Assessments                                   | 2,118,078   | 2,062,308   | 2,305,093   |
| 31 | My Home Energy Report  | 10,056,526  | 9,282,029   | 7,717,135   |
| 32 | Energy Efficient Appliances and Devices                          | 22,090,705  | 31,039,197  | 29,553,027  |
| 33 | Residential – Smart Saver Energy Efficiency Program              | 5,390,270   | 5,057,299   | 5,410,814   |
| 34 | Appliance Recycle Program  | 3,864   | -   | -   |
| 35 | Income Qualified Energy Efficiency and Weatherization Assistance | 4,008,844   | 4,719,611   | 5,367,996   |
| 36 | Multi family Energy Efficiency                                   | 2,306,888   | 2,621,248   | 2,690,649   |
| 37 | Energy Efficiency Education                                      | 1,512,683   | 1,448,633   | 1,201,662   |
| 38 | Nonresidential Smart Saver Custom Energy Assessments             | 1,558,016   | 296,155   | 216,352   |
| 39 | Energy Management Information Systems                            | -   | -   | -   |
| 40 | Non-Residential Smart Saver Custom                               | 5,318,561   | 4,412,884   | 6,485,948   |
| 41 | Non-Residential Smart Saver Performance Incentive                | 233,395   | 348,739   | 573,880   |
| 42 | Non-Residential Energy Efficient Food Service Products           | 223,150   | 171,315   | 248,504   |
| 43 | Non-Residential Smart Saver Energy Efficient HVAC Products       | 1,136,376   | 1,178,495   | 1,614,102   |
| 44 | Non-Residential Smart Saver Energy Efficient Lighting Products   | 48,555,988  | 18,812,597  | 15,228,212  |
| 45 | Nonresidential Energy Efficient Pumps and Drives Products        | 385,112   | 201,986   | 138,267   |
| 46 | Nonresidential Energy Efficient ITEE                             | 44,570  | 26,813  | 32,404  |
| 47 | Nonresidential Energy Efficient Process Equipment Products       | 118,251   | 49,088  | 87,594  |
| 48 | Smart Energy In Offices  | 648,734   | 159,785   | -   |
| 49 | Small Business Energy Saver                                      | 12,633,026  | 11,618,086  | 8,347,945   |
| 50 | Business Energy Report   | 92,234  | -   | -   |
| 51 | Power Manager  | 10,082,296  | 9,778,895   | 10,268,601  |
| 52 | EnergyWise for Business  | 1,879,262   | 2,416,251   | 2,664,815   |
| 53 | Power Share  | 10,072,077  | 10,194,918  | 9,411,189   |
| 54 |  |   |   |   |
| 55 | <b>Total Energy Efficiency &amp; Demand Side Program Costs</b>   | <b>\$ 140,468,909</b>                               | <b>\$ 115,896,335</b>                               | <b>\$ 109,564,190</b>                               |

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## Evans Exhibit 5

Duke Energy Carolinas  
System Event Based Demand Response January 1, 2019 - December 31, 2019  
Docket Number E-7, Sub 1230

| Date      | State     | Program Name  | Event Trigger | High / Low System Temp<br>(F) | Customers Notified /Switches Dispatched               | MW Reduction |
|-----------|-----------|---------------|---------------|-------------------------------|---|--------------|
| 7/15/2019 | NC and SC | Power Manager | M&V Event     | 91 / 74                       | 226,600 / 272,600                                     | 275.0        |
| 7/19/2019 | NC and SC | Power Manager | M&V Event     | 94 / 74                       | 23,800 / 28,700                                       | n/a          |
| 8/9/2019  | NC and SC | Power Manager | M&V Event     | 93 / 70                       | 238,400 / 286,700                                     | 302.3        |
| 8/19/2019 | NC and SC | Power Manager | M&V Event     | 92 / 73                       | Tests across different hours with different subgroups | n/a          |
| 9/9/2019  | NC and SC | Power Manager | M&V Event     | 93 / 68                       | 226,800 / 272,700                                     | 182.9        |
| 9/12/2019 | NC and SC | Power Manager | M&V Event     | 96 / 71                       | 226,800 / 272,700                                     | 230.0        |
| 9/17/2019 | NC and SC | Power Manager | M&V Event     | 91 / 69                       | 226,600 / 272,500                                     | 200.0        |
| 9/26/2019 | NC and SC | Power Manager | M&V Event     | 92 / 65                       | 226,500 / 272,300                                     | 227.3        |

**Notes:**

- The 'High / Low System Temperature' is the average of the daily high & low temperatures from 3 weather stations (Charlotte, Greensboro, Greenville/Spartanburg)
- 'Customers Notified' is the number of participants notified to participate in the event
- 'Switches Dispatched' values represent the monthly active switch counts
- 'MW Reduction' values are based on the average across all hours of the event
- A loss adjustment of 1.0622 has been included in the 'MW Reduction' values.
- Customer and switch counts are estimated and rounded to nearest 100 due to not all customers being controlled in M&V events - some were left out as part of an uncontrolled control group.
- There were no PowerShare curtailment events in 2019

Duke Energy Carolinas  
System Event Based Demand Response January 1, 2018 - December 31, 2018  
Docket Number E-7, Sub 1192

| Date      | State     | Program Name  | Event Trigger           | High / Low System Temp<br>(F) | Customers Notified /Switches Dispatched | MW Reduction |
|-----------|-----------|---------------|-------------------------|-------------------------------|---|--------------|
| 1/2/2018  | NC and SC | PowerShare    | Emergency, Low Reserves | 32/10                         | 163                                     | 282.1        |
| 1/7/2018  | NC and SC | PowerShare    | Emergency, Low Reserves | 29/12                         | 163                                     | 210.0        |
| 8/30/2018 | NC and SC | Power Manager | Test Event              | 91 / 72                       | 225,210 / 270,511                       | 184.1        |

**Notes:**

- The 'High / Low System Temperature' is the average of the daily high & low temperatures from 3 weather stations (Charlotte, Greensboro, Greenville/Spartanburg)
- 'Customers Notified' is the number of participants notified to participate in the event
- 'Switches Dispatched' values represent the monthly active switch counts
- 'MW Reduction' values are based on the average across all hours of the event
- A loss adjustment of 1.0622 has been included in the 'MW Reduction' values.

## Evans Exhibit 5

Duke Energy Carolinas  
System Event Based Demand Response January 1, 2017 - December 31, 2017  
Docket Number E-7, Sub 1164

| Date      | State     | Program Name  | Event Trigger           | High / Low System Temp<br>(F) | Customers Notified /Switches Dispatched | MW Reduction |
|-----------|-----------|---------------|-------------------------|-------------------------------|---|--------------|
| 7/13/2017 | NC and SC | Power Manager | Emergency, Low Reserves | 92 / 78                       | 208,330 / 248,954                       | 220.5        |

**Notes:**

- The 'High / Low System Temperature' is the average of the daily high & low temperatures from 3 weather stations (Charlotte, Greensboro, Greenville/Spartanburg)
- 'Customers Notified' is the number of participants notified to participate in the event
- 'Switches Dispatched' values represent the monthly active switch counts
- 'MW Reduction' values are based on the average across all hours of the event
- A loss adjustment of 1.0622 has been included in the 'MW Reduction' values.

Duke Energy Carolinas  
System Event Based Demand Response January 1, 2016 - December 31, 2016  
Docket Number E-7, Sub 1130

| Date      | State     | Program Name               | Event Trigger           | High / Low System Temp<br>(F) | Customers Notified /Switches Dispatched | MW Reduction |
|-----------|-----------|----------------------------|-------------------------|-------------------------------|---|--------------|
| 6/23/2016 | NC and SC | Power Manager              | Economic, Low Reserves  | 94 / 76                       | 185,744 / 222,898                       | 219.9        |
| 7/13/2016 | NC and SC | PowerShare Mandatory       | Emergency, Low Reserves | 93 / 71                       | 168                                     | 302.2        |
| 7/13/2016 | NC and SC | PowerShare Generator       | Emergency, Low Reserves | 93 / 71                       | 13                                      | 11.9         |
| 7/13/2016 | NC        | Interruptible Service (IS) | Emergency, Low Reserves | 93 / 71                       | 50                                      | 115.1        |
| 7/13/2016 | NC        | Standby Generator (SG)     | Emergency, Low Reserves | 93 / 71                       | 24                                      | 10.7         |
| 7/14/2016 | NC and SC | Power Manager              | Emergency, Low Reserves | 96 / 72                       | 186,504 / 223,788                       | 220.8        |
| 7/14/2016 | NC and SC | PowerShare Mandatory       | Emergency, Low Reserves | 96 / 72                       | 168                                     | 315.8        |
| 7/14/2016 | NC and SC | PowerShare Generator       | Emergency, Low Reserves | 96 / 72                       | 13                                      | 11.8         |
| 7/14/2016 | NC        | Interruptible Service (IS) | Emergency, Low Reserves | 96 / 72                       | 50                                      | 122.8        |
| 7/14/2016 | NC        | Standby Generator (SG)     | Emergency, Low Reserves | 96 / 72                       | 24                                      | 8.6          |
| 7/25/2016 | NC and SC | PowerShare Mandatory       | Emergency, Low Reserves | 97 / 76                       | 168                                     | 326.5        |
| 7/25/2016 | NC and SC | PowerShare Generator       | Emergency, Low Reserves | 97 / 76                       | 13                                      | 10.2         |
| 7/25/2016 | NC        | Interruptible Service (IS) | Emergency, Low Reserves | 97 / 76                       | 50                                      | 121.4        |
| 7/25/2016 | NC        | Standby Generator (SG)     | Emergency, Low Reserves | 97 / 76                       | 24                                      | 8.5          |
| 7/26/2016 | NC and SC | PowerShare Mandatory       | Emergency, Low Reserves | 94 / 76                       | 168                                     | 328.8        |
| 7/26/2016 | NC and SC | PowerShare Generator       | Emergency, Low Reserves | 94 / 76                       | 13                                      | 10.1         |
| 7/26/2016 | NC        | Interruptible Service (IS) | Emergency, Low Reserves | 94 / 76                       | 50                                      | 121.6        |
| 7/26/2016 | NC        | Standby Generator (SG)     | Emergency, Low Reserves | 94 / 76                       | 24                                      | 8.1          |
| 9/8/2016  | NC and SC | Power Manager              | Economic, Low Reserves  | 93 / 68                       | 189,396 / 227,222                       | 179.9        |
| 9/19/2016 | NC and SC | Power Manager              | Economic, Low Reserves  | 87 / 73                       | 190,306 / 228,381                       | 150.2        |

**Notes:**

- The 'High Temperature' is the average of the daily high temperatures from 3 weather stations (Charlotte, Greensboro, Greenville/Spartanburg)
- 'Customers Notified' is the number of participants notified to participate in the event
- 'Switches Dispatched' values represent the monthly active switch counts
- 'MW Reduction' values are based on the average across all hours of the event
- A loss adjustment of 1.0622 has been included in the 'MW Reduction' values.

**Duke Energy Carolinas**  
**System Event Based Demand Response January 1, 2015 - December 31, 2015**  
**Docket Number E-7, Sub 1105**

| Date      | State     | Program Name          | Event Trigger | High / Low Temperature | Customers Notified /Switched Dispatched | MW Reduction |
|-----------|-----------|-----------------------|---------------|------------------------|---|--------------|
| 1/8/2015  | NC and SC | IS                    | Emergency     | H 28 L 9               | 56                                      | 115.7        |
| 1/8/2015  | NC and SC | SG                    | Emergency     | H 28 L 9               | 30                                      | 14.7         |
| 1/8/2015  | NC and SC | PowerShare Mandatory  | Emergency     | H 28 L 9               | 169                                     | 318.3        |
| 1/8/2015  | NC and SC | PowerShare Voluntary  | Emergency     | H 28 L 9               | 3                                       | -            |
| 1/9/2015  | NC and SC | IS                    | Emergency     | H 44 L 24              | 56                                      | 118.2        |
| 1/9/2015  | NC and SC | SG                    | Emergency     | H 44 L 24              | 30                                      | 14.5         |
| 1/9/2015  | NC and SC | PowerShare Mandatory  | Emergency     | H 44 L 24              | 169                                     | 303.4        |
| 1/9/2015  | NC and SC | PowerShare Voluntary  | Emergency     | H 44 L 24              | 3                                       | -            |
| 2/19/2015 | NC and SC | IS                    | Emergency     | H 24 L 12              | 56                                      | 102.8        |
| 2/19/2015 | NC and SC | SG                    | Emergency     | H 24 L 12              | 30                                      | 15.2         |
| 2/19/2015 | NC and SC | PowerShare Mandatory  | Emergency     | H 24 L 12              | 168                                     | 331.6        |
| 2/19/2015 | NC and SC | PowerShare Voluntary  | Emergency     | H 24 L 12              | 3                                       | -            |
| 2/20/2015 | NC and SC | Power Share Generator | Emergency     | H 30 L 8               | 33                                      | 32.7         |
| 2/20/2015 | NC and SC | IS                    | Emergency     | H 30 L 8               | 56                                      | 87.3         |
| 2/20/2015 | NC and SC | SG                    | Emergency     | H 30 L 8               | 30                                      | 15.5         |
| 2/20/2015 | NC and SC | PowerShare Mandatory  | Emergency     | H 30 L 8               | 168                                     | 304.1        |
| 2/20/2015 | NC and SC | PowerShare Voluntary  | Emergency     | H 30 L 8               | 3                                       | -            |
| 6/16/2015 | NC and SC | Power Manager         | Economic      | H 96 L73               | 163,633/196,105                         | 284.2        |
| 6/23/2015 | NC and SC | Power Manager         | Economic      | H 96 L73               | 163,716/196,267                         | 276.3        |
| 7/20/2015 | NC and SC | Power Manager         | Economic      | H 96 L73               | 121,245/144,208                         | 207.3        |
| 8/5/2015  | NC and SC | Power Manager         | Economic      | H 95 L 72              | 166,697/199,615                         | 266.8        |

## Notes:

- The 'High Temperature' is the average of the daily high temperatures from 3 weather stations (Charlotte, Greensboro, Greenville/Spartanburg)
- 'Customers Notified' is the number of participants notified to participate in the event
- 'Switches Dispatched' values represent the monthly active switch counts
- 'MW Reduction' values are based on the average across all hours of the event
- A loss adjustment of 1.0622 has been included in the 'MW Reduction' values.



Barnes Exhibit 5

Duke Energy Carolinas, LLC  
System Event Based Demand Response January 1, 2014 - December 31, 2014  
Docket Number E-7, Sub 1073

| Date      | State     | Program Name         | Event Trigger  | Weather Conditions | Numbers of Customers Notified / Enrolled | MW Reduction  |
|-----------|-----------|----------------------|----------------|--------------------|--|---|
| 1/7/2014  | NC and SC | PowerShare Generator | Emergency      | H 25 L 5           | 9  | 12.60   |
| 1/7/2014  | NC and SC | IS                   | Emergency      | H 25 L 5           | 61                                       | 145.51  |
| 1/7/2014  | NC and SC | SG                   | Emergency      | H 25 L 5           | 80                                       | 30.16   |
| 1/7/2014  | NC and SC | PowerShare Mandatory | Emergency      | H 25 L 5           | 184                                      | 284.50  |
| 1/8/2014  | NC and SC | PowerShare Generator | Emergency      | H 44 L 14          | 9  | 14.46   |
| 1/8/2014  | NC and SC | IS                   | Emergency      | H 44 L 14          | 61                                       | 151.42  |
| 1/8/2014  | NC and SC | SG                   | Emergency      | H 44 L 14          | 80                                       | 36.18   |
| 1/8/2014  | NC and SC | PowerShare Mandatory | Emergency      | H 44 L 14          | 184                                      | 358.72  |
| 1/23/2014 | NC and SC | PowerShare Voluntary | Economic       | H 40 L 18          | 134                                      | 3.32  |
| 6/5/2014  | NC and SC | Power Manager        | SOC Test Event | H 90 L 70          | 156,650                                  | M&V impacts not available at the time of this filing. |
| 6/10/2014 | NC and SC | Power Manager        | SOC Test Event | H 90 L 67          | 183,683                                  |   |
| 6/18/2014 | NC and SC | Power Manager        | Economic       | H 93 L 70          | 183,683                                  |   |
| 9/2/2014  | NC and SC | Power Manager        | Economic       | H 94 L 70          | 183,117                                  |   |
| 9/11/2014 | NC and SC | Power Manager        | Economic       | H 89 L 66          | 183,117                                  |   |
| 9/16/2014 | NC and SC | Power Manager        | Economic       | H 85 L 66          | 183,117                                  |   |

## Notes:

- 'Weather Conditions' is the averaged daily high/low temperature from 3 weather stations (Charlotte, Greensboro, Greenville/Spartanburg).
- 'Numbers of Customers Notified/Enrolled' is the number of participants notified to participate in the event. For Power Manager events, this is the monthly active switch count.
- 'MW Reduction' values are based on the average MW reduction across all hours of the event.
- A loss adjustment of 1.08 has been included in the 'MW Reduction' values to reflect "at the plant" values.

Public Staff  
Hinton Exhibit 2  
Page 6 of 9

Duke Energy Carolinas  
System Event Based Demand Response January 1, 2013 - December 31, 2013  
Docket Number E-7, Sub 1050

| Date      | State     | Program Name  | Event Trigger | High Temperature | Customers Notified | Customers Enrolled | MW Reduction |
|-----------|-----------|---------------|---------------|------------------|--------------------|--------------------|--------------|
| 7/18/2013 | NC        | Power Manager | High Prices   | 89.7             | N/A                | 129,398            | 115.9        |
| 7/19/2013 | NC        | Power Manager | High Prices   | 89.7             | N/A                | 129,398            | 112.3        |
| 7/24/2013 | NC and SC | Power Manager | High Prices   | 90.0             | N/A                | 178,289            | 150.4        |
| 8/12/2013 | NC and SC | Power Manager | High Prices   | 91.0             | N/A                | 177,924            | 157.6        |
| 8/29/2013 | NC and SC | Power Manager | High Prices   | 91.0             | N/A                | 178,283            | 157.4        |
| 9/10/2013 | NC and SC | Power Manager | High Prices   | 88.3             | N/A                | 178,109            | 142.5        |
| 9/11/2013 | NC and SC | Power Manager | High Prices   | 88.7             | N/A                | 178,109            | 123.0        |

Note:

A loss adjustment has been included in the MW values.

The high temperature is the average of the daily high temperatures from 3 weather stations (Charlotte, Greensboro, Greenville/Spartanburg).

The values for MW reduction are based on the average across the hours of the event.

Customers Notified is the number of participants notified that they should participate or have the opportunity to participate in the event.

For Power Manager events, the Customer Enrolled value represents the load control devices activated for the event.

**Duke Energy Carolinas**  
**System Event Based Demand Response January 1, 2012 - December 31, 2012**  
**Docket Number E-7 Sub 1031**

| Date      | State     | Program Name          | Event Trigger | High Temperature | Customers Notified | Customers Enrolled | MW Reduction |
|-----------|-----------|-----------------------|---------------|------------------|--------------------|--------------------|--------------|
| 6/29/2012 | NC and SC | Power Manager         | High Prices   | 103              | N/A                | 172,232            | 152.1        |
| 7/9/2012  | NC and SC | Power Manager         | High Prices   | 94               | N/A                | 172,232            | 113.4        |
| 7/17/2012 | NC and SC | Power Manager         | High Prices   | 93               | N/A                | 171,531            | 141.5        |
| 7/26/2012 | NC and SC | Power Manager         | High Prices   | 95               | N/A                | 171,531            | 142.9        |
| 7/27/2012 | NC and SC | Power Manager         | High Prices   | 95               | N/A                | 171,531            | 152.1        |
| 7/27/2012 | NC and SC | PowerShare CallOption | High Prices   | 95               | 1                  | 1                  | 0.2          |

**Note:**

A loss adjustment has been included in the MW values.

The high temperature is the average of the high temperatures from 3 weather stations.

The values for MW reduction are based on the average across the hours of the event.

Customers Notified is the number of participants notified that they should participate or have the opportunity to participate in the event.

For Power Manager events, the Customer Enrolled value represents the load control devices activated for the event.



Duke Energy Carolinas  
System Event Based Demand Response January 1, 2011 - December 31, 2011  
Docket Number E-7 Sub 1001

|    | Date      | State     | Program Name         | Event Trigger | High Temperature | Customer Notified | Customers Enrolled | MW Reduction |
|----|-----------|-----------|----------------------|---------------|------------------|-------------------|--------------------|--------------|
| 1  | 6/1/2011  | NC and SC | PowerShare Mandatory | Reliability   | 94               | 139               | 139                | 333.6        |
| 2  |           | NC and SC | PowerShare Generator | Reliability   |                  | 8                 | 8                  | 16.5         |
| 3  |           | NC and SC | PowerShare Voluntary | Reliability   |                  | 100               | 100                | 1.6          |
| 4  |           | NC        | IS                   | Reliability   |                  | 66                | 66                 | 156.4        |
| 5  |           | NC        | SG                   | Reliability   |                  | 93                | 93                 | 54.6         |
| 6  | 6/2/2011  | NC and SC | PowerShare Voluntary | High Prices   | 92               | 100               | 100                | 16.1         |
| 7  | 6/21/2011 | NC and SC | Power Manager        | High Prices   | 95               | N/A               | 165,953            | 100.6        |
| 8  | 7/11/2011 | NC and SC | Power Manager        | High Prices   | 92               | N/A               | 165,955            | 101.1        |
| 9  | 7/12/2011 | NC and SC | PowerShare Mandatory | Reliability   | 96               | 141               | 141                | 338.6        |
| 10 |           | NC and SC | PowerShare Generator | Reliability   |                  | 8                 | 8                  | 12.5         |
| 11 |           | NC        | IS                   | Reliability   |                  | 66                | 66                 | 132.5        |
| 12 |           | NC        | SG                   | Reliability   |                  | 93                | 93                 | 44.9         |
| 13 | 7/13/2011 | NC and SC | Power Manager        | High Prices   | 95               | N/A               | 165,956            | 101.7        |
| 14 | 7/20/2011 | NC and SC | Power Manager        | High Prices   | 94               | N/A               | 165,957            | 107.5        |
| 15 |           | NC and SC | PowerShare Voluntary | High Prices   |                  | 101               | 101                | 1.8          |
| 16 | 7/21/2011 | NC and SC | Power Manager        | High Prices   | 96               | N/A               | 165,957            | 114.6        |
| 17 |           | NC and SC | PowerShare Voluntary | High Prices   |                  | 101               | 101                | 1.9          |
| 18 | 7/22/2011 | NC and SC | PowerShare Voluntary | High Prices   | 96               | 101               | 101                | 3.6          |
| 19 | 7/29/2011 | NC and SC | Power Manager        | High Prices   | 97               | N/A               | 165,969            | 110.4        |
| 20 | 8/2/2011  | NC and SC | Power Manager        | High Prices   | 96               | N/A               | 166,006            | 115.3        |
| 21 | 8/3/2011  | NC and SC | PowerShare Voluntary | High Prices   | 96               | 101               | 101                | 2.1          |
| 22 | 8/25/2011 | NC and SC | Power Manager        | Test          | 92               | N/A               | 192,261            | 183.3        |

**Note:**

The loss factor has been included in the MW values.

The high temperature is the average of the high temperatures from 3 weather stations.

The values for MW reduction are based on the average across the hours of the event.

Customers Notified is the number of participants notified that they should participate or have the opportunity to participate in the event.

For Power Manager events, the Customer Enrolled value represents the load control devices activated for the event.

Docket Number E-7, Sub \_\_\_\_

Projected Program/Portfolio Cost Effectiveness

| Docket Number E-7, Sub ____   | 2018                        |       |      |      | 2019                        |        |      |       | 2020                        |        |      |       |                               |      |
|---|-----------------------------|-------|------|------|-----------------------------|--------|------|-------|-----------------------------|--------|------|-------|-------------------------------|------|
| Projected Program/Portfolio Cost Effectiveness                          | vintage 2019                |       |      |      | vintage 2020                |        |      |       | vintage 2021                |        |      |       |                               |      |
|   | Evans Exhibit 7 in Sub 1164 |       |      |      | Evans Exhibit 7 in Sub 1192 |        |      |       | Evans Exhibit 7 in Sub 1230 |        |      |       | Percent change from last year |      |
| Program   | UCT                         | TRC   | RIM  | PCT  | UCT                         | TRC    | RIM  | PCT   | UCT                         | TRC    | RIM  | PCT   | UCT                           | TRC  |
| Residential Programs  |                             |       |      |      |                             |        |      |       |                             |        |      |       |                               |      |
| Appliance Recycling Program   | -                           | -     | -    | -    | -                           | -      | -    | -     | -                           | -      | -    | -     | -                             | -    |
| Energy Efficiency Education   | 1.22                        | 1.69  | 0.53 | -    | 1.32                        | 1.32   | 0.54 | 7.68  | 1.40                        | 1.41   | 0.53 | 8.97  | 6%                            | 7%   |
| Energy Efficient Appliances & Devices                                   | 2.4                         | 2.17  | 0.42 | 6.11 | 3.27                        | 3.54   | 0.70 | 7.50  | 2.64                        | 2.20   | 0.60 | 4.96  | -19%                          | -38% |
| HVAC Energy Efficiency/Smart Saver EE                                   | 0.94                        | 0.59  | 0.45 | 1.52 | 1.31                        | 0.95   | 0.60 | 1.84  | 0.81                        | 0.67   | 0.49 | 1.68  | -38%                          | -29% |
| Income-Qualified Energy Efficiency and Weatherization Assistance        | 0.19                        | 0.83  | 0.16 | -    | 0.21                        | 0.35   | 0.17 | 2.80  | 0.70                        | 0.72   | 0.44 | 2.09  | 235%                          | 107% |
| Multi-Family Energy Efficiency  | 2.82                        | 4.71  | 0.59 | -    | 2.97                        | 2.97   | 0.61 | 22.81 | 3.14                        | 3.16   | 0.66 | 20.52 | 6%                            | 6%   |
| My Home Energy Report   | 1.56                        | 1.56  | 0.57 | -    | 1.89                        | 1.89   | 0.61 | -     | 1.89                        | 1.89   | 0.66 | -     | 0%                            | 0%   |
| Power Manager   | 4.33                        | 8.86  | 4.33 | -    | 4.22                        | 8.72   | 4.22 | -     | 4.33                        | 9.80   | 4.33 | -     | 3%                            | 12%  |
| Residential Energy Assessments  | 1.41                        | 1.56  | 0.54 | -    | 1.36                        | 1.34   | 0.49 | 30.23 | 1.33                        | 1.28   | 0.48 | 19.95 | -2%                           | -4%  |
| Residential Total   | 2.22                        | 2.60  | 0.70 | 7.69 | 2.5                         | 3.02   | 1.04 | 6.61  | 2.50                        | 2.82   | 1.04 | 6.18  | 0%                            | -6%  |
| Non-Residential Programs  |                             |       |      |      |                             |        |      |       |                             |        |      |       |                               |      |
| Business Energy Report  | -                           | -     | -    | -    | -                           | -      | -    | -     | -                           | -      | -    | -     | -                             | -    |
| Non Residential Smart Saver Custom Energy Assessments                   | 2.17                        | 0.89  | 0.68 | 1.78 | 3.07                        | 1.08   | 0.84 | 1.99  | 2.70                        | 0.80   | 0.84 | 1.38  | -12%                          | -26% |
| Non Residential Smart Saver Custom                                      | 2.38                        | 1.07  | 0.67 | 2.18 | 3.42                        | 1.79   | 0.84 | 3.38  | 3.07                        | 1.18   | 0.87 | 1.97  | -10%                          | -34% |
| EnergyWise For Business   | 0.83                        | 1.21  | 0.68 | -    | 0.72                        | 1.25   | 0.61 | -     | 0.63                        | 1.26   | 0.55 | -     | -13%                          | 1%   |
| Non Residential Smart Saver Energy Efficient Food Service Products      | 2.68                        | 1.95  | 0.61 | 3.18 | 1.40                        | 0.81   | 0.51 | 2.02  | 1.45                        | 0.79   | 0.45 | 2.38  | 4%                            | -3%  |
| Non Residential Smart Saver Energy Efficient HVAC Products              | 2.04                        | 1.63  | 0.88 | 1.82 | 1.57                        | 1.24   | 0.70 | 2.06  | 1.47                        | 1.12   | 0.64 | 2.05  | -6%                           | -10% |
| Non Residential Smart Saver Energy Efficient Lighting Products          | 3.48                        | 1.44  | 0.74 | 2.17 | 4.29                        | 2.00   | 0.80 | 3.75  | 4.19                        | 2.14   | 0.78 | 4.08  | -3%                           | 7%   |
| Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 2.54                        | 2.45  | 0.54 | 3.56 | 3.68                        | 2.63   | 0.86 | 5.38  | 3.11                        | 2.41   | 0.82 | 4.99  | -15%                          | -8%  |
| Non Residential Smart Saver Energy Efficient IT Products                | 2.36                        | 1.77  | 0.59 | 3.79 | 0.60                        | 0.46   | 0.31 | 2.55  | 0.65                        | 0.47   | 0.31 | 2.26  | 8%                            | 2%   |
| Non Residential Smart Saver Energy Efficient Process Equipment Products | 2.13                        | 2.23  | 0.47 | 4.21 | 2.14                        | 1.85   | 0.70 | 3.86  | 3.50                        | 2.26   | 0.97 | 3.66  | 63%                           | 22%  |
| Non Residential Smart Saver Performance Incentive                       | 2.7                         | 0.81  | 0.69 | 1.50 | 3.29                        | 1.06   | 0.83 | 1.79  | 3.22                        | 1.06   | 0.86 | 1.79  | -2%                           | 0%   |
| Small Business Energy Saver   | 2.59                        | 1.61  | 0.77 | 3.00 | 2.70                        | 1.67   | 0.80 | 2.93  | 2.32                        | 1.43   | 0.76 | 2.60  | -14%                          | -14% |
| Smart Energy in Offices   | -                           | -     | -    | -    | -                           | -      | -    | -     | -                           | -      | -    | -     | -                             | -    |
| PowerShare Call Option  | -                           | -     | -    | -    | -                           | -      | -    | -     | -                           | -      | -    | -     | -                             | -    |
| PowerShare  | 2.9                         | 41.14 | 2.90 | -    | 3.35                        | 112.28 | 3.35 | -     | 3.37                        | 137.02 | 3.37 | -     | 1%                            | 22%  |
| Non-Residential Total   | 2.69                        | 1.67  | 0.85 | 2.41 | 3.28                        | 2.13   | 0.94 | 3.34  | 3.12                        | 2.03   | 0.93 | 3.16  | -5%                           | -5%  |
| Overall Portfolio total   | 2.46                        | 1.98  | 0.78 | 3.48 | 2.90                        | 2.43   | 0.98 | 4.00  | 2.81                        | 2.32   | 0.98 | 3.83  | -3%                           | -5%  |

Docket Number E-7, Sub \_\_\_\_

Current Actual YTD Program/Portfolio Cost Effectiveness

| Docket Number E-7, Sub ____<br>Current Actual YTD Program/Portfolio Cost Effectiveness | 2016                        |       |      |      | 2017                        |       |      |        | 2018                        |       |      |       | Williamson Exhibit 2          |      |
|--|-----------------------------|-------|------|------|-----------------------------|-------|------|--------|-----------------------------|-------|------|-------|-------------------------------|------|
|  | vintage 2017                |       |      |      | vintage 2018                |       |      |        | vintage 2019                |       |      |       |                               |      |
|  | Evans Exhibit 7 in Sub 1105 |       |      |      | Evans Exhibit 7 in Sub 1130 |       |      |        | Evans Exhibit 7 in Sub 1164 |       |      |       | Percent change from last year |      |
|  | UCT                         | TRC   | RIM  | PCT  | UCT                         | TRC   | RIM  | PCT    | UCT                         | TRC   | RIM  | PCT   | UCT                           | TRC  |
| Program  |                             |       |      |      |                             |       |      |        |                             |       |      |       |                               |      |
| Residential Programs   |                             |       |      |      |                             |       |      |        |                             |       |      |       |                               |      |
| Appliance Recycling Program  | -                           | -     | -    | -    | -                           | -     | -    | -      | -                           | -     | -    | -     | -                             | -    |
| Energy Efficiency Education  | 1.73                        | 2.47  | 0.73 | -    | 1.36                        | 1.85  | 0.60 | -      | 1.50                        | 1.48  | 0.48 | 10.39 | 10%                           | -20% |
| Energy Efficient Appliances & Devices  | 3.46                        | 4.53  | 0.88 | 7.19 | 3.17                        | 5.29  | 0.78 | 9.62   | 2.47                        | 3.06  | 0.60 | 6.97  | -22%                          | -42% |
| HVAC Energy Efficiency   | 1.00                        | 0.54  | 0.59 | 0.91 | 1.05                        | 0.69  | 0.57 | 131.00 | 0.96                        | 0.77  | 0.50 | 1.82  | -9%                           | 11%  |
| Income-Qualified Energy Efficiency and Weatherization Assistance                       | 0.58                        | 2.32  | 0.38 | -    | 0.54                        | 2.61  | 0.42 | -      | 0.50                        | 0.49  | 0.30 | 2.14  | -7%                           | -81% |
| Multi-Family Energy Efficiency   | 4.21                        | 6.74  | 0.81 | -    | 3.79                        | 5.66  | 0.70 | -      | 3.23                        | 3.09  | 0.55 | 22.13 | -15%                          | -45% |
| My Home Energy Report  | 1.57                        | 1.57  | 0.63 | -    | 1.60                        | 1.78  | 0.63 | -      | 2.21                        | 2.21  | 0.66 | -     | 38%                           | 24%  |
| Power Manager  | 4.36                        | 8.39  | 4.36 | -    | 4.31                        | 8.59  | 4.29 | -      | 5.21                        | 12.18 | 5.21 | -     | 21%                           | 42%  |
| Residential Energy Assessments   | 2.27                        | 2.44  | 0.80 | -    | 2.03                        | 7.27  | 0.68 | -      | 1.38                        | 1.35  | 0.49 | 22.86 | -32%                          | -81% |
| Residential Total  | 2.80                        | 3.38  | 1.02 | 6.56 | 2.73                        | 4.08  | 0.91 | 9.30   | 2.54                        | 3.00  | 0.80 | 6.79  | -7%                           | -26% |
|  |                             |       |      |      |                             |       |      |        |                             |       |      |       |                               |      |
| Non-Residential Programs   |                             |       |      |      |                             |       |      |        |                             |       |      |       |                               |      |
| Business Energy Report   | 0.01                        | 0.01  | 0.01 | -    | -                           | -     | -    | -      | -                           | -     | -    | -     | -                             | -    |
| Non Residential Smart Saver Custom Energy Assessments                                  | 4.80                        | 1.88  | 1.22 | 2.30 | 0.17                        | 0.16  | 0.16 | 1.25   | 2.34                        | 0.78  | 0.52 | 2.33  | 1276%                         | 388% |
| Non Residential Smart Saver Custom   | 4.75                        | 1.30  | 1.43 | 1.25 | 3.84                        | 1.49  | 1.18 | 1.84   | 4.04                        | 1.72  | 0.83 | 3.22  | 5%                            | 15%  |
| EnergyWise For Business  | 1.02                        | 1.18  | 0.72 | -    | 0.73                        | 0.92  | 0.59 | -      | 0.74                        | 0.97  | 0.60 | -     | 1%                            | 5%   |
| Non Residential Smart Saver Energy Efficient Food Service Products                     | 3.13                        | 1.99  | 0.93 | 3.06 | 3.15                        | 1.09  | 0.78 | 1.82   | 1.07                        | 0.64  | 0.57 | 1.32  | -66%                          | -41% |
| Non Residential Smart Saver Energy Efficient HVAC Products                             | 1.90                        | 1.48  | 0.99 | 1.70 | 1.73                        | 1.67  | 0.89 | 2.09   | 2.03                        | 1.74  | 0.53 | 3.79  | 17%                           | 4%   |
| Non Residential Smart Saver Energy Efficient Lighting Products                         | 3.60                        | 1.68  | 1.09 | 1.98 | 5.66                        | 2.54  | 1.17 | 3.06   | 4.70                        | 2.48  | 0.89 | 4.12  | -17%                          | -2%  |
| Non Residential Smart Saver Energy Efficient Pumps and Drives Products                 | 5.80                        | 4.69  | 1.17 | 6.26 | 5.82                        | 3.89  | 1.03 | 5.88   | 2.70                        | 2.08  | 0.77 | 4.81  | -54%                          | -47% |
| Non Residential Smart Saver Energy Efficient IT Products                               | 0.01                        | 0.01  | 0.01 | 2.16 | 0.08                        | 0.08  | 0.08 | 2.79   | 0.02                        | 0.04  | 0.02 | 11.82 | -75%                          | -50% |
| Non Residential Smart Saver Energy Efficient Process Equipment Products                | 3.27                        | 2.83  | 1.50 | 2.56 | 3.36                        | 3.48  | 1.16 | 4.58   | 2.59                        | 2.09  | 0.74 | 3.97  | -23%                          | -40% |
| Non Residential Smart Saver Performance Incentive                                      | 0.03                        | 0.03  | 0.03 | 0.87 | 3.48                        | 1.03  | 0.96 | 1.59   | 2.85                        | 1.07  | 0.63 | 2.78  | -18%                          | 4%   |
| Small Business Energy Saver  | 3.64                        | 2.35  | 1.10 | 2.95 | 2.93                        | 1.95  | 0.89 | 3.07   | 2.25                        | 1.49  | 0.70 | 3.03  | -23%                          | -24% |
| Smart Energy in Offices  | 1.20                        | 1.29  | 0.72 | -    | 0.65                        | 0.65  | 0.49 | -      | -                           | -     | -    | -     | -                             | -    |
| PowerShare Call Option   | -                           | -     | -    | -    | -                           | -     | -    | -      | -                           | -     | -    | -     | -                             | -    |
| PowerShare   | 3.12                        | 65.75 | 3.12 | -    | 2.78                        | 50.77 | 2.79 | -      | 3.23                        | 57.56 | 3.23 | -     | 16%                           | 13%  |
| Non-Residential Total  | 3.54                        | 1.92  | 1.19 | 2.09 | 3.90                        | 2.48  | 1.18 | 2.99   | 3.44                        | 2.43  | 0.96 | 3.78  | -12%                          | -2%  |
|  |                             |       |      |      |                             |       |      |        |                             |       |      |       |                               |      |
| Overall Portfolio total  | 3.24                        | 2.27  | 1.13 | 2.87 | 3.22                        | 3.08  | 1.03 | 5.02   | 2.91                        | 2.69  | 0.87 | 5.14  | -10%                          | -13% |

## Program/Portfolio Cost Effectiveness - Program Year 2021

|   | ORIGINAL    |             |             |             | Removing 17% Reserve Margin Adder |             |             |             | Applying 90%W/10%S Seasonal Allocation |             |             |             | Total Net Impacts |             |             |             | Percent Change of "Total Net Impacts" from "Original" |             |
|---|-------------|-------------|-------------|-------------|-----------------------------------|-------------|-------------|-------------|--|-------------|-------------|-------------|-------------------|-------------|-------------|-------------|---|-------------|
| Program                                   | UCT         | TRC         | RIM         | PCT         | UCT                               | TRC         | RIM         | PCT         | UCT                                    | TRC         | RIM         | PCT         | UCT               | TRC         | RIM         | PCT         | UCT   | TRC         |
| <b>Residential Programs</b>               |             |             |             |             |                                   |             |             |             |  |             |             |             |                   |             |             |             |   |             |
| • Energy Education Program for Schools    | 1.40        | 1.41        | 0.53        | 8.97        | 1.35                              | 1.37        | 0.51        | 8.97        | 1.40                                   | 1.41        | 0.53        | 8.97        | 1.35              | 1.37        | 0.51        | 8.97        | -3%   | -3%         |
| • Energy Efficient Appliances & Devices   | 2.64        | 2.20        | 0.60        | 4.96        | 2.58                              | 2.15        | 0.59        | 4.96        | 2.64                                   | 2.20        | 0.60        | 4.96        | 2.58              | 2.15        | 0.59        | 4.96        | -2%   | -2%         |
| • HVAC EE Products & Services             | 0.81        | 0.67        | 0.49        | 1.68        | 0.78                              | 0.65        | 0.47        | 1.68        | 0.81                                   | 0.67        | 0.49        | 1.68        | 0.78              | 0.65        | 0.47        | 1.68        | -4%   | -4%         |
| • Income-Qualified EE Products & Services | 0.70        | 0.72        | 0.44        | 2.09        | 0.68                              | 0.70        | 0.42        | 2.09        | 0.70                                   | 0.72        | 0.44        | 2.09        | 0.68              | 0.70        | 0.42        | 2.09        | -4%   | -4%         |
| • Multi-Family EE Products & Services     | 3.14        | 3.16        | 0.66        | 20.52       | 3.04                              | 3.06        | 0.64        | 20.52       | 3.14                                   | 3.16        | 0.66        | 20.52       | 3.04              | 3.06        | 0.64        | 20.52       | -3%   | -3%         |
| • My Home Energy Report                   | 1.89        | 1.89        | 0.66        |             | 1.81                              | 1.81        | 0.63        |             | 1.89                                   | 1.89        | 0.66        |             | 1.81              | 1.81        | 0.63        |             | -4%   | -4%         |
| • Power Manager                           | 4.33        | 9.80        | 4.33        |             | 4.33                              | 9.80        | 4.33        |             | 2.25                                   | 5.10        | 2.25        |             | 2.25              | 5.10        | 2.25        |             | -48%  | -48%        |
| • Residential Energy Assessments          | 1.33        | 1.28        | 0.48        | 19.95       | 1.30                              | 1.26        | 0.47        | 19.95       | 1.33                                   | 1.28        | 0.48        | 19.95       | 1.30              | 1.26        | 0.47        | 19.95       | -2%   | -2%         |
| <b>Residential Total</b>                  | <b>2.50</b> | <b>2.82</b> | <b>1.04</b> | <b>6.18</b> | <b>2.46</b>                       | <b>2.78</b> | <b>1.02</b> | <b>6.18</b> | <b>1.90</b>                            | <b>2.15</b> | <b>0.79</b> | <b>6.18</b> | <b>1.86</b>       | <b>2.10</b> | <b>0.77</b> | <b>6.18</b> | <b>-25%</b>   | <b>-25%</b> |
| <b>Non-Residential Programs</b>           |             |             |             |             |                                   |             |             |             |  |             |             |             |                   |             |             |             |   |             |
| • Custom Assessment                       | 2.70        | 0.80        | 0.84        | 1.38        | 2.63                              | 0.78        | 0.82        | 1.38        | 2.70                                   | 0.80        | 0.84        | 1.38        | 2.63              | 0.78        | 0.82        | 1.38        | -3%   | -3%         |
| • Custom Incentive                        | 3.07        | 1.18        | 0.87        | 1.97        | 2.98                              | 1.14        | 0.84        | 1.97        | 3.07                                   | 1.18        | 0.87        | 1.97        | 2.98              | 1.14        | 0.84        | 1.97        | -3%   | -3%         |
| • EnergyWise for Business                 | 0.63        | 1.26        | 0.55        |             | 0.63                              | 1.26        | 0.55        |             | 0.41                                   | 0.83        | 0.36        |             | 0.41              | 0.83        | 0.36        |             | -34%  | -34%        |
| • Food Service Products                   | 1.45        | 0.79        | 0.45        | 2.38        | 1.43                              | 0.78        | 0.44        | 2.38        | 1.45                                   | 0.79        | 0.45        | 2.38        | 1.43              | 0.78        | 0.44        | 2.38        | -1%   | -1%         |
| • HVAC                                    | 1.47        | 1.12        | 0.64        | 2.05        | 1.44                              | 1.09        | 0.63        | 2.05        | 1.47                                   | 1.12        | 0.64        | 2.05        | 1.44              | 1.09        | 0.63        | 2.05        | -2%   | -2%         |
| • Lighting                                | 4.19        | 2.14        | 0.78        | 4.08        | 4.05                              | 2.07        | 0.76        | 4.08        | 4.19                                   | 2.14        | 0.78        | 4.08        | 4.05              | 2.07        | 0.76        | 4.08        | -3%   | -3%         |
| • Motors, Pumps & VFDs                    | 3.11        | 2.41        | 0.82        | 4.99        | 3.01                              | 2.33        | 0.79        | 4.99        | 3.11                                   | 2.41        | 0.82        | 4.99        | 3.01              | 2.33        | 0.79        | 4.99        | -3%   | -3%         |
| • Non Res Information Technology          | 0.65        | 0.47        | 0.31        | 2.26        | 0.65                              | 0.47        | 0.31        | 2.26        | 0.65                                   | 0.47        | 0.31        | 2.26        | 0.65              | 0.47        | 0.31        | 2.26        | 0%  | 0%          |
| • Process Equipment                       | 3.50        | 2.26        | 0.97        | 3.66        | 3.36                              | 2.18        | 0.93        | 3.66        | 3.50                                   | 2.26        | 0.97        | 3.66        | 3.36              | 2.18        | 0.93        | 3.66        | -4%   | -4%         |
| • Performance Incentive                   | 3.22        | 1.06        | 0.86        | 1.79        | 3.13                              | 1.03        | 0.83        | 1.79        | 3.22                                   | 1.06        | 0.86        | 1.79        | 3.13              | 1.03        | 0.83        | 1.79        | -3%   | -3%         |
| • Small Business Energy Saver             | 2.32        | 1.43        | 0.76        | 2.60        | 2.26                              | 1.40        | 0.74        | 2.60        | 2.32                                   | 1.43        | 0.76        | 2.60        | 2.26              | 1.40        | 0.74        | 2.60        | -3%   | -3%         |
| • PowerShare                              | 3.37        | 137.02      | 3.37        |             | 3.37                              | 137.02      | 3.37        |             | 1.92                                   | 78.06       | 1.92        |             | 1.92              | 78.06       | 1.92        |             | -43%  | -43%        |
| <b>Non-Residential Total</b>              | <b>3.12</b> | <b>2.03</b> | <b>0.93</b> | <b>3.16</b> | <b>3.05</b>                       | <b>1.98</b> | <b>0.91</b> | <b>3.16</b> | <b>2.83</b>                            | <b>1.83</b> | <b>0.84</b> | <b>3.16</b> | <b>2.75</b>       | <b>1.79</b> | <b>0.82</b> | <b>3.16</b> | <b>-12%</b>   | <b>-12%</b> |
| <b>Overall Portfolio Total</b>            | <b>2.81</b> | <b>2.32</b> | <b>0.98</b> | <b>3.83</b> | <b>2.76</b>                       | <b>2.27</b> | <b>0.95</b> | <b>3.83</b> | <b>2.37</b>                            | <b>1.95</b> | <b>0.82</b> | <b>3.83</b> | <b>2.31</b>       | <b>1.90</b> | <b>0.80</b> | <b>3.83</b> | <b>-18%</b>   | <b>-18%</b> |

## Program/Portfolio Cost Effectiveness - Program Year 2021

|   | ORIGINAL    |             |             |             | Removing 17% Reserve Margin Adder |             |             |             | Applying 90%W/10%S Seasonal Allocation |             |             |             | Total Net Impacts |             |             |             | Percent Change of "Total Net Impacts" from "Original" |             |
|---|-------------|-------------|-------------|-------------|-----------------------------------|-------------|-------------|-------------|--|-------------|-------------|-------------|-------------------|-------------|-------------|-------------|---|-------------|
| Program                                   | UCT         | TRC         | RIM         | PCT         | UCT                               | TRC         | RIM         | PCT         | UCT                                    | TRC         | RIM         | PCT         | UCT               | TRC         | RIM         | PCT         | UCT   | TRC         |
| <b>Residential Programs</b>               |             |             |             |             |                                   |             |             |             |  |             |             |             |                   |             |             |             |   |             |
| • Energy Education Program for Schools    | 1.40        | 1.41        | 0.53        | 8.97        | 1.35                              | 1.37        | 0.51        | 8.97        | 1.40                                   | 1.41        | 0.53        | 8.97        | 1.35              | 1.37        | 0.51        | 8.97        | -3%   | -3%         |
| • Energy Efficient Appliances & Devices   | 2.64        | 2.20        | 0.60        | 4.96        | 2.58                              | 2.15        | 0.59        | 4.96        | 2.64                                   | 2.20        | 0.60        | 4.96        | 2.58              | 2.15        | 0.59        | 4.96        | -2%   | -2%         |
| • HVAC EE Products & Services             | 0.81        | 0.67        | 0.49        | 1.68        | 0.78                              | 0.65        | 0.47        | 1.68        | 0.81                                   | 0.67        | 0.49        | 1.68        | 0.78              | 0.65        | 0.47        | 1.68        | -4%   | -4%         |
| • Income-Qualified EE Products & Services | 0.70        | 0.72        | 0.43        | 2.09        | 0.67                              | 0.69        | 0.42        | 2.09        | 0.70                                   | 0.72        | 0.43        | 2.09        | 0.67              | 0.69        | 0.42        | 2.09        | -4%   | -4%         |
| • Multi-Family EE Products & Services     | 3.14        | 3.16        | 0.66        | 20.52       | 3.04                              | 3.06        | 0.64        | 20.52       | 3.14                                   | 3.16        | 0.66        | 20.52       | 3.04              | 3.06        | 0.64        | 20.52       | -3%   | -3%         |
| • My Home Energy Report                   | 1.89        | 1.89        | 0.66        |             | 1.81                              | 1.81        | 0.63        |             | 1.89                                   | 1.89        | 0.66        |             | 1.81              | 1.81        | 0.63        |             | -4%   | -4%         |
| • Power Manager                           | 4.33        | 9.80        | 4.33        |             | 4.33                              | 9.80        | 4.33        |             | 2.25                                   | 5.10        | 2.25        |             | 2.25              | 5.10        | 2.25        |             | -48%  | -48%        |
| • Residential Energy Assessments          | 1.33        | 1.28        | 0.48        | 19.95       | 1.30                              | 1.26        | 0.47        | 19.95       | 1.33                                   | 1.28        | 0.48        | 19.95       | 1.30              | 1.26        | 0.47        | 19.95       | -2%   | -2%         |
| <b>Residential Total</b>                  | <b>2.50</b> | <b>2.82</b> | <b>1.03</b> | <b>6.18</b> | <b>2.46</b>                       | <b>2.78</b> | <b>1.02</b> | <b>6.18</b> | <b>1.90</b>                            | <b>2.15</b> | <b>0.79</b> | <b>6.18</b> | <b>1.86</b>       | <b>2.10</b> | <b>0.77</b> | <b>6.18</b> | <b>-25%</b>   | <b>-25%</b> |
| <b>Non-Residential Programs</b>           |             |             |             |             |                                   |             |             |             |  |             |             |             |                   |             |             |             |   |             |
| • Custom Assessment                       | 2.70        | 0.80        | 0.84        | 1.38        | 2.63                              | 0.78        | 0.82        | 1.38        | 2.70                                   | 0.80        | 0.84        | 1.38        | 2.63              | 0.78        | 0.82        | 1.38        | -3%   | -3%         |
| • Custom Incentive                        | 3.07        | 1.18        | 0.87        | 1.97        | 2.98                              | 1.14        | 0.84        | 1.97        | 3.07                                   | 1.18        | 0.87        | 1.97        | 2.98              | 1.14        | 0.84        | 1.97        | -3%   | -3%         |
| • EnergyWise for Business                 | 0.63        | 1.26        | 0.55        |             | 0.63                              | 1.26        | 0.55        |             | 0.41                                   | 0.83        | 0.36        |             | 0.41              | 0.83        | 0.36        |             | -34%  | -34%        |
| • Food Service Products                   | 1.45        | 0.79        | 0.45        | 2.38        | 1.43                              | 0.78        | 0.44        | 2.38        | 1.45                                   | 0.79        | 0.45        | 2.38        | 1.43              | 0.78        | 0.44        | 2.38        | -1%   | -1%         |
| • HVAC                                    | 1.47        | 1.12        | 0.64        | 2.05        | 1.44                              | 1.09        | 0.63        | 2.05        | 1.47                                   | 1.12        | 0.64        | 2.05        | 1.44              | 1.09        | 0.63        | 2.05        | -2%   | -2%         |
| • Lighting                                | 4.19        | 2.14        | 0.78        | 4.08        | 4.05                              | 2.07        | 0.76        | 4.08        | 4.19                                   | 2.14        | 0.78        | 4.08        | 4.05              | 2.07        | 0.76        | 4.08        | -3%   | -3%         |
| • Motors, Pumps & VFDs                    | 3.11        | 2.41        | 0.82        | 4.99        | 3.01                              | 2.33        | 0.79        | 4.99        | 3.11                                   | 2.41        | 0.82        | 4.99        | 3.01              | 2.33        | 0.79        | 4.99        | -3%   | -3%         |
| • Non Res Information Technology          | 0.65        | 0.47        | 0.31        | 2.26        | 0.65                              | 0.47        | 0.31        | 2.26        | 0.65                                   | 0.47        | 0.31        | 2.26        | 0.65              | 0.47        | 0.31        | 2.26        | 0%  | 0%          |
| • Process Equipment                       | 3.50        | 2.26        | 0.97        | 3.66        | 3.36                              | 2.18        | 0.93        | 3.66        | 3.50                                   | 2.26        | 0.97        | 3.66        | 3.36              | 2.18        | 0.93        | 3.66        | -4%   | -4%         |
| • Performance Incentive                   | 3.22        | 1.06        | 0.86        | 1.79        | 3.13                              | 1.03        | 0.83        | 1.79        | 3.22                                   | 1.06        | 0.86        | 1.79        | 3.13              | 1.03        | 0.83        | 1.79        | -3%   | -3%         |
| • Small Business Energy Saver             | 2.32        | 1.43        | 0.76        | 2.60        | 2.26                              | 1.40        | 0.74        | 2.60        | 2.32                                   | 1.43        | 0.76        | 2.60        | 2.26              | 1.40        | 0.74        | 2.60        | -3%   | -3%         |
| • PowerShare                              | 3.37        | 136.89      | 3.37        |             | 3.37                              | 136.89      | 3.37        |             | 3.26                                   | 132.30      | 3.26        |             | 3.26              | 132.30      | 3.26        |             | -3%   | -3%         |
| <b>Non-Residential Total</b>              | <b>3.12</b> | <b>2.03</b> | <b>0.93</b> | <b>3.16</b> | <b>3.05</b>                       | <b>1.98</b> | <b>0.91</b> | <b>3.16</b> | <b>3.08</b>                            | <b>2.00</b> | <b>0.92</b> | <b>3.16</b> | <b>3.01</b>       | <b>1.95</b> | <b>0.90</b> | <b>3.16</b> | <b>-4%</b>  | <b>-4%</b>  |
| <b>Overall Portfolio Total</b>            | <b>2.81</b> | <b>2.32</b> | <b>0.97</b> | <b>3.83</b> | <b>2.76</b>                       | <b>2.27</b> | <b>0.96</b> | <b>3.83</b> | <b>2.50</b>                            | <b>2.05</b> | <b>0.86</b> | <b>3.83</b> | <b>2.44</b>       | <b>2.01</b> | <b>0.84</b> | <b>3.83</b> | <b>-13%</b>   | <b>-13%</b> |

Public Staff  
Maness Exhibit I  
Schedule 1

Supplemental Miller Exhibit 1, page 1 (unless otherwise noted)

Duke Energy Carolinas, LLC  
DSM/EE Cost Recovery Rider 12  
Docket Number E-7 Sub 1230  
Exhibit Summary of Rider EE Exhibits and Factors

**Residential Billing Factor for Rider 12 True-up (EMF) Components**

|        |   |                                  |    |                |
|--------|---|----------------------------------|----|----------------|
| Line 1 | Year 2016 EE/DSM True-up (EMF) Revenue Requirement                  | Miller Exhibit 2, pg 1a, Line 15 | \$ | (57,239)       |
| 2      | Year 2017 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg.1 Line 15    |    | (4,091,589)    |
| 3      | Year 2018 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg 2 Line 15    |    | 2,645,710      |
| 4      | Year 2019 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg 3 Line 15    |    | 23,835,420     |
| 5      | Total True-up (EMF) Revenue Requirement                             | Sum Lines 1-3                    | \$ | 22,332,301     |
| 6      | Projected NC Residential Sales (kWh) for rate period                | Miller Exhibit 6 pg. 1, Line 1   |    | 22,092,324,452 |
| 7      | EE/DSM Revenue Requirement EMF Residential Rider EE (cents per kWh) | Line 4 / Line 5 * 100            |    | <b>0.1011</b>  |

**Residential Billing Factor for Rider 12 Prospective Components**

|    |   |                                     |    |                   |
|----|---|-------------------------------------|----|-------------------|
| 8  | Vintage 2018 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 2, Line 15     |    | -                 |
| 9  | Vintage 2019 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 3, Line 15     |    | 5,292,331         |
| 10 | Vintage 2020 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 4, Line 1      |    | 4,495,479         |
| 11 | Vintage 2021 Total EE/DSM Prospective Amounts Revenue Requirement           | <b>Maness Exhibit I, Schedule 2</b> |    | <b>80,087,298</b> |
| 12 | Total Prospective Revenue Requirement                                       | Sum Lines 7-10                      | \$ | 89,875,108        |
| 13 | Projected NC Residential Sales (kWh) for rate period                        | Miller Exhibit 6 pg. 1, Line 1      |    | 22,092,324,452    |
| 14 | EE/DSM Revenue Requirement Prospective Residential Rider EE (cents per kWh) | Line 11 / Line 12 * 100             |    | <b>0.4068</b>     |

Total Revenue Requirements in Rider 12 from Residential Customers

|    |  |                   |    |                    |
|----|--|-------------------|----|--------------------|
| 15 | Total True-up (EMF) Revenue Requirement  | Line 4            | \$ | 22,332,301         |
| 16 | Total Prospective Revenue Requirement  | Line 11           |    | 89,875,108         |
| 17 | <b>Total EE/DSM Revenue Requirement for Residential Rider EE</b>                 | Line 14 + Line 15 | \$ | <b>112,207,409</b> |
| 18 | <b>Total EE/DSM Revenue Requirement for Residential Rider EE (cents per kWh)</b> | Line 6 + Line 13  |    | <b>0.5079</b>      |

**Non-Residential Billing Factors for Rider 12 True-up (EMF) Components**

|    |   |                                  |    |                 |
|----|---|----------------------------------|----|-----------------|
| 19 | Vintage Year 2016 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 1a, Line 25 | \$ | 3,217,376       |
| 20 | Projected Year 2016 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 4          |    | 16,670,610,353  |
| 21 | EE Revenue Requirement Year 2016 EMF Non-Residential Rider EE (cents per kWh)       | Line 18/Line 19 * 100            |    | <b>0.0193</b>   |
| 22 | Vintage Year 2016 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 1a, Line 35 | \$ | (18,608)        |
| 23 | Projected Year 2016 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 5          |    | 16,964,126,808  |
| 24 | DSM Revenue Requirement Year 2016 EMF Non-Residential Rider EE (cents per kWh)      | Line 21/Line 22 * 100            |    | <b>(0.0001)</b> |
| 25 | Vintage Year 2017 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 1, Line 25  | \$ | 5,650,795       |
| 26 | Projected Year 2017 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 4          |    | 16,498,870,944  |
| 27 | EE Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)       | Line 18/Line 19 * 100            |    | <b>0.0342</b>   |
| 28 | Vintage Year 2017 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 1, Line 35  | \$ | 6,539           |
| 29 | Projected Year 2017 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 5          |    | 16,933,914,400  |
| 30 | DSM Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)      | Line 21/Line 22 * 100            |    | -               |

| Supplemental Miller Exhibit 1, page 2 |   |                                 |                |
|---------------------------------------|---|---------------------------------|----------------|
| 31                                    | Vintage Year 2018 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 2, Line 25 | \$ (784,173)   |
| 32                                    | Projected Year 2018 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 6         | 15,929,504,199 |
| 33                                    | EE Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)       | Line 24/Line 25 * 100           | (0.0049)       |
| 34                                    | Vintage Year 2018 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 2, Line 35 | \$ (243,015)   |
| 35                                    | Projected Year 2018 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 7         | 16,832,538,740 |
| 36                                    | DSM Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)      | Line 27/Line 28 * 100           | (0.0014)       |
| 37                                    | Vintage Year 2019 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 3, Line 25 | \$ (3,527,723) |
| 38                                    | Projected Year 2019 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 8         | 15,707,415,542 |
| 39                                    | EE Revenue Requirement Year 2019 EMF Non-Residential Rider EE (cents per kWh)       | Line 30/Line 31 * 100           | (0.0225)       |
| 40                                    | Vintage Year 2019 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 3, Line 35 | \$ 312,940     |
| 41                                    | Projected Year 2019 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 9         | 16,897,018,794 |
| 42                                    | DSM Revenue Requirement Year 2019 EMF Non-Residential Rider EE (cents per kWh)      | Line 33/Line 34 * 100           | 0.0019         |

### ***Non-Residential Billing Factors for Rider 12 Prospective Components***

|                        |   |                                 |                |
|------------------------|---|---------------------------------|----------------|
| 43                     | Vintage Year 2018 EE Prospective Amounts Revenue Requirement  | Miller Exhibit 2 pg. 2, Line 25 | \$ 2,182,027   |
| 44                     | Projected Program Year 2018 EE Participants NC Non-Residential Sales (kwh) for rate period              | Miller Exhibit 6 Line 6         | 15,929,504,199 |
| 45                     | EE Revenue Requirement Vintage 2018 Prospective Component for Non-Residential Rider EE (cents per kWh)  | Line 36/Line 37 * 100           | 0.0137         |
| 46                     | Vintage Year 2019 EE Prospective Amounts Revenue Requirement  | Miller Exhibit 2 pg. 3, Line 25 | \$ 10,794,655  |
| 47                     | Projected Vintage 2019 EE Participants NC Non-Residential Sales (kwh) for rate period                   | Miller Exhibit 6 Line 8         | 15,707,415,542 |
| 48                     | EE Revenue Requirement Vintage 2019 Prospective Component for Non-Residential Rider EE (cents per kWh)  | Line 39/Line 40 * 100           | 0.0687         |
| 49                     | Vintage Year 2020 EE Prospective Amounts Revenue Requirement  | Miller Exhibit 2 pg. 4, Line 4  | \$ 9,376,721   |
| 50                     | Projected Vintage 2020 EE Participants NC Non-Residential Sales (kwh) for rate period                   | Miller Exhibit 6 Line 10        | 15,330,345,599 |
| 51                     | EE Revenue Requirement Vintage 2020 Prospective Component for Non-Residential Rider EE (cents per kWh)  | Line 42/Line 43 * 100           | 0.0612         |
| 52                     | Vintage Year 2021 EE Prospective Amounts Revenue Requirement  | Maness Exhibit I, Schedule 2    | \$ 53,575,595  |
| 53                     | Projected Vintage 2021 EE Participants NC Non-Residential Sales (kwh) for rate period                   | Miller Exhibit 6 Line 12        | 15,330,345,599 |
| 54                     | EE Revenue Requirement Vintage 2021 Prospective Component for Non-Residential Rider EE (cents per kWh)  | Line 45/Line 46 * 100           | 0.3495         |
| 55                     | Vintage Year 2021 DSM Prospective Amounts Revenue Requirement   | Maness Exhibit I, Schedule 2    | \$ 17,522,052  |
| 56                     | Projected Vintage 2021 DSM Participants NC Non-Residential Sales (kwh) for rate period                  | Miller Exhibit 6 Line 13        | 16,898,362,794 |
| 57                     | DSM Revenue Requirement Vintage 2021 Prospective Component for Non-Residential Rider EE (cents per kWh) | Line 48/Line 49 * 100           | 0.1037         |
| Total EMF Rate         |   |                                 | 0.0265         |
| Total Prospective Rate |   |                                 | 0.5968         |

### ***Total Revenue Requirements in Rider 12 from Non-Residential Customers***

|   |   |                   |             |
|---|---|-------------------|-------------|
| 58  | Vintage Year 2016 EE True-up (EMF) Revenue Requirement        | Line 19           | 3,217,376   |
| 59  | Vintage Year 2016 DSM True-up (EMF) Revenue Requirement       | Line 22           | (18,608)    |
| 60  | Vintage Year 2017 EE True-up (EMF) Revenue Requirement        | Line 25           | 5,650,795   |
| 61  | Vintage Year 2017 DSM True-up (EMF) Revenue Requirement       | Line 28           | 6,539       |
| 62  | Vintage Year 2018 EE True-up (EMF) Revenue Requirement        | Line 31           | (784,173)   |
| 63  | Vintage Year 2018 DSM True-up (EMF) Revenue Requirement       | Line 34           | (243,015)   |
| 64  | Vintage Year 2019 EE True-up (EMF) Revenue Requirement        | Line 37           | (3,527,723) |
| 65  | Vintage Year 2019 DSM True-up (EMF) Revenue Requirement       | Line 40           | 312,940     |
| 66  | Vintage Year 2018 EE Prospective Amounts Revenue Requirement  | Line 43           | 2,182,027   |
| 67  | Vintage Year 2019 EE Prospective Amounts Revenue Requirement  | Line 46           | 10,794,655  |
| 68  | Vintage Year 2020 EE Prospective Amounts Revenue Requirement  | Line 49           | 9,376,721   |
| 69  | Vintage Year 2021 EE Prospective Amounts Revenue Requirement  | Line 52           | 53,575,595  |
| 70  | Vintage Year 2021 DSM Prospective Amounts Revenue Requirement | Line 55           | 17,522,052  |
| Total Non-Residential Revenue Requirement in Rider 12 |   | Sum (Lines 58-70) | 98,065,181  |

**Public Staff  
Maness Exhibit I  
Schedule 2**

Supplemental Miller Exhibit 2, page 5 (unless otherwise marked)

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Program Costs, Earned Incentive and Lost Revenues for Vintage Year 2021

**RESIDENTIAL**

| Line  | Reference  | 2021                 |
|---|--|----------------------|
| 1 Residential EE Program Cost                                 | Evans Exhibit 1, pg. 4 * NC Alloc. Factor              | \$ 37,155,471        |
| 2 Residential EE Earned Utility Incentive                     | <b>Maness Exhibit I, Schedule 3 * NC Alloc. Factor</b> | <b>2,774,995</b>     |
| 3 Total EE Program Cost and Incentive Components              | Line 1 + Line 2, Evans Exhibit 1, Line 10              | 39,930,466           |
| 4 Residential DSM Program Cost                                | Evans Exhibit 1, pg. 4 * NC Alloc. Factor              | 13,699,485           |
| 5 Residential DSM Earned Utility Incentive                    | <b>Maness Exhibit I, Schedule 3 * NC Alloc. Factor</b> | <b>1,180,685</b>     |
| 6 Total DSM Program Cost and Incentive Components             | Line 4 + Line 5, Evans Exhibit 1, Line 12              | <b>14,880,170</b>    |
| 7 Total EE/DSM Program Cost and Incentive Components          | Line 3 + Line 6  | 54,810,636           |
| 8 Revenue-related taxes and regulatory fees factor            | Miller Exhibit 2, pg. 6                                | 1.001302             |
| 9 Total EE/DSM Program Cost and Incentive Revenue Requirement | Line 7 * Line 8  | 54,881,999           |
| 10 Residential Net Lost Revenues                              | Evans Exhibit 2 pg. 3                                  | 25,205,298           |
| 11 <b>Total Residential EE Revenue Requirement</b>            | <b>Line 9 + Line 10</b>                                | <b>\$ 80,087,298</b> |

See Miller Exhibit 1  
for rate

**NON-RESIDENTIAL  
Energy Efficiency Programs**

|   | Reference  | 2021             |
|---|--|------------------|
| 12 Non-Residential EE Program Cost  | Evans Exhibit 1, pg. 4 * NC Alloc. Factor              | \$ 38,264,959    |
| 13 Non-Residential EE Earned Utility Incentive                              | <b>Maness Exhibit I, Schedule 3 * NC Alloc. Factor</b> | <b>8,888,527</b> |
| 14 Total EE Program Cost and Incentive Components                           | Line 12 + Line 13, Evans Exhibit 1, Line 27            | 47,153,486       |
| 15 Revenue-related taxes and regulatory fees factor                         | Miller Exhibit 2, pg. 6                                | 1.001302         |
| 16 Total Non-Residential EE Program Cost and Incentive Revenue Requirements | Line 14 * Line 15                                      | 47,214,880       |
| 17 Non-Residential Net Lost Revenues  | Evans Exhibit 2 pg. 3                                  | 6,360,715        |
| 18 Total Non-Residential EE Revenue Requirement                             | Line 16 + Line 17                                      | \$ 53,575,595    |
| 19 Projected NC Residential Sales (kWh)                                     | Miller Exhibit 6, pg. 1, Line 12                       | 15,330,345,599   |
| 20 <b>NC Non-Residential EE billing factor (Cents/kWh)</b>                  | <b>Line 18/Line 19*100</b>                             | <b>0.3495</b>    |

**DSM Programs**

|  |  | 2021             |
|--|--|------------------|
| 21 Non-Residential DSM Program Cost                                | Evans Exhibit 1, pg. 4 * NC Alloc. Factor              | \$ 16,110,767    |
| 22 Non-Residential DSM Earned Utility Incentive                    | <b>Maness Exhibit I, Schedule 3 * NC Alloc. Factor</b> | <b>1,388,501</b> |
| 23 Total Non-Residential DSM Program Cost and Incentive Components | Line 21 + Line 22, Evans Exhibit 1, Line 29            | 17,499,268       |
| 24 Revenue-related taxes and regulatory fees factor                | Miller Exhibit 2, pg. 6                                | 1.001302         |
| 25 Total Non-Residential DSM Revenue Requirement                   | Line 23 * Line 24                                      | 17,522,052       |
| 26 Projected NC Non-Residential Sales (kWh)                        | Miller Exhibit 6, pg. 1, Line 13                       | 16,898,362,794   |
| 27 <b>NC Non-Residential DSM billing factor</b>                    | <b>Line 25/Line 26*100</b>                             | <b>0.1037</b>    |



| A | B | C | D                       | E               | F | G | H |
|---|---|---|-------------------------|-----------------|---|---|---|
|   |   |   | $= (A \cdot B) \cdot C$ | $= (B \cdot D)$ |   |   |   |

(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintages.  
(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

Public Staff  
Maness Revised Exhibit I  
Schedule 1  
Page 1 of 2

Supplemental Miller Exhibit 1 (unless otherwise noted)

Duke Energy Carolinas, LLC  
DSM/EE Cost Recovery Rider 12  
Docket Number E-7 Sub 1230  
Exhibit Summary of Rider EE Exhibits and Factors

**Residential Billing Factor for Rider 12 True-up (EMF) Components**

|      |   |                                  |                |
|------|---|----------------------------------|----------------|
| Line |   |                                  |                |
| 1    | Year 2016 EE/DSM True-up (EMF) Revenue Requirement                  | Miller Exhibit 2, pg 1a, Line 15 | \$ (57,239)    |
| 2    | Year 2017 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg.1 Line 15    | (4,091,589)    |
| 3    | Year 2018 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg 2 Line 15    | 2,645,710      |
| 4    | Year 2019 EE/DSM True-Up (EMF) Revenue Requirement                  | Miller Exhibit 2 pg 3 Line 15    | 23,835,420     |
| 5    | Total True-up (EMF) Revenue Requirement                             | Sum Lines 1-3                    | \$ 22,332,301  |
| 6    | Projected NC Residential Sales (kWh) for rate period                | Miller Exhibit 6 pg. 1, Line 1   | 22,092,324,452 |
| 7    | EE/DSM Revenue Requirement EMF Residential Rider EE (cents per kWh) | Line 4 / Line 5 * 100            | 0.1011         |

**Residential Billing Factor for Rider 12 Prospective Components**

|    |   |                                 |                |
|----|---|---------------------------------|----------------|
| 8  | Vintage 2018 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 2, Line 15 | -              |
| 9  | Vintage 2019 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 3, Line 15 | 5,292,331      |
| 10 | Vintage 2020 Total EE/DSM Prospective Amounts Revenue Requirement           | Miller Exhibit 2 pg. 4, Line 1  | 4,495,479      |
| 11 | Vintage 2021 Total EE/DSM Prospective Amounts Revenue Requirement           | Maness Exhibit I, Schedule 2    | 80,763,354     |
| 12 | Total Prospective Revenue Requirement                                       | Sum Lines 7-10                  | \$ 90,551,164  |
| 13 | Projected NC Residential Sales (kWh) for rate period                        | Miller Exhibit 6 pg. 1, Line 1  | 22,092,324,452 |
| 14 | EE/DSM Revenue Requirement Prospective Residential Rider EE (cents per kWh) | Line 11 / Line 12 * 100         | 0.4099         |

Total Revenue Requirements in Rider 12 from Residential Customers

|    |   |                   |                |
|----|---|-------------------|----------------|
| 15 | Total True-up (EMF) Revenue Requirement                                   | Line 4            | \$ 22,332,301  |
| 16 | Total Prospective Revenue Requirement                                     | Line 11           | 90,551,164     |
| 17 | Total EE/DSM Revenue Requirement for Residential Rider EE                 | Line 14 + Line 15 | \$ 112,883,465 |
| 18 | Total EE/DSM Revenue Requirement for Residential Rider EE (cents per kWh) | Line 6 + Line 13  | 0.5110         |

**Non-Residential Billing Factors for Rider 12 True-up (EMF) Components**

|    |   |                                  |                |
|----|---|----------------------------------|----------------|
| 19 | Vintage Year 2016 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 1a, Line 25 | \$ 3,217,376   |
| 20 | Projected Year 2016 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 4          | 16,670,610,353 |
| 21 | EE Revenue Requirement Year 2016 EMF Non-Residential Rider EE (cents per kWh)       | Line 18/Line 19 * 100            | 0.0193         |
| 22 | Vintage Year 2016 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 1a, Line 35 | \$ (18,608)    |
| 23 | Projected Year 2016 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 5          | 16,964,126,808 |
| 24 | DSM Revenue Requirement Year 2016 EMF Non-Residential Rider EE (cents per kWh)      | Line 21/Line 22 * 100            | (0.0001)       |
| 25 | Vintage Year 2017 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 1, Line 25  | \$ 5,650,795   |
| 26 | Projected Year 2017 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 4          | 16,498,870,944 |
| 27 | EE Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)       | Line 18/Line 19 * 100            | 0.0342         |
| 28 | Vintage Year 2017 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 1, Line 35  | \$ 6,539       |
| 29 | Projected Year 2017 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 5          | 16,933,914,400 |
| 30 | DSM Revenue Requirement Year 2017 EMF Non-Residential Rider EE (cents per kWh)      | Line 21/Line 22 * 100            | -              |

## Supplemental Miller Exhibit 1, page 2

|    |   |                                 |    |                 |
|----|---|---------------------------------|----|-----------------|
| 31 | Vintage Year 2018 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 2, Line 25 | \$ | (784,173)       |
| 32 | Projected Year 2018 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 6         |    | 15,929,504,199  |
| 33 | EE Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)       | Line 24/Line 25 * 100           |    | <b>(0.0049)</b> |
| 34 | Vintage Year 2018 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 2, Line 35 | \$ | (243,015)       |
| 35 | Projected Year 2018 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 7         |    | 16,832,538,740  |
| 36 | DSM Revenue Requirement Year 2018 EMF Non-Residential Rider EE (cents per kWh)      | Line 27/Line 28 * 100           |    | <b>(0.0014)</b> |
| 37 | Vintage Year 2019 EE True-up (EMF) Revenue Requirement                              | Miller Exhibit 2 pg. 3, Line 25 | \$ | (3,527,723)     |
| 38 | Projected Year 2019 EE Participants NC Non-Residential Sales (kwh) for rate period  | Miller Exhibit 6 Line 8         |    | 15,707,415,542  |
| 39 | EE Revenue Requirement Year 2019 EMF Non-Residential Rider EE (cents per kWh)       | Line 30/Line 31 * 100           |    | <b>(0.0225)</b> |
| 40 | Vintage Year 2019 DSM True-up (EMF) Revenue Requirement                             | Miller Exhibit 2 pg. 3, Line 35 | \$ | 312,940         |
| 41 | Projected Year 2019 DSM Participants NC Non-Residential Sales (kwh) for rate period | Miller Exhibit 6 Line 9         |    | 16,897,018,794  |
| 42 | DSM Revenue Requirement Year 2019 EMF Non-Residential Rider EE (cents per kWh)      | Line 33/Line 34 * 100           |    | <b>0.0019</b>   |

**Non-Residential Billing Factors for Rider 12 Prospective Components**

|    |   |                                     |    |                      |
|----|---|-------------------------------------|----|----------------------|
| 43 | Vintage Year 2018 EE Prospective Amounts Revenue Requirement  | Miller Exhibit 2 pg. 2, Line 25     | \$ | 2,182,027            |
| 44 | Projected Program Year 2018 EE Participants NC Non-Residential Sales (kwh) for rate period              | Miller Exhibit 6 Line 6             |    | 15,929,504,199       |
| 45 | EE Revenue Requirement Vintage 2018 Prospective Component for Non-Residential Rider EE (cents per kWh)  | Line 36/Line 37 * 100               |    | <b>0.0137</b>        |
| 46 | Vintage Year 2019 EE Prospective Amounts Revenue Requirement  | Miller Exhibit 2 pg. 3, Line 25     | \$ | 10,794,655           |
| 47 | Projected Vintage 2019 EE Participants NC Non-Residential Sales (kwh) for rate period                   | Miller Exhibit 6 Line 8             |    | 15,707,415,542       |
| 48 | EE Revenue Requirement Vintage 2019 Prospective Component for Non-Residential Rider EE (cents per kWh)  | Line 39/Line 40 * 100               |    | <b>0.0687</b>        |
| 49 | Vintage Year 2020 EE Prospective Amounts Revenue Requirement  | Miller Exhibit 2 pg. 4, Line 4      | \$ | 9,376,721            |
| 50 | Projected Vintage 2020 EE Participants NC Non-Residential Sales (kwh) for rate period                   | Miller Exhibit 6 Line 10            |    | 15,330,345,599       |
| 51 | EE Revenue Requirement Vintage 2020 Prospective Component for Non-Residential Rider EE (cents per kWh)  | Line 42/Line 43 * 100               |    | <b>0.0612</b>        |
| 52 | Vintage Year 2021 EE Prospective Amounts Revenue Requirement  | <b>Maness Exhibit I, Schedule 2</b> | \$ | 53,575,595 <b>rv</b> |
| 53 | Projected Vintage 2021 EE Participants NC Non-Residential Sales (kwh) for rate period                   | Miller Exhibit 6 Line 12            |    | 15,330,345,599       |
| 54 | EE Revenue Requirement Vintage 2021 Prospective Component for Non-Residential Rider EE (cents per kWh)  | Line 45/Line 46 * 100               |    | <b>0.3495</b>        |
| 55 | Vintage Year 2021 DSM Prospective Amounts Revenue Requirement   | <b>Maness Exhibit I, Schedule 2</b> | \$ | 18,317,103 <b>rv</b> |
| 56 | Projected Vintage 2021 DSM Participants NC Non-Residential Sales (kwh) for rate period                  | Miller Exhibit 6 Line 13            |    | 16,898,362,794       |
| 57 | DSM Revenue Requirement Vintage 2021 Prospective Component for Non-Residential Rider EE (cents per kWh) | Line 48/Line 49 * 100               |    | <b>0.1084</b>        |
|    | <b>Total EMF Rate</b>   |                                     |    | <b>0.0265</b>        |
|    | <b>Total Prospective Rate</b>   |                                     |    | <b>0.6015</b>        |

**Total Revenue Requirements in Rider 12 from Non-Residential Customers**

|    |   |                   |  |                   |
|----|---|-------------------|--|-------------------|
| 58 | Vintage Year 2016 EE True-up (EMF) Revenue Requirement        | Line 19           |  | 3,217,376         |
| 59 | Vintage Year 2016 DSM True-up (EMF) Revenue Requirement       | Line 22           |  | (18,608)          |
| 60 | Vintage Year 2017 EE True-up (EMF) Revenue Requirement        | Line 25           |  | 5,650,795         |
| 61 | Vintage Year 2017 DSM True-up (EMF) Revenue Requirement       | Line 28           |  | 6,539             |
| 62 | Vintage Year 2018 EE True-up (EMF) Revenue Requirement        | Line 31           |  | (784,173)         |
| 63 | Vintage Year 2018 DSM True-up (EMF) Revenue Requirement       | Line 34           |  | (243,015)         |
| 64 | Vintage Year 2019 EE True-up (EMF) Revenue Requirement        | Line 37           |  | (3,527,723)       |
| 65 | Vintage Year 2019 DSM True-up (EMF) Revenue Requirement       | Line 40           |  | 312,940           |
| 66 | Vintage Year 2018 EE Prospective Amounts Revenue Requirement  | Line 43           |  | 2,182,027         |
| 67 | Vintage Year 2019 EE Prospective Amounts Revenue Requirement  | Line 46           |  | 10,794,655        |
| 68 | Vintage Year 2020 EE Prospective Amounts Revenue Requirement  | Line 49           |  | 9,376,721         |
| 69 | Vintage Year 2021 EE Prospective Amounts Revenue Requirement  | Line 52           |  | 53,575,595        |
| 70 | Vintage Year 2021 DSM Prospective Amounts Revenue Requirement | Line 55           |  | 18,317,103        |
|    | <b>Total Non-Residential Revenue Requirement in Rider 12</b>  | Sum (Lines 58-70) |  | <b>98,860,231</b> |

|                 |        |
|-----------------|--------|
| Total DSM Rates | 0.1088 |
| Total EE Rates  | 0.5192 |
|                 | 0.6280 |

Public Staff  
Maness Revised Exhibit I  
Schedule 2

Supplemental Miller Exhibit 2, page 5 (unless otherwise noted)

Duke Energy Carolinas, LLC  
Docket No. E-7, Sub 1230  
Estimated Program Costs, Earned Incentive and Lost Revenues for Vintage Year 2021

## RESIDENTIAL

| Line  | Reference  | 2021                 |           |
|---|--|----------------------|-----------|
| 1 Residential EE Program Cost                                 | Evans Exhibit 1, pg. 4 * NC Alloc. Factor              | \$ 37,155,471        |           |
| 2 Residential EE Earned Utility Incentive                     | <b>Maness Exhibit I, Schedule 3 * NC Alloc. Factor</b> | <b>2,774,995</b>     | <b>rv</b> |
| 3 Total EE Program Cost and Incentive Components              | Line 1 + Line 2, Evans Exhibit 1, Line 10              | 39,930,466           |           |
| 4 Residential DSM Program Cost                                | Evans Exhibit 1, pg. 4 * NC Alloc. Factor              | 13,699,485           |           |
| 5 Residential DSM Earned Utility Incentive                    | <b>Maness Exhibit I, Schedule 3 * NC Alloc. Factor</b> | <b>1,855,862</b>     | <b>rv</b> |
| 6 Total DSM Program Cost and Incentive Components             | Line 4 + Line 5, Evans Exhibit 1, Line 12              | 15,555,347           |           |
| 7 Total EE/DSM Program Cost and Incentive Components          | Line 3 + Line 6  | 55,485,813           |           |
| 8 Revenue-related taxes and regulatory fees factor            | Miller Exhibit 2, pg. 6                                | 1.001302             |           |
| 9 Total EE/DSM Program Cost and Incentive Revenue Requirement | Line 7 * Line 8  | 55,558,055           |           |
| 10 Residential Net Lost Revenues                              | Evans Exhibit 2 pg. 3                                  | 25,205,298           |           |
| 11 <b>Total Residential EE Revenue Requirement</b>            | <b>Line 9 + Line 10</b>                                | <b>\$ 80,763,354</b> |           |
| See Miller Exhibit 1<br>for rate                              |  |                      |           |

## NON-RESIDENTIAL Energy Efficiency Programs

|   | Reference  | 2021             |           |
|---|--|------------------|-----------|
| 12 Non-Residential EE Program Cost  | Evans Exhibit 1, pg. 4 * NC Alloc. Factor              | \$ 38,264,959    |           |
| 13 Non-Residential EE Earned Utility Incentive                              | <b>Maness Exhibit I, Schedule 3 * NC Alloc. Factor</b> | <b>8,888,527</b> | <b>rv</b> |
| 14 Total EE Program Cost and Incentive Components                           | Line 12 + Line 13, Evans Exhibit 1, Line 27            | 47,153,486       |           |
| 15 Revenue-related taxes and regulatory fees factor                         | Miller Exhibit 2, pg. 6                                | 1.001302         |           |
| 16 Total Non-Residential EE Program Cost and Incentive Revenue Requirements | Line 14 * Line 15                                      | 47,214,880       |           |
| 17 Non-Residential Net Lost Revenues  | Evans Exhibit 2 pg. 3                                  | 6,360,715        |           |
| 18 Total Non-Residential EE Revenue Requirement                             | Line 16 + Line 17                                      | \$ 53,575,595    |           |
| 19 Projected NC Residential Sales (kWh)                                     | Miller Exhibit 6, pg. 1, Line 12                       | 15,330,345,599   |           |
| 20 <b>NC Non-Residential EE billing factor (Cents/kWh)</b>                  | <b>Line 18/Line 19*100</b>                             | <b>0.3495</b>    |           |

## DSM Programs

|  |  | 2021             |           |
|--|--|------------------|-----------|
| 21 Non-Residential DSM Program Cost                                | Evans Exhibit 1, pg. 4 * NC Alloc. Factor              | \$ 16,110,767    |           |
| 22 Non-Residential DSM Earned Utility Incentive                    | <b>Maness Exhibit I, Schedule 3 * NC Alloc. Factor</b> | <b>2,182,517</b> | <b>rv</b> |
| 23 Total Non-Residential DSM Program Cost and Incentive Components | Line 21 + Line 22, Evans Exhibit 1, Line 29            | 18,293,285       |           |
| 24 Revenue-related taxes and regulatory fees factor                | Miller Exhibit 2, pg. 6                                | 1.001302         |           |
| 25 Total Non-Residential DSM Revenue Requirement                   | Line 23 * Line 24                                      | 18,317,103       |           |
| 26 Projected NC Non-Residential Sales (kWh)                        | Miller Exhibit 6, pg. 1, Line 13                       | 16,898,362,794   |           |
| 27 <b>NC Non-Residential DSM billing factor</b>                    | <b>Line 25/Line 26*100</b>                             | <b>0.1084</b>    |           |

Duke Energy Carolinas  
Evans Exhibit 1  
Vintage 2020 Estimate - January 1, 2021 to December 31, 2021  
Docket Number E-7, Sub 1230  
Load Impacts and Estimated Revenue Requirements by Program

|  | A | B | C | D<br>=(A-B)*C | E<br>=(B+D) | F | G | H |
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(1) My Home Energy Report impacts reflect cumulative capability as of end of vintage year, including impacts for participants from prior vintages

(2) Total System DSM programs allocated to Residential and Non-Residential based on contribution to retail system peak

## **PROFESSIONAL EXPERIENCE**

**Energy Efficiency Director:** Southern Alliance for Clean Energy, Knoxville, TN **April 2018 – Present**

- Regulatory filings, testimony, strategy, and stakeholder management on integrated resource planning, energy efficiency program design, cost recovery and related matters throughout the Southeast.

**Senior Policy Director:** Alliance for Affordable Energy, New Orleans, LA **February 2017 – April 2018**

- Regulatory filings, strategy, and stakeholder management on integrated resource planning and energy efficiency rulemaking, power plant proposals and related matters at the city and state level.

**Consultant:** Utility Regulation and Energy Policy **December 2014 – February 2017**

- Technical and strategic guidance on clean energy policy and utility regulation for Opower, Gulf States Renewable Energy Industries Association, the Alliance, and Mississippi PSC candidate Brent Bailey.

**Candidate:** Louisiana Public Service Commission **July - December 2014**

- Won the open primary and secured 49.15% of the vote in the general election against a highly favored, well-funded incumbent.
- Raised nearly \$500,000 in campaign contributions while publicly pledging not to accept money from monopoly companies regulated by the PSC.
- Campaign focused on ethical leadership, reducing bills, energy efficiency, the rights of customers to generate solar energy, and government transparency.

**Utility Policy Director:** Alliance for Affordable Energy, New Orleans, LA **October 2005 – June 2014**

- Directed successful policy efforts for energy efficiency, renewable energy, and integrated resource planning at the Louisiana PSC and New Orleans City Council, spurring every major Louisiana utility investment in clean energy over the past decade.
- Reviewed and filed intervenor comments, met with commissioners, utilities, and technical consultants, assembled and managed relationships with a broad coalition of stakeholders, worked with media, and served as the organization's public face.
- Launched and managed energy efficiency and solar workforce training programs, public education campaigns, and direct service projects to improve energy performance in over 100 homes following the city's rebuild post-Katrina.

**Owner and Director:** EcoPark LLC (d.b.a. The Building Block), New Orleans, LA **February 2008 – Present**

Created an innovative co-location business center to serve as a catalyst for moving green commerce and social entrepreneurship to the mainstream.

- Developed the business concept and plan, brought initial funding to the project, hired staff, established brand identity, and secured tenants.

**Sustainable Development Team Facilitator:** Shell International, New Orleans, LA **May 2001 – June 2004**

- Worked to facilitate a paradigm shift within corporate management's core business practices toward social and environmental issue management.
- Engaged a diverse team of professionals across the company to identify energy and resource inefficiencies and methods to reduce carbon emissions from venting and flaring in oil and natural gas exploration and production.
- Analyzed ways to incorporate sustainability accounting into each stage of new venture development for major drilling projects.

## **EDUCATION**

**Tulane University**

- **Master of Arts in Latin American Studies, 2011**  
Concentration in environmental law, business, and international development
- **Bachelor of Arts with Honors in Latin American Studies, 2001**

## **EXPERT WITNESS TESTIMONY**

Forest Bradley-Wright, Direct Testimony on Behalf of Southern Alliance for Clean Energy and League of United Latin American Citizens. Docket Nos. 20190015-EG, 20190016-EG, 20190018-EG, 20190019-EG, 20190020-EG, 20190021-EG- Commission Review of Numeric Conservation Goals for Florida Power & Light, Gulf Power Company, Duke Energy Florida, Orlando Utilities Commission, Jacksonville Electric Authority, Tampa Electric Company. June 10<sup>th</sup>, 2019.

Forest Bradley-Wright, Direct Testimony on Behalf of Southern Alliance for Clean Energy and North Carolina Justice Center, Application of Duke Energy Carolinas, LLC for Approval of Demand-Side Management and Energy Efficiency Cost Recovery Rider Pursuant to N.C.G.S. §62-133.9 and Commission Rule R8-69; Docket No. E-7, Sub 1192. May 20<sup>th</sup>, 2019.

Forest Bradley-Wright, Direct Testimony on Behalf of Southern Alliance for Clean Energy, Georgia Power Company's Application for the Certification, Decertification, and Amended Demand Side Management Plan, Docket No. 42311. April 25<sup>th</sup>, 2019.

## **OTHER REGULATORY FILINGS**

Forest Bradley-Wright, Comments on Behalf of Southern Alliance for Clean Energy, Order Establishing Docket to Investigate the Development and Implementation of an Integrated Resource Planning Rule – MPSC Docket 2018-AD-64. February 15<sup>th</sup>, 2019

Forest Bradley-Wright and Daniel Brookeshire, Comments on Behalf of North Carolina Sustainable Energy Association and Southern Alliance for Clean Energy, Duke Energy Progress, LLC's Proposed Non-Profit Low-Income Weatherization Pay for Performance Pilot, Docket No. E-2, Sub 1187. November 9<sup>th</sup>, 2018

Forest Bradley-Wright, Comments on Behalf of Southern Alliance for Clean Energy, Order Establishing Docket to Investigate the Development and Implementation of an Integrated Resource Planning Rule – MPSC Docket 2018-AD-64. August 1<sup>st</sup>, 2018

Forest Bradley-Wright and Logan Burke, Comments on Behalf of Alliance for Affordable Energy, Rulemaking to Study the Possible Development of Financial Incentives for the Promotion of Energy Efficiency by Jurisdictional Electric and Natural Gas Utilities, Louisiana Public Service Commission Docket R-31106. June 20<sup>th</sup>, 2017

Forest Bradley-Wright and Logan Burke, Comments on Behalf of Alliance for Affordable Energy, Rulemaking to Establish Integrated Resource Planning Components and Reporting Requirements for Entergy New Orleans, Docket No. UD-17-01. May 25<sup>th</sup>, 2017

Forest Bradley-Wright and Logan Burke, Comments on Behalf of Alliance for Affordable Energy, Rulemaking to Study the Possible Development of Financial Incentives for the Promotion of Energy Efficiency by Jurisdictional Electric and Natural Gas Utilities, Louisiana Public Service Commission Docket R-31106. March 7<sup>th</sup>, 2017

Forest Bradley-Wright and Jeff Cantin, Post Hearing Brief on Behalf of Gulf States Renewable Energy Industries Association, Petition for a Certificate of Convenience and Necessity for Alabama Power, Docket No. 32382. August 19<sup>th</sup>, 2015

## **PUBLICATIONS**

Forest Bradley-Wright and Heather Pohnan, Energy Efficiency in the Southeast 2019 Annual Report, Southern Alliance for Clean Energy. January 21<sup>st</sup>, 2020

Forest Bradley-Wright and Heather Pohnan, Energy Efficiency in the Southeast 2018 Annual Report, Southern Alliance for Clean Energy. December 12<sup>th</sup>, 2018

SACE  
Docket No. E-7, Sub 1230  
DSM/EE Rider  
SACE Data Request No. 1  
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**DUKE ENERGY CAROLINAS**

**Request:**

Please provide a calculation of DSM/EE portfolio savings with and without line loss (1) as percentage of total annual sales; and (2) as a percentage of annual sales to non-opt-out customers:

- a. for the year 2019 (as a percentage of 2018 retail sales); and
- b. forecasted for the year 2021 (as a result of forecasted 2020 sales).

**Response:**

Please refer to "CCL-SACE DR1-14.xlsx."



CCL-SACE%20DR1-1  
4.xlsx



**Duke Energy Carolinas**

**CCL\_SACE DR 1-14**

|   |                    |  |
|---|--------------------|--|
| 2019 Incremental Energy Savings             | 794,856,771 kWh    | Evans Exhibit 1 page 3 (2019) line 28 - adjusted for line loss |
| 2019 Opt Out Electricity Sales - NC         | 20,042,218,854 kWh | Miller Exh 6, Line 8   |
| 2019 Opt Out Electricity Sales - SC         | 10,446,567,023 kWh | Exhibit 3 pg 1 of 2, Line 12                                   |
| 2018 System Retail Billed Electricity Sales | 81,399,234 MWh     | 2018 RAC Report  |

|                                      |                    |  |
|--------------------------------------|--------------------|--|
| 2021 Incremental Energy Savings      | 715,710,984 kWh    | Evans Exhibit 1 page 4 (2021) line 27 - adjusted for line loss |
| 2021 Opt Out Electricity Sales - NC  | 20,419,288,797 kWh | Miller Exh 6, Line 12  |
| 2021 Opt Out Electricity Sales - SC  | 10,490,870,196 kWh | Exhibit 3 pg 1 of 2, Line 16                                   |
| 2020 System Retail Electricity Sales | 80,141,016 MWh     | 2019 Fall Forecast, sales at meter                             |

**1. Please provide a calculation of DSM/EE portfolio savings with and without line loss (1) as a percentage of total annual sales; and (2) as a percentage of annual sales to non-opt-out customers:**

**a. for the year 2019 (as a percentage of 2018 retail sales);**

|   |                |
|---|----------------|
| 2019 Incremental Energy Savings                           | 794,856.77 MWh |
| 2018 System Retail Electricity Sales                      | 81,399,234 MWh |
| Savings as % of 2018 Sales                                | 0.98%          |
| 2019 Incremental Energy Savings                           | 794,856.77 MWh |
| 2018 System Retail Electricity Sales, net of 2019 Opt Out | 50,910,448 MWh |
| Savings as % of 2018 Sales, net of 2019 Opt Out           | 1.56%          |

**1. Please provide a calculation of DSM/EE portfolio savings with and without line loss (1) as a percentage of total annual sales; and (2) as a percentage of annual sales to non-opt-out customers:**

**b. forecasted for the year 2021 (as a result of forecasted 2020 sales).**

|                                      |                |
|--------------------------------------|----------------|
| 2021 Incremental Energy Savings      | 715,710.98 MWh |
| 2020 System Retail Electricity Sales | 80,141,016 MWh |
| Savings as % of 2020 Sales           | 0.89%          |

S.C. Coastal Conservation League and Southern Alliance for Clean Energy  
Second Data Request  
Public Service Commission of South Carolina Docket No. 2019-89-E  
Item No. 2-2  
Page 1 of 1

**DUKE ENERGY CAROLINAS, LLC**

**Request:**

- 2-2. Please provide a calculation of cumulative DSM/EE portfolio savings (1) as a percentage of total annual sales; and (2) as a percentage of annual sales to non-opt-out customers from 2014 through 2018, taking into account line loss.

**Response:** See Attachment CCL-SACE DR2-2.xlsx



CCL-SACE DR2-2.xlsx

## Duke Energy Carolinas

### CCL\_SACE DR 2-2

|   |                |     |  |
|---|----------------|-----|--|
| 2014 Incremental Energy Savings             | 508,689,316    | kWh | Year 2014 Exhibit 2 - line 31 adjusted for line loss |
| 2014 Opt Out Electricity Sales - NC         | 17,153,650,420 | kWh | workpapers   |
| 2014 Opt Out Electricity Sales - SC         | 9,992,960,564  | kWh | workpapers   |
| 2013 System Retail Billed Electricity Sales | 76,021,887     | MWh | 2013 RAC Report                                      |
| 2015 Incremental Energy Savings             | 614,743,741    | kWh | Year 2015 Exhibit 2 - line 32 adjusted for line loss |
| 2015 Opt Out Electricity Sales - NC         | 17,296,168,323 | kWh | Miller Exhibit 6                                     |
| 2015 Opt Out Electricity Sales - SC         | 9,824,240,223  | kWh | Exhibit 3 pg 1 of 2                                  |
| 2014 System Retail Billed Electricity Sales | 78,277,836     | MWh | 2014 RAC Report                                      |
| 2016 Incremental Energy Savings             | 754,838,256    | kWh | Year 2016 Exhibit 2 - line 33 adjusted for line loss |
| 2016 Opt Out Electricity Sales - NC         | 17,541,642,770 | kWh | Miller Exhibit 6                                     |
| 2016 Opt Out Electricity Sales - SC         | 10,115,080,343 | kWh | Exhibit 3 pg 1 of 2                                  |
| 2015 System Retail Billed Electricity Sales | 79,056,620     | MWh | 2015 RAC Report                                      |
| 2017 Incremental Energy Savings             | 879,954,382    | kWh | Year 2017 Exhibit 2 - line 33 adjusted for line loss |
| 2017 Opt Out Electricity Sales - NC         | 17,749,899,702 | kWh | Miller Exhibit 6                                     |
| 2017 Opt Out Electricity Sales - SC         | 10,211,024,604 | kWh | Exhibit 3 pg 1 of 2                                  |
| 2016 System Retail Billed Electricity Sales | 79,090,737     | MWh | 2016 RAC report                                      |
| 2018 Incremental Energy Savings             | 811,152,170    | kWh | Year 2018 Exhibit 2 - line 33 adjusted for line loss |
| 2018 Opt Out Electricity Sales - NC         | 18,347,183,120 | kWh | Miller Exh 6, Line 10                                |
| 2018 Opt Out Electricity Sales - SC         | 10,257,713,985 | kWh | Exhibit 3 pg 1 of 2, Line 14                         |
| 2017 System Retail Billed Electricity Sales | 77,059,079     | MWh | 2017 RAC Report                                      |

**2. Please provide a calculation of cumulative DSM/EE portfolio savings (1) as a percentage of total annual sales; and (2) as a percentage of annual sales to non-opt-out customers from 2014 through 2018, taking into account line loss.**

|   |            |     |
|---|------------|-----|
| 2014 Incremental Energy Savings                           | 508,689.32 | MWh |
| 2013 System Retail Electricity Sales                      | 76,021,887 | MWh |
| 2013 System Retail Electricity Sales, net of 2014 Opt Out | 48,875,276 |     |
| Savings as % of 2013 Sales                                | 0.67%      |     |
| Savings as % of 2013 Sales, net of 2014 Opt Out           | 1.04%      |     |
| 2015 Incremental Energy Savings                           | 614,743.74 | MWh |
| 2014 System Retail Electricity Sales                      | 78,277,836 | MWh |
| 2014 System Retail Electricity Sales, net of 2015 Opt Out | 51,157,427 |     |
| Savings as % of 2014 Sales                                | 0.79%      |     |
| Savings as % of 2014 Sales, net of 2015 Opt Out           | 1.20%      |     |
| 2016 Incremental Energy Savings                           | 754,838.26 | MWh |
| 2015 System Retail Electricity Sales                      | 79,056,620 | MWh |
| 2015 System Retail Electricity Sales, net of 2016 Opt Out | 51,399,896 |     |
| Savings as % of 2015 Sales                                | 0.95%      |     |
| Savings as % of 2015 Sales, net of 2016 Opt Out           | 1.47%      |     |

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**DUKE ENERGY CAROLINAS**

**Request:**

For each program in DEC's DSM/EE portfolio, please provide UCT and TRC cost-effectiveness test scores with corresponding total costs and benefits for 2015, 2016, 2017, 2018, and 2019.

**Response:**

Please refer to "CCL-SACE - DR1-4.xlsx." Due to the availability of actual participant costs, calculations of historical TRC prior to 2018 are unavailable.



CCL-SACE%20-%20D  
R1-4.xlsx

**CCL-SACE DR1-4**

**1-4. For each program in DEC's DSM/EE portfolio, please provide UCT and TRC cost-effectiveness test scores with corresponding t**

**Note: Due to the availability of actual participant costs, calculations of historical TRC prior to 2018 are unavailable.**

**Note: Minor variances in Total Portfolio NPV of AC and Program Costs due to rounding**

|   | 2014               |                   |
|---|--------------------|-------------------|
|   | NPV of AC          | Program Cost      |
| Appliance Recycling Program   | 1,763,411          | 1,515,867         |
| Energy Efficiency Education   | 5,079,938          | 1,963,153         |
| Energy Efficient Appliances and Devices   | 52,276,512         | 14,738,129        |
| HVAC Energy Efficiency  | 7,061,500          | 4,786,807         |
| Income Qualified Energy Efficiency and Weatherization Assistance                  | 1,675,463          | 1,917,192         |
| Multi-Family Energy Efficiency  | 5,306,321          | 1,442,533         |
| Energy Assessments  | 12,827,575         | 3,605,737         |
| My Home Energy Report   | 12,166,183         | 8,285,066         |
| PowerManager  | 57,744,666         | 15,662,693        |
| Non Residential Smart Saver Custom Technical Assessments                          | 6,858,644          | 1,458,195         |
| Non Residential Smart Saver Custom  | 49,908,871         | 8,136,712         |
| Energy Management Information Services  | -                  | 74,855            |
| Non Residential Smart Saver Energy Efficient Food Service Products                | 1,489,862          | 199,350           |
| Non Residential Smart Saver Energy Efficient HVAC Products                        | 5,224,765          | 815,339           |
| Non Residential Smart Saver Energy Efficient Lighting Products                    | 40,866,018         | 6,727,675         |
| Non Residential Energy Efficient Pumps and Drives Products                        | 3,629,866          | 584,874           |
| Non Residential Energy Efficient ITEE   | 35,580             | 25,730            |
| Non Residential Energy Efficient Process Equipment Products                       | 660,330            | 89,809            |
| Non Residential Smart Saver Performance Incentive                                 |                    |                   |
| Small Business Energy Saver   | 3,221,137          | 1,026,607         |
| Smart Energy in Offices   | 934,385            | 1,156,497         |
| Business Energy Report  | -                  | -                 |
| EnergyWise for Business   | -                  | -                 |
| PowerShare  | 55,293,377         | 15,520,492        |
| Disallowed Costs from 2015 Program Cost Audit (Order E-7 Sub 1105, dated 8/25/16) |                    |                   |
| <b>Total Portfolio</b>  | <b>324,024,404</b> | <b>89,733,312</b> |

otal costs and benefits for 2015, 2016, 2017, 2018, and 2019

| 2015        |                    |                    |             | 2016               |                    |             | 2017               |                    |
|-------------|--------------------|--------------------|-------------|--------------------|--------------------|-------------|--------------------|--------------------|
| UCT         | NPV of AC          | Program Cost       | UCT         | NPV of AC          | Program Cost       | UCT         | NPV of AC          | Program Cost       |
| 1.16        | 1,901,321          | 1,537,241          | 1.24        | 59,758             | (97,397)           | -0.61       | -                  | 5,307              |
| 2.59        | 2,498,417          | 2,054,672          | 1.22        | 3,695,507          | 2,126,509          | 1.74        | 3,597,724          | 2,077,611          |
| 3.55        | 49,525,402         | 12,050,485         | 4.11        | 82,262,218         | 24,069,774         | 3.42        | 105,352,687        | 30,340,728         |
| 1.48        | 6,816,479          | 5,416,833          | 1.26        | 7,476,100          | 7,839,566          | 0.95        | 7,287,263          | 7,403,327          |
| 0.87        | 1,854,068          | 2,238,776          | 0.83        | 2,984,760          | 4,792,436          | 0.62        | 3,185,867          | 5,505,992          |
| 3.68        | 7,431,163          | 2,092,935          | 3.55        | 8,950,706          | 2,518,988          | 3.55        | 13,539,656         | 3,168,422          |
| 3.56        | 10,115,222         | 3,086,173          | 3.28        | 6,822,806          | 2,678,893          | 2.55        | 6,602,773          | 2,909,098          |
| 1.47        | 16,583,325         | 9,845,895          | 1.68        | 20,423,954         | 10,822,444         | 1.89        | 21,728,369         | 13,812,250         |
| 3.69        | 52,718,688         | 14,634,279         | 3.60        | 54,179,776         | 13,644,970         | 3.97        | 61,074,105         | 14,021,500         |
| 4.70        | 321,686            | 660,420            | 0.49        | 9,572,687          | 2,034,308          | 4.71        | 10,272,302         | 2,139,875          |
| 6.13        | 53,882,448         | 9,932,877          | 5.42        | 39,025,086         | 7,356,509          | 5.30        | 34,693,083         | 7,304,838          |
| 0.00        | -                  | -                  |             | -                  | -                  |             | -                  | -                  |
| 7.47        | 1,099,734          | 194,425            | 5.66        | 2,474,312          | 324,117            | 7.63        | 959,251            | 306,488            |
| 6.41        | 6,221,217          | 1,142,522          | 5.45        | 3,344,669          | 1,473,991          | 2.27        | 2,958,336          | 1,560,769          |
| 6.07        | 42,227,035         | 11,335,798         | 3.73        | 120,392,639        | 39,622,944         | 3.04        | 240,054,511        | 66,689,770         |
| 6.21        | 1,924,058          | 466,478            | 4.12        | 1,574,965          | 471,930            | 3.34        | 3,070,044          | 528,937            |
| 1.38        | 1,130,386          | 716,542            | 1.58        | 777,601            | 285,430            | 2.72        | 523                | 61,215             |
| 7.35        | 517,342            | 88,823             | 5.82        | 279,184            | 125,947            | 2.22        | 530,295            | 162,413            |
|             |                    |                    |             | -                  | 35,670             | 0.00        | 8,958              | 320,559            |
| 3.14        | 47,989,975         | 13,968,790         | 3.44        | 55,685,830         | 15,360,852         | 3.63        | 63,169,894         | 17,350,972         |
| 0.81        | 1,666,306          | 1,463,240          | 1.14        | 1,843,559          | 1,061,729          | 1.74        | 1,067,480          | 891,010            |
|             | -                  | 126,404            | 0.00        | 302,497            | 263,169            | 1.15        | 696                | 126,680            |
|             | 11,248             | 1,549,305          | 0.01        | 574,590            | 470,304            | 1.22        | 2,530,761          | 2,484,618          |
| 3.56        | 48,383,622         | 15,779,050         | 3.07        | 43,889,394         | 14,291,024         | 3.07        | 41,482,644         | 13,316,535         |
|             |                    | (3,851)            |             |                    |                    |             |                    |                    |
| <b>3.61</b> | <b>354,819,144</b> | <b>110,378,109</b> | <b>3.21</b> | <b>466,592,598</b> | <b>151,574,107</b> | <b>3.08</b> | <b>623,167,221</b> | <b>192,488,915</b> |

| 2018        |                    |                    |                        |                             |             |             |                    |                    |
|-------------|--------------------|--------------------|------------------------|-----------------------------|-------------|-------------|--------------------|--------------------|
| UCT         | NPV of AC          | Program Cost       | Participant Incentives | NPV Participant Costs (net) | UCT         | TRC         | NPV of AC          | Program Cost       |
| 0.00        | -                  | -                  | -                      | -                           |             |             | -                  | -                  |
| 1.73        | 2,863,507          | 1,992,260          | 441,383                | -                           | 1.44        | 1.85        | 2,519,645          | 1,684,083          |
| 3.47        | 135,857,936        | 42,687,244         | 35,592,245             | 18,585,822                  | 3.18        | 5.29        | 102,051,327        | 41,380,987         |
| 0.98        | 7,088,531          | 6,955,146          | 5,303,166              | 8,572,619                   | 1.02        | 0.69        | 7,079,940          | 7,400,669          |
| 0.58        | 4,315,688          | 6,490,735          | 4,835,515              | -                           | 0.66        | 2.61        | 3,648,597          | 7,342,133          |
| 4.27        | 13,857,877         | 3,604,921          | 1,155,116              | -                           | 3.84        | 5.66        | 11,891,700         | 3,680,155          |
| 2.27        | 5,756,902          | 2,836,229          | 2,044,393              | -                           | 2.03        | 7.27        | 4,413,585          | 3,186,888          |
| 1.57        | 22,684,688         | 12,765,286         | -                      | -                           | 1.78        | 1.78        | 23,361,954         | 10,555,159         |
| 4.36        | 61,924,152         | 14,423,610         | 7,213,282              | -                           | 4.29        | 8.59        | 69,783,157         | 13,383,639         |
| 4.80        | 67,306             | 407,293            | 7,794                  | 24,493                      | 0.17        | 0.16        | 691,285            | 295,925            |
| 4.75        | 23,322,046         | 6,068,902          | 3,495,543              | 13,128,691                  | 3.84        | 1.49        | 35,884,367         | 8,871,440          |
|             | -                  | -                  | -                      | -                           |             | -           | -                  | -                  |
| 3.13        | 431,679            | 235,605            | 172,207                | 332,863                     | 1.83        | 1.09        | 364,227            | 339,904            |
| 1.90        | 2,810,168          | 1,620,748          | 1,418,533              | 1,481,662                   | 1.73        | 1.67        | 4,481,911          | 2,207,760          |
| 3.60        | 146,534,847        | 25,872,380         | 22,136,715             | 53,989,440                  | 5.66        | 2.54        | 97,967,602         | 20,829,118         |
| 5.80        | 1,617,749          | 277,785            | 221,861                | 360,094                     | 5.82        | 3.89        | 510,415            | 189,123            |
| 0.01        | 3,025              | 36,875             | 3,528                  | 2,491                       | 0.08        | 0.08        | 1,038              | 44,323             |
| 3.27        | 226,725            | 67,509             | 51,787                 | 49,376                      | 3.36        | 3.48        | 310,293            | 119,811            |
| 0.03        | 1,671,793          | 479,610            | 279,680                | 1,420,247                   | 3.49        | 1.03        | 2,238,186          | 784,949            |
| 3.64        | 46,832,942         | 15,977,993         | 14,439,122             | 22,510,536                  | 2.93        | 1.95        | 25,661,729         | 11,418,264         |
| 1.20        | 143,285            | 219,748            | -                      | -                           | 0.65        | 0.65        | -                  | -                  |
| 0.01        | -                  | -                  | -                      | -                           |             | -           | -                  | -                  |
| 1.02        | 2,279,967          | 3,062,816          | 595,564                | -                           | 0.74        | 0.92        | 2,728,428          | 3,686,451          |
| 3.12        | 36,012,817         | 12,922,977         | 12,213,583             | -                           | 2.79        | 50.77       | 42,072,382         | 13,019,606         |
| <b>3.24</b> | <b>516,303,632</b> | <b>159,005,671</b> | <b>111,621,017</b>     | <b>120,458,335</b>          | <b>3.25</b> | <b>3.08</b> | <b>437,661,769</b> | <b>150,420,388</b> |

| 2019                      |                                |             |             |
|---------------------------|--------------------------------|-------------|-------------|
| Participant<br>Incentives | NPV Participant<br>Costs (net) | UCT         | TRC         |
| 495,935                   | 512,554                        | 1.50        | 1.48        |
| 34,642,993                | 26,575,132                     | 2.47        | 3.06        |
| 5,311,650                 | 7,107,099                      | 0.96        | 0.77        |
| 5,590,035                 | 5,662,865                      | 0.50        | 0.49        |
| 1,008,869                 | 1,171,249                      | 3.23        | 3.09        |
| 192,776                   | 286,787                        | 1.38        | 1.35        |
| -                         | -                              | 2.21        | 2.21        |
| 7,654,406                 | -                              | 5.21        | 12.18       |
| 165,648                   | 750,359                        | 2.34        | 0.78        |
| 5,987,025                 | 17,933,319                     | 4.04        | 1.72        |
| -                         | -                              | -           | -           |
| 251,163                   | 481,683                        | 1.07        | 0.64        |
| 1,950,484                 | 2,318,458                      | 2.03        | 1.74        |
| 16,543,407                | 35,295,763                     | 4.70        | 2.48        |
| 102,810                   | 159,597                        | 2.70        | 2.08        |
| 19,591                    | 1,192                          | 0.02        | 0.04        |
| 99,668                    | 128,437                        | 2.59        | 2.09        |
| 402,997                   | 1,711,020                      | 2.85        | 1.07        |
| 10,040,202                | 15,796,578                     | 2.25        | 1.49        |
| -                         | -                              | -           | -           |
| -                         | -                              | -           | -           |
| 884,345                   | -                              | 0.74        | 0.97        |
| 12,288,629                | -                              | 3.23        | 57.56       |
| <b>103,632,631</b>        | <b>115,892,092</b>             | <b>2.91</b> | <b>2.69</b> |



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SACE  
Docket No. E-7, Sub 1230  
DSM/EE Rider  
SACE Data Request No. 1  
Item No. 1-16  
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**DUKE ENERGY CAROLINAS**

**Request:**

For the years 2019, 2020(forecasted), and 2021 (forecasted), please identify the following:

- a. Total DSM non-residential opt-outs;
- b. Total EE non-residential opt outs; and
- c. Total non-residential sales.

**Response:**

Please see the attached Excel file for actual and forecasted opt out information.



DR%201-16.xlsx

DR 1-16 First Data Request to Duke Energy Carolinas, LLC

| Source: |                      | DSM            |                | EE             |                | Total Non-Residential Sales (kWh) |                |
|---------|----------------------|----------------|----------------|----------------|----------------|-----------------------------------|----------------|
|         |                      | Actual         | Forecasted     | Actual         | Forecasted     | Actual                            | Forecasted     |
|         |                      | 2019           | 2021           | 2019           | 2021           | 2019                              | 2021           |
| NC      | Miller Exhibit 6     | 18,852,615,603 | 18,851,271,603 | 20,042,218,854 | 20,419,288,797 | 36,550,697,769                    | 35,749,634,396 |
| SC      | R12 Exhibit 3 page 1 | 9,402,889,130  | 9,402,889,130  | 10,446,567,023 | 10,490,870,196 | 14,697,398,282                    | 14,895,366,192 |
| Total   |                      | 28,255,504,733 | 28,254,160,733 | 30,488,785,877 | 30,910,158,993 | 51,248,096,051                    | 50,645,000,588 |

SACE  
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SACE Data Request No. 1  
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**DUKE ENERGY CAROLINAS**

**Request:**

Please provide the following information for each of Duke Energy Carolinas, LLC's ("DEC" or "the Company") Demand-Side Management ("DSM") and Energy Efficiency ("EE") programs, for 2015, 2016, 2017, 2018, and 2019, as well as estimates for 2020 and 2021. Please include and distinguish between all income-qualified programs and offerings; for the Income-Qualified Energy Efficiency and Weatherization Assistance Program, please provide information at the program level and separately for each of the program's offerings, Neighborhood Energy Saver ("NES"), Weatherization and Equipment Replacement Program ("WERP"), and Refrigerator Replacement Program ("RRP"). If DEC does not categorize the requested information as set forth below, please so indicate and provide the information as categorized by DEC.

- a. Program costs
- b. Any revenues generated by the program (e.g., fees charged to customers)
- c. Shareholder incentive
- d. Energy savings expressed in kilowatt-hours (kWh)
- e. Demand reduction expressed in kilowatts (kW)
- f. Lost revenues

**Response:**

Please refer to "CCL-SACE DR1-2 - NC.pdf", "CCL-SACE - DR1-2a - Vintage 2015-2021 PC by Category-NC View.xlsx," and "CCL-SACE DR 1-2 Low Income KWh kW LR.xlsx" for response.



CCL-SACE DR1-2 -  
NC.pdf



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## **First Data Request to Duke Energy Carolinas, LLC**

South Carolina State Conference of the NAACP, South Carolina Coastal Conservation League,  
and Southern Alliance for Clean Energy

South Carolina Public Service Commission Docket No. 2020-83-E

April 17, 2020

1. Please provide the following information for each of Duke Energy Carolinas, LLC's ("DEC" or "the Company") Demand-Side Management ("DSM") and Energy Efficiency ("EE") programs, for 2015, 2016, 2017, 2018, and 2019, as well as estimates for 2020 and 2021. Please include and distinguish between all income-qualified programs and offerings; for the Income-Qualified Energy Efficiency and Weatherization Assistance Program, please provide information at the program level and separately for each of its offerings, the Neighborhood Energy Saver Program ("NES"), Weatherization and Equipment Replacement Program ("WERP"), and Refrigerator Replacement Program ("RRP"). If DEC does not categorize the requested information as set forth below, please so indicate and provide the information as categorized by DEC.

### **a. Program costs**

Refer to "CCL-SACE - DR1-2a - Vintage 2015-2021 PC by Category-NC View.xlsx" for costs by category. Categorization for 2015 includes customer incentive, employee expense, labor, materials, other, outside labor, overtime and postage, while the categorization for 2016 through 2019 includes administrative, advertising, installation, measurement and verification, product development, product fulfillment, rebate and incentive and other costs. Categorization for the 2020 and 2021 forecast periods includes administration costs, implementation costs, incentives, other utility costs and measurement and verification costs.

### **b. Any revenues generated by the program (e.g., fees charged to customers)**

No revenues have been generated by the programs.

### **c. Shareholder incentive**

The NC view of system shareholder incentives for 2015, 2016, and 2020 are included in Evans Exhibit, 1 pg. 1-2 and pg. 5 of E-7, Sub 1192. Refer to Column C, "Earned Utility Incentive." 2017, 2018, 2019 and 2021 estimates are included in Evans Exhibit 1, pg. 1-4 of E-7, Sub 1230. Refer to the Column D, "Incentive."

The SC view of system shareholder incentives for 2015, 2016, and 2020 (estimate) are included in Year 2015 Exhibit 2, Year 2016 Exhibit 2, and Year 2020 Exhibit 2 of Docket 2019-89-E. Refer to the Column C, "Earned Utility Incentive." Incentives for years 2017, 2018, 2019 and 2021 (estimate) are included in Year 2017 Exhibit 2, Year 2018 Exhibit 2, Year 2019 Exhibit 2 and Year 2021 Exhibit 2 of Docket 2020-83-E. Refer to the Column D, "Incentive."

## First Data Request to Duke Energy Carolinas, LLC

South Carolina State Conference of the NAACP, South Carolina Coastal Conservation League,  
and Southern Alliance for Clean Energy

South Carolina Public Service Commission Docket No. 2020-83-E

April 17, 2020

| Earned Utility Incentive               | 2015       | 2016       | 2017       | 2018       | 2019       | 2020       | 2021       |
|--|------------|------------|------------|------------|------------|------------|------------|
| <i>North Carolina (System View)</i>    | 28,169,497 | 36,418,438 | 49,809,308 | 41,339,396 | 33,457,516 | 28,050,720 | 27,126,188 |
| <i>North Carolina View (Allocated)</i> | 20,711,621 | 26,743,114 | 36,358,448 | 30,132,647 | 24,566,073 | 20,487,368 | 19,945,446 |
| <i>South Carolina (System View)</i>    | 31,933,599 | 40,421,159 | 54,472,631 | 55,126,315 | 39,012,353 | 33,119,827 | 34,712,888 |
| <i>South Carolina View (Allocated)</i> | 8,410,491  | 10,693,175 | 14,658,779 | 14,901,268 | 10,328,376 | 8,768,632  | 9,146,754  |

- d. Energy savings expressed in kilowatt-hours (kWh), and
- e. Demand reduction expressed in kilowatts (kW)

Energy savings and demand reductions for 2015, 2016, 2017, 2018, 2019 and a forecast for 2020 and 2021 are included in columns labeled “System kW Reduction – Summer Peak” and “System Energy Reduction (kWh)” of the following schedules:

- North Carolina - Evans Exhibit 1, page 1-2 and page 5, of E-7, Sub 1192 and Evans Exhibit 1, pages 1-4 of E-7, Sub 1230.
- South Carolina – Year 2015 Exhibit 2, Year 2016 Exhibit 2, and Year 2020 Exhibit 2 of Docket Number 2019-89-E and Year 2017 Exhibit 2, Year 2018 Exhibit 2, Year 2019 Exhibit 2, and Year 2021 Exhibit 2 of Docket Number 2020-83-E.

State specific kWh and kW can be calculated by multiplying the system values by the column labeled “Retail kWh Sales Allocation Factor.” Refer to “CCL-SACE DR 1-2 Low Income KWh kW LR.xlsx” for Low Income KWh and kW.

- f. Lost revenues

NC lost revenues are included in Evans Exhibit 2 of E-7, Sub 1192 and Exhibit 2 of E-7, Sub 1230.

SC lost revenues are included in Rider 11 Exhibit 1 of Docket 2019-89-E and Rider 12 Exhibit 1 of Docket 2020-83-E.

Refer to “CCL-SACE DR 1-2 Low Income KWh kW LR.xlsx” for Low Income lost revenues.

2015 System Program Costs (North Carolina View)  
Duke Energy Carolina, LLC  
Total Program Cost Source: E-7, Sub 1164, Evans Exhibit 3

|   | Vintage 2015 Program Cost by Category |                  |           |            |           |               |          |         |                     |
|---|---------------------------------------|------------------|-----------|------------|-----------|---------------|----------|---------|---------------------|
|   | Customer Incentive                    | Employee Expense | Labor     | Materials  | Other     | Outside Labor | Overtime | Postage | Total Utility Costs |
| Appliance Recycling Program   | 582,101                               | 402              | 72,063    | 594        | 132,989   | 745,556       | -        | 3,538   | 1,537,241           |
| Energy Education Program for Schools  | 494,750                               | 1,547            | 52,769    | 590,884    | 163,622   | 751,100       | -        | -       | 2,054,672           |
| Energy Efficient Appliances & Devices   | 9,869,905                             | 5,752            | 109,653   | 44,165     | 1,265,087 | 283,389       | -        | 472,533 | 12,050,485          |
| HVAC EE Products & Services   | 3,979,150                             | 14,947           | 118,539   | 6,487      | 424,460   | 865,290       | -        | 7,960   | 5,416,833           |
| Income-Qualified EE Products & Services   | 1,228,462                             | 60,574           | 192,895   | 28,184     | 160,930   | 567,704       | -        | 26      | 2,238,776           |
| Multi-Family EE Products & Services   | 651,360                               | 290              | 34,328    | 118,951    | 149,278   | 1,138,631     | -        | 97      | 2,092,935           |
| My Home Energy Report   | -                                     | 9,125            | 92,922    | 8,977,332  | 703,047   | 63,467        | -        | -       | 9,845,895           |
| Power Manager   | 5,407,391                             | 19,220           | 304,384   | 1,918,204  | 1,049,205 | 5,867,650     | -        | 68,224  | 14,634,279          |
| Residential Energy Assessments  | 187,443                               | 409              | 43,464    | 296,409    | 345,498   | 2,166,676     | -        | 46,275  | 3,086,173           |
| Total Residential   | 22,400,562                            | 112,266          | 1,021,017 | 11,981,210 | 4,394,116 | 12,449,463    | -        | 598,653 | 52,957,287          |
| Business Energy Report  | -                                     | 2,819            | 68,454    | -          | 9,019     | 46,064        | -        | 48      | 126,404             |
| EnergyWise for Business   | -                                     | 8,585            | 53,087    | -          | 110,575   | 1,377,057     | -        | -       | 1,549,305           |
| Non-Residential Smart Saver Custom Assessment                                     | 262,862                               | 13,962           | 158,104   | 206,275    | (86,857)  | 106,071       | 2        | -       | 660,420             |
| Non-Residential Smart Saver Custom Incentive                                      | 7,406,124                             | 28,946           | 423,621   | 6,470      | 725,385   | 1,341,954     | 15       | 361     | 9,932,877           |
| Non-Residential Smart Saver Food Service Products                                 | 162,256                               | 698              | 3,270     | 53         | 14,282    | 13,834        | -        | 32      | 194,425             |
| Non-Residential Smart Saver HVAC  | 985,651                               | 1,328            | 16,892    | 1,795      | 82,805    | 53,993        | -        | 59      | 1,142,522           |
| Non-Residential Smart Saver Lighting  | 9,691,843                             | 10,004           | 211,502   | 5,553      | 827,726   | 588,195       | 747      | 229     | 11,335,798          |
| Non-Residential Smart Saver Pumps & VFDs  | 363,886                               | 1,171            | 15,734    | 292        | 34,269    | 51,117        | -        | 9       | 466,478             |
| Non-Residential Smart Saver Information Technology                                | 634,811                               | 555              | 7,223     | 137        | 51,669    | 22,144        | -        | 3       | 716,542             |
| Non-Residential Smart Saver Process Equipment                                     | 79,068                                | 187              | 78        | 6          | 6,370     | 3,110         | -        | 3       | 88,823              |
| Power Share   | 14,507,238                            | 6,453            | 46,861    | 3          | 1,266,686 | (49,730)      | -        | 1,537   | 15,779,050          |
| Small Business Energy Saver   | 12,051,164                            | 2,614            | 57,038    | 4,279      | 1,037,522 | 786,492       | -        | 29,682  | 13,968,790          |
| Smart Energy in Offices   | 466,638                               | 17,743           | 250,021   | 13,871     | 105,905   | 609,061       | -        | -       | 1,463,240           |
| Total Non-Residential   | 46,611,542                            | 95,065           | 1,311,885 | 238,734    | 4,185,357 | 4,949,362     | 764      | 31,962  | 57,424,673          |
| Disallowed Costs from 2015 Program Cost Audit (Order E-7 Sub 1105, dated 8/25/16) |                                       |                  |           |            | (3,851)   |               |          |         | (3,851)             |
| Total Program Costs   | 69,012,103                            | 207,331          | 2,332,902 | 12,219,944 | 8,575,623 | 17,398,826    | 764      | 630,615 | 110,378,109         |

|  | Customer Incentive | Employee Expense | Labor      | Materials | Other   | Outside Labor | Overtime | Postage | Total Utility Costs |
|--|--------------------|------------------|------------|-----------|---------|---------------|----------|---------|---------------------|
| Income-Qualified EE Products & Services            | 1,228,462          | 60,574           | 192,895    | 28,184    | 160,930 | 567,704       | -        | 26      | 2,238,776           |
| Low Income Neighborhood                            | 709,153.56         | 34,967.61        | 111,352.53 | 16,270    | 92,900  | 327,718       | -        | 15      | 1,292,377           |
| Low Income Weatherization Refrigerator Replacement | 16,445.51          | 810.91           | 2,582.30   | 377       | 2,154   | 7,600         | -        | 0       | 29,971              |
| Low Income Weatherization                          | 502,863.17         | 24,795.65        | 78,960.45  | 11,537    | 65,876  | 232,386       | -        | 11      | 916,429             |

|                | Vintage 2015 Program Cost by Category - NC Allocation |                  |           |           |           |               |          |         |                     |
|----------------|---|------------------|-----------|-----------|-----------|---------------|----------|---------|---------------------|
|                | Customer Incentive                                    | Employee Expense | Labor     | Materials | Other     | Outside Labor | Overtime | Postage | Total Utility Costs |
| Appliance Re   | 424,680   | 293              | 52,575    | 433       | 97,024    | 543,931       | -        | 2,581   | 1,121,517           |
| Energy Educa   | 360,952   | 1,129            | 38,498    | 431,088   | 119,373   | 547,976       | -        | -       | 1,499,016           |
| Energy Efficie | 7,200,734   | 4,196            | 79,999    | 32,221    | 922,963   | 206,751       | -        | 344,744 | 8,791,608           |
| HVAC EE Prod   | 2,903,047   | 10,905           | 86,482    | 4,733     | 309,671   | 631,285       | -        | 5,807   | 3,951,930           |
| Income-Quali   | 896,243   | 44,193           | 140,730   | 20,562    | 117,409   | 414,177       | -        | 19      | 1,633,332           |
| Multi-Family   | 475,209   | 211              | 25,045    | 86,782    | 108,908   | 830,705       | -        | 71      | 1,526,931           |
| My Home En     | -   | 6,658            | 67,793    | 6,549,545 | 512,919   | 46,304        | -        | -       | 7,183,217           |
| Power Manag    | 6,476,608   | 11,142           | 131,496   | 623,837   | 789,132   | 2,339,941     | -        | 22,688  | 10,394,843          |
| Residential Ei | 136,752   | 298              | 31,710    | 216,250   | 252,063   | 1,580,730     | -        | 33,761  | 2,251,563           |
| Total Resider  | 18,874,226  | 79,024           | 654,327   | 7,965,451 | 3,229,461 | 7,141,799     | -        | 409,670 | 38,353,958          |
| Business Ener  | -   | 2,057            | 49,942    | -         | 6,580     | 33,607        | -        | 35      | 92,220              |
| EnergyWise f   | -   | 8,302            | 91,162    | -         | 82,695    | 3,168,577     | -        | -       | 1,213,062           |
| Non-Resident   | 191,775   | 10,186           | 115,347   | 150,491   | (63,368)  | 77,386        | 2        | -       | 481,819             |
| Non-Resident   | 5,403,247   | 21,118           | 309,059   | 4,720     | 529,215   | 979,042       | 11       | 263     | 7,246,677           |
| Non-Resident   | 118,376   | 510              | 2,385     | 38        | 10,420    | 10,093        | -        | 23      | 141,845             |
| Non-Resident   | 719,096   | 969              | 12,324    | 1,309     | 60,411    | 39,391        | -        | 43      | 833,543             |
| Non-Resident   | 7,070,827   | 7,299            | 154,304   | 4,051     | 603,879   | 429,126       | 545      | 167     | 8,270,198           |
| Non-Resident   | 265,478   | 854              | 11,479    | 213       | 25,002    | 37,293        | -        | 6       | 340,326             |
| Non-Resident   | 463,136   | 405              | 5,270     | 100       | 37,696    | 16,155        | -        | 2       | 522,764             |
| Non-Resident   | 57,685  | 137              | 57        | 4         | 4,648     | 2,269         | -        | 2       | 64,802              |
| Power Share    | 8,453,434.54  | 6,240            | 80,470    | 814,248   | 947,301   | (114,427)     | #DIV/0!  | 29,613  | 12,354,553          |
| Small Busines  | 8,792,104   | 1,907            | 41,613    | 3,122     | 756,939   | 573,797       | -        | 21,655  | 10,191,136          |
| Smart Energy   | 340,443   | 12,945           | 182,407   | 10,120    | 77,265    | 444,350       | -        | -       | 1,067,528           |
| Total Non-Res  | 31,875,601  | 72,927           | 1,055,819 | 988,417   | 3,078,683 | 5,696,659     | #DIV/0!  | 51,810  | 42,820,474          |
| Disallowed Co  | -   | -                | -         | -         | (2,887)   | -             | -        | -       | (2,887)             |
| Total Prog     | 50,749,827  | 151,951          | 1,710,145 | 8,953,868 | 6,305,257 | 12,838,458    | #DIV/0!  | 461,479 | 81,171,544          |

|              | Customer Incentive | Employee Expense | Labor   | Materials | Other   | Outside Labor | Overtime | Postage | Total Utility Costs |
|--------------|--------------------|------------------|---------|-----------|---------|---------------|----------|---------|---------------------|
| Income-Quali | 896,243            | 44,193           | 140,730 | 20,562    | 117,409 | 414,177       | -        | 19      | 1,633,332           |
| Low Income f | 517,373            | 25,511           | 81,239  | 11,870    | 67,777  | 239,092       | -        | 11      | 942,872             |
| Low Income   | 11,998             | 592              | 1,884   | 275       | 1,572   | 5,545         | -        | 0       | 21,866              |
| Low Income   | 366,871            | 18,090           | 57,607  | 8,417     | 48,061  | 169,541       | -        | 8       | 668,594             |

|  | Vintage 2016 Program Cost by Category |             |                    |                              |                           |                           |                            |           |                     |
|--|---------------------------------------|-------------|--------------------|------------------------------|---------------------------|---------------------------|----------------------------|-----------|---------------------|
|  | Administrative Costs                  | Advertising | Installation Costs | Measurement and Verification | Product Development Costs | Product Fulfillment Costs | Rebate and Incentive Costs | Other     | Total Utility Costs |
| Appliance Recycling Program                        | (101,096)                             | 12,132      | -                  | 10,010                       | -                         | -                         | (13,948)                   | (4,495)   | (97,397)            |
| Energy Education Program for Schools               | 1,332,371                             | 5,554       | -                  | 9,844                        | -                         | -                         | 680,597                    | 98,143    | 2,126,509           |
| Energy Efficient Appliances & Devices              | 3,634,377                             | 1,467,918   | -                  | 60,585                       | 1,221                     | -                         | 17,794,804                 | 1,110,869 | 24,069,774          |
| HVAC EE Products & Services                        | 530,598                               | 692,661     | -                  | (50,609)                     | -                         | -                         | 6,305,103                  | 361,812   | 7,839,566           |
| Income-Qualified EE Products & Services            | 934,320                               | 36,125      | -                  | 141,561                      | -                         | (6,456)                   | 3,465,706                  | 221,181   | 4,792,436           |
| Multi-Family EE Products & Services                | 1,507,276                             | 68          | -                  | 101,779                      | -                         | -                         | 793,608                    | 116,256   | 2,518,988           |
| My Home Energy Report                              | 144,403                               | 9,972,133   | -                  | 142,848                      | 14,981                    | 48,601                    | -                          | 499,478   | 10,822,444          |
| Power Manager                                      | 260,919                               | 328,523     | 4,912,851          | 235,416                      | -                         | 1,162,058                 | 6,115,459                  | 629,743   | 13,644,970          |
| Residential Energy Assessments                     | 1,781,283                             | 637,879     | -                  | -                            | -                         | 2                         | 136,093                    | 123,636   | 2,678,893           |
| Total Residential                                  | 10,024,454                            | 13,152,994  | 4,912,851          | 651,433                      | 16,202                    | 1,204,205                 | 35,277,423                 | 3,156,623 | 68,396,185          |
|  |                                       |             |                    |                              |                           |                           |                            |           |                     |
| Business Energy Report                             | 232,370                               | -           | -                  | 10,413                       | 8,240                     | -                         | -                          | 12,146    | 263,169             |
| EnergyWise for Business                            | 1,009,948                             | 103,901     | 561,558            | 10,716                       | (1,317,690)               | -                         | 80,165                     | 21,705    | 470,304             |
| Non-Residential Smart Saver Custom Assessment      | 346,858                               | 35,738      | -                  | 70,232                       | -                         | -                         | 1,487,593                  | 93,887    | 2,034,308           |
| Non-Residential Smart Saver Custom Incentive       | 1,528,890                             | 303,504     | -                  | 288,286                      | 8,066                     | -                         | 4,888,245                  | 339,518   | 7,356,509           |
| Non-Residential Smart Saver Food Service Products  | 73,811                                | 16,222      | -                  | 2,435                        | -                         | -                         | 216,691                    | 14,959    | 324,117             |
| Non-Residential Smart Saver HVAC                   | 163,421                               | 47,280      | -                  | 17,143                       | -                         | -                         | 1,178,120                  | 68,028    | 1,473,991           |
| Non-Residential Smart Saver Lighting               | 2,051,297                             | 206,137     | -                  | 115,933                      | -                         | -                         | 35,420,897                 | 1,828,680 | 39,622,944          |
| Non-Residential Smart Saver Pumps & VFDs           | 49,964                                | 12,091      | -                  | 30,202                       | -                         | -                         | 357,893                    | 21,781    | 471,930             |
| Non-Residential Smart Saver Information Technology | 39,058                                | 8,146       | -                  | 4,870                        | -                         | -                         | 220,182                    | 13,173    | 285,430             |
| Non-Residential Smart Saver Process Equipment      | 11,106                                | 7,852       | -                  | 4,870                        | -                         | -                         | 96,306                     | 5,813     | 125,947             |
| Non-Residential Smart Saver Performance Incentive  | 17,613                                | 12,539      | -                  | -                            | 3,872                     | -                         | -                          | 1,646     | 35,670              |
| Power Share  | 272,166                               | 8,583       | (31)               | 29,696                       | -                         | -                         | 13,321,050                 | 659,560   | 14,291,024          |
| Small Business Energy Saver                        | 852,198                               | 101,754     | -                  | 112,632                      | -                         | -                         | 13,585,332                 | 708,935   | 15,360,852          |
| Smart Energy in Offices                            | 167,956                               | 10,105      | 430,355            | 46,837                       | 549                       | -                         | 356,925                    | 49,001    | 1,061,729           |
| Total Non-Residential                              | 6,816,656                             | 873,851     | 991,882            | 744,266                      | (1,296,963)               | -                         | 71,209,400                 | 3,838,831 | 83,177,922          |
|  |                                       |             |                    |                              |                           |                           |                            |           |                     |
| Total Program Costs                                | 16,841,110                            | 14,026,845  | 5,904,733          | 1,395,699                    | (1,280,762)               | 1,204,205                 | 106,486,823                | 6,995,454 | 151,574,107         |

|  | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Product Development Costs | Product Fulfillment Costs | Rebate and Incentive Costs | Other   | Total Utility Costs |
|--|----------------------|-------------|--------------------|------------------------------|---------------------------|---------------------------|----------------------------|---------|---------------------|
| Income-Qualified EE Products & Services            | 934,320              | 36,125      | -                  | 141,561                      | -                         | (6,456)                   | 3,465,706                  | 221,181 | 4,792,436           |
| Low Income Neighborhood                            | 576,218              | 31,125      |                    | 94,042                       |                           | (6,456)                   | 1,944,702                  | 136,408 | 2,776,039           |
| Low Income Weatherization Refrigerator Replacement | 19,772               | -           |                    | -                            |                           |                           | 88,550                     | 4,681   | 113,003             |
| Low Income Weatherization                          | 338,329              | 5,000       |                    | 47,519                       |                           |                           | 1,432,454                  | 80,092  | 1,903,394           |

| NC Allocation |
|---------------|
| 73.10%        |
| 73.10%        |
| 73.10%        |
| 73.10%        |
| 73.10%        |
| 73.10%        |
| 73.10%        |
| 33.80%        |
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| 73.10%        |
| 40.82%        |
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| 73.10%        |
| 73.10%        |
| 73.10%        |
| 40.82%        |
| 73.10%        |
| 73.10%        |

|        |
|--------|
| 73.10% |
| 73.10% |
| 73.10% |
| 73.10% |

|            | Vintage 2016 Program Cost by Category - NC Allocation |             |                    |                              |                           |                           |                            |           |                     |
|------------|---|-------------|--------------------|------------------------------|---------------------------|---------------------------|----------------------------|-----------|---------------------|
|            | Administrative Costs                                  | Advertising | Installation Costs | Measurement and Verification | Product Development Costs | Product Fulfillment Costs | Rebate and Incentive Costs | Other     | Total Utility Costs |
| Appliance  | (73,897)  | 8,868       | -                  | 7,317                        | -                         | -                         | (10,196)                   | (3,286)   | (71,194)            |
| Energy Ed  | 973,914   | 4,060       | -                  | 7,195                        | -                         | -                         | 497,491                    | 71,739    | 1,554,399           |
| Energy Eff | 2,656,595   | 1,072,993   | -                  | 44,285                       | 892                       | -                         | 13,007,340                 | 812,004   | 17,594,110          |
| HVAC EE P  | 387,848   | 506,310     | -                  | (36,993)                     | -                         | -                         | 4,608,796                  | 264,471   | 5,730,431           |
| Income-Q   | 682,953   | 26,406      | -                  | 103,476                      | -                         | (4,719)                   | 2,533,302                  | 161,675   | 3,503,093           |
| Multi-Fam  | 1,101,763   | 50          | -                  | 74,396                       | -                         | -                         | 580,098                    | 84,979    | 1,841,287           |
| My Home    | 105,554   | 7,289,259   | -                  | 104,417                      | 10,950                    | 35,526                    | -                          | 365,100   | 7,910,805           |
| Power Ma   | 521,504   | 149,049     | 1,850,195          | 93,223                       | (445,344)                 | 392,745                   | 6,596,118                  | 443,086   | 9,600,575           |
| Residentia | 1,302,052   | 466,266     | -                  | -                            | -                         | 1                         | 99,479                     | 90,374    | 1,958,171           |
| Total Resi | 7,658,285   | 9,523,260   | 1,850,195          | 397,316                      | (433,501)                 | 423,552                   | 27,912,430                 | 2,290,142 | 49,621,678          |
|            |   |             |                    |                              |                           |                           |                            |           |                     |
|            |   |             |                    |                              |                           |                           |                            |           |                     |
| Business E | 169,854   | -           | -                  | 7,612                        | 6,023                     | -                         | -                          | 8,878     | 192,366             |
| EnergyWis  | 496,118   | 166,270     | 2,234,582          | 29,853                       | (537,837)                 | -                         | 47,652                     | 17,049    | 369,407             |
| Non-Resid  | 253,540   | 26,123      | -                  | 51,337                       | -                         | -                         | 1,087,375                  | 68,628    | 1,487,003           |
| Non-Resid  | 1,117,561   | 221,850     | -                  | 210,727                      | 5,896                     | -                         | 3,573,125                  | 248,175   | 5,377,335           |
| Non-Resid  | 53,953  | 11,857      | -                  | 1,780                        | -                         | -                         | 158,393                    | 10,934    | 236,918             |
| Non-Resid  | 119,455   | 34,560      | -                  | 12,531                       | -                         | -                         | 861,162                    | 49,726    | 1,077,433           |
| Non-Resid  | 1,499,422   | 150,679     | -                  | 84,743                       | -                         | -                         | 25,891,359                 | 1,336,697 | 28,962,899          |
| Non-Resid  | 36,522  | 8,838       | -                  | 22,076                       | -                         | -                         | 261,607                    | 15,921    | 344,963             |
| Non-Resid  | 28,550  | 5,955       | -                  | 3,560                        | -                         | -                         | 160,945                    | 9,629     | 208,639             |
| Non-Resid  | 8,118   | 5,739       | -                  | 3,560                        | -                         | -                         | 70,396                     | 4,249     | 92,062              |
| Non-Resid  | 12,875  | 9,165       | -                  | -                            | 2,830                     | -                         | -                          | 1,203     | 26,073              |
| Power Sha  | 133,696   | 13,735      | (124)              | 82,730                       | -                         | #DIV/0!                   | 7,918,399                  | 518,061   | 11,225,091          |
| Small Busi | 622,925   | 74,379      | -                  | 82,330                       | -                         | -                         | 9,930,373                  | 518,205   | 11,228,212          |
| Smart Ene  | 122,769   | 7,386       | 314,574            | 34,236                       | 402                       | -                         | 260,899                    | 35,818    | 776,084             |
| Total No   | 4,675,359   | 736,535     | 2,549,031          | 627,074                      | (522,686)                 | #DIV/0!                   | 50,221,685                 | 2,843,172 | 61,604,485          |
|            |   |             |                    |                              |                           |                           |                            |           |                     |
| Total P    | 12,333,644  | 10,259,796  | 4,399,226          | 1,024,390                    | (956,188)                 | #DIV/0!                   | 78,134,115                 | 5,133,314 | 111,226,163         |

|           | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Product Development Costs | Product Fulfillment Costs | Rebate and Incentive Costs | Other   | Total Utility Costs |
|-----------|----------------------|-------------|--------------------|------------------------------|---------------------------|---------------------------|----------------------------|---------|---------------------|
| Income-Q  | 682,953              | 26,406      | -                  | 103,476                      | -                         | (4,719)                   | 2,533,302                  | 161,675 | 3,503,093           |
| Low Incom | 421,194              | 22,751      | -                  | 68,741                       | -                         | (4,719)                   | 1,421,505                  | 99,709  | 2,029,181           |
| Low Incom | 14,453               | -           | -                  | -                            | -                         | -                         | 64,727                     | 3,421   | 82,601              |
| Low Incom | 247,306              | 3,655       | -                  | 34,735                       | -                         | -                         | 1,047,071                  | 58,545  | 1,391,311           |

2017 System Program Costs (North Carolina View)  
Duke Energy Carolina, LLC  
Total Program Cost Source: E-7, Sub 1230, Evans Exhibit 3

|  | Vintage 2017 Program Cost by Category |             |                    |                              |                           |                           |                            |           |                     |
|--|---------------------------------------|-------------|--------------------|------------------------------|---------------------------|---------------------------|----------------------------|-----------|---------------------|
|  | Administrative Costs                  | Advertising | Installation Costs | Measurement and Verification | Product Development Costs | Product Fulfillment Costs | Rebate and Incentive Costs | Other     | Total Utility Costs |
| Appliance Recycling Program                        | 5,048                                 | -           | -                  | -                            | -                         | -                         | 52                         | 208       | 5,307               |
| Energy Education Program for Schools               | 1,340,534                             | 25,262      | -                  | 8,885                        | 316                       | -                         | 621,479                    | 81,135    | 2,077,611           |
| Energy Efficient Appliances & Devices              | 3,343,210                             | 1,037,877   | -                  | 206,171                      | 5,296                     | -                         | 24,564,685                 | 1,183,489 | 30,340,728          |
| HVAC EE Products & Services                        | 351,596                               | 1,185,047   | -                  | 158,501                      | -                         | -                         | 5,421,355                  | 286,829   | 7,403,327           |
| Income-Qualified EE Products & Services            | 1,048,816                             | 52,723      | -                  | 54,444                       | -                         | -                         | 4,135,546                  | 214,463   | 5,505,992           |
| Multi-Family EE Products & Services                | 1,826,887                             | 20,223      | -                  | 6,539                        | -                         | -                         | 1,190,913                  | 123,860   | 3,168,422           |
| My Home Energy Report                              | 686,596                               | 12,554,962  | -                  | 10,725                       | -                         | 19,698                    | -                          | 540,268   | 13,812,250          |
| Power Manager                                      | 218,842                               | 117,393     | 5,253,434          | 75,532                       | -                         | 1,271,781                 | 6,745,840                  | 338,677   | 14,021,500          |
| Residential Energy Assessments                     | 2,048,701                             | 495,006     | -                  | 45,272                       | -                         | -                         | 207,105                    | 113,014   | 2,909,098           |
| Total Residential                                  | 10,870,230                            | 15,488,495  | 5,253,434          | 566,069                      | 5,612                     | 1,291,480                 | 42,886,974                 | 2,881,943 | 79,244,235          |
|  |                                       |             |                    |                              |                           |                           |                            |           |                     |
| Business Energy Report                             | 103,231                               | 7,287       | -                  | 8,505                        | 3,985                     | -                         | -                          | 3,673     | 126,680             |
| EnergyWise for Business                            | 118,718                               | 311,334     | 1,137,476          | 109,159                      | 388,672                   | -                         | 346,751                    | 72,508    | 2,484,618           |
| Non-Residential Smart Saver Custom Assessment      | 343,861                               | 35,639      | -                  | 207,187                      | -                         | -                         | 1,491,673                  | 61,516    | 2,139,875           |
| Non-Residential Smart Saver Custom Incentive       | 1,773,198                             | 344,061     | -                  | 245,035                      | (13,336)                  | -                         | 4,742,081                  | 213,799   | 7,304,838           |
| Non-Residential Smart Saver Food Service Products  | 43,785                                | 10,951      | -                  | 2,255                        | 1,888                     | -                         | 238,574                    | 9,036     | 306,488             |
| Non-Residential Smart Saver HVAC                   | 167,786                               | 21,108      | -                  | 86,714                       | 2,975                     | -                         | 1,236,788                  | 45,398    | 1,560,769           |
| Non-Residential Smart Saver Lighting               | 2,070,648                             | 598,594     | -                  | 123,832                      | 29,764                    | -                         | 61,897,658                 | 1,969,275 | 66,689,770          |
| Non-Residential Smart Saver Pumps & VFDs           | 43,111                                | 23,662      | -                  | 4,562                        | 2,258                     | -                         | 439,754                    | 15,589    | 528,937             |
| Non-Residential Smart Saver Information Technology | 42,484                                | 10,847      | -                  | 4,510                        | 1,515                     | -                         | 87                         | 1,771     | 61,215              |
| Non-Residential Smart Saver Process Equipment      | 8,901                                 | 7,474       | -                  | 16,064                       | 268                       | -                         | 125,039                    | 4,666     | 162,413             |
| Non Residential Smart Saver Performance Incentive  | 286,089                               | 14,471      | -                  | -                            | 9,184                     | -                         | 1,344                      | 9,471     | 320,559             |
| Power Share  | 278,121                               | 140         | -                  | 22,190                       | -                         | -                         | 12,694,300                 | 321,784   | 13,316,535          |
| Small Business Energy Saver                        | 948,458                               | 169,988     | -                  | 74,296                       | -                         | -                         | 15,646,222                 | 512,009   | 17,350,972          |
| Smart Energy in Offices                            | 456,984                               | 121,516     | 76,657             | 149,566                      | -                         | -                         | 61,194                     | 25,094    | 891,010             |
| Total Non-Residential                              | 6,685,373                             | 1,677,071   | 1,214,133          | 1,053,875                    | 427,173                   | -                         | 98,921,465                 | 3,265,591 | 113,244,680         |
|  |                                       |             |                    |                              |                           |                           |                            |           |                     |
| Total Program Costs                                | 17,555,603                            | 17,165,566  | 6,467,566          | 1,619,944                    | 432,785                   | 1,291,480                 | 141,808,439                | 6,147,533 | 192,488,915         |

|  | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Product Development Costs | Product Fulfillment Costs | Rebate and Incentive Costs | Other   | Total Utility Costs |
|--|----------------------|-------------|--------------------|------------------------------|---------------------------|---------------------------|----------------------------|---------|---------------------|
| Income-Qualified EE Products & Services            | 1,048,816            | 52,723      | -                  | 54,444                       | -                         | -                         | 4,135,546                  | 214,463 | 5,505,992           |
| Low Income Neighborhood                            | 887,304              | 45,003      |                    | 27,610                       |                           |                           | 2,591,881                  | 143,959 | 3,695,758           |
| Low Income Weatherization Refrigerator Replacement | 4,851                | -           |                    | -                            |                           |                           | 111,886                    | 4,732   | 121,469             |
| Low Income Weatherization                          | 156,661              | 7,721       |                    | 26,834                       |                           |                           | 1,431,778                  | 65,772  | 1,688,765           |

| NC Allocation |
|---------------|
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| 72.81% |
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| 72.81% |

| Vintage 2017 Program Cost by Category - NC Allocation |                      |             |                    |                              |                           |                           |                            |           |                     |
|---|----------------------|-------------|--------------------|------------------------------|---------------------------|---------------------------|----------------------------|-----------|---------------------|
|   | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Product Development Costs | Product Fulfillment Costs | Rebate and Incentive Costs | Other     | Total Utility Costs |
| Appliance   | 3,675                | -           | -                  | -                            | -                         | -                         | 38                         | 151       | 3,864               |
| Energy Education                                      | 976,026              | 18,393      | -                  | 6,469                        | 230                       | -                         | 452,491                    | 59,073    | 1,512,683           |
| Energy Efficiency                                     | 2,434,149            | 755,666     | -                  | 150,110                      | 3,856                     | -                         | 17,885,240                 | 861,684   | 22,090,705          |
| HVAC Equipment  | 255,992              | 862,818     | -                  | 115,403                      | -                         | -                         | 3,947,221                  | 208,837   | 5,390,270           |
| Income-Qualification                                  | 763,630              | 38,387      | -                  | 39,640                       | -                         | -                         | 3,011,039                  | 156,148   | 4,008,844           |
| Multi-Family  | 1,330,134            | 14,724      | -                  | 4,761                        | -                         | -                         | 867,089                    | 90,181    | 2,306,888           |
| My Home   | 499,902              | 9,141,111   | -                  | 7,809                        | -                         | 14,342                    | -                          | 393,362   | 10,056,526          |
| Power Meters  | 208,146              | 144,989     | 2,160,607          | 69,941                       | 131,400                   | 429,958                   | 6,689,455                  | 247,799   | 10,082,296          |
| Residential   | 1,491,634            | 360,408     | -                  | 32,962                       | -                         | -                         | 150,790                    | 82,284    | 2,118,078           |
| Total Residential                                     | 7,963,288            | #####       | 2,160,607          | 427,095                      | 135,486                   | 444,300                   | 33,003,363                 | 2,099,519 | 57,570,155          |
|   |                      |             |                    |                              |                           |                           |                            |           |                     |
| Business Equipment                                    | 75,161               | 5,306       | -                  | 6,192                        | 2,901                     | -                         | -                          | 2,674     | 92,234              |
| EnergyWise  | 73,812               | 171,790     | 2,561,138          | 68,901                       | 155,759                   | -                         | 210,840                    | 54,016    | 1,879,262           |
| Non-Residential                                       | 250,361              | 25,948      | -                  | 150,850                      | -                         | -                         | 1,086,068                  | 44,789    | 1,558,016           |
| Non-Residential                                       | 1,291,043            | 250,506     | -                  | 178,407                      | (9,710)                   | -                         | 3,452,650                  | 155,665   | 5,318,561           |
| Non-Residential                                       | 31,879               | 7,973       | -                  | 1,642                        | 1,375                     | -                         | 173,702                    | 6,579     | 223,150             |
| Non-Residential                                       | 122,163              | 15,368      | -                  | 63,135                       | 2,166                     | -                         | 900,490                    | 33,054    | 1,136,376           |
| Non-Residential                                       | 1,507,613            | 435,829     | -                  | 90,161                       | 21,670                    | -                         | 45,066,912                 | 1,433,805 | 48,555,988          |
| Non-Residential                                       | 31,389               | 17,228      | -                  | 3,322                        | 1,644                     | -                         | 320,180                    | 11,350    | 385,112             |
| Non-Residential                                       | 30,932               | 7,898       | -                  | 3,283                        | 1,103                     | -                         | 64                         | 1,290     | 44,570              |
| Non-Residential                                       | 6,480                | 5,442       | -                  | 11,696                       | 195                       | -                         | 91,039                     | 3,397     | 118,251             |
| Non-Residential                                       | 208,298              | 10,536      | -                  | -                            | 6,687                     | -                         | 979                        | 6,895     | 233,395             |
| Power Sheds   | 172,920              | 77          | -                  | 14,006                       | -                         | -                         | 7,718,698                  | 239,719   | 10,072,076.70       |
| Small Business  | 690,560              | 123,766     | -                  | 54,094                       | -                         | -                         | 11,391,818                 | 372,787   | 12,633,026          |
| Smart Energy  | 332,724              | 88,474      | 55,813             | 108,897                      | -                         | -                         | 44,554                     | 18,270    | 648,734             |
| Total Non-Residential                                 | 4,825,336            | 1,166,141   | 2,616,951          | 754,587                      | 183,791                   |                           | 70,457,994                 | 2,384,292 | 82,898,754          |
|   |                      |             |                    |                              |                           |                           |                            |           |                     |
| Total Program   | 12,788,624           | #####       | 4,777,558          | #####                        | 319,277                   | 444,300                   | #####                      | 4,483,810 | 140,468,909         |

|            | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Product Development Costs | Product Fulfillment Costs | Rebate and Incentive Costs | Other   | Total Utility Costs |
|------------|----------------------|-------------|--------------------|------------------------------|---------------------------|---------------------------|----------------------------|---------|---------------------|
| Income-Qu  | 763,630              | 38,387      | -                  | 39,640                       | -                         | -                         | 3,011,039                  | 156,148 | 4,008,844           |
| Low Income | 646,035              | 32,766      | -                  | 20,102                       | -                         | -                         | 1,887,116                  | 104,815 | 2,690,835           |
| Low Income | 3,532                | -           | -                  | -                            | -                         | -                         | 81,463                     | 3,445   | 88,440              |
| Low Income | 114,063              | 5,621       | -                  | 19,538                       | -                         | -                         | 1,042,460                  | 47,888  | 1,229,560           |



|   | Vintage 2018 Program Cost by Category |             |                    |                              |                     |                           |                            |           |                     |
|---|---------------------------------------|-------------|--------------------|------------------------------|---------------------|---------------------------|----------------------------|-----------|---------------------|
|   | Administrative Costs                  | Advertising | Installation Costs | Measurement and Verification | Product Development | Product Fulfillment Costs | Rebate and Incentive Costs | Other     | Total Utility Costs |
| Appliance Recycling Program   | -                                     | -           | -                  | -                            | -                   | -                         | -                          | -         | -                   |
| Energy Efficiency Education Program for Schools                         | 1,302,970                             | 26,906      | -                  | 78,871                       | 25,779              | -                         | 480,232                    | 77,502    | 1,992,260           |
| Energy Efficient Appliances and Devices                                 | 3,310,906                             | 1,081,539   | -                  | 82,354                       | 16,771              | -                         | 36,512,751                 | 1,682,923 | 42,687,244          |
| HVAC Energy Efficiency  | 241,549                               | 1,127,704   | -                  | 8,453                        | -                   | -                         | 5,303,166                  | 274,274   | 6,955,146           |
| Low Income Energy Efficiency and Weatherization Assistance Program      | 1,270,339                             | 48,276      | -                  | 81,668                       | -                   | -                         | 4,835,515                  | 254,936   | 6,490,735           |
| Multi-Family Energy Efficiency  | 2,203,225                             | -           | -                  | 105,830                      | -                   | -                         | 1,155,116                  | 140,750   | 3,604,921           |
| My Home Energy Report   | 118,751                               | 11,781,280  | -                  | 81,069                       | 262,500             | 19,201                    | -                          | 502,485   | 12,765,286          |
| PowerManager  | 372,974                               | 416,328     | 4,791,425          | 35,352                       | -                   | 1,143,684                 | 7,213,282                  | 450,564   | 14,423,610          |
| Residential Energy Assessments  | 1,996,686                             | 397,134     | -                  | 52,881                       | -                   | -                         | 278,369                    | 111,159   | 2,836,229           |
| Total Residential   | 10,817,402                            | 14,879,166  | 4,791,425          | 526,477                      | 305,049             | 1,162,885                 | 55,778,431                 | 3,494,594 | 91,755,430          |
|   |                                       |             |                    |                              |                     |                           |                            |           |                     |
| Business Energy Report  | -                                     | -           | -                  | -                            | -                   | -                         | -                          | -         | -                   |
| Non Residential Smart Saver Custom Technical Assessments                | 383,236                               | 2,781       | -                  | -                            | -                   | -                         | 7,794                      | 13,482    | 407,293             |
| Non Residential Smart Saver Custom                                      | 1,997,478                             | 117,437     | -                  | 259,471                      | -                   | -                         | 3,495,543                  | 198,974   | 6,068,902           |
| EnergyWise for Business   | 99,439                                | 395,160     | 2,040,713          | 90,854                       | (259,626)           | -                         | 595,564                    | 100,712   | 3,062,816           |
| Non Residential Smart Saver Energy Efficient Food Service Products      | 41,488                                | 13,827      | -                  | 286                          | -                   | -                         | 172,207                    | 7,797     | 235,605             |
| Non Residential Smart Saver Energy Efficient HVAC Products              | 138,979                               | 9,375       | -                  | 215                          | -                   | -                         | 1,418,533                  | 53,647    | 1,620,748           |
| Non Residential Smart Saver Energy Efficient Lighting Products          | 2,677,123                             | 195,886     | -                  | 6,303                        | -                   | -                         | 22,136,715                 | 856,353   | 25,872,380          |
| Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 38,126                                | 8,391       | -                  | 215                          | -                   | -                         | 221,861                    | 9,193     | 277,785             |
| Non Residential Energy Efficient ITEE                                   | 29,897                                | 2,159       | -                  | 72                           | -                   | -                         | 3,528                      | 1,220     | 36,875              |
| Non Residential Smart Saver Energy Efficient Process Equipment Products | 12,028                                | 1,388       | -                  | 72                           | -                   | -                         | 51,787                     | 2,234     | 67,509              |
| Non Residential Smart Saver Performance Incentive                       | 173,688                               | 10,366      | -                  | -                            | -                   | -                         | 279,680                    | 15,876    | 479,610             |
| Small Business Energy Saver   | 884,599                               | 87,848      | -                  | 37,818                       | -                   | -                         | 14,439,122                 | 528,607   | 15,977,993          |
| Smart Energy in Offices   | 165,265                               | 500         | -                  | 47,055                       | -                   | -                         | 6,927                      | -         | 219,748             |
| PowerShare  | 267,881                               | (140)       | -                  | 38,000                       | -                   | -                         | 12,213,583                 | 403,653   | 12,922,977          |
| Total Non-Residential   | 6,909,227                             | 844,978     | 2,040,713          | 480,360                      | (259,626)           | -                         | 55,035,916                 | 2,198,674 | 67,250,242          |
|   |                                       |             |                    |                              |                     |                           |                            |           |                     |
| Total Program Costs   | 17,726,628                            | 15,724,143  | 6,832,138          | 1,006,837                    | 45,423              | 1,162,885                 | 110,814,347                | 5,693,269 | 159,005,671         |

|  | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Product Development | Product Fulfillment Costs | Rebate and Incentive Costs | Other   | Total Utility Costs |
|--|----------------------|-------------|--------------------|------------------------------|---------------------|---------------------------|----------------------------|---------|---------------------|
| Low Income Energy Efficiency and Weatherization Assistance Program | 1,270,339            | 48,276      | -                  | 81,668                       | -                   | -                         | 4,835,515                  | 254,936 | 6,490,735           |
| Low Income Neighborhood  | 695,741              | 35,528      |                    | 36,095                       |                     |                           | 2,461,887                  | 139,623 | 3,368,873           |
| Low Income Weatherization Refrigerator Replacement                 | 54,158               |             |                    | -                            |                     |                           | 218,076                    | 10,869  | 283,103             |
| Low Income Weatherization  | 520,443              | 12,749      |                    | 45,574                       |                     |                           | 2,155,552                  | 104,444 | 2,838,761           |

NC Allocation

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|   | Vintage 2018 Program Cost by Category - NC Allocation |              |                    |                              |                     |                           |                            |            |                     |
|---|---|--------------|--------------------|------------------------------|---------------------|---------------------------|----------------------------|------------|---------------------|
|   | Administrative Costs                                  | Advertising  | Installation Costs | Measurement and Verification | Product Development | Product Fulfillment Costs | Rebate and Incentive Costs | Other      | Total Utility Costs |
| Appliance Recycling Program   | -   | -            | -                  | -                            | -                   | -                         | -                          | -          | -                   |
| Energy Efficiency Education Program for Schools                         | 947,430   | 19,564       | -                  | 57,349                       | 18,744              | -                         | 349,191                    | 56,354     | 1,448,633           |
| Energy Efficient Appliances and Devices                                 | 2,407,461   | 786,420      | -                  | 59,882                       | 12,194              | -                         | 26,549,535                 | 1,223,704  | 31,039,197          |
| HVAC Energy Efficiency  | 175,638   | 819,988      | -                  | 6,147                        | -                   | -                         | 3,856,094                  | 199,433    | 5,057,299           |
| Low Income Energy Efficiency and Weatherization Assistance Program      | 923,703   | 35,103       | -                  | 59,383                       | -                   | -                         | 3,516,051                  | 185,372    | 4,719,611           |
| Multi-Family Energy Efficiency  | 1,602,032   | -            | -                  | 76,952                       | -                   | -                         | 839,920                    | 102,344    | 2,621,248           |
| My Home Energy Report   | 86,347.52   | 8,566,527.80 | -                  | 58,947.58                    | 190,871.76          | 13,961.74                 | -                          | 365,372.41 | 9,282,028.81        |
| PowerManager  | 238,060   | 260,909      | 2,197,043          | 52,804                       | (83,489)            | 367,780                   | 6,438,707                  | 307,081    | 9,778,895           |
| Residential Energy Assessments  | 1,451,852   | 288,768      | -                  | 38,451                       | -                   | -                         | 202,410                    | 80,827     | 2,062,308           |
| Total Residential   | 7,832,522   | 10,777,280   | 2,197,043          | 409,917                      | 138,322             | 381,742                   | 41,751,908                 | 2,520,488  | 66,009,221          |
|   |   |              |                    |                              |                     |                           |                            |            |                     |
| Business Energy Report  | -   | -            | -                  | -                            | -                   | -                         | -                          | -          | -                   |
| Non Residential Smart Saver Custom Technical Assessments                | 278,663   | 2,022        | -                  | -                            | -                   | -                         | 5,667                      | 9,803      | 296,155             |
| Non Residential Smart Saver Custom                                      | 1,452,427   | 85,392       | -                  | 188,669                      | -                   | -                         | 2,541,716                  | 144,680    | 4,412,884           |
| EnergyWise for Business   | 83,112  | 336,596      | 2,833,375          | 48,016                       | (107,670)           | -                         | 386,076                    | 79,078     | 2,416,251           |
| Non Residential Smart Saver Energy Efficient Food Service Products      | 30,167  | 10,054       | -                  | 208                          | -                   | -                         | 125,217                    | 5,669.16   | 171,315             |
| Non Residential Smart Saver Energy Efficient HVAC Products              | 101,056   | 6,817        | -                  | 156                          | -                   | -                         | 1,031,459                  | 39,008     | 1,178,495           |
| Non Residential Smart Saver Energy Efficient Lighting Products          | 1,946,618   | 142,435      | -                  | 4,583                        | -                   | -                         | 16,096,281                 | 622,680    | 18,812,597          |
| Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 27,722  | 6,101        | -                  | 156                          | -                   | -                         | 161,322                    | 6,685      | 201,986             |
| Non Residential Energy Efficient ITEE                                   | 21,739  | 1,570        | -                  | 52                           | -                   | -                         | 2,565                      | 887        | 26,813              |
| Non Residential Smart Saver Energy Efficient Process Equipment Products | 8,746   | 1,009        | -                  | 52                           | -                   | -                         | 37,656                     | 1,624      | 49,088              |
| Non Residential Smart Saver Performance Incentive                       | 126,294   | 7,537        | -                  | -                            | -                   | -                         | 203,364                    | 11,544     | 348,739             |
| Small Business Energy Saver   | 643,219   | 63,877       | -                  | 27,499                       | -                   | -                         | 10,499,126                 | 384,366    | 11,618,086          |
| Smart Energy in Offices   | 120,169   | 364          | -                  | 34,215                       | -                   | -                         | -                          | 5,037      | 159,785             |
| PowerShare  | 223,898   | (119)        | -                  | 20,083                       | -                   | -                         | 7,917,482                  | 316,944    | 10,194,918          |
| Total Non-Residential   | 5,063,829   | 663,654      | 2,833,375          | 323,689                      | (107,670)           | -                         | 39,007,930                 | 1,628,005  | 49,887,114          |
|   |   |              |                    |                              |                     |                           |                            |            |                     |
| Total Program Costs   | 12,896,351  | 11,440,934   | 5,030,418          | 733,606                      | 30,651              | 381,742                   | 80,759,839                 | 4,148,494  | 115,896,335         |

|  | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Product Development | Product Fulfillment Costs | Rebate and Incentive Costs | Other   | Total Utility Costs |
|--|----------------------|-------------|--------------------|------------------------------|---------------------|---------------------------|----------------------------|---------|---------------------|
| Low Income Energy Efficiency and Weatherization Assistance Program | 923,703              | 35,103      | -                  | 59,383                       | -                   | -                         | 3,516,051                  | 185,372 | 4,719,611           |
| Low Income Neighborhood  | 505,894              | 25,833      | -                  | 26,245                       | -                   | -                         | 1,790,113                  | 101,524 | 2,449,610           |
| Low Income Weatherization Refrigerator Replacement                 | 39,380               | -           | -                  | -                            | -                   | -                         | 158,570                    | 7,903   | 205,853             |
| Low Income Weatherization  | 378,430              | 9,270       | -                  | 33,138                       | -                   | -                         | 1,567,368                  | 75,944  | 2,064,150           |

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|   | Vintage 2019 Program Cost by Category |             |                    |                              |                     |                           |                            |           |                     |
|---|---------------------------------------|-------------|--------------------|------------------------------|---------------------|---------------------------|----------------------------|-----------|---------------------|
|   | Administrative Costs                  | Advertising | Installation Costs | Measurement and Verification | Product Development | Product Fulfillment Costs | Rebate and Incentive Costs | Other     | Total Utility Costs |
| Appliance Recycling Program   | -                                     | -           | -                  | -                            | -                   | -                         | -                          | -         | -                   |
| Energy Efficiency Education Program for Schools                         | 1,084,097                             | 28,519      | -                  | 4,056                        | 2,692               | -                         | 495,935                    | 68,784    | 1,684,083           |
| Energy Efficient Appliances and Devices                                 | 2,832,797                             | 2,205,869   | -                  | 6,852                        | 3,501               | -                         | 34,642,993                 | 1,688,975 | 41,380,987          |
| HVAC Energy Efficiency  | 276,102                               | 1,510,873   | -                  | -                            | -                   | -                         | 5,311,650                  | 302,045   | 7,400,669           |
| Low Income Energy Efficiency and Weatherization Assistance Program      | 1,314,043                             | 49,863      | -                  | 87,440                       | -                   | -                         | 5,590,035                  | 300,753   | 7,342,133           |
| Multi-Family Energy Efficiency  | 2,503,166                             | -           | -                  | 17,700                       | -                   | -                         | 1,008,869                  | 150,421   | 3,680,155           |
| My Home Energy Report   | 530,263                               | 9,059,954   | 481,469            | 21,210                       | 343                 | 30,864                    | -                          | 431,055   | 10,555,159          |
| PowerManager  | 209,175                               | 123,301     | 3,822,472          | 20,082                       | -                   | 1,075,725                 | 7,654,406                  | 478,477   | 13,383,639          |
| Residential Energy Assessments  | 2,270,416                             | 587,183     | -                  | 6,367                        | -                   | -                         | 192,776                    | 130,147   | 3,186,888           |
| Total Residential   | 11,020,059                            | 13,565,561  | 4,303,941          | 163,707                      | 6,537               | 1,106,589                 | 54,896,664                 | 3,550,656 | 88,613,714          |
| Business Energy Report  | -                                     | -           | -                  | -                            | -                   | -                         | -                          | -         | -                   |
| Non Residential Smart Saver Custom Technical Assessments                | 106,322                               | 5,704       | -                  | -                            | 4,776               | -                         | 165,648                    | 13,475    | 295,925             |
| Non Residential Smart Saver Custom                                      | 2,353,768                             | 76,578      | -                  | 17,760                       | 23,396              | -                         | 5,987,025                  | 412,913   | 8,871,440           |
| EnergyWise for Business   | 75,224                                | 363,163     | 2,189,964          | 5,852                        | -                   | -                         | 884,345                    | 167,902   | 3,686,451           |
| Non Residential Smart Saver Energy Efficient Food Service Products      | 59,262                                | 8,208       | -                  | 5,750                        | -                   | -                         | 251,163                    | 15,521    | 339,904             |
| Non Residential Smart Saver Energy Efficient HVAC Products              | 140,512                               | 4,810       | -                  | 8,625                        | 2,736               | -                         | 1,950,484                  | 100,593   | 2,207,760           |
| Non Residential Smart Saver Energy Efficient Lighting Products          | 2,871,441                             | 168,798     | -                  | 256,230                      | 38,878              | -                         | 16,543,407                 | 950,365   | 20,829,118          |
| Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 58,322                                | 7,793       | -                  | 11,500                       | -                   | -                         | 102,810                    | 8,698     | 189,123             |
| Non Residential Energy Efficient ITEE                                   | 19,123                                | 694         | -                  | 2,875                        | -                   | -                         | 19,591                     | 2,040     | 44,323              |
| Non Residential Smart Saver Energy Efficient Process Equipment Products | 10,829                                | 963         | -                  | 2,875                        | -                   | -                         | 99,668                     | 5,477     | 119,811             |
| Non Residential Smart Saver Performance Incentive                       | 322,119                               | 21,633      | -                  | -                            | 2,458               | -                         | 402,997                    | 35,742    | 784,949             |
| Small Business Energy Saver   | 713,870                               | 137,623     | -                  | 6,603                        | -                   | -                         | 10,040,202                 | 519,966   | 11,418,264          |
| Smart Energy in Offices   | -                                     | -           | -                  | -                            | -                   | -                         | -                          | -         | -                   |
| PowerShare  | 235,001                               | -           | -                  | 30,320                       | -                   | -                         | 12,288,629                 | 465,656   | 13,019,606          |
| Total Non-Residential   | 6,965,794                             | 795,968     | 2,189,964          | 348,389                      | 72,245              | -                         | 48,735,967                 | 2,698,346 | 61,806,674          |
| Total Program Costs   | 17,985,853                            | 14,361,529  | 6,493,906          | 512,097                      | 78,782              | 1,106,589                 | 103,632,631                | 6,249,002 | 150,420,388         |

|  | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Product Development | Product Fulfillment Costs | Rebate and Incentive Costs | Other   | Total Utility Costs |
|--|----------------------|-------------|--------------------|------------------------------|---------------------|---------------------------|----------------------------|---------|---------------------|
| Low Income Energy Efficiency and Weatherization Assistance Program | 1,314,043            | 49,863      | -                  | 87,440                       | -                   | -                         | 5,590,035                  | 300,753 | 7,342,133           |
| Low Income Neighborhood  | 635,190              | 33,898      | -                  | 86,520                       | -                   | -                         | 2,356,855                  | 145,380 | 3,257,842           |
| Low Income Weatherization Refrigerator Replacement                 | 50,121               | -           | -                  | -                            | -                   | -                         | 244,401                    | 11,471  | 305,993             |
| Low Income Weatherization  | 628,732              | 15,965      | -                  | 920                          | -                   | -                         | 2,988,779                  | 143,902 | 3,778,297           |

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|   | Vintage 2019 Program Cost by Category - NC Allocation |              |                    |                              |                     |                           |                            |            |                     |
|---|---|--------------|--------------------|------------------------------|---------------------|---------------------------|----------------------------|------------|---------------------|
|   | Administrative Costs                                  | Advertising  | Installation Costs | Measurement and Verification | Product Development | Product Fulfillment Costs | Rebate and Incentive Costs | Other      | Total Utility Costs |
| Appliance Recycling Program   | -   | -            | -                  | -                            | -                   | -                         | -                          | -          | -                   |
| Energy Efficiency Education Program for Schools                         | 792,371   | 20,844       | -                  | 2,965                        | 1,968               | -                         | 362,481                    | 50,274     | 1,230,903           |
| Energy Efficient Appliances and Devices                                 | 2,070,502   | 1,612,278    | -                  | 5,008                        | 2,559               | -                         | 25,320,700                 | 1,234,478  | 30,245,525          |
| HVAC Energy Efficiency  | 201,804   | 1,104,303    | -                  | -                            | -                   | -                         | 3,882,306                  | 220,766    | 5,409,178           |
| Low Income Energy Efficiency and Weatherization Assistance Program      | 960,439   | 36,445       | -                  | 63,910                       | -                   | -                         | 4,085,778                  | 219,821    | 5,366,394           |
| Multi-Family Energy Efficiency  | 1,829,574   | -            | -                  | 12,937                       | -                   | -                         | 737,386                    | 109,943    | 2,689,840           |
| My Home Energy Report   | 387,571.55  | 6,621,955.80 | 351,908            | 15,502.27                    | 251.05              | 22,558.71                 | -                          | 315,060.12 | 7,714,807.17        |
| PowerManager  | 177,210   | 165,972      | 2,051,329          | 19,193                       | -                   | 367,017                   | 7,105,907                  | 379,405    | 10,266,034          |
| Residential Energy Assessments  | 1,659,456   | 429,174      | -                  | 4,654                        | -                   | -                         | 140,900                    | 95,125     | 2,329,309           |
| Total Residential   | 8,078,927   | 9,990,973    | 2,403,237          | 124,169                      | 4,778               | 389,576                   | 41,635,458                 | 2,624,873  | 65,251,990          |
| Business Energy Report  | -   | -            | -                  | -                            | -                   | -                         | -                          | -          | -                   |
| Non Residential Smart Saver Custom Technical Assessments                | 77,711  | 4,169        | -                  | -                            | 3,491               | -                         | 121,073                    | 9,849      | 216,292             |
| Non Residential Smart Saver Custom                                      | 1,720,378   | 55,971       | -                  | 12,981                       | 17,101              | -                         | 4,375,940                  | 301,800    | 6,484,170           |
| EnergyWise for Business   | 50,533.59   | 195,185      | 2,412,389          | 3,652                        | #DIV/0!             | -                         | 561,008                    | 118,246    | 2,664,092           |
| Non Residential Smart Saver Energy Efficient Food Service Products      | 43,315  | 6,000        | -                  | 4,203                        | -                   | -                         | 183,576                    | 11,344.05  | 248,437             |
| Non Residential Smart Saver Energy Efficient HVAC Products              | 102,700   | 3,516        | -                  | 6,304                        | 2,000               | -                         | 1,425,616                  | 73,524     | 1,613,660           |
| Non Residential Smart Saver Energy Efficient Lighting Products          | 2,098,748   | 123,375      | -                  | 187,279                      | 28,416              | -                         | 12,091,641                 | 694,625    | 15,224,084          |
| Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 42,628  | 5,696        | -                  | 8,405                        | -                   | -                         | 75,144                     | 6,358      | 138,231             |
| Non Residential Energy Efficient ITEE                                   | 13,977  | 507          | -                  | 2,101                        | -                   | -                         | 14,319                     | 1,491      | 32,396              |
| Non Residential Smart Saver Energy Efficient Process Equipment Products | 7,915   | 704          | -                  | 2,101                        | -                   | -                         | 72,847                     | 4,003      | 87,570              |
| Non Residential Smart Saver Performance Incentive                       | 235,438   | 15,812       | -                  | -                            | 1,797               | -                         | 294,552                    | 26,124     | 573,723             |
| Small Business Energy Saver   | 521,770   | 100,589      | -                  | 4,826                        | -                   | -                         | 7,338,423                  | 380,045    | 8,345,654           |
| Smart Energy in Offices   | -   | -            | -                  | -                            | -                   | -                         | -                          | -          | -                   |
| PowerShare  | 157,867   | -            | -                  | 18,920                       | #DIV/0!             | -                         | 7,795,628                  | 327,940    | 9,408,894           |
| Total Non-Residential   | 5,072,982   | 511,524      | 2,412,389          | 250,772                      | #DIV/0!             | -                         | 34,349,768                 | 1,955,347  | 45,037,204          |
| Total Program Costs   | 13,151,909  | 10,502,497   | 4,815,626          | 374,941                      | #DIV/0!             | 389,576                   | 75,985,227                 | 4,580,220  | 110,289,194         |

|  | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Product Development | Product Fulfillment Costs | Rebate and Incentive Costs | Other   | Total Utility Costs |
|--|----------------------|-------------|--------------------|------------------------------|---------------------|---------------------------|----------------------------|---------|---------------------|
| Low Income Energy Efficiency and Weatherization Assistance Program | 960,439              | 36,445      | -                  | 63,910                       | -                   | -                         | 4,085,778                  | 219,821 | 5,366,394           |
| Low Income Neighborhood  | 464,263              | 24,776      | -                  | 63,238                       | -                   | -                         | 1,722,634                  | 106,259 | 2,381,170           |
| Low Income Weatherization Refrigerator Replacement                 | 36,634               | -           | -                  | -                            | -                   | -                         | 178,634                    | 8,385   | 223,652             |
| Low Income Weatherization  | 459,542              | 11,669      | -                  | 672                          | -                   | -                         | 2,184,510                  | 105,178 | 2,761,572           |

2020 Forecasted System Program Costs (North Carolina View)  
Duke Energy Carolina, LLC  
Total Program Cost Source: E-7, Sub 1164, Evans Exhibit 1

|  | Vintage 2020 Program Cost by Category |             |                    |                              |                            |           |                     |
|--|---------------------------------------|-------------|--------------------|------------------------------|----------------------------|-----------|---------------------|
|  | Administrative Costs                  | Advertising | Installation Costs | Measurement and Verification | Rebate and Incentive Costs | Other     | Total Utility Costs |
| Appliance Recycling Program  | -                                     | -           | -                  | -                            | -                          | -         | -                   |
| Energy Efficiency Education Program for Schools                        | 1,664,687                             | 6,189       | -                  | 85,800                       | 716,587                    | 148,365   | 2,621,628           |
| Energy Efficient Appliances and Devices                                | 1,418,553                             | 958,765     | -                  | 308,660                      | 5,912,982                  | 515,188   | 9,114,148           |
| HVAC Energy Efficiency   | 983,575                               | 325,244     | -                  | -                            | 5,906,400                  | 448,379   | 7,663,598           |
| Income Qualified Energy Efficiency and Weatherization Assistance       | 1,450,248                             | 67,614      | -                  | -                            | 6,663,028                  | 508,389   | 8,689,280           |
| Multi-Family Energy Efficiency   | 2,425,656                             | 5,293       | -                  | 134,376                      | 844,267                    | 203,533   | 3,613,126           |
| My Home Energy Report  | 1,303,244                             | 9,660,816   | -                  | -                            | -                          | 681,345   | 11,645,405          |
| PowerManager   | 1,393,533                             | 1,250,239   | 5,887,970          | 375,000                      | 9,505,310                  | 979,575   | 19,391,626          |
| Residential Energy Assessments   | 1,982,520                             | 480,911     | -                  | 28,200                       | 227,052                    | 76,575    | 2,795,258           |
| Total Residential  | 12,622,018                            | 12,755,070  | 5,887,970          | 932,036                      | 29,775,626                 | 3,561,350 | 65,534,070          |
| Business Energy Report   | -                                     | -           | -                  | -                            | -                          | -         | -                   |
| Non Residential Smart Saver Custom Technical Assessments               | 491,149                               | 52,505      | -                  | 115,350                      | 681,600                    | 74,073    | 1,414,676           |
| Non Residential Smart Saver Custom                                     | 2,768,025                             | 255,468     | -                  | 231,000                      | 6,901,731                  | 600,030   | 10,756,254          |
| EnergyWise for Business  | 106,704                               | 256,916     | 2,282,826          | 120,000                      | 2,047,932                  | 283,799   | 5,098,177           |
| Non Residential Smart Saver Energy Efficient Food Service Products     | 205,217                               | 23,275      | -                  | 298                          | 1,125,293                  | 81,843    | 1,435,926           |
| Non Residential Smart Saver Energy Efficient HVAC Products             | 168,540                               | 23,264      | -                  | 447                          | 1,089,065                  | 77,435    | 1,358,750           |
| Non Residential Smart Saver Energy Efficient Lighting Products         | 4,884,312                             | 582,820     | -                  | 13,261                       | 14,838,434                 | 1,227,575 | 21,546,401          |
| Non Residential Smart Saver Energy Efficient Pumps and Drives Products | 211,096                               | 17,492      | -                  | 596                          | 386,755                    | 37,201    | 653,139             |
| Non Residential Energy Efficient ITEE                                  | 37,463                                | 4,482       | -                  | 149                          | 25,677                     | 4,088     | 71,858              |
| Non Residential Energy Efficient Process Equipment Products            | 33,274                                | 2,546       | -                  | 149                          | 126,372                    | 9,805     | 172,146             |
| Non Residential Smart Saver Performance Incentive                      | 698,946                               | 67,701      | -                  | 21,000                       | 2,807,280                  | 216,062   | 3,810,989           |
| Small Business Energy Saver  | 679,276                               | 140,000     | -                  | 69,924                       | 9,146,901                  | 602,506   | 10,638,607          |
| Smart Energy in Offices  | -                                     | -           | -                  | -                            | -                          | -         | -                   |
| PowerShare   | 231,662                               | 30,000      | 53,040             | 70,000                       | 12,502,638                 | 696,097   | 13,583,438          |
| Total Non-Residential  | 10,515,663                            | 1,456,466   | 2,335,866          | 642,174                      | 51,679,678                 | 3,910,515 | 70,540,362          |
| Total Program Costs  | 23,137,682                            | 14,211,536  | 8,223,835          | 1,574,210                    | 81,455,304                 | 7,471,865 | 136,074,432         |

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|  | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Rebate and Incentive Costs | Other   | Total Utility Costs |
|--|----------------------|-------------|--------------------|------------------------------|----------------------------|---------|---------------------|
| Income Qualified Energy Efficiency and Weatherization Assistance | 1,450,248            | 67,614      | -                  | -                            | 6,663,028                  | 508,389 | 8,689,280           |
| Low Income Neighborhood  | 997,245              | 60,064      | -                  | -                            | 2,623,653                  | 228,748 | 3,909,710           |
| Low Income Weatherization Refrigerator Replacement               | 19,871               | -           | -                  | -                            | 180,375                    | 12,444  | 212,690             |
| Low Income Weatherization  | 433,133              | 7,550       | -                  | -                            | 3,859,000                  | 267,197 | 4,566,880           |

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|   | Vintage 2020 Program Cost by Category - NC Allocation |             |                    |                              |                            |           |                     |
|---|---|-------------|--------------------|------------------------------|----------------------------|-----------|---------------------|
|   | Administrative Costs                                  | Advertising | Installation Costs | Measurement and Verification | Rebate and Incentive Costs | Other     | Total Utility Costs |
| Appliance Recycling Program   | -   | -           | -                  | -                            | -                          | -         | -                   |
| Energy Efficiency Education Program for Schools                         | 1,210,445   | 4,500       | -                  | 62,388                       | 521,052                    | 107,881   | 1,906,266           |
| Energy Efficient Appliances and Devices                                 | 1,031,473   | 697,147     | -                  | 224,436                      | 4,299,510                  | 374,609   | 6,627,175           |
| HVAC Energy Efficiency  | 715,188   | 236,495     | -                  | -                            | 4,294,724                  | 326,030   | 5,572,436           |
| Low Income Energy Efficiency and Weatherization Assistance Program      | 1,054,520   | 49,164      | -                  | -                            | 4,844,891                  | 369,665   | 6,318,240           |
| Multi-Family Energy Efficiency  | 1,763,769   | 3,849       | -                  | 97,709                       | 613,892                    | 147,995   | 2,627,214           |
| My Home Energy Report   | 947,629   | 7,024,674   | -                  | -                            | -                          | 495,427   | 8,467,729           |
| PowerManager  | 556,935   | 494,310     | 2,644,578          | 181,690                      | 7,735,763                  | 630,117   | 12,243,392          |
| Residential Energy Assessments  | 1,441,551   | 349,685     | -                  | 20,505                       | 165,097                    | 55,680    | 2,032,518           |
| Total Residential   | 8,721,509   | 8,859,824   | 2,644,578          | 586,728                      | 22,474,928                 | 2,507,404 | 45,794,970          |
| Business Energy Report  | -   | -           | -                  | -                            | -                          | -         | -                   |
| Non Residential Smart Saver Custom Technical Assessments                | 357,129   | 38,178      | -                  | 83,875                       | 495,612                    | 53,861    | 1,028,654           |
| Non Residential Smart Saver Custom                                      | 2,012,715   | 185,759     | -                  | 167,967                      | 5,018,459                  | 436,300   | 7,821,200           |
| EnergyWise for Business   | 226,499   | 570,823     | 3,333,088          | 147,987                      | 1,404,120                  | 235,352   | 4,308,914           |
| Non Residential Smart Saver Energy Efficient Food Service Products      | 149,219   | 16,924      | -                  | 217                          | 818,235                    | 59,510.69 | 1,044,106           |
| Non Residential Smart Saver Energy Efficient HVAC Products              | 122,550   | 16,916      | -                  | 325                          | 791,893                    | 56,305    | 987,989             |
| Non Residential Smart Saver Energy Efficient Lighting Products          | 3,551,532   | 423,786     | -                  | 9,642                        | 10,789,478                 | 892,607   | 15,667,045          |
| Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 153,494   | 12,719      | -                  | 433                          | 281,221                    | 27,050    | 474,917             |
| Non Residential Energy Efficient ITEE                                   | 27,240  | 3,259       | -                  | 108                          | 18,671                     | 2,973     | 52,250              |
| Non Residential Smart Saver Energy Efficient Process Equipment Products | 24,194  | 1,851       | -                  | 108                          | 91,889                     | 7,130     | 125,173             |
| Non Residential Smart Saver Performance Incentive                       | 508,225   | 49,227      | -                  | 15,270                       | 2,041,259                  | 157,105   | 2,771,086           |
| Small Business Energy Saver   | 493,922   | 101,798     | -                  | 50,844                       | 6,650,991                  | 438,101   | 7,735,656           |
| Smart Energy in Offices   | -   | -           | -                  | -                            | -                          | -         | -                   |
| PowerShare  | 491,743   | 66,655      | 77,442             | 86,326                       | 8,572,162                  | 577,266   | 11,480,548          |
| Total Non-Residential   | 8,118,464   | 1,487,893   | 3,410,530          | 563,102                      | 36,973,989                 | 2,943,560 | 53,497,539          |
| Total Program Costs   | 16,839,973  | 10,347,717  | 6,055,107          | 1,149,830                    | 59,448,917                 | 5,450,964 | 99,292,509          |

|  | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Rebate and Incentive Costs | Other   | Total Utility Costs |
|--|----------------------|-------------|--------------------|------------------------------|----------------------------|---------|---------------------|
| Low Income Energy Efficiency and Weatherization Assistance Program | 1,054,520            | 49,164      | -                  | -                            | 4,844,891                  | 369,665 | 6,318,240           |
| Low Income Neighborhood  | 725,127              | 43,674      | -                  | -                            | 1,907,738                  | 166,330 | 2,842,869           |
| Low Income Weatherization Refrigerator Replacement                 | 14,449               | -           | -                  | -                            | 131,156                    | 9,048   | 154,653             |
| Low Income Weatherization  | 314,944              | 5,490       | -                  | -                            | 2,805,997                  | 194,287 | 3,320,718           |

2021 Forecasted System Program Costs (North Carolina View)  
Duke Energy Carolina, LLC  
Total Program Cost Source: E-7, Sub 1230, Evans Exhibit 1

|   | Vintage 2021 Program Cost by Category |             |                    |                              |                            |           |                     |
|---|---------------------------------------|-------------|--------------------|------------------------------|----------------------------|-----------|---------------------|
|   | Administrative Costs                  | Advertising | Installation Costs | Measurement and Verification | Rebate and Incentive Costs | Other     | Total Utility Costs |
| Appliance Recycling Program   | -                                     | -           | -                  | -                            | -                          | -         | -                   |
| Energy Efficiency Education Program for Schools                         | 1,495,224                             | 12,626      | -                  | 22,200                       | 628,362                    | 156,643   | 2,315,055           |
| Energy Efficient Appliances and Devices                                 | 1,100,027                             | 852,285     | -                  | 114,606                      | 8,231,934                  | 316,882   | 10,615,734          |
| HVAC Energy Efficiency  | 429,347                               | 1,726,465   | -                  | 167,191                      | 2,818,400                  | 794,650   | 5,936,054           |
| Low Income Energy Efficiency and Weatherization Assistance Program      | 1,106,857                             | 239,683     | -                  | -                            | 6,178,677                  | 551,806   | 8,077,022           |
| Multi-Family Energy Efficiency  | 3,285,556                             | 292         | -                  | -                            | 1,235,752                  | 331,558   | 4,853,158           |
| My Home Energy Report   | 581,611                               | 11,227,442  | 35,191             | 219,800                      | -                          | 868,510   | 12,932,554          |
| PowerManager  | 1,202,913                             | 831,878     | 6,155,858          | 275,000                      | 10,700,422                 | 1,261,832 | 20,427,903          |
| Residential Energy Assessments  | 984,758                               | 270,870     | 3,947,295          | -                            | 485,352                    | 417,107   | 6,105,383           |
| Total Residential   | 10,186,293                            | 15,161,542  | 10,138,344         | 798,797                      | 30,278,899                 | 4,698,988 | 71,262,862          |
|   |                                       |             |                    |                              |                            |           |                     |
| Business Energy Report  | -                                     | -           | -                  | -                            | -                          | -         | -                   |
| Non Residential Smart Saver Custom Technical Assessments                | 493,432                               | 43,248      | -                  | -                            | 494,160                    | 75,806    | 1,106,646           |
| Non Residential Smart Saver Custom                                      | 3,238,872                             | 223,181     | -                  | 99,000                       | 5,940,475                  | 691,444   | 10,192,972          |
| EnergyWise for Business   | 81,854                                | 256,916     | 2,307,512          | 120,000                      | 2,813,992                  | 401,538   | 5,981,812           |
| Non Residential Smart Saver Energy Efficient Food Service Products      | 179,239                               | 20,559      | -                  | 4,343                        | 781,365                    | 72,153    | 1,057,658           |
| Non Residential Smart Saver Energy Efficient HVAC Products              | 185,090                               | 29,571      | -                  | 6,514                        | 1,393,367                  | 118,251   | 1,732,792           |
| Non Residential Smart Saver Energy Efficient Lighting Products          | 4,879,327                             | 655,114     | -                  | 193,255                      | 16,903,125                 | 1,650,016 | 24,280,837          |
| Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 119,872                               | 16,839      | -                  | 8,686                        | 251,070                    | 28,517    | 424,983             |
| Non Residential Energy Efficient ITEE                                   | 15,793                                | 4,705       | -                  | 2,171                        | 21,616                     | 3,097     | 47,381              |
| Non Residential Smart Saver Energy Efficient Process Equipment Products | 26,840                                | 2,936       | -                  | 2,171                        | 77,544                     | 7,892     | 117,383             |
| Non Residential Smart Saver Performance Incentive                       | 671,181                               | 63,632      | -                  | 9,000                        | 1,460,345                  | 161,428   | 2,365,586           |
| Small Business Energy Saver   | 734,550                               | 125,000     | -                  | 76,920                       | 9,340,151                  | 750,066   | 11,026,688          |
| Smart Energy in Offices   | -                                     | -           | -                  | -                            | -                          | -         | -                   |
| PowerShare  | 174,223                               | 30,000      | 53,045             | 60,000                       | 12,569,384                 | 856,758   | 13,743,409          |
| Total Non-Residential   | 10,800,271                            | 1,471,700   | 2,360,557          | 582,060                      | 52,046,594                 | 4,816,965 | 72,078,147          |
|   |                                       |             |                    |                              |                            |           |                     |
| Total Program Costs   | 20,986,564                            | 16,633,241  | 12,498,901         | 1,380,857                    | 82,325,493                 | 9,515,953 | 143,341,010         |

|  | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Rebate and Incentive Costs | Other   | Total Utility Costs |
|--|----------------------|-------------|--------------------|------------------------------|----------------------------|---------|---------------------|
| Low Income Energy Efficiency and Weatherization Assistance Program | 1,106,857            | 239,683     | -                  | -                            | 6,178,677                  | 551,806 | 8,077,022           |
| Low Income Neighborhood  | 805,975              | 233,083     | -                  | -                            | 3,855,677                  | 358,919 | 5,253,653           |
| Low Income Weatherization Refrigerator Replacement                 | 27,100               | -           | -                  | -                            | 271,000                    | 21,859  | 319,959             |
| Low Income Weatherization  | 273,782              | 6,600       | -                  | -                            | 2,052,000                  | 171,028 | 2,503,410           |

NC Allocation

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|   | Vintage 2021 Program Cost by Category - NC Allocation |             |                    |                              |                            |            |                     |
|---|---|-------------|--------------------|------------------------------|----------------------------|------------|---------------------|
|   | Administrative Costs                                  | Advertising | Installation Costs | Measurement and Verification | Rebate and Incentive Costs | Other      | Total Utility Costs |
| Appliance Recycling Program   | -   | -           | -                  | -                            | -                          | -          | -                   |
| Energy Efficiency Education Program for Schools                         | 1,092,865   | 9,229       | -                  | 16,226                       | 459,272                    | 114,491    | 1,692,082           |
| Energy Efficient Appliances and Devices                                 | 804,014   | 622,939     | -                  | 83,766                       | 6,016,753                  | 231,611    | 7,759,082           |
| HVAC Energy Efficiency  | 313,811   | 1,261,880   | -                  | 122,201                      | 2,059,980                  | 580,813    | 4,338,685           |
| Low Income Energy Efficiency and Weatherization Assistance Program      | 809,006   | 175,185     | -                  | -                            | 4,516,019                  | 403,317    | 5,903,527           |
| Multi-Family Energy Efficiency  | 2,401,426   | 213         | -                  | -                            | 903,216                    | 242,337    | 3,547,192           |
| My Home Energy Report   | 425,102   | 8,206,181   | 25,721             | 160,653                      | -                          | 634,797    | 9,452,454           |
| PowerManager  | 497,780   | 381,711     | 2,905,639          | 155,237                      | 8,899,297                  | 859,820    | 13,699,485          |
| Residential Energy Assessments  | 719,763   | 197,980     | 2,885,093          | -                            | 354,746                    | 304,865    | 4,462,448           |
| Total Residential   | 7,063,767   | 10,855,318  | 5,816,454          | 538,083                      | 23,209,283                 | 3,372,051  | 50,854,956          |
|   |   |             |                    |                              |                            |            |                     |
| Business Energy Report  | -   | -           | -                  | -                            | -                          | -          | -                   |
| Non Residential Smart Saver Custom Technical Assessments                | 360,652   | 31,610      | -                  | -                            | 361,183                    | 55,407     | 808,852             |
| Non Residential Smart Saver Custom                                      | 2,367,304   | 163,124     | -                  | 72,359                       | 4,341,916                  | 505,379    | 7,450,083           |
| EnergyWise for Business   | 187,119.84  | 401,960.32  | 3,340,282.13       | 121,707.41                   | 1,914,427.61               | 322,673.51 | 4,885,703.19        |
| Non Residential Smart Saver Energy Efficient Food Service Products      | 131,006   | 15,026      | -                  | 3,174                        | 571,103                    | 52,736.76  | 773,047             |
| Non Residential Smart Saver Energy Efficient HVAC Products              | 135,283   | 21,613      | -                  | 4,761                        | 1,018,417                  | 86,430     | 1,266,505           |
| Non Residential Smart Saver Energy Efficient Lighting Products          | 3,566,319   | 478,826     | -                  | 141,251                      | 12,354,561                 | 1,206,003  | 17,746,959          |
| Non Residential Smart Saver Energy Efficient Pumps and Drives Products  | 87,615  | 12,308      | -                  | 6,349                        | 183,508                    | 20,843     | 310,622             |
| Non Residential Energy Efficient ITEE                                   | 11,543  | 3,439       | -                  | 1,587                        | 15,799                     | 2,264      | 34,631              |
| Non Residential Smart Saver Energy Efficient Process Equipment Products | 19,618  | 2,146       | -                  | 1,587                        | 56,677                     | 5,768      | 85,796              |
| Non Residential Smart Saver Performance Incentive                       | 490,569   | 46,509      | -                  | 6,578                        | 1,067,372                  | 117,988    | 1,729,016           |
| Small Business Energy Saver   | 536,885   | 91,363      | -                  | 56,221                       | 6,826,753                  | 548,226    | 8,059,449           |
| Smart Energy in Offices   | -   | -           | -                  | -                            | -                          | -          | -                   |
| PowerShare  | 398,275.51  | 46,936.86   | 76,786.35          | 60,853.71                    | 8,551,258.55               | 688,485.49 | 11,225,064.10       |
| Total Non-Residential   | 8,292,188   | 1,314,861   | 3,417,068          | 476,428                      | 37,262,976                 | 3,612,204  | 54,375,726          |
|   |   |             |                    |                              |                            |            |                     |
| Total Program Costs   | 15,355,956  | 12,170,179  | 9,233,522          | 1,014,511                    | 60,472,259                 | 6,984,255  | 105,230,682         |

|  | Administrative Costs | Advertising | Installation Costs | Measurement and Verification | Rebate and Incentive Costs | Other   | Total Utility Costs |
|--|----------------------|-------------|--------------------|------------------------------|----------------------------|---------|---------------------|
| Low Income Energy Efficiency and Weatherization Assistance Program | 809,006              | 175,185     | -                  | -                            | 4,516,019                  | 403,317 | 5,903,527           |
| Low Income Neighborhood  | 589,090              | 170,361     | -                  | -                            | 2,818,129                  | 262,335 | 3,839,916           |
| Low Income Weatherization Refrigerator Replacement                 | 19,807               | -           | -                  | -                            | 198,075                    | 15,977  | 233,859             |
| Low Income Weatherization  | 200,108              | 4,824       | -                  | -                            | 1,499,815                  | 125,005 | 1,829,752           |

2015 Income Qualified Energy Efficiency and Weatherization Assistance

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR | NC Allocation |
|---|-----------------------------|----------------------------|---------------|
| Low Income Neighborhood                             | 2,291,394                   | 538                        | 72.96%        |
| Low Income Weatherization- Refrigerator Replacement | 51,997                      | 6                          | 72.96%        |
| Low Income Weatherization- Tier 1                   | 22,548                      | 4                          | 72.96%        |
| Low Income Weatherization- Tier 2                   | 759,245                     | 60                         | 72.96%        |
| Totals  | 3,125,184                   | 608                        |               |

2015 Income Qualified Energy Efficiency and Weatherization Assistance - NC Allocation

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR |
|---|-----------------------------|----------------------------|
| Low Income Neighborhood                             | 1,671,720                   | 392                        |
| Low Income Weatherization- Refrigerator Replacement | 37,935                      | 4                          |
| Low Income Weatherization- Tier 1                   | 16,450                      | 3                          |
| Low Income Weatherization- Tier 2                   | 553,919                     | 44                         |
| Totals  | 2,280,024                   | 444                        |

2016 Income Qualified Energy Efficiency and Weatherization Assistance

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR | NC Allocation |
|---|-----------------------------|----------------------------|---------------|
| Low Income Neighborhood                             | 3,132,505                   | 509                        | 73.10%        |
| Low Income Weatherization- Refrigerator Replacement | 168,674                     | 19                         | 73.10%        |
| Low Income Weatherization- Tier 1                   | 22,269                      | 4                          | 73.10%        |
| Low Income Weatherization- Tier 2                   | 1,478,029                   | 118                        | 73.10%        |
| Totals  | 4,801,478                   | 649                        |               |

2016 Income Qualified Energy Efficiency and Weatherization Assistance - NC Allocation

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR |
|---|-----------------------------|----------------------------|
| Low Income Neighborhood                             | 2,289,745                   | 372                        |
| Low Income Weatherization- Refrigerator Replacement | 123,294                     | 14                         |
| Low Income Weatherization- Tier 1                   | 16,278                      | 3                          |
| Low Income Weatherization- Tier 2                   | 1,080,385                   | 86                         |
| Totals  | 3,509,702                   | 474                        |

2017 Income Qualified Energy Efficiency and Weatherization Assistance

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR | NC Allocation |
|---|-----------------------------|----------------------------|---------------|
| Low Income Neighborhood                             | 4,082,385                   | 663                        | 72.81%        |
| Low Income Weatherization- Refrigerator Replacement | 191,502                     | 22                         | 72.81%        |
| Low Income Weatherization- Tier 1                   | 13,362                      | 2                          | 72.81%        |
| Low Income Weatherization- Tier 2                   | 1,054,375                   | 84                         | 72.81%        |
| Totals  | 5,341,624                   | 771                        |               |

2017 Income Qualified Energy Efficiency and Weatherization Assistance - NC Allocation

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR |
|---|-----------------------------|----------------------------|
| Low Income Neighborhood                             | 2,972,334                   | 483                        |
| Low Income Weatherization- Refrigerator Replacement | 139,430.19                  | 15.88                      |
| Low Income Weatherization- Tier 1                   | 9,728                       | 2                          |
| Low Income Weatherization- Tier 2                   | 767,677                     | 61                         |
| Totals  | 3,889,170                   | 561                        |

2018 Income Qualified Energy Efficiency and Weatherization Assistance

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR | NC Allocation |
|---|-----------------------------|----------------------------|---------------|
| Low Income Neighborhood                             | 5,394,663                   | 768                        | 0.7271305     |
| Low Income Weatherization- Refrigerator Replacement | 239,695                     | 27                         | 0.7271305     |
| Low Income Weatherization- Tier 1                   | 20,321                      | 3                          | 0.7271305     |
| Low Income Weatherization- Tier 2                   | 1,318,564                   | 105                        | 0.7271305     |
| Totals  | 6,973,243                   | 904                        |               |

2018 Income Qualified Energy Efficiency and Weatherization Assistance - NC Allocation

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR |
|---|-----------------------------|----------------------------|
| Low Income Neighborhood                             | 3,922,624.26                | 559                        |
| Low Income Weatherization- Refrigerator Replacement | 174,289.20                  | 19.85                      |
| Low Income Weatherization- Tier 1                   | 14,775.89                   | 2                          |
| Low Income Weatherization- Tier 2                   | 958,768.18                  | 76                         |
| Totals  | 5,070,458                   | 657                        |

2019 Income Qualified Energy Efficiency and Weatherization Assistance

2019 Income Qualified Energy Efficiency and Weatherization Assistance - NC Allocation

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR | NC Allocation |
|---|-----------------------------|----------------------------|---------------|
| Low Income Neighborhood                             | 7,014,628                   | 931                        | 0.7309039     |
| Low Income Weatherization- Refrigerator Replacement | 370,322                     | 42                         | 0.7309039     |
| Low Income Weatherization- Tier 1                   | 19,207                      | 3                          | 0.7309039     |
| Low Income Weatherization- Tier 2                   | 1,625,594                   | 129                        | 0.7309039     |
| Totals  | 9,029,752                   | 1,105                      |               |

2020 Income Qualified Energy Efficiency and Weatherization Assistance

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR | NC Allocation |
|---|-----------------------------|----------------------------|---------------|
| Low Income Weatherization- Refrigerator Replacement | 209,257                     | 24                         | 0.7271305     |
| Low Income Weatherization- Tier 1                   | 25,053                      | 4                          | 0.7271305     |
| Low Income Weatherization- Tier 2                   | 323,024                     | 26                         | 0.7271305     |
| Low Income Neighborhood                             | 3,688,658                   | 599                        | 0.7271305     |
| Totals  | 4,245,993                   | 653                        |               |

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR |
|---|-----------------------------|----------------------------|
| Low Income Neighborhood                             | 5,127,019.23                | 680                        |
| Low Income Weatherization- Refrigerator Replacement | 270,669.58                  | 30.83                      |
| Low Income Weatherization- Tier 1                   | 14,038.73                   | 2                          |
| Low Income Weatherization- Tier 2                   | 1,188,153.29                | 94                         |
| Totals  | 6,599,881                   | 808                        |

2020 Income Qualified Energy Efficiency and Weatherization Assistance - NC Allocation

| Name  | Annual kWh at Plant, Net FR | Annual kW at Plant, Net FR |
|---|-----------------------------|----------------------------|
| Low Income Weatherization- Refrigerator Replacement | 152,157.24                  | 17                         |
| Low Income Weatherization- Tier 1                   | 18,216.85                   | 3.07                       |
| Low Income Weatherization- Tier 2                   | 234,880.90                  | 18.68                      |
| Low Income Neighborhood                             | 2,682,135.85                | 435                        |
| Totals  | 3,087,391                   | 475                        |

2021 Income Qualified Energy Efficiency and Weatherization Assistance

| Name  | Annual Cumulative kWh w/losses Net Free | Annual Cumulative Summer Coincident kW w/losses Net Free | NC Allocation |
|---|---|--|---------------|
| Low Income Weatherization- Refrigerator Replacement | 310,722                                 | 35   | 73.09%        |
| Low Income Weatherization- Tier 1                   | 20,878                                  | 4  | 73.09%        |
| Low Income Weatherization- Tier 2                   | 1,261,442                               | 100  | 73.09%        |
| Low Income Neighborhood                             | 5,384,822                               | 714  | 73.09%        |
| NES Attic Insulation                                | 401,966                                 | 279  | 73.09%        |
| NES Air Sealing                                     | 535,489                                 | 265  | 73.09%        |
| NES Duct Sealing                                    | 805,792                                 | 261  | 73.09%        |
| NES Smart Thermostat                                | 446,373                                 | -  | 73.09%        |
| Totals  | 9,167,483                               | 1,658  |               |

2021 Income Qualified Energy Efficiency and Weatherization Assistance - NC Allocation

| Name  | Annual Cumulative kWh w/losses Net Free | Annual Cumulative Summer Coincident kW w/losses Net Free |
|---|---|--|
| Low Income Weatherization- Refrigerator Replacement | 227,107.61                              | 26   |
| Low Income Weatherization- Tier 1                   | 15,259.48                               | 3  |
| Low Income Weatherization- Tier 2                   | 921,993.03                              | 73   |
| Low Income Neighborhood                             | 3,935,787.54                            | 522  |
| NES Attic Insulation                                | 293,798.20                              | 204  |
| NES Air Sealing                                     | 391,390.88                              | 194  |
| NES Duct Sealing                                    | 588,956.57                              | 190  |
| NES Smart Thermostat                                | 326,256.11                              | -  |
| Totals  | 6,700,549                               | 1,212  |

2015 Income Qualified Energy Efficiency and Weatherization Assistance

| Meas # | Name                            | Lost Revenue<br>Earned in 2015 | Lost<br>Revenue<br>Earned in<br>2016 | Lost<br>Revenue<br>Earned<br>in 2017 | Lost<br>Revenue<br>Earned<br>in 2018 | Lost<br>Revenue<br>Earned in<br>2019 | Lost<br>Revenue<br>Earned in<br>2020 | Lost<br>Revenue<br>Earned in<br>2021 |
|--------|---------------------------------|--------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|        | Low Income Neighborhood         | 838,328                        | 1,485,950                            | #####                                | 586,930                              |                                      |                                      | -                                    |
|        | Low Income Weatherization- Ref  | 11,144                         | 48,953                               | 48,953                               | 28,556                               |                                      |                                      | -                                    |
|        | Low Income Weatherization- Tier | 5,722                          | 21,228                               | 21,228                               | 12,383                               |                                      |                                      | -                                    |
|        | Low Income Weatherization- Tier | 185,608                        | 714,794                              | 714,794                              | 416,963                              |                                      |                                      | -                                    |
|        | Totals                          | <u>1,040,801</u>               | <u>2,270,925</u>                     | <u>#####</u>                         | <u>#####</u>                         | <u>-</u>                             | <u>-</u>                             | <u>-</u>                             |

2016 Income Qualified Energy Efficiency and Weatherization Assistance

| Meas # | Name  | Lost Revenue<br>Earned in 2015 | Lost<br>Revenue<br>Earned in<br>2016 | Lost<br>Revenue<br>Earned<br>in 2017 | Lost<br>Revenue<br>Earned<br>in 2018 | Lost<br>Revenue<br>Earned in<br>2019 | Lost<br>Revenue<br>Earned in<br>2020 | Lost<br>Revenue<br>Earned in<br>2021 |
|--------|---|--------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|        | Low Income Neighborhood                             |                                | 64,859.37                            | 139,657                              | 80,897                               | -                                    |                                      | -                                    |
|        | Low Income Weatherization- Refrigerator Replacement |                                | 5,219.48                             | 10,574                               | 6,126                                | -                                    |                                      | -                                    |
|        | Low Income Weatherization- Tier 1                   |                                | 702.45                               | 1,413                                | 820                                  | -                                    |                                      | -                                    |
|        | Low Income Weatherization- Tier 2                   |                                | 44,718.37                            | 90,473                               | 52,387                               | -                                    |                                      | -                                    |
|        | Totals  | <u>-</u>                       | <u>#####</u>                         | <u>#####</u>                         | <u>#####</u>                         | <u>-</u>                             | <u>-</u>                             | <u>-</u>                             |

2017 Income Qualified Energy Efficiency and Weatherization Assistance

| Meas # | Name  | Lost Revenue<br>Earned in 2015 | Lost<br>Revenue<br>Earned in<br>2016 | Lost<br>Revenue<br>Earned<br>in 2017 | Lost<br>Revenue<br>Earned<br>in 2018 | Lost<br>Revenue<br>Earned in<br>2019 | Lost<br>Revenue<br>Earned in<br>2020 | Lost<br>Revenue<br>Earned in<br>2021 |
|--------|---|--------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|        | Low Income Neighborhood                             |                                |                                      | 102,129                              | 149,915                              | 97,191                               | 39,129                               | -                                    |
|        | Low Income Weatherization- Refrigerator Replacement |                                |                                      | 5,730                                | 9,136                                | 5,929                                | 2,748                                | -                                    |
|        | Low Income Weatherization- Tier 1                   |                                |                                      | 480                                  | 669                                  | 434                                  | 163                                  | -                                    |
|        | Low Income Weatherization- Tier 2                   |                                |                                      | 33,112                               | 50,891                               | 32,960                               | 13,591                               | -                                    |
|        | Totals  | <u>-</u>                       | <u>-</u>                             | <u>#####</u>                         | <u>#####</u>                         | <u>136,514</u>                       | <u>55,631</u>                        | <u>-</u>                             |

2018 Income Qualified Energy Efficiency and Weatherization Assistance

| Meas # | Name  | Lost Revenue<br>Earned in 2015 | Lost<br>Revenue<br>Earned in<br>2016 | Lost<br>Revenue<br>Earned<br>in 2017 | Lost<br>Revenue<br>Earned<br>in 2018 | Lost<br>Revenue<br>Earned in<br>2019 | Lost<br>Revenue<br>Earned in<br>2020 | Lost<br>Revenue<br>Earned in<br>2021 |
|--------|---|--------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|        | Low Income Neighborhood                             |                                |                                      |                                      | 106,351                              | 251,976                              | 147,598                              |                                      |
|        | Low Income Weatherization- Refrigerator Replacement |                                |                                      |                                      | 6,603                                | 14,871                               | 8,711                                |                                      |
|        | Low Income Weatherization- Tier 1                   |                                |                                      |                                      | 616                                  | 1,234                                | 723                                  |                                      |
|        | Low Income Weatherization- Tier 2                   |                                |                                      |                                      | 42,664                               | 78,410                               | 45,930                               |                                      |
|        | Totals  | <u>-</u>                       | <u>-</u>                             | <u>-</u>                             | <u>#####</u>                         | <u>346,490</u>                       | <u>202,961</u>                       | <u>-</u>                             |

2019 Income Qualified Energy Efficiency and Weatherization Assistance

| Meas # | Name  | Lost Revenue<br>Earned in 2015 | Lost<br>Revenue<br>Earned in<br>2016 | Lost<br>Revenue<br>Earned<br>in 2017 | Lost<br>Revenue<br>Earned<br>in 2018 | Lost<br>Revenue<br>Earned in<br>2019 | Lost<br>Revenue<br>Earned in<br>2020 | Lost<br>Revenue<br>Earned in<br>2021 |
|--------|---|--------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|        | Low Income Neighborhood                             |                                |                                      |                                      |                                      | 163,281                              | 228,242                              | 126,121                              |
|        | Low Income Weatherization- Refrigerator Replacement |                                |                                      |                                      |                                      | 10,363                               | 13,861                               | 8,584                                |
|        | Low Income Weatherization- Tier 1                   |                                |                                      |                                      |                                      | 624                                  | 971                                  | 601                                  |
|        | Low Income Weatherization- Tier 2                   |                                |                                      |                                      |                                      | 51,565                               | 78,069                               | 48,345                               |
|        | Totals  | -                              | -                                    | -                                    | -                                    | 225,833                              | 321,143                              | 183,651                              |

2020 Income Qualified Energy Efficiency and Weatherization Assistance

| Meas # | Name  | Lost Revenue<br>Earned in 2015 | Lost<br>Revenue<br>Earned in<br>2016 | Lost<br>Revenue<br>Earned<br>in 2017 | Lost<br>Revenue<br>Earned<br>in 2018 | Lost<br>Revenue<br>Earned in<br>2019 | Lost<br>Revenue<br>Earned in<br>2020 | Lost<br>Revenue<br>Earned in<br>2021 |
|--------|---|--------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|        | Low Income Weatherization- Refrigerator Replacement |                                |                                      |                                      |                                      |                                      | 6,429                                | 12,168                               |
|        | Low Income Weatherization- Tier 1                   |                                |                                      |                                      |                                      |                                      | 753                                  | 1,425                                |
|        | Low Income Weatherization- Tier 2                   |                                |                                      |                                      |                                      |                                      | 6,892                                | 13,044                               |
|        | Low Income Neighborhood                             |                                |                                      |                                      |                                      |                                      | 89,461                               | 335,758                              |
|        | Totals  | -                              | -                                    | -                                    | -                                    | -                                    | 103,534                              | 362,395                              |

2021 Income Qualified Energy Efficiency and Weatherization Assistance

| Meas # | Name  | Lost Revenue<br>Earned in 2015 | Lost<br>Revenue<br>Earned in<br>2016 | Lost<br>Revenue<br>Earned<br>in 2017 | Lost<br>Revenue<br>Earned<br>in 2018 | Lost<br>Revenue<br>Earned in<br>2019 | Lost<br>Revenue<br>Earned in<br>2020 | Lost<br>Revenue<br>Earned in<br>2021 |
|--------|---|--------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|        | Low Income Weatherization- Refrigerator Replacement |                                |                                      |                                      |                                      |                                      |                                      | \$ -                                 |
|        | Low Income Weatherization- Tier 1                   |                                |                                      |                                      |                                      |                                      |                                      | \$ 675                               |
|        | Low Income Weatherization- Tier 2                   |                                |                                      |                                      |                                      |                                      |                                      | \$ 41,232                            |
|        | Low Income Neighborhood                             |                                |                                      |                                      |                                      |                                      |                                      | #####                                |
|        | NES Attic Insulation                                |                                |                                      |                                      |                                      |                                      |                                      | \$ 9,158                             |
|        | NES Air Sealing                                     |                                |                                      |                                      |                                      |                                      |                                      | \$ 12,199                            |
|        | NES Duct Sealing                                    |                                |                                      |                                      |                                      |                                      |                                      | \$ 18,357                            |
|        | NES Smart Thermostat                                |                                |                                      |                                      |                                      |                                      |                                      | \$ 10,210                            |
|        | Totals  | -                              | -                                    | -                                    | -                                    | -                                    | -                                    | 216,311                              |



# Portfolio Level Opportunities & Challenges Summary Report

January  
2019

In addition to a continued focus on individual program opportunities, Collaborative stakeholders decided in January 2019 to select two priority focus areas for the year:

- Finding ways to increase savings impact for low-income customers
- Assessing Portfolio Level Opportunities and Challenges

The choice to focus on Portfolio Level Opportunities and Challenges was driven by a desire to establish a common understanding among Collaborative participants around the cross-cutting factors that could impact the potential for expanding energy efficiency savings through individual programs. It also provided a way to identify the broader dynamics that would impact **total** energy efficiency savings in the years to come. The opportunities and challenges outlined below provide valuable context and help hone our attention on areas for future work together in the Collaborative for 2020 and beyond.

## Primary Objective

Through regular convenings of utility staff, energy efficiency advocates and other key stakeholders, the Collaborative strives to facilitate Duke's ability to increase total savings from its energy efficiency and demand response program portfolios and to expand the number and types of customers participating in the company's EE/DSM programs.

Successful engagement requires a two-way flow of information to bring information to Duke from the Collaborative and to the Collaborative from Duke.

## The 1% Savings Target

The 1% savings target originated with a Settlement Agreement between the Environmental Defense Fund, South Carolina Coastal Conservation League and Duke Energy on December 8<sup>th</sup>, 2011 as part of the Duke / Progress merger.

- An annual savings target of one percent (1%) of the previous year's retail electricity sales beginning in 2015; and
- A cumulative savings target of seven percent (7%) of retail electricity sales over the five-year time period of 2014-2018
- Compliance subject to existing NCUC and SCPSC EE program approval process using standard cost-effectiveness tests
- Savings verified by rigorous EM&V

Duke Energy Carolinas reached the 1% target in 2017 and 2018. Duke Energy Progress has come close with 0.94 in 2015, though, savings in subsequent years were lower.

Advocates continue to support efforts to reach or surpass the 1% target year after year. As documented in its annual DSM/EE Recovery Rider filings, Duke has shown that its energy efficiency programs deliver substantial financial benefit to customers, and advocates want to maximize this benefit while also

achieving other organizational priorities related to environment and equity. The 1% savings target serves as a guide for identifying additional savings potential and tracking performance drivers, which was a key factor in the Collaborative prioritizing an examination of Portfolio Level Opportunities and Challenges in 2019. Advocates believe that the reference achievements of other jurisdictions—in some cases 2% of retail sales or greater—are another strong indication that 1% savings is achievable in the Carolinas, even given differences in climate, energy costs, and EM&V practices.

Duke currently seeks to achieve the largest amount of cost-effective savings with the least effect on customer rates. This approach is evident in Duke's preference for incentives and administrative costs to be as low as possible without jeopardizing program performance, and for programs to exceed 1.0 UCT scores by a wide margin. Additionally, regulators have been supportive of programs that are as cost effective as possible.

Advocates, while appreciative of Duke's focus, believe that increasing participation and savings may justify increased program expenditures, even if the cost effectiveness score margin declines somewhat and rate impacts are somewhat greater. Advocates acknowledge the need for programs to be cost-effective, and support inclusion of all avoided utility costs and appropriate consideration of a more comprehensive range of customer and social benefits in cost-effectiveness calculations.

Often, utility performance or Energy Efficiency Resources Standards ("EERS") targets set by other states are used as reference points for savings potential. Duke asserts that those comparisons are often misleading and are not an accurate benchmark given wide variations in how savings attribution is determined in different jurisdictions. Duke believes that choosing 1% as the savings target is arbitrary unless it is based on a utility-specific market potential study.<sup>1</sup> Although DEC has achieved 1% of savings in the past, Duke is uncertain that it will be able to achieve similar savings in the future for the following reasons:

- Federal lighting standards impacts are significant and unknown
- Falling avoided costs may undermine cost effectiveness and limit the programs Duke can offer
- EM&V rigor holds Duke to a higher standard than neighboring utilities
- Incremental savings erosion from increasing appliance standards and market saturation drives up costs and drives down net savings
- Increasing numbers of opt out customers fueled by the snowball effect of more savings driving higher rates and additional opt outs

Many members of the Collaborative noted that the 1% benchmark does not reflect the full range of benefits that can be pursued through demand side management, nor does it ensure that different customer segments are receiving those benefits equitably. For instance, the 1% target does not capture the benefits of demand response programs and does not distinguish from what sectors the savings are

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<sup>1</sup> Market potentials studies, while a valuable source of information, are inherently conservative and typically do not represent the upper limit of what is cost effectively possible to achieve.

achieved, nor does it adjust for customers who are ineligible to participate based on their opted-out status.

These considerations prompted the Collaborative to ask whether there are additional metrics that warrant attention for assessing Duke's performance, such as:

- Lifecycle savings targets that give the utility credit for a measure's lifetime savings for every year in which the savings occur, rather than only recognizing the first year savings in the year the measure is installed.
- Cumulative savings where a target is set over several years and the incremental savings accumulate year over year.
- Capacity savings targets that recognize the beneficial effects of demand response and efficiency programs that shift load to periods of lower demand.
- Customer-related targets that set specific goals to encourage efforts to increase savings among historically underserved demographics.
- Growth-related targets focus on proactively capturing savings from new load and new customers coming onto the system.

### Pressure on savings:

A number of issues outside the influence of the Collaborative in its advisory forum role have a direct or indirect effect on the Company's ability to achieve energy savings through regulated customer programs. There are numerous factors listed below that are expected to put downward pressure on savings, while others will likely lead to increased savings opportunities. Some will have effects that are uncertain at this time.

- Market Dynamics Limiting Utility Efficiency Savings:
  - Natural adoption of efficiency without utility participation is increasing
  - Cost per unit of savings has been increasing (though new technologies have the potential to change this)
  - More stringent federal standards reduce the incremental savings that can be attributed to utility efficiency programs
  - Increasing socket saturation for standard screw-base LED bulbs
  - Lower contractor capacity in some regions
  - Falling avoided costs
- Market Dynamics Supporting Increased Utility Efficiency Savings:
  - Emerging technologies, such as:
    - Advanced Metering Infrastructure and Wi-fi thermostats
    - Smart appliances
    - Smart phone applications
    - Heat pump water heaters

- Minisplits
  - Induction cooktop stoves
  - Grid modernization that allows for geographically targeted efficiency deployment
  - Electrification opportunities and growth of the utility customer base (in some areas)
  - Aging housing stock
  - Increasing attention to winter demand peaks
  - Opportunities to improve contractor/vendor education and implementation standards or practices.
- Availability of New and Diverse Delivery Channels
  - Midstream and upstream opportunities
  - Real-time communication with customers
  - Customer access to data
  - Customer segmentation and targeting
  - Vendor innovation (eg. residential savings guarantees)
- Related State Policy and Regulatory Matters
  - Commercial and industrial customer opt out statutes
  - Potential changes in cost effectiveness testing
  - Inclusion of Non-Energy Benefits
  - Increasing building codes
  - Expansion of and coordination with gas industry energy efficiency programs
  - Gas industry opposition to fuel switching
  - Utility performance incentive mechanism constraints
  - Current lack of low income utility performance incentive and defined low-income cost effectiveness expectations
  - Integrated Resource Planning requirements (energy efficiency as a resource, etc.)
  - Executive Order 80 (reducing energy and water in gov't buildings, decarbonization, electric transportation)
  - Renewable Energy Portfolio Standard and associated energy efficiency targets
  - Establishing or coordinating with energy efficiency financing opportunities

## Portfolio-level Program Issues

Many members of the Collaborative consider 1% achievable if the Company adds new programs or improves and expands existing ones.

Some members suggest that the Collaborative should assist Duke in tackling the following program-related tasks:

- Find new delivery channels through improved marketing (midstream incentives, bulk replacement, community based nonprofit organizations, etc.)
- Find new sources of funding to leverage (WAP, LIHTC, REAP, Green Bank, PACE, etc.)
- Design programs around new technologies (remote monitoring, etc.)
- Design program(s) that leverage existing expertise by providing leads to contractors that perform EE projects (midstream labor)
- Expand trade ally engagement and minimize barriers to participation
- Provide insights from other utilities which have stronger adoption of measures which underperform in Duke's programs
- Build on existing Duke programs that have been successful
- Investigate ways to incorporate energy code compliance training into EE programming (new construction and existing for both residential and non-residential)
- Expand the reach and impact of Low- and Moderate Income programs
- Avoid lost opportunities in new homes, businesses and communities by developing growth-related initiatives
- Provide offerings that address the needs of small and medium-size commercial customers

Duke currently has a full-time staff of marketing professionals and a team of employees dedicated to new product development. The managers of existing programs are motivated to improve and expand their programs whenever they see opportunities to do so.

Duke proposes that the best contributions for the Collaborative to make are the following:

- Bring the company details about programs Duke does not have but that other utilities are running successfully
- Represent the interests of the constituencies each member's organization serves to eliminate the likelihood that Duke's programs will leave any customers out
- Express support before the state commissions for the Company's efforts to expand and improve programs
- Promote Duke's programs outside the Collaborative

## Areas of Focus for 2020

The following program ideas have emerged as potential areas of focus for 2020:

- DEC Residential New Construction
- DEP Income Qualified Weatherization

- Energy Star Retail Products Platform
- Mobile/manufactured home programs
- Code Compliance Credit justification
- Leveraging savings from Advanced Metering Infrastructure
- Expanded midstream products, such as residential HVAC
- Leveraging alternative funding opportunities such as the Rural Energy for America Program
- Seeking new program opportunities to increase low income savings impact (including continued support for LIHTC developers)
- Explore expanded low-income program coordination with SC WAP.





## Duke Energy Carolinas Collaborative Meeting

March 19, 2020



## Meeting Agenda

- Safety
- Regulatory Update
- Market Potential Study Update
- Residential Program Updates
- ISOP Planning
- Lunch
- Nonresidential Program Updates
- New Program Ideas
- Wrap Up and Scheduling



## Safety

### Meeting Safety

- What to do in case of Evacuation
- What to do in case of Emergency

### Cold and Flu Safety Tips

- Avoid close contact with people who are sick.
- Avoid touching your eyes, nose, and mouth.
- Stay home when you are sick.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash.
- Clean and disinfect frequently touched objects and surfaces
- Wash your hands often with soap and water for at least 20 seconds, especially after going to the bathroom; before eating; and after blowing your nose, coughing, or sneezing.

### 9 in 10 employees come to work sick, survey shows

Among the 28 U.S. cities in the study, **Charlotte**, Miami (96 percent each), Austin, Chicago, and Cincinnati (93 percent each) had the most employees who show up while feeling ill.



## Regulatory Update

### North Carolina

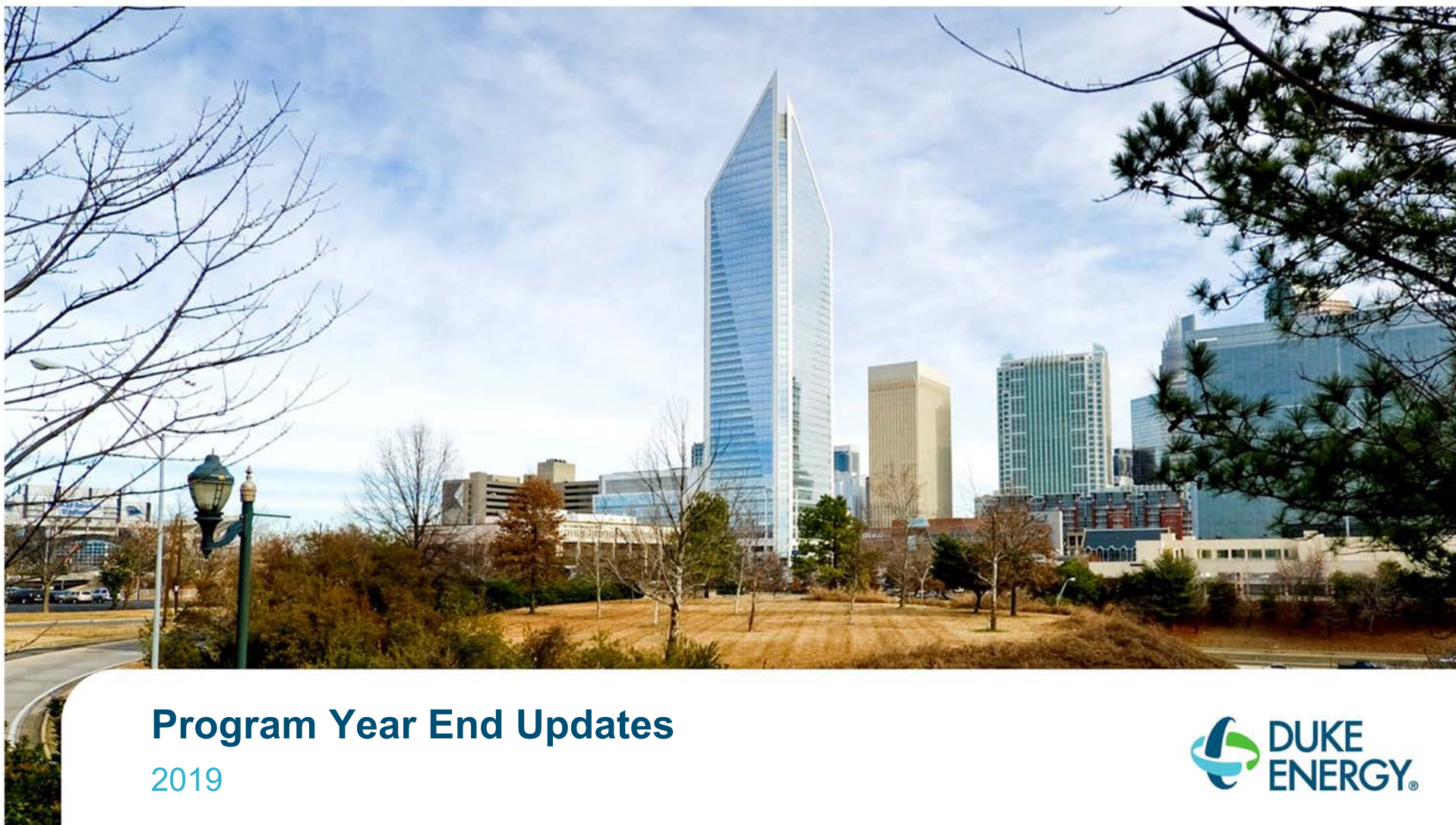
- DEC Filing February 25, 2019, E-7 sub 1230

### South Carolina

- DEC Filing March 2, 2019, 2020-83-E

- Program filings:

- Residential New Construction – negotiations ongoing post-technical conference
- Program modifications (NES 2.0, Home Energy House Call, DRA)
- New Mechanism
  - Comments filed, awaiting NCUC action
  - Moving discussion to SC



## Program Year End Updates

2019



## Portfolio Summary : DEC

### 2019 Portfolio Summary

| Demand (MW) Actual | Energy (MWh) | Actual Expenditures | Performance Incentives | Total Annual Energy Sales | % of Energy Sales | UCT Score | TRC Score |
|--------------------|--------------|---------------------|------------------------|---------------------------|-------------------|-----------|-----------|
| 1,103.00           | 844,287      | \$150,420,388       | \$33,457,516           | 49,620,203                | 2%                | 2.91      | 2.69      |

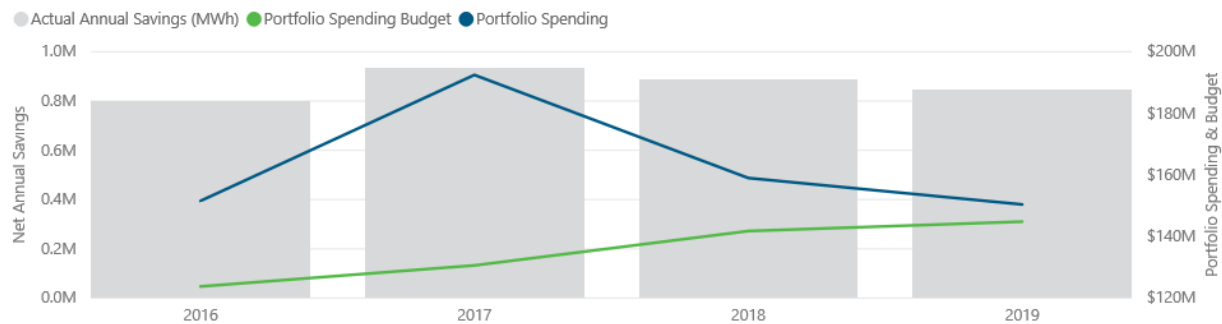
### Company Statistics

#### Prior Year & YTD Revenues & Expenditures

| Program Year | Total Revenue (\$MM) | Budget           |              | Actual             |              |
|--------------|----------------------|------------------|--------------|--------------------|--------------|
|              |                      | Portfolio Budget | % of Revenue | Portfolio Spending | % of Revenue |
| 2016         | \$7,322              | \$123,781,349    | 1.7%         | \$151,574,107      | 2.1%         |
| 2017         | \$7,302              | \$130,617,734    | 1.8%         | \$192,488,915      | 2.6%         |
| 2018         | \$7,300              | \$141,778,571    | 1.9%         | \$159,005,671      | 2.2%         |
| 2019         | \$7,395              | \$144,837,499    | 2.0%         | \$150,420,388      | 2.0%         |

#### Energy

| Program Year | Prior Yr Annual Energy Sales (Net of Opt-Out) | Budget             |                   | Actual             |                   |
|--------------|---|--------------------|-------------------|--------------------|-------------------|
|              |   | Net Annual Savings | % of Energy Sales | Net Annual Savings | % of Energy Sales |
| 2016         | 54,596,302                                    | 591,015            | 1.1%              | 801,779            | 1.5%              |
| 2017         | 54,309,422                                    | 608,070            | 1.1%              | 934,676            | 1.7%              |
| 2018         | 51,467,402                                    | 816,508            | 1.6%              | 887,162            | 1.7%              |
| 2019         | 49,620,203                                    | 781,394            | 1.6%              | 844,287            | 1.7%              |



#### Note:

Actual Annual Savings Portfolio Spending & Total Revenue reflect Year-to-date values

## Portfolio Summary : DEP

### 2019 Portfolio Summary

| Demand<br>(MW) Actual | Energy<br>(MWh) | Actual<br>Expenditures | Performance<br>Incentives | Total Annual<br>Energy Sales | % of Energy<br>Sales | UCT Score | TRC Score |
|-----------------------|-----------------|------------------------|---------------------------|------------------------------|----------------------|-----------|-----------|
| 133.57                | 366,018         | \$87,400,540           | \$15,017,088              | 28,182,233                   | 1%                   | 2.40      | 2.32      |

### Company Statistics

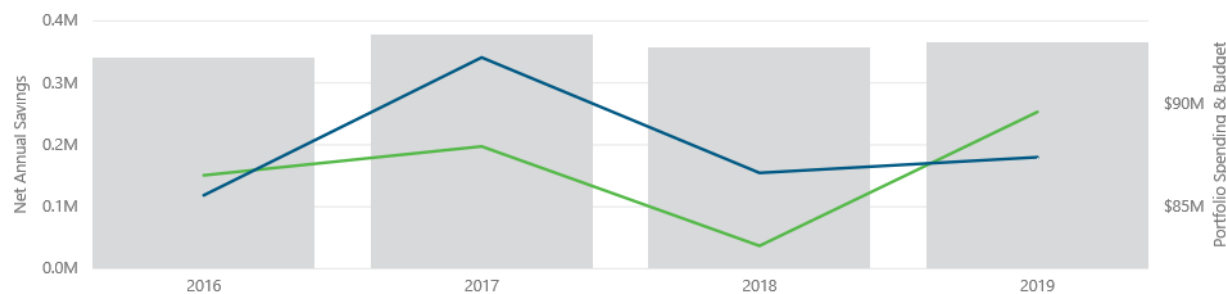
#### Prior Year & YTD Revenues & Expenditures

| Program<br>Year | Total Revenue<br>(\$MM) | Budget              |                 | Actual                |                 |
|-----------------|-------------------------|---------------------|-----------------|-----------------------|-----------------|
|                 |                         | Portfolio<br>Budget | % of<br>Revenue | Portfolio<br>Spending | % of<br>Revenue |
| 2016            | \$5,277                 | \$86,525,157        | 1.6%            | \$85,558,746          | 1.6%            |
| 2017            | \$5,129                 | \$87,923,780        | 1.7%            | \$92,232,546          | 1.8%            |
| 2018            | \$5,699                 | \$83,107,282        | 1.5%            | \$86,641,573          | 1.5%            |
| 2019            | \$5,957                 | \$89,592,768        | 1.5%            | \$87,400,540          | 1.5%            |

#### Energy

| Program<br>Year | Prior Yr Annual<br>Energy Sales (Net of<br>Opt-Out) | Budget                |                      | Actual                |                      |
|-----------------|---|-----------------------|----------------------|-----------------------|----------------------|
|                 |   | Net Annual<br>Savings | % of Energy<br>Sales | Net Annual<br>Savings | % of Energy<br>Sales |
| 2016            | 31,454,848  | 351,831               | 1.1%                 | 339,918               | 1.1%                 |
| 2017            | 30,908,887  | 350,851               | 1.1%                 | 378,262               | 1.2%                 |
| 2018            | 29,943,275  | 324,305               | 1.1%                 | 356,587               | 1.2%                 |
| 2019            | 28,182,233  | 341,047               | 1.2%                 | 366,018               | 1.3%                 |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



Note:

Actual Annual Savings Portfolio Spending  
& Total Revenue reflect Year-to-date values

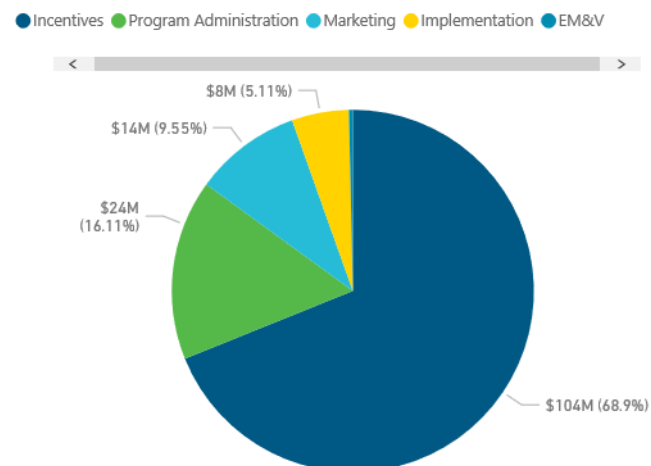
## DEC Portfolio Support

2019 EE Portfolio Expenditures by Program

| Program  | Program Type        | Actual Costs         | Budget Costs         | %           |
|--|---------------------|----------------------|----------------------|-------------|
| Energy Assessments   | Residential-EE      | \$3,186,888          | \$2,987,118          | 107%        |
| Energy Efficiency Education  | Residential-EE      | \$1,684,083          | \$2,104,087          | 80%         |
| Energy Efficient Appliances and Devices                            | Residential-EE      | \$41,380,987         | \$21,726,700         | 190%        |
| HVAC Energy Efficiency   | Residential-EE      | \$7,400,669          | \$4,802,289          | 154%        |
| Income Qualified Energy Efficiency and Weatherization Assistance   | Residential-EE      | \$7,342,133          | \$7,905,880          | 93%         |
| Multi-Family Energy Efficiency                                     | Residential-EE      | \$3,680,155          | \$3,382,816          | 109%        |
| My Home Energy Report  | Residential-EE      | \$10,555,159         | \$13,406,971         | 79%         |
| PowerManager   | Residential-DSM     | \$13,383,639         | \$14,055,575         | 95%         |
| Non Residential Energy Efficient ITEE                              | Non-Residential-EE  | \$44,323             | \$749,325            | 6%          |
| Non Residential Energy Efficient Process Equipment Products        | Non-Residential-EE  | \$119,811            | \$240,281            | 50%         |
| Non Residential Energy Efficient Pumps and Drives Products         | Non-Residential-EE  | \$189,123            | \$1,165,434          | 16%         |
| Non Residential Smart Saver Custom                                 | Non-Residential-EE  | \$8,871,440          | \$10,095,189         | 88%         |
| Non Residential Smart Saver Custom Technical Assessments           | Non-Residential-EE  | \$295,925            | \$1,618,240          | 18%         |
| Non Residential Smart Saver Energy Efficient Food Service Products | Non-Residential-EE  | \$339,904            | \$2,010,534          | 17%         |
| Non Residential Smart Saver Energy Efficient HVAC Products         | Non-Residential-EE  | \$2,207,760          | \$5,762,803          | 38%         |
| Non Residential Smart Saver Energy Efficient Lighting Products     | Non-Residential-EE  | \$20,829,118         | \$17,828,618         | 117%        |
| Non Residential Smart Saver Performance Incentive                  | Non-Residential-EE  | \$784,949            | \$3,162,160          | 25%         |
| Small Business Energy Saver  | Non-Residential-EE  | \$11,418,264         | \$14,602,066         | 78%         |
| EnergyWise for Business  | Non-Residential-DSM | \$3,686,451          | \$3,967,504          | 93%         |
| PowerShare   | Non-Residential-DSM | \$13,019,606         | \$13,263,911         | 98%         |
| <b>Total</b>   |                     | <b>\$150,420,388</b> | <b>\$144,837,499</b> | <b>104%</b> |

2019 EE Portfolio Expenditure Summary by Cost Type

| Cost Category          | % of Total     | Budget Costs         | Actual Costs         | % of Total     |
|------------------------|----------------|----------------------|----------------------|----------------|
| EM&V                   | 0.67%          | \$977,000            | \$512,097            | 0.34%          |
| Implementation         | 5.60%          | \$8,104,227          | \$7,679,277          | 5.11%          |
| Incentives             | 61.33%         | \$88,824,951         | \$103,632,631        | 68.90%         |
| Marketing              | 13.46%         | \$19,496,106         | \$14,361,529         | 9.55%          |
| Program Administration | 18.94%         | \$27,435,216         | \$24,234,855         | 16.11%         |
| <b>Total</b>           | <b>100.00%</b> | <b>\$144,837,499</b> | <b>\$150,420,388</b> | <b>100.00%</b> |





## DEP Portfolio Support

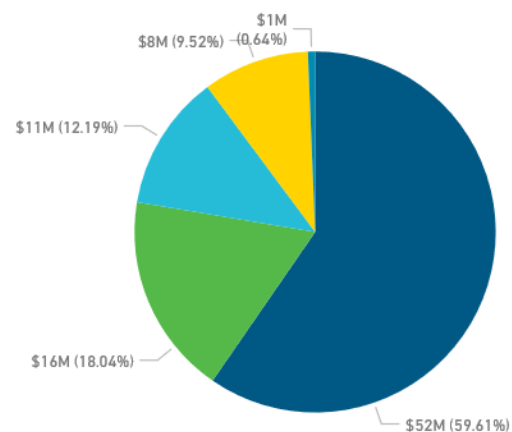
2019 EE Portfolio Expenditures by Program

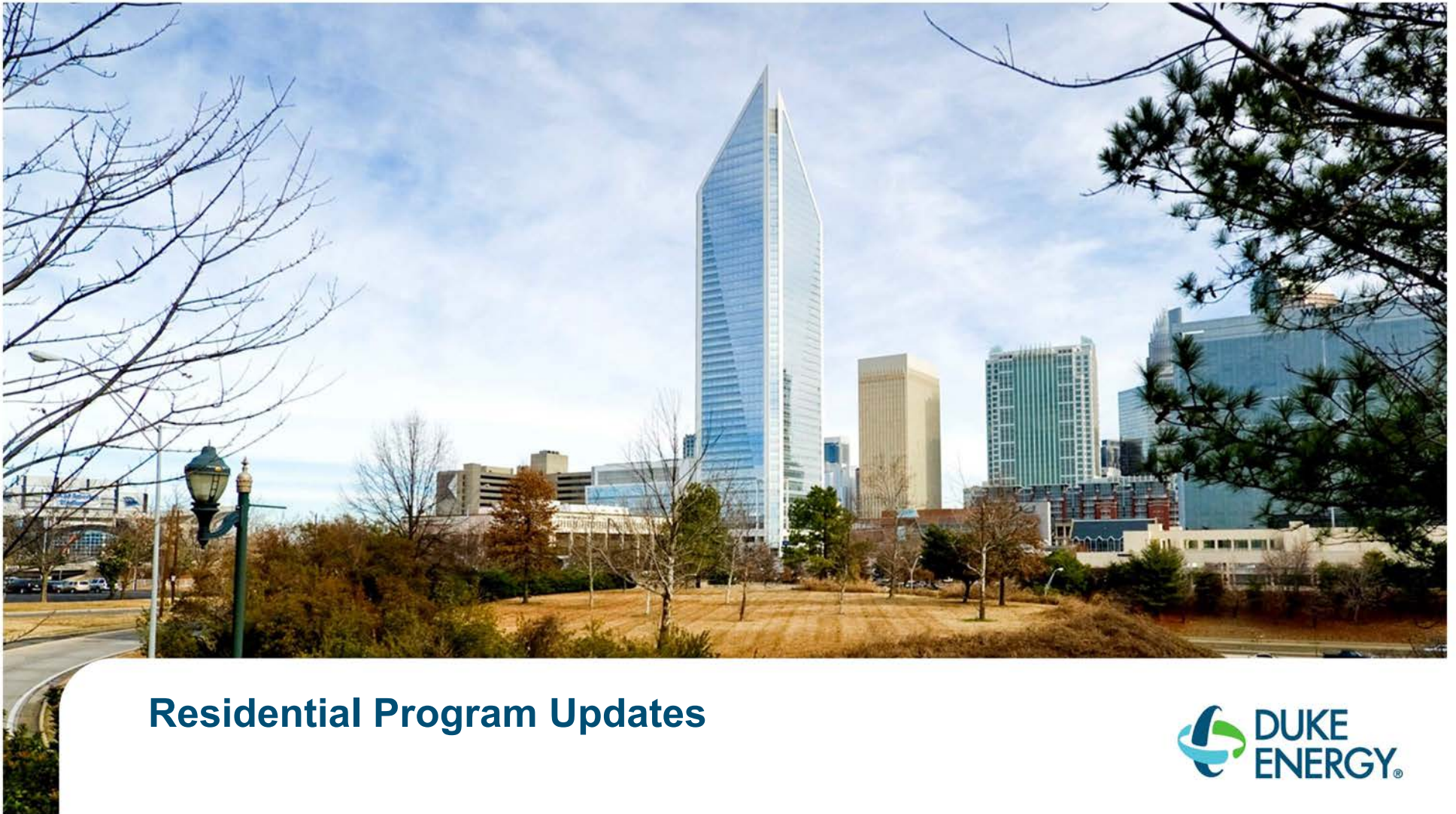
| Program  | Program Type        | Actual Costs        | Budget Costs        | %          |
|--|---------------------|---------------------|---------------------|------------|
| Appliances and Devices                                 | Residential-EE      | \$1,226,733         | \$1,527,511         | 80%        |
| Energy Education Program for Schools                   | Residential-EE      | \$745,829           | \$753,793           | 99%        |
| Energy Efficient Lighting                              | Residential-EE      | \$14,346,463        | \$13,209,118        | 109%       |
| Low Income Weatherization Pilot                        | Residential-EE      | \$27,295            | \$0                 | 0%         |
| Multi-Family   | Residential-EE      | \$2,151,724         | \$2,738,339         | 79%        |
| My Home Energy Report                                  | Residential-EE      | \$6,746,551         | \$7,994,059         | 84%        |
| Neighborhood Energy Saver                              | Residential-EE      | \$1,667,723         | \$2,028,200         | 82%        |
| Residential Energy Assessments                         | Residential-EE      | \$2,109,106         | \$1,138,481         | 185%       |
| Residential New Construction                           | Residential-EE      | \$15,080,405        | \$12,691,351        | 119%       |
| Residential SmartSaver                                 | Residential-EE      | \$6,397,527         | \$3,985,069         | 161%       |
| EnergyWise   | Residential-DSM     | \$14,537,464        | \$14,086,536        | 103%       |
| Non-Residential SmartSaver Custom                      | Non-Residential-EE  | \$2,769,305         | \$2,719,960         | 102%       |
| Non-Residential SmartSaver Performance                 | Non-Residential-EE  | \$269,460           | \$845,910           | 32%        |
| Non-Residential SmartSaver Prescriptive                | Non-Residential-EE  | \$7,948,870         | \$11,408,405        | 70%        |
| Small Business Energy Saver                            | Non-Residential-EE  | \$7,346,426         | \$9,294,966         | 79%        |
| Commercial, Industrial, & Governmental Demand Response | Non-Residential-DSM | \$1,647,027         | \$2,694,260         | 61%        |
| EnergyWise for Business                                | Non-Residential-DSM | \$2,382,632         | \$2,476,808         | 96%        |
| <b>Total</b>   |                     | <b>\$87,400,540</b> | <b>\$89,592,768</b> | <b>98%</b> |

2019 EE Portfolio Expenditure Summary by Cost Type

| Cost Category          | % of Total     | Budget Costs        | Actual Costs        | % of Total     |
|------------------------|----------------|---------------------|---------------------|----------------|
| EM&V                   | 1.37%          | \$1,225,000         | \$560,428           | 0.64%          |
| Implementation         | 7.34%          | \$6,573,038         | \$8,324,514         | 9.52%          |
| Incentives             | 56.31%         | \$50,453,958        | \$52,098,767        | 59.61%         |
| Marketing              | 13.34%         | \$11,953,585        | \$10,652,278        | 12.19%         |
| Program Administration | 21.64%         | \$19,387,187        | \$15,764,554        | 18.04%         |
| <b>Total</b>           | <b>100.00%</b> | <b>\$89,592,768</b> | <b>\$87,400,540</b> | <b>100.00%</b> |

● Incentives ● Program Administration ● Marketing ● Implementation ● EM&V





## Residential Program Updates





# Income-Qualified Programs

## Neighborhood Energy Savers

Income Qualified Energy Efficiency and Weatherization Assistance<sup>1</sup>

| <i><u>\$ in millions, rounded</u></i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|---------------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost                   | \$1.5                    | \$3.6                                 | 239%           |
| Program Cost                          | \$7.9                    | \$7.3                                 | 93%            |
| MW                                    | 0.6                      | 1.1                                   | 173%           |
| MWH                                   | 4,043.4                  | 9,029.8                               | 223%           |
| Units                                 | 10,114                   | 10,814                                | 107%           |

1) Values are reflected at the system level.

| 2019 YTD Results      | Annual<br>Forecast | Actual at<br>12/31/2019 | Variation |
|-----------------------|--------------------|-------------------------|-----------|
| Savings (MWH)         | 2,135              | 3,829                   | 1,694     |
| Savings (MW)          | 0.33               | 0.52                    | 0.19      |
| Participants          |                    | 5,825                   |           |
| 2019 Program Expenses |                    | \$1,695,018             |           |

## Neighborhood Energy Savers

- Served the communities in the following towns:
  - Bessemer City, Burlington, Charlotte, Durham, Greensboro, Hickory, Kannapolis, Winston-Salem, Spring Lake, Dunn, Rockingham
  - Greenville, Kershaw, Spartanburg, Manning, Florence

| NES    | Goal  | Actual |
|--------|-------|--------|
| DEC NC | 6,516 | 6,625  |
| DEC SC | 2,410 | 3,193  |
| DEP NC | 3,825 | 2,722  |
| DEP SC | 675   | 1,795  |

## Weatherization and Equipment Replacement, Refrigerator Replacement

- working with the NC and SC Weatherization Agencies to deliver this program
- 736 homes received weatherization in conjunction with the DOE weatherization program, with 292 refrigerators replaced, 69 Tier 1 services provided and 667 Tier 2 services provided

| Weatherization           | Goal | Actual |
|--------------------------|------|--------|
| DEC NC                   | 880  | 736    |
| DEC SC                   | 60   | 16     |
|                          |      |        |
| Refrigerator Replacement |      |        |
| DEC NC                   | 150  | 222    |
| DEC SC                   | 15   | 70     |

| Combined                 |          |                 |
|--------------------------|----------|-----------------|
| DEC Wx - Project Type    | Projects | Total Paid      |
| Refrigerator Replacement | 190      | \$ 158,940.83   |
| Weatherization Tier 1    | 70       | \$ 39,428.03    |
| Weatherization Tier 2    | 353      | \$ 910,446.96   |
| HVAC Replacment          | 238      | \$ 1,404,793.47 |
| Total                    | 851      | \$ 2,513,609.29 |

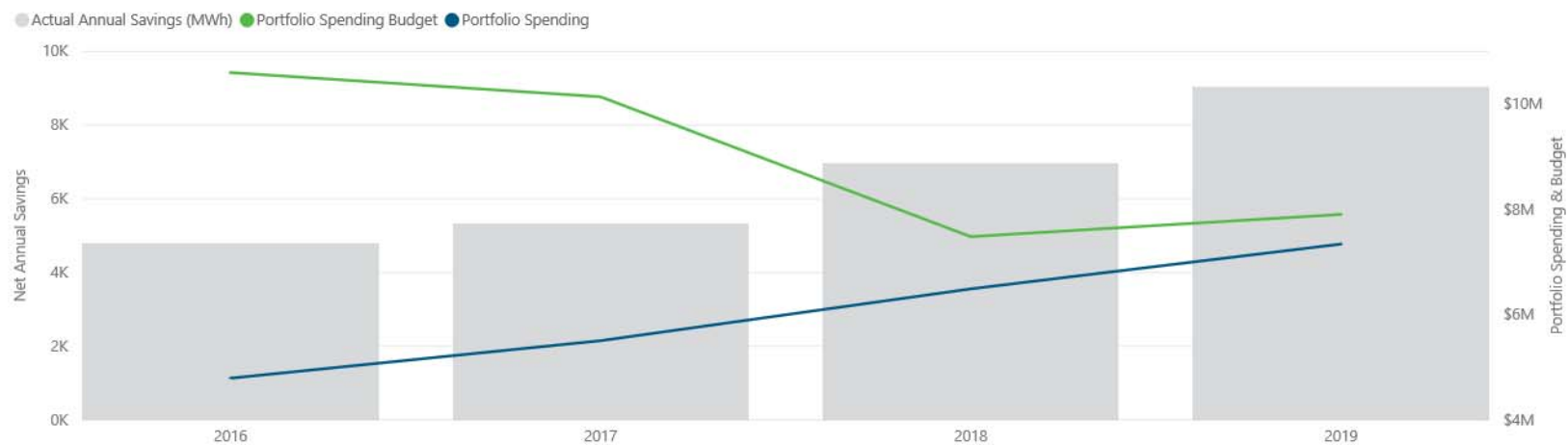
| NC                       |          |                 |
|--------------------------|----------|-----------------|
| DEC Wx - Project Type    | Projects | Total Paid      |
| Refrigerator Replacement | 120      | \$ 104,706.00   |
| Weatherization Tier 1    | 70       | \$ 39,428.03    |
| Weatherization Tier 2    | 353      | \$ 910,446.96   |
| HVAC Replacment          | 222      | \$ 1,316,592.01 |
| Total                    | 765      | \$ 2,371,173.00 |

| SC                       |          |               |
|--------------------------|----------|---------------|
| DEC Wx - Project Type    | Projects | Total Paid    |
| Refrigerator Replacement | 70       | \$ 54,234.83  |
| Weatherization Tier 1    |          |               |
| Weatherization Tier 2    |          |               |
| HVAC Replacment          | 16       | \$ 88,201.46  |
| Total                    | 86       | \$ 142,436.29 |

## DEC NES and Weatherization

Income Qualified Energy Efficiency and Weatherization Assistance Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |     | Energy Savings |        |      | Demand Savings |        |      | Participants |        |      |
|--------------|--------------|-------------|-----|----------------|--------|------|----------------|--------|------|--------------|--------|------|
|              | Budget       | Actual      | %   | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual | %    |
| 2017         | \$10,141,446 | \$5,505,992 | 54% | 5,310          | 5,342  | 101% | 1.05           | 0.77   | 74%  | 10,538       | 11,726 | 111% |
| 2019         | \$7,905,880  | \$7,342,133 | 93% | 4,043          | 9,030  | 223% | 0.64           | 1.11   | 173% | 10,114       | 10,814 | 107% |
| 2018         | \$7,483,328  | \$6,490,735 | 87% | 5,287          | 6,973  | 132% | 0.82           | 0.90   | 110% | 10,426       | 10,681 | 102% |
| 2016         | \$10,601,322 | \$4,792,436 | 45% | 5,010          | 4,801  | 96%  | 1.00           | 0.65   | 65%  | 10,421       | 9,339  | 90%  |

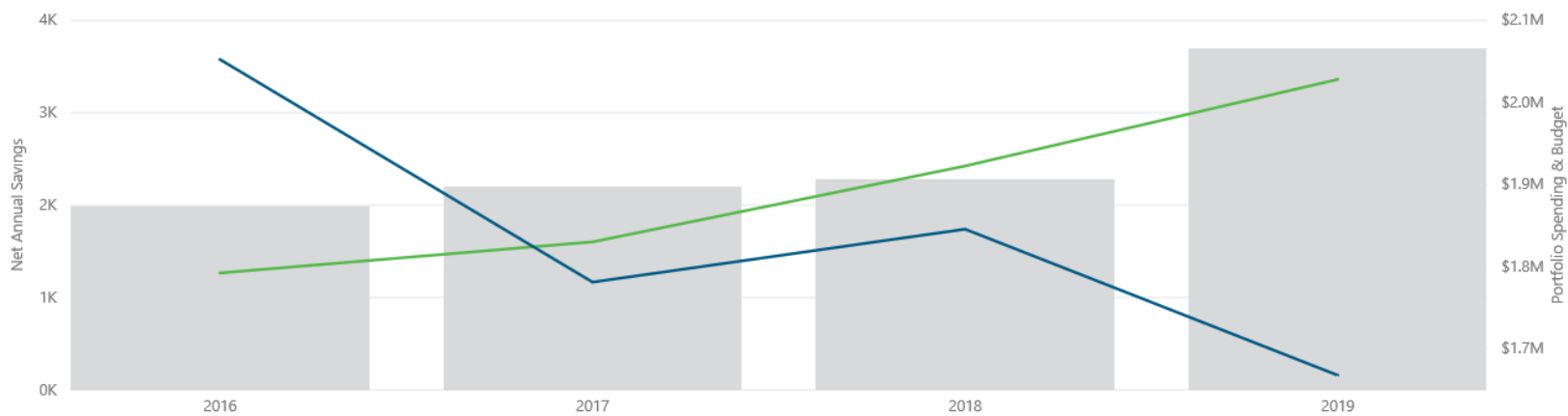


# DEP NES

Neighborhood Energy Saver Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |      | Energy Savings |        |      | Demand Savings |        |      | Participants |        |      |
|--------------|--------------|-------------|------|----------------|--------|------|----------------|--------|------|--------------|--------|------|
|              | Budget       | Actual      | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual | %    |
| 2018         | \$1,922,686  | \$1,845,739 | 96%  | 2,033          | 2,279  | 112% | 0.31           | 0.35   | 112% | 4,503        | 5,047  | 112% |
| 2017         | \$1,830,237  | \$1,781,211 | 97%  | 1,735          | 2,200  | 127% | 0.30           | 0.34   | 110% | 4,500        | 4,873  | 108% |
| 2019         | \$2,028,200  | \$1,667,723 | 82%  | 2,135          | 3,699  | 173% | 0.33           | 0.49   | 151% | 4,729        | 4,517  | 96%  |
| 2016         | \$1,792,345  | \$2,052,535 | 115% | 1,735          | 1,992  | 115% | 0.30           | 0.30   | 100% | 4,500        | 4,412  | 98%  |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



**Programs that are free to Participants**

## Multi-Family Energy Efficiency

### Multi-Family Energy Efficiency<sup>1</sup>

| <u>\$ in millions, rounded</u> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$9.6                    | \$11.9                                | 124%           |
| Program Cost                   | \$3.4                    | \$3.7                                 | 109%           |
| MW                             | 2.0                      | 2.6                                   | 132%           |
| MWH                            | 19,846.4                 | 24,086.2                              | 121%           |
| Units                          | 342,660                  | 493,307                               | 144%           |

1) Values are reflected at the system level.

| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | 15,206          | 14,966               | -240      |
| Savings (MW)          | 2.13            | 2.05                 | -0.09     |
| Participants          |                 | 389,131              |           |
| 2019 Program Expenses |                 | \$3,081,002          |           |



## Multi-Family Energy Efficiency

- Total 112 properties in DEP (15, 763 units) and 293 in DEC (46,422 units)
- 71+% lighting measures, remaining is water measures
- Marketing:
  - Outbound calls and on-site visits to property managers
  - Apartment association memberships, trade shows
  - Public website
  - Brochures
  - Tenant materials

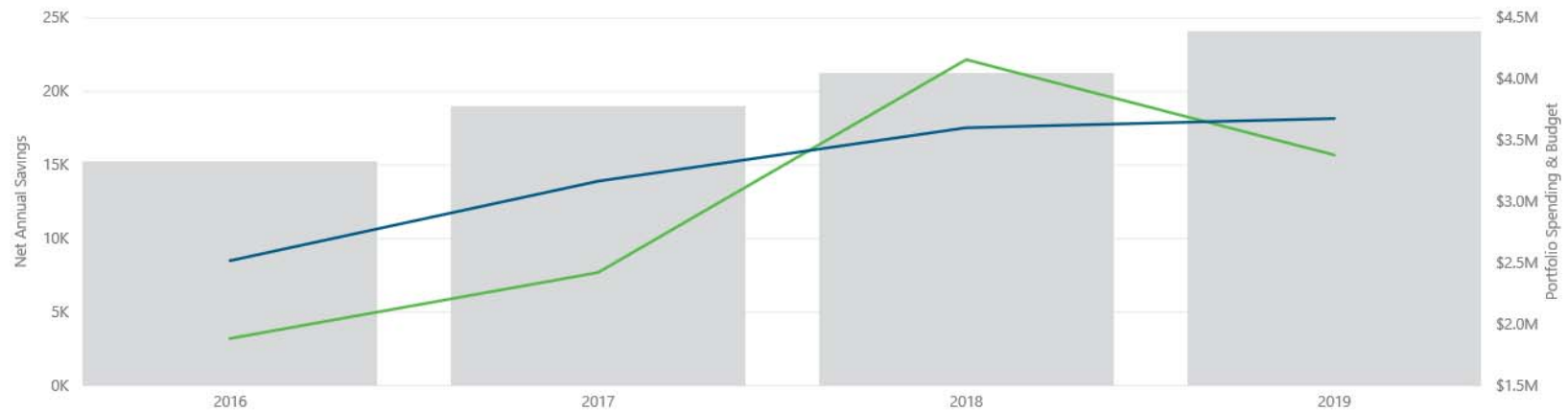
| Multifamily        |            |               |
|--------------------|------------|---------------|
| Jurisdiction       | Properties | Units         |
| DEC - NC           | 161        | 26,087        |
| DEC - SC           | 20         | 4,572         |
| DEP - NC           | 101        | 15,002        |
| DEP - SC           | 11         | 761           |
| <b>Grand Total</b> | <b>293</b> | <b>46,422</b> |

## DEC Multifamily

Multi-Family Energy Efficiency Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |      | Energy Savings |        |      | Demand Savings |        |      | Participants |         |      |
|--------------|--------------|-------------|------|----------------|--------|------|----------------|--------|------|--------------|---------|------|
|              | Budget       | Actual      | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual  | %    |
| 2019         | \$3,382,816  | \$3,680,155 | 109% | 19,846         | 24,086 | 121% | 2.00           | 2.65   | 132% | 342,660      | 493,307 | 144% |
| 2018         | \$4,161,326  | \$3,604,921 | 87%  | 22,582         | 21,289 | 94%  | 2.20           | 2.30   | 105% | 370,882      | 430,475 | 116% |
| 2017         | \$2,422,689  | \$3,168,422 | 131% | 12,688         | 19,056 | 150% | 1.19           | 1.92   | 161% | 186,948      | 356,003 | 190% |
| 2016         | \$1,883,584  | \$2,518,988 | 134% | 12,320         | 15,235 | 124% | 1.02           | 1.57   | 154% | 151,004      | 269,671 | 179% |

Actual Annual Savings (MWh) Portfolio Spending Budget Portfolio Spending

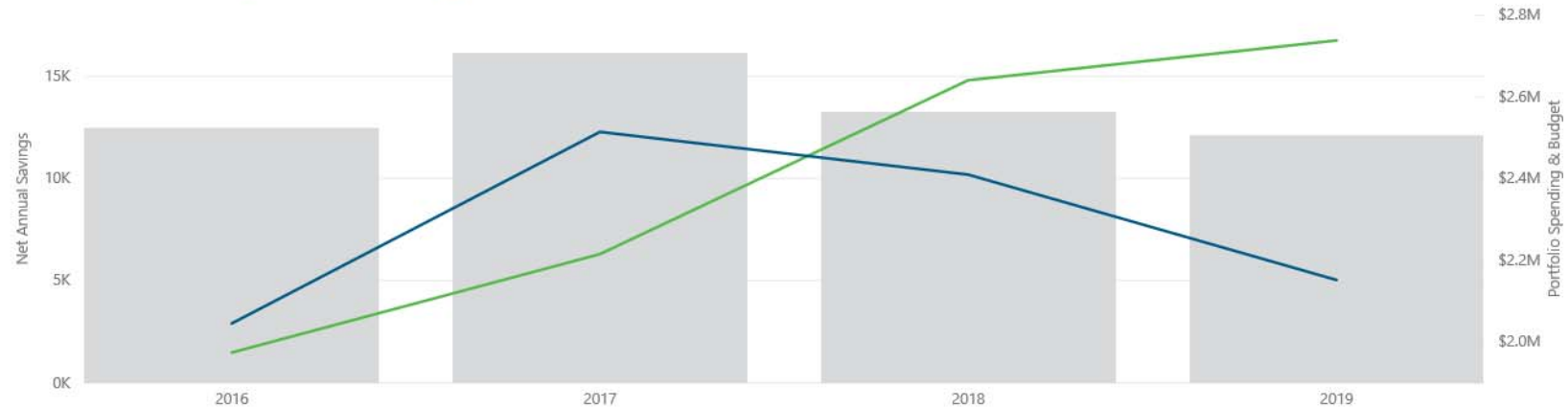


## DEP Multifamily

Multi-Family Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |      | Energy Savings |        |      | Demand Savings |        |      | Participants |         |      |
|--------------|--------------|-------------|------|----------------|--------|------|----------------|--------|------|--------------|---------|------|
|              | Budget       | Actual      | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual  | %    |
| 2017         | \$2,215,099  | \$2,514,413 | 114% | 10,444         | 16,151 | 155% | 1.02           | 2.05   | 200% | 201,072      | 297,837 | 148% |
| 2018         | \$2,640,920  | \$2,409,743 | 91%  | 13,579         | 13,292 | 98%  | 1.84           | 1.74   | 95%  | 264,177      | 288,093 | 109% |
| 2019         | \$2,738,339  | \$2,151,724 | 79%  | 15,206         | 12,107 | 80%  | 2.13           | 1.62   | 76%  | 291,444      | 285,365 | 98%  |
| 2016         | \$1,974,027  | \$2,045,220 | 104% | 10,993         | 12,462 | 113% | 1.08           | 1.48   | 137% | 211,656      | 240,436 | 114% |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



## My Home Energy Reports (MyHER)

My Home Energy Report<sup>1</sup>

| <i><u>\$ in millions, rounded</u></i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|---------------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost                   | \$20.9                   | \$23.4                                | 112%           |
| Program Cost                          | \$13.4                   | \$10.6                                | 79%            |
| MW <sup>2</sup>                       | 79.4                     | 91.4                                  | 115%           |
| MWH <sup>2</sup>                      | 312,934.1                | 328,439.1                             | 105%           |
| Units <sup>3</sup>                    | 1,364,000                | 1,339,152                             | 98%            |

1) Values are reflected at the system level.

2) Values represent the annual MW and MWH savings associated with the December 2019 month end participation.

3) At month-end December 2019, single-family participation was 1,183,442, while multifamily participation was 155,710.

| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | 119,273         | 154,602              | 35,329    |
| Savings (MW)          | 20.01           | 54.25                | 34.24     |
| Participants          |                 | 769,490              |           |
| 2019 Program Expenses |                 | \$6,746,551          |           |

## My Home Energy Reports (MyHER)

| Total DEC            |      |                      |      |
|----------------------|------|----------------------|------|
| NC                   |      | SC                   |      |
| <b>Single Family</b> | 68%  | <b>Single Family</b> | 21%  |
| Paper                | 63%  | Paper                | 19%  |
| Online               | 5%   | Online               | 2%   |
| <b>Multifamily</b>   | 9%   | <b>Multifamily</b>   | 2%   |
| Paper                | 9%   | Paper                | 2%   |
| Online               | 0.7% | Online               | 0.2% |

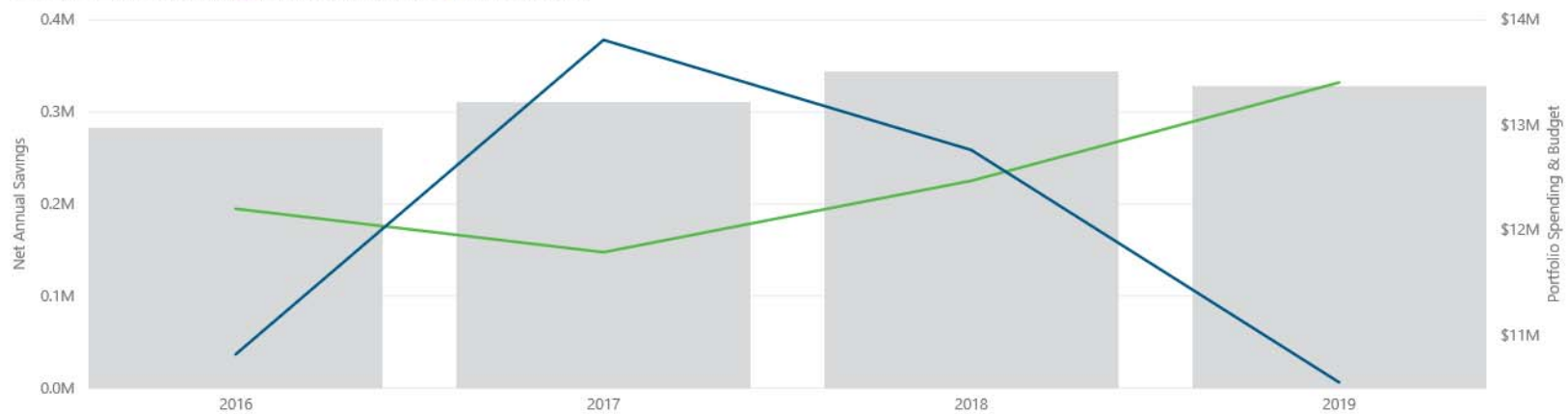
| Total DEP            |      |                      |      |
|----------------------|------|----------------------|------|
| NC                   |      | SC                   |      |
| <b>Single Family</b> | 82%  | <b>Single Family</b> | 9%   |
| Paper                | 76%  | Paper                | 9%   |
| Online               | 6%   | Online               | 0.6% |
| <b>Multifamily</b>   | 8%   | <b>Multifamily</b>   | 1%   |
| Paper                | 7%   | Paper                | 1%   |
| Online               | 0.4% | Online               | 0.1% |

## DEC My Home Energy Reports

My Home Energy Report Program Budget, Savings & Number of Measures

| Program Year | Expenditures |              |      | Energy Savings |         |      | Demand Savings |        |      | Participants |           |      |
|--------------|--------------|--------------|------|----------------|---------|------|----------------|--------|------|--------------|-----------|------|
|              | Budget       | Actual       | %    | Budget         | Actual  | %    | Budget         | Actual | %    | Budget       | Actual    | %    |
| 2018         | \$12,472,487 | \$12,765,286 | 102% | 304,387        | 344,760 | 113% | 77.28          | 95.89  | 124% | 1,354,138    | 1,432,263 | 106% |
| 2017         | \$11,792,498 | \$13,812,250 | 117% | 211,048        | 311,369 | 148% | 56.98          | 79.07  | 139% | 1,050,000    | 1,394,693 | 133% |
| 2019         | \$13,406,971 | \$10,555,159 | 79%  | 312,934        | 328,439 | 105% | 79.36          | 91.39  | 115% | 1,364,000    | 1,339,152 | 98%  |
| 2016         | \$12,206,008 | \$10,822,444 | 89%  | 204,880        | 283,570 | 138% | 55.32          | 71.81  | 130% | 1,050,000    | 1,202,664 | 115% |

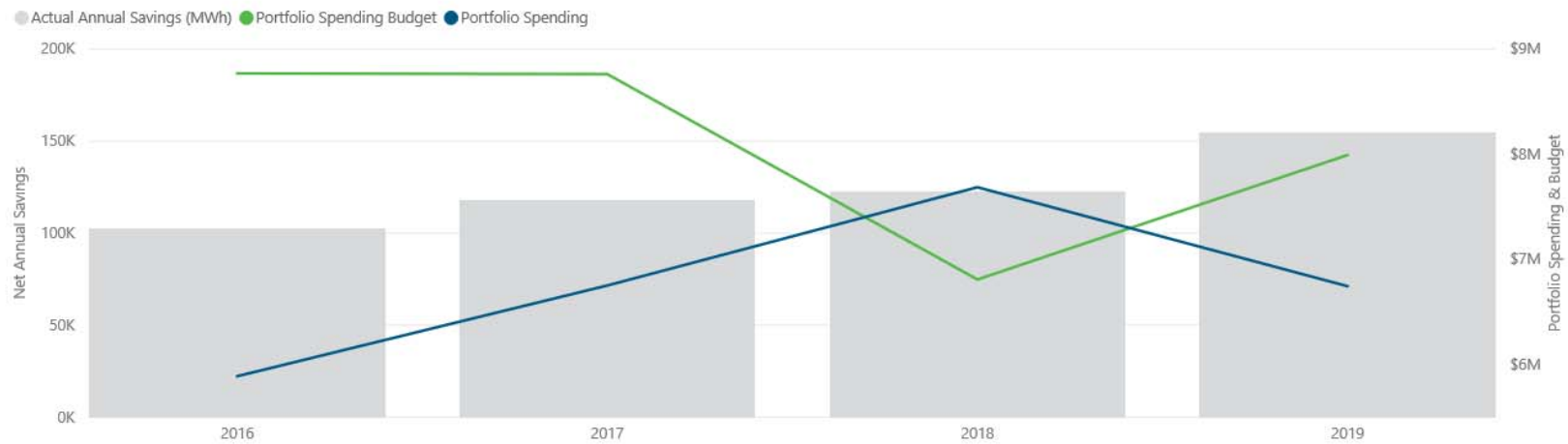
● Actual Annual Savings (MWh)
 ● Portfolio Spending Budget
 ● Portfolio Spending



## DEP My Home Energy Reports

My Home Energy Report Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |      | Energy Savings |         |      | Demand Savings |        |      | Participants |           |       |
|--------------|--------------|-------------|------|----------------|---------|------|----------------|--------|------|--------------|-----------|-------|
|              | Budget       | Actual      | %    | Budget         | Actual  | %    | Budget         | Actual | %    | Budget       | Actual    | %     |
| 2018         | \$6,810,235  | \$7,687,891 | 113% | 132,895        | 122,685 | 92%  | 36.11          | 20.78  | 58%  | 673,400      | 9,578,379 | 1422% |
| 2017         | \$8,763,955  | \$6,753,153 | 77%  | 133,917        | 117,852 | 88%  | 36.39          | 19.96  | 55%  | 682,300      | 8,775,108 | 1286% |
| 2016         | \$8,770,681  | \$5,890,093 | 67%  | 133,917        | 102,921 | 77%  | 36.39          | 16.91  | 46%  | 682,300      | 7,909,262 | 1159% |
| 2019         | \$7,994,059  | \$6,746,551 | 84%  | 119,273        | 154,602 | 130% | 20.01          | 54.25  | 271% | 797,000      | 769,490   | 97%   |



## EE in Education

### Energy Efficiency Education<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$2.6</b>             | <b>\$2.5</b>                          | <b>98%</b>     |
| <b>Program Cost</b>            | <b>\$2.1</b>             | <b>\$1.7</b>                          | <b>80%</b>     |
| <b>MW</b>                      | <b>1.3</b>               | <b>0.8</b>                            | <b>63%</b>     |
| <b>MWH</b>                     | <b>5,701.5</b>           | <b>6,713.8</b>                        | <b>118%</b>    |
| <b>Units</b>                   | <b>26,705</b>            | <b>24,785</b>                         | <b>93%</b>     |

1) Values are reflected at the system level.

| <b>2019 YTD Results</b> | <b>Annual Forecast</b> | <b>Actual at 12/31/2019</b> | <b>Variation</b> |
|-------------------------|------------------------|-----------------------------|------------------|
| Savings (MWH)           | 2,315                  | 3,284                       | 969              |
| Savings (MW)            | 0.98                   | 0.39                        | -0.59            |
| Participants            |                        | 9,887                       |                  |
| 2019 Program Expenses   |                        | \$745,829                   |                  |



## EE in Education

| DEP                    |        | DEC                    |         |
|------------------------|--------|------------------------|---------|
| <b>NC - PMID 9054</b>  |        | <b>NC - PMID 3627</b>  |         |
| Number of Schools      | 193    | Number of Schools      | 455     |
| Number of Performances | 316    | Number of Performances | 727     |
| Number of Students     | 69,202 | Number of Students     | 155,286 |
| Number of Kits         | 8,661  | Number of Kits         | 19,855  |
| <b>SC - PMID 9055</b>  |        | <b>SC - PMID 3629</b>  |         |
| Number of Schools      | 54     | Number of Schools      | 134     |
| Number of Performances | 87     | Number of Performances | 192     |
| Number of Students     | 17,677 | Number of Students     | 42,992  |
| Number of Kits         | 1,226  | Number of Kits         | 4,930   |
| <b>Total</b>           |        | <b>Total</b>           |         |
| Number of Schools      | 247    | Number of Schools      | 589     |
| Number of Performances | 403    | Number of Performances | 919     |
| Number of Students     | 86,879 | Number of Students     | 198,278 |
| Number of Kits         | 9,887  | Number of Kits         | 24,785  |

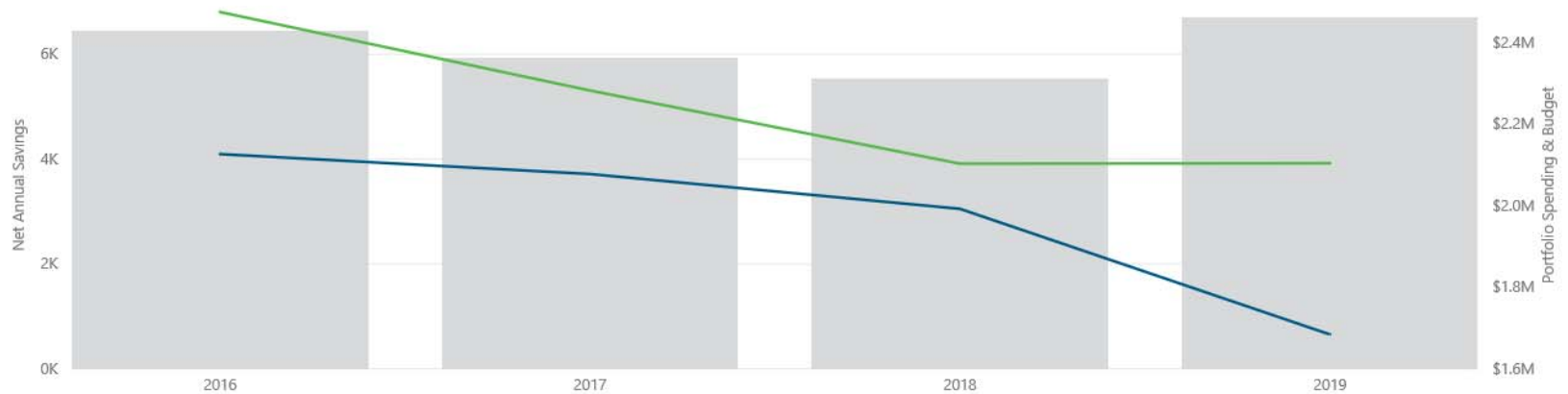
## DEC EE in Education

Energy Efficiency Education Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |     | Energy Savings |        |      | Demand Savings |        |      | Participants |        |      |
|--------------|--------------|-------------|-----|----------------|--------|------|----------------|--------|------|--------------|--------|------|
|              | Budget       | Actual      | %   | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual | %    |
| 2016         | \$2,474,928  | \$2,126,509 | 86% | 6,580          | 6,441  | 98%  | 0.69           | 1.51   | 219% | 26,250       | 30,170 | 115% |
| 2017         | \$2,282,458  | \$2,077,611 | 91% | 5,604          | 5,932  | 106% | 1.32           | 1.39   | 106% | 26,250       | 27,785 | 106% |
| 2019         | \$2,104,087  | \$1,684,083 | 80% | 5,702          | 6,714  | 118% | 1.34           | 0.84   | 63%  | 26,705       | 24,785 | 93%  |
| 2018         | \$2,103,036  | \$1,992,260 | 95% | 5,604          | 5,531  | 99%  | 1.32           | 0.97   | 73%  | 26,250       | 22,901 | 87%  |

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● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



## DEP EE in Education

Energy Education Program for Schools Program Budget, Savings & Number of Measures

| Program Year | Expenditures |           |      | Energy Savings |        |      | Demand Savings |        |      | Participants |        |      |
|--------------|--------------|-----------|------|----------------|--------|------|----------------|--------|------|--------------|--------|------|
|              | Budget       | Actual    | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual | %    |
| 2019         | \$753,793    | \$745,829 | 99%  | 2,315          | 3,284  | 142% | 0.98           | 0.39   | 40%  | 8,952        | 9,887  | 110% |
| 2016         | \$801,351    | \$827,497 | 103% | 1,998          | 2,554  | 128% | 0.20           | 1.08   | 546% | 8,800        | 9,877  | 112% |
| 2017         | \$830,606    | \$835,991 | 101% | 1,998          | 2,354  | 118% | 0.20           | 1.00   | 503% | 8,800        | 9,104  | 103% |
| 2018         | \$744,749    | \$676,815 | 91%  | 1,997          | 2,563  | 128% | 0.20           | 0.77   | 387% | 8,798        | 9,013  | 102% |

■ Actual Annual Savings (MWh)
 ● Portfolio Spending Budget
 ● Portfolio Spending



## Home Energy House Call

### Energy Assessments<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31,<br>2019 | % of<br>Target |
|--------------------------------|--------------------------|--|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$4.2</b>             | <b>\$4.4</b>                             | <b>105%</b>    |
| <b>Program Cost</b>            | <b>\$3.0</b>             | <b>\$3.2</b>                             | <b>107%</b>    |
| <b>MW</b>                      | <b>1.0</b>               | <b>0.9</b>                               | <b>91%</b>     |
| <b>MWH</b>                     | <b>6,542.9</b>           | <b>7,886.9</b>                           | <b>121%</b>    |
| <b>Units</b>                   | <b>34,304</b>            | <b>61,692</b>                            | <b>180%</b>    |

1) Values are reflected at the system level.

2) Units represent number of measures, and do include additional LEDs.

| <b>2019 YTD Results</b> | <b>Annual Forecast</b> | <b>Actual at 12/31/2019</b> | <b>Variation</b> |
|-------------------------|------------------------|-----------------------------|------------------|
| Savings (MWH)           | 2,565                  | 7,834                       | 5,269            |
| Savings (MW)            | 0.43                   | 0.94                        | 0.51             |
| Participants            |                        | 41,226                      |                  |
| 2019 Program Expenses   |                        | \$2,109,106                 |                  |

## Home Energy House Call

| Measure          | State | NC     | SC     |
|------------------|-------|--------|--------|
| Audit            | DEC   | 7,529  | 2,817  |
| Additional Bulb  |       | 31,016 | 12,119 |
| Bathroom Aerator |       | 1,663  | 639    |
| Pipewrap         |       | 4,887  | 1,062  |
| Total            |       | 45,095 | 16,637 |
|                  |       |        |        |
| Audit            | DEP   | 5,948  | 779    |
| Additional Bulb  |       | 25,352 | 3,181  |
| Bathroom Aerator |       | 1,879  | 168    |
| Pipewrap         |       | 3,213  | 706    |
| Total            |       | 36,392 | 4,834  |

## DEC Home Energy House Call

Energy Assessments Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |      | Energy Savings |        |      | Demand Savings |        |      | Participants |        |      |
|--------------|--------------|-------------|------|----------------|--------|------|----------------|--------|------|--------------|--------|------|
|              | Budget       | Actual      | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual | %    |
| 2019         | \$2,987,118  | \$3,186,888 | 107% | 6,543          | 7,887  | 121% | 1.04           | 0.95   | 91%  | 34,304       | 61,692 | 180% |
| 2018         | \$2,613,893  | \$2,836,229 | 109% | 7,436          | 7,717  | 104% | 1.14           | 0.93   | 81%  | 8,440        | 55,978 | 663% |
| 2017         | \$2,568,858  | \$2,909,098 | 113% | 7,923          | 7,721  | 97%  | 0.98           | 1.04   | 106% | 8,038        | 52,546 | 654% |
| 2016         | \$3,010,149  | \$2,678,893 | 89%  | 7,547          | 7,389  | 98%  | 0.93           | 1.07   | 114% | 7,656        | 28,853 | 377% |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending

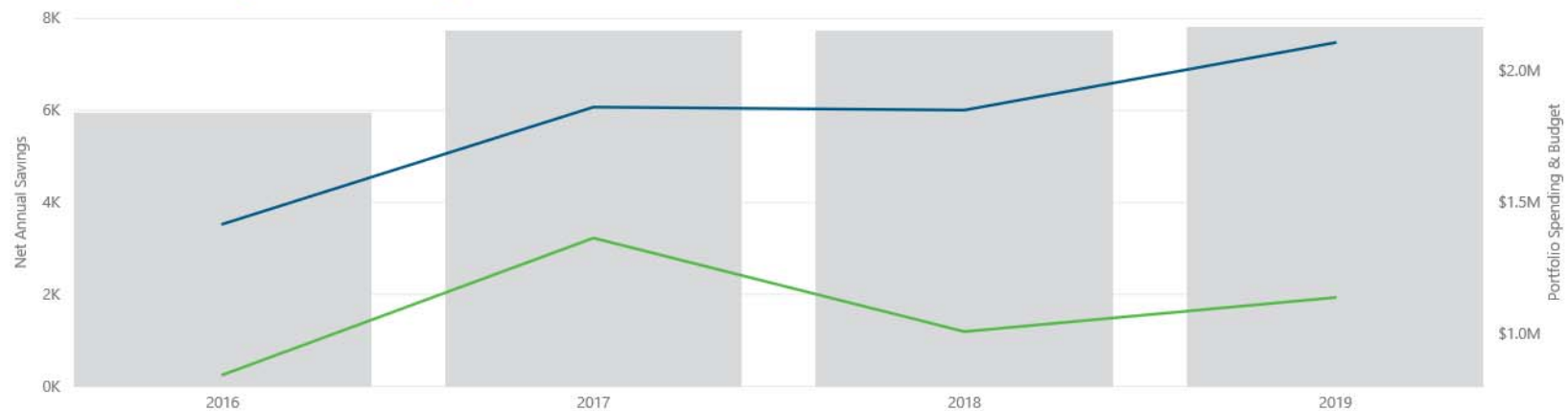


## DEP Home Energy House Call

Residential Energy Assessments Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |      | Energy Savings |        |      | Demand Savings |        |      | Participants |        |      |
|--------------|--------------|-------------|------|----------------|--------|------|----------------|--------|------|--------------|--------|------|
|              | Budget       | Actual      | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual | %    |
| 2019         | \$1,138,481  | \$2,109,106 | 185% | 2,565          | 7,834  | 305% | 0.43           | 0.94   | 220% | 13,672       | 41,226 | 302% |
| 2017         | \$1,365,004  | \$1,863,486 | 137% | 3,132          | 7,734  | 247% | 0.52           | 0.93   | 178% | 25,375       | 38,090 | 150% |
| 2018         | \$1,008,625  | \$1,851,965 | 184% | 2,720          | 7,752  | 285% | 0.45           | 0.94   | 206% | 22,036       | 37,923 | 172% |
| 2016         | \$843,942    | \$1,417,924 | 168% | 1,282          | 5,943  | 464% | 0.21           | 0.72   | 334% | 10,385       | 27,614 | 266% |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



## Save Energy and Water Kits\*\*

| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | 30,940          | 16,709               | -14,231   |
| Savings (MW)          | 8.91            | 5.05                 | -3.87     |
| Participants          |                 | 253,098              |           |
| 2019 Program Expenses |                 | \$1,226,733          |           |

| Save Energy and Water |               |
|-----------------------|---------------|
| Jurisdiction          | Kits          |
| DEC - NC              | 31,961        |
| DEC - SC              | 11,075        |
| DEP - NC              | 21,929        |
| DEP - SC              | 3,814         |
| <b>Grand Total</b>    | <b>68,779</b> |

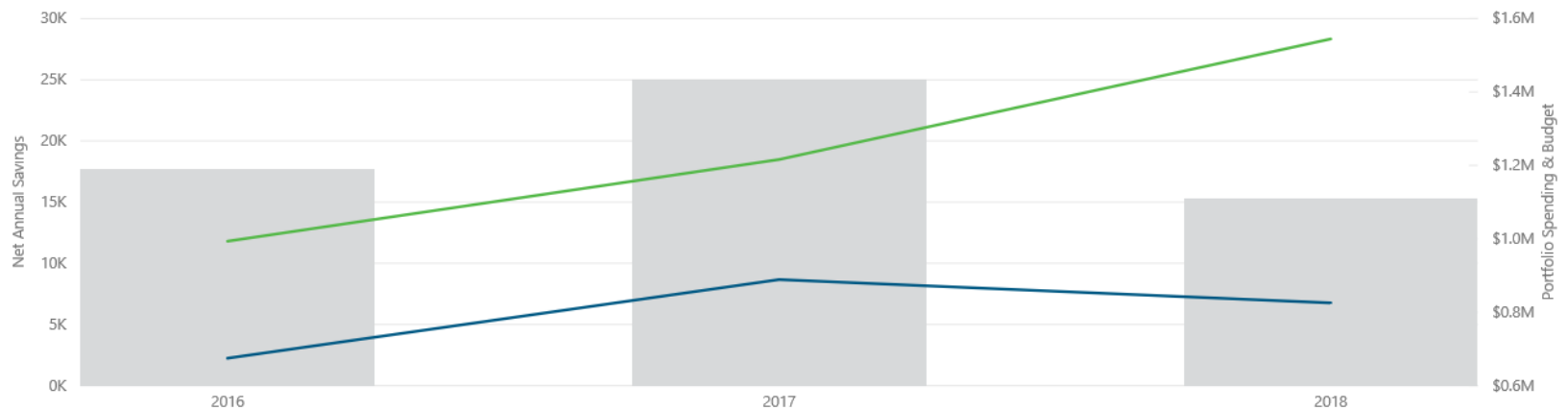


## DEP Save Energy and Water Kits

Save Energy and Water Kit Program Budget, Savings & Number of Measures

| Program Year | Expenditures |           |     | Energy Savings |        |      | Demand Savings |        |      | Participants |         |      |
|--------------|--------------|-----------|-----|----------------|--------|------|----------------|--------|------|--------------|---------|------|
|              | Budget       | Actual    | %   | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual  | %    |
| 2017         | \$1,216,177  | \$888,869 | 73% | 15,667         | 25,021 | 160% | 1.25           | 8.38   | 668% | 316,437      | 463,854 | 147% |
| 2016         | \$993,420    | \$674,538 | 68% | 12,758         | 17,672 | 139% | 1.02           | 5.91   | 579% | 257,688      | 325,146 | 126% |
| 2018         | \$1,544,762  | \$825,279 | 53% | 21,484         | 15,252 | 71%  | 1.72           | 5.06   | 294% | 432,591      | 276,327 | 64%  |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



## Free LEDs\*\*

- Offered in DEC as part of EE Appliances and Devices Program
- 451,000 orders for 5.6 million bulbs in 2019
- The Free LED program is scheduled to discontinue in Duke Energy Carolinas in 2020

| Free LEDs (DEC Only) |                       |       |
|----------------------|-----------------------|-------|
| State                | Participation (Bulbs) | Split |
| NC                   | 4,440,368             | 77%   |
| SC                   | 1,361,532             | 23%   |
| Total                | 5,801,900             | 100%  |

# Programs with Participant Costs

## Energy Efficient Appliances and Devices

Energy Efficient Appliances and Devices<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$52.1                   | \$102.1                               | 196%           |
| Program Cost                   | \$21.7                   | \$41.4                                | 190%           |
| MW                             | 16.7                     | 31.8                                  | 190%           |
| MWH                            | 97,320.5                 | 187,351.7                             | 193%           |
| Units                          | 3,997,670                | 9,893,466                             | 247%           |

1) Values are reflected at the system level.

|        |     |        |     |
|--------|-----|--------|-----|
| DEC NC | 76% | DEP NC | 93% |
| DEC SC | 24% | DEP SC | 7%  |

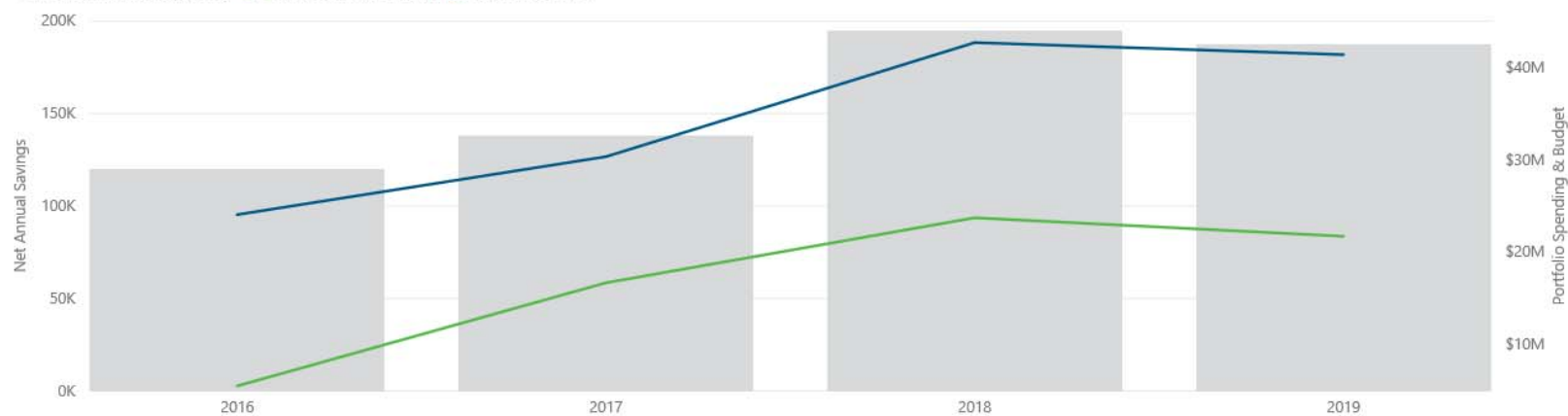
- For DEC, includes Free LEDs, SEWK, Retail Lighting, Specialty Lighting and Online Store
- 43,578 orders thru OLS for 331,095 bulbs; 11,724 smart thermostats; 3,553 smart strips; and 220 water measures, 639 LED fixtures
- Over 99 percent of customers accessed OLS via the public website, while 1 percent accessed OLS by logging into their OLS account.

## DEC Energy Efficient Appliances and Devices

Energy Efficient Appliances and Devices Program Budget, Savings & Number of Measures

| Program Year | Expenditures |              |      | Energy Savings |         |      | Demand Savings |        |      | Participants |            |      |
|--------------|--------------|--------------|------|----------------|---------|------|----------------|--------|------|--------------|------------|------|
|              | Budget       | Actual       | %    | Budget         | Actual  | %    | Budget         | Actual | %    | Budget       | Actual     | %    |
| 2018         | \$23,729,947 | \$42,687,244 | 180% | 97,729         | 195,213 | 200% | 11.73          | 32.80  | 280% | 3,533,486    | 10,242,946 | 290% |
| 2019         | \$21,726,700 | \$41,380,987 | 190% | 97,321         | 187,352 | 193% | 16.73          | 31.80  | 190% | 3,997,670    | 9,893,466  | 247% |
| 2017         | \$16,694,730 | \$30,340,728 | 182% | 63,591         | 137,960 | 217% | 8.14           | 24.61  | 302% | 2,544,764    | 6,819,189  | 268% |
| 2016         | \$5,528,158  | \$24,069,774 | 435% | 36,348         | 120,226 | 331% | 4.06           | 14.52  | 357% | 955,750      | 3,868,812  | 405% |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending

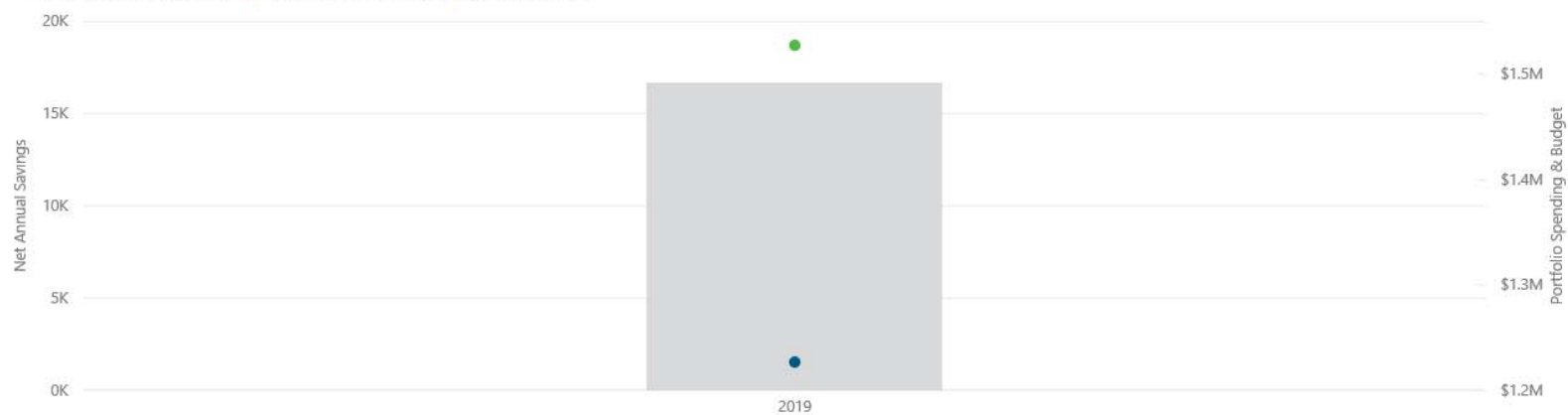


## DEP Appliances and Devices

Appliances and Devices Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |     | Energy Savings |        |     | Demand Savings |        |     | Participants |         |     |
|--------------|--------------|-------------|-----|----------------|--------|-----|----------------|--------|-----|--------------|---------|-----|
|              | Budget       | Actual      | %   | Budget         | Actual | %   | Budget         | Actual | %   | Budget       | Actual  | %   |
| 2019         | \$1,527,511  | \$1,226,733 | 80% | 30,940         | 16,709 | 54% | 8.91           | 5.05   | 57% | 452,400      | 253,098 | 56% |

● Actual Annual Savings (MWh)
 ● Portfolio Spending Budget
 ● Portfolio Spending



## Retail Lighting

| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | 31,505          | 37,390               | 5,886     |
| Savings (MW)          | 5.81            | 6.16                 | 0.35      |
| Participants          |                 | 2,650,367            |           |
| 2019 Program Expenses |                 | \$13,417,185         |           |

- DEC Retail Lighting is included in EE Appliances and Devices Program.
- DEP had 17 lighting retail channels actively participating --the top 5 retail channels account for 78% of the sales
- DEC had 8 lighting retail channels actively participating --the top 3 retail channels account for 70% of the sales

| Retail Lighting Program (DEC) |                       |       |
|-------------------------------|-----------------------|-------|
| State                         | Participation (Bulbs) | Split |
| DEC (NC)                      | 2,683,079             | 77%   |
| DEC (SC)                      | 793,363               | 23%   |
| Total                         | 3,476,442             | 100%  |

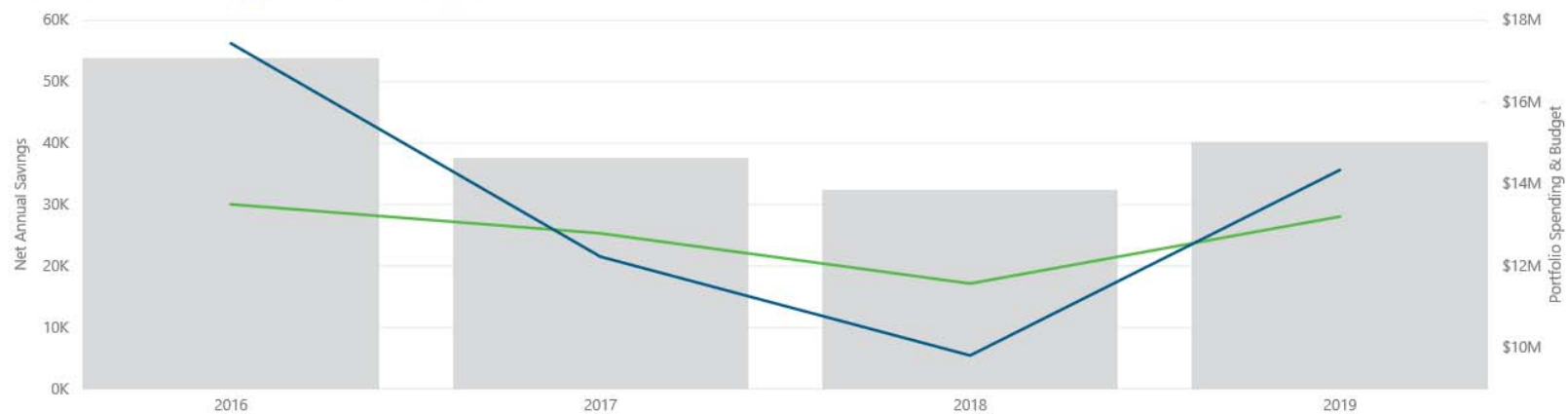
| Retail Lighting Program (DEP) |                       |       |
|-------------------------------|-----------------------|-------|
| State                         | Participation (Bulbs) | Split |
| DEP (NC)                      | 2,281,045             | 86%   |
| DEP (SC)                      | 369,322               | 14%   |
| Total                         | 2,650,367             | 100%  |

## DEP Retail Lighting

Energy Efficient Lighting Program Budget, Savings & Number of Measures

| Program Year | Expenditures |              |      | Energy Savings |        |      | Demand Savings |        |      | Participants |           |      |
|--------------|--------------|--------------|------|----------------|--------|------|----------------|--------|------|--------------|-----------|------|
|              | Budget       | Actual       | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual    | %    |
| 2016         | \$13,508,880 | \$17,441,878 | 129% | 68,441         | 53,830 | 79%  | 11.23          | 8.82   | 79%  | 2,501,909    | 3,244,448 | 130% |
| 2019         | \$13,209,118 | \$14,346,463 | 109% | 31,505         | 40,249 | 128% | 5.81           | 6.59   | 113% | 1,945,783    | 2,754,133 | 142% |
| 2017         | \$12,799,466 | \$12,229,222 | 96%  | 63,371         | 37,551 | 59%  | 10.40          | 6.82   | 66%  | 2,251,730    | 2,520,381 | 112% |
| 2018         | \$11,573,219 | \$9,815,496  | 85%  | 29,251         | 32,403 | 111% | 4.92           | 5.98   | 121% | 1,868,674    | 2,147,254 | 115% |

Actual Annual Savings (MWh) Portfolio Spending Budget Portfolio Spending





## Smart \$aver Residential

Residential - Smart \$aver Energy Efficiency Program<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$4.5                    | \$7.1                                 | 157%           |
| Program Cost                   | \$4.8                    | \$7.4                                 | 154%           |
| MW                             | 1.3                      | 2.0                                   | 157%           |
| MWH                            | 5,130.7                  | 7,329.1                               | 143%           |
| Units                          | 9,630                    | 25,852                                | 268%           |

1) Values are reflected at the system level.

| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | 4,184           | 6,756                | 2,572     |
| Savings (MW)          | 1.11            | 1.86                 | 0.75      |
| Participants          |                 | 21,965               |           |
| 2019 Program Expenses |                 | \$6,397,527          |           |

## Smart \$aver Residential

- The Referral Channel generated over 15,668 customer referrals during 2019 with a 95% customer satisfaction rating

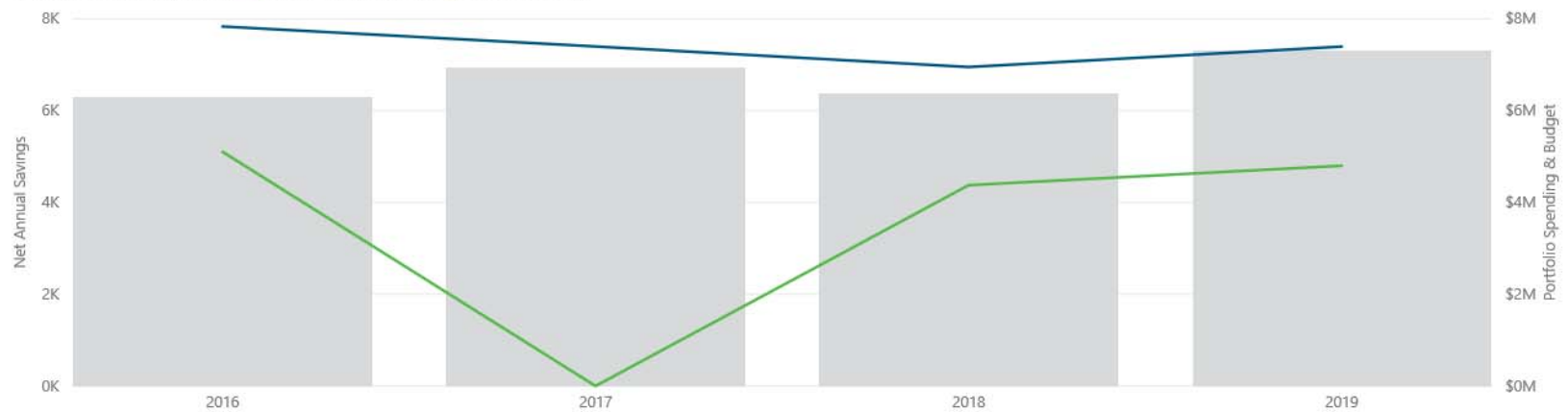
| NC                 |        | SC                |     |
|--------------------|--------|-------------------|-----|
| DEC                | DEP    | DEC               | DEP |
| 22,645             | 21,209 | 3,979             | 790 |
| 46%                | 44%    | 8%                | 2%  |
| Total NC<br>43,854 |        | Total SC<br>4,769 |     |

## DEC Smart Saver HVAC

HVAC Energy Efficiency Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |      | Energy Savings |        |      | Demand Savings |        |      | Participants |        |      |
|--------------|--------------|-------------|------|----------------|--------|------|----------------|--------|------|--------------|--------|------|
|              | Budget       | Actual      | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual | %    |
| 2017         | \$0          | \$7,403,327 | 0%   | 0              | 6,955  | 0%   | 0.00           | 1.85   | 0%   | 0            | 27,311 | 0%   |
| 2019         | \$4,802,289  | \$7,400,669 | 154% | 5,131          | 7,329  | 143% | 1.29           | 2.03   | 157% | 9,630        | 25,852 | 268% |
| 2018         | \$4,379,521  | \$6,955,146 | 159% | 5,360          | 6,367  | 119% | 1.58           | 1.64   | 104% | 9,480        | 25,293 | 267% |
| 2016         | \$5,107,181  | \$7,839,566 | 154% | 3,365          | 6,295  | 187% | 1.53           | 2.46   | 161% | 9,986        | 19,475 | 195% |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending

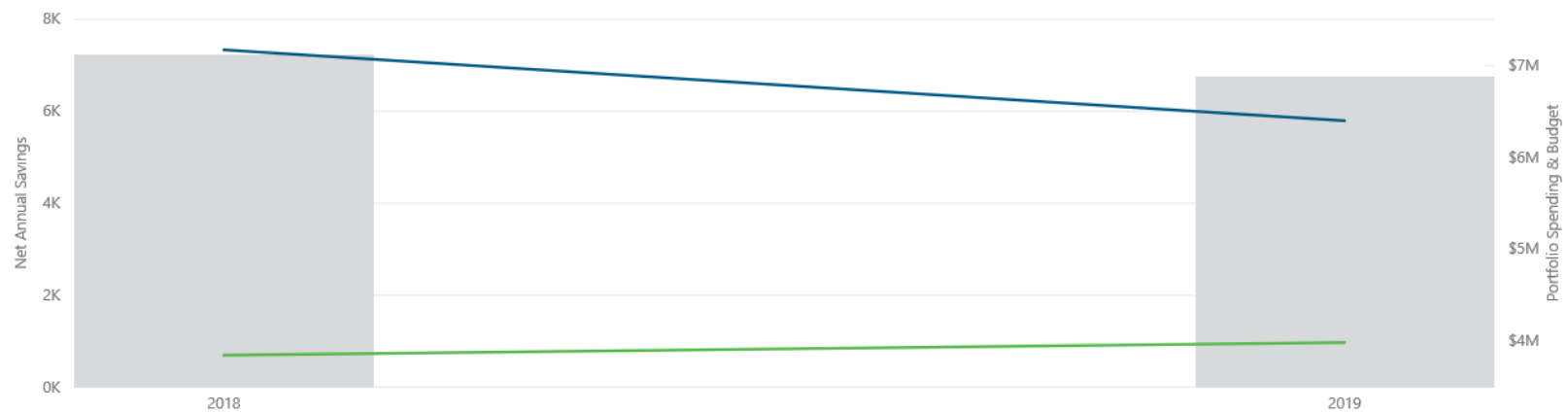


## DEP Smart \$aver

Residential Smart\$aver Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |      | Energy Savings |        |      | Demand Savings |        |      | Participants |        |      |
|--------------|--------------|-------------|------|----------------|--------|------|----------------|--------|------|--------------|--------|------|
|              | Budget       | Actual      | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual | %    |
| 2018         | \$3,847,421  | \$7,168,833 | 186% | 3,134          | 7,229  | 231% | 1.14           | 1.80   | 158% | 9,260        | 24,562 | 265% |
| 2019         | \$3,985,069  | \$6,397,527 | 161% | 4,184          | 6,756  | 161% | 1.11           | 1.86   | 168% | 8,147        | 21,965 | 270% |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



## Residential New Construction

| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | 16,447          | 16,337               | -109      |
| Savings (MW)          | 7.10            | 4.66                 | -2.44     |
| Participants          |                 | 13,165,685           |           |
| 2019 Program Expenses |                 | \$15,080,405         |           |

- Total, 580 builders and 28 approved raters registered

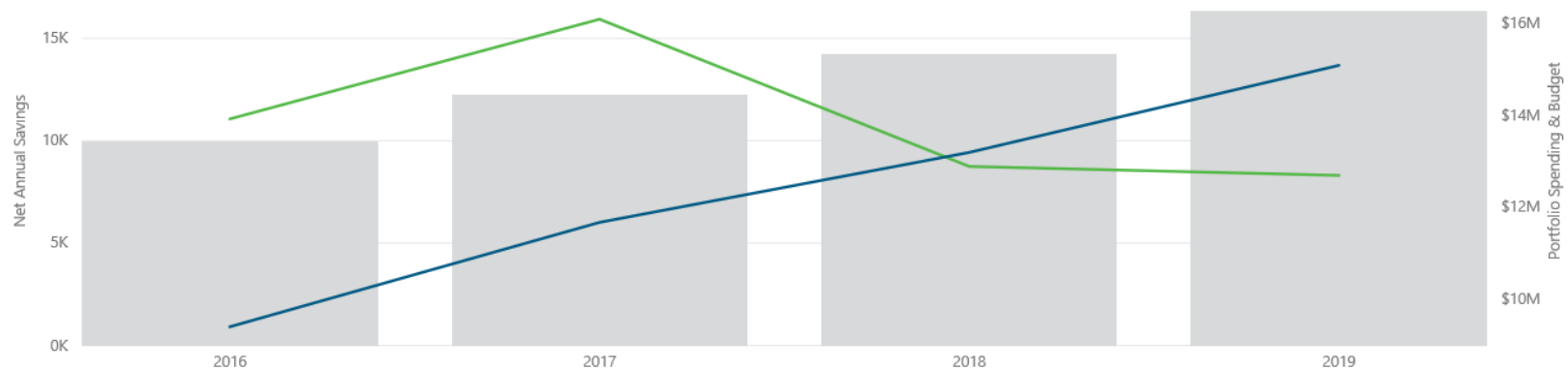
| Measure Qty |          |          |             |
|-------------|----------|----------|-------------|
|             | DEP (NC) | DEP (SC) | Grand Total |
| 2019        | 5941     | 2        | 5943        |

## DEP Residential New Construction

Residential New Construction Program Budget, Savings & Number of Measures

| Program Year | Expenditures |              |      | Energy Savings |        |      | Demand Savings |        |      | Participants |            |         |
|--------------|--------------|--------------|------|----------------|--------|------|----------------|--------|------|--------------|------------|---------|
|              | Budget       | Actual       | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual     | %       |
| 2019         | \$12,691,351 | \$15,080,405 | 119% | 16,447         | 16,337 | 99%  | 7.10           | 4.66   | 66%  | 11,891,674   | 13,165,685 | 111%    |
| 2018         | \$12,886,524 | \$13,189,949 | 102% | 16,048         | 14,263 | 89%  | 6.95           | 5.44   | 78%  | 11,341,393   | 11,275,657 | 99%     |
| 2017         | \$16,082,178 | \$11,671,724 | 73%  | 10,075         | 12,246 | 122% | 4.36           | 5.27   | 121% | 4,750        | 9,732,077  | 204886% |
| 2016         | \$13,917,269 | \$9,405,615  | 68%  | 8,955          | 9,955  | 111% | 3.87           | 4.36   | 113% | 4,500        | 5,700,623  | 126681% |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



# Demand Response

## Energy Wise Home

| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | N/A             | N/A                  | N/A       |
| Savings (MW)          | 418.15          | 422.12               | 3.97      |
| Participants          |                 | 422.12               |           |
| 2019 Program Expenses |                 | \$14,607,732         |           |

MW Savings at the meter include Summer MW for AC participants and Winter MW for Heat Strip and Water Heater Participants

- 182,000 participants and full shed load impacts of 376 MW summer and 14.5 MW winter at the meter
- Bring Your Own Thermostat Program launched in mid-December—
  - DEC ~3,700 Customers, 5,400 devices
  - DEP ~2,900 Customers, 4,300 devices

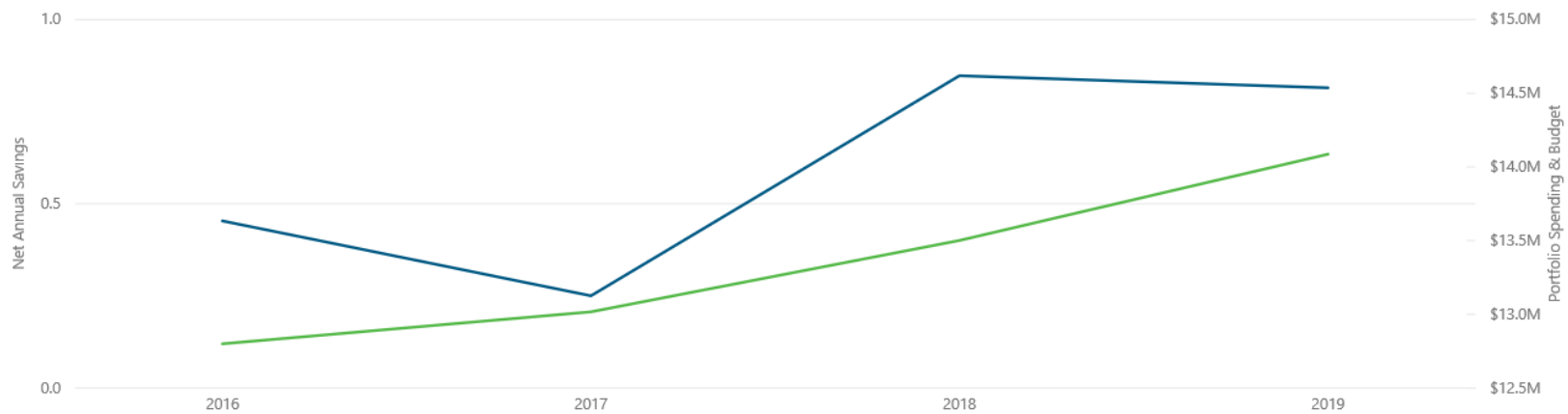


# DEP EnergyWise Home

EnergyWise Program Budget, Savings & Number of Measures

| Program Year | Expenditures |              |      | Energy Savings |        |    | Demand Savings |        |      | Participants |        |      |
|--------------|--------------|--------------|------|----------------|--------|----|----------------|--------|------|--------------|--------|------|
|              | Budget       | Actual       | %    | Budget         | Actual | %  | Budget         | Actual | %    | Budget       | Actual | %    |
| 2017         | \$13,016,514 | \$13,125,314 | 101% | 0              | 0      | 0% | 22.04          | 33.43  | 152% | 11,066       | 20,506 | 185% |
| 2016         | \$12,799,495 | \$13,633,666 | 107% | 0              | 0      | 0% | 22.81          | 34.06  | 149% | 11,433       | 18,465 | 162% |
| 2019         | \$14,086,536 | \$14,537,464 | 103% | 0              | 0      | 0% | 27.12          | 31.09  | 115% | 14,820       | 15,978 | 108% |
| 2018         | \$13,501,070 | \$14,619,512 | 108% | 0              | 0      | 0% | 29.08          | 29.48  | 101% | 14,985       | 15,602 | 104% |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



## Power Manager

PowerManager<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$60.8                   | \$69.8                                | 115%           |
| Program Cost                   | \$14.1                   | \$13.4                                | 95%            |
| MW <sup>2</sup>                | 534.4                    | 568.2                                 | 106%           |
| MWH                            | 0.0                      | N/A                                   | -              |
| Units <sup>3</sup>             | 503,131                  | 535,704                               | 106%           |

### Notes on Tables:

1) Values are reflected at the system level.

| State & Type    |         |
|-----------------|---------|
| NC - CAN        | 216,490 |
| SC - CAN        | 69,983  |
| DEC - CAN       | 286,473 |
| NC - Customers  | 180,513 |
| SC - Customers  | 57,544  |
| DEC - Customers | 238,057 |

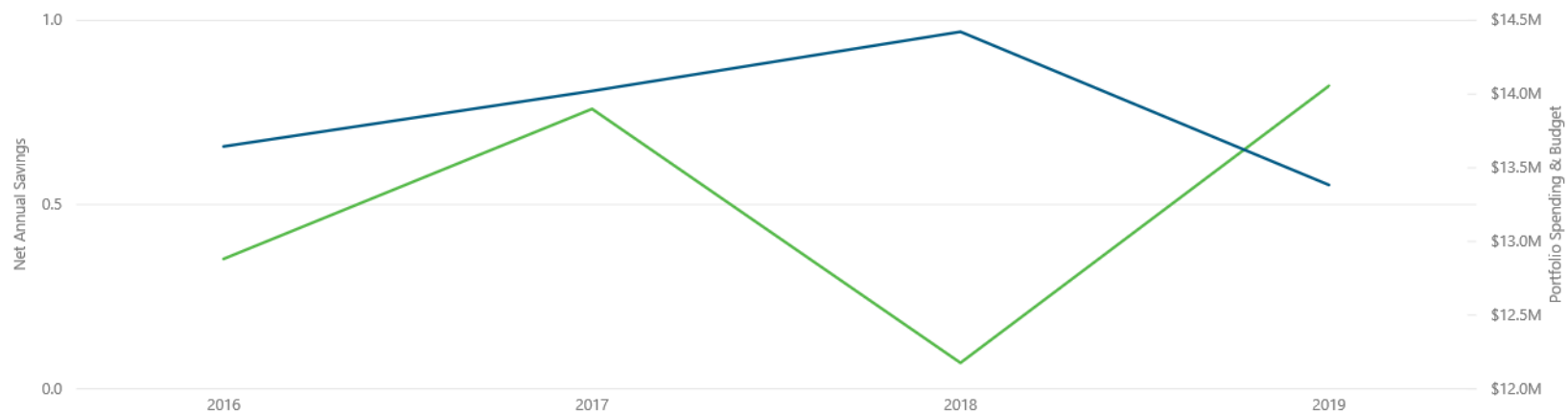
- At year-end, there were
  - 238,057 customers--NC: 180,513 and SC: 57,544
  - 286,473 air conditioners--NC: 216,490 and SC: 69,983
- net increases of 8,682 customers (+3.8%) and 10,794 air conditioners (+3.9%).

# DEC Power Manager

PowerManager Program Budget, Savings & Number of Measures

| Program Year | Expenditures |              |      | Energy Savings |        |    | Demand Savings |        |      | Participants |         |      |
|--------------|--------------|--------------|------|----------------|--------|----|----------------|--------|------|--------------|---------|------|
|              | Budget       | Actual       | %    | Budget         | Actual | %  | Budget         | Actual | %    | Budget       | Actual  | %    |
| 2019         | \$14,055,575 | \$13,383,639 | 95%  | 0              | 0      | 0% | 534.42         | 568.24 | 106% | 503,131      | 534,967 | 106% |
| 2018         | \$12,175,733 | \$14,423,610 | 118% | 0              | 0      | 0% | 503.30         | 533.51 | 106% | 473,837      | 502,271 | 106% |
| 2017         | \$13,899,748 | \$14,021,500 | 101% | 0              | 0      | 0% | 502.97         | 501.12 | 100% | 473,525      | 471,780 | 100% |
| 2016         | \$12,881,566 | \$13,644,970 | 106% | 0              | 0      | 0% | 504.19         | 455.39 | 90%  | 474,675      | 428,731 | 90%  |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



## ISOP Coordination with Carolinas Collaborative

March 19, 2020



*BUILDING A SMARTER ENERGY FUTURE<sup>SM</sup>*

## ISOP & Carolinas Collaborative partnership opportunity

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The Ask: Can the Collaborative help ISOP to assess potential of EE and Customer Programs to be used as non-traditional solutions?

- Current regulatory treatment and policies are not designed to recognize localized EE/Customer Program benefits (or costs)
- Can we leverage Collaborative to gather feedback and address opportunities to improve EE/Customer Program analysis and rate design?
- Development of "Use Cases" is an effective way to identify and address barriers

# Timeline of Strategic Carolinas Stakeholder Activities



*The path forward for the Carolinas' energy future will continue to evolve iteratively through dialogues with diverse stakeholders, and state-mandated clean energy requirements.*

## Commitments

Duke Energy's 2020 Carolinas IRP will reflect the company's updated climate goals.

Future IRPs will continue to evolve, reflecting changes in market dynamics and state policies, including any next steps from NC's Clean Energy Plan and SC's Act 62.

Duke Energy's goal is to implement the basic elements of ISOP in the 2022 Carolinas IRP.

| Initiative                              | Q4 2019  | Q1 2020         | Q2 2020                            | Q3 2020 | Q4 2020                                     | 2021       | 2022                               |
|---|--|-----------------|------------------------------------|---------|---|------------|------------------------------------|
| Integrated Resource Plan                |  | 2020 IRP Forums | Prepare & Submit 2020 Full IRP 9/1 |         |   | IRP Update | Full IRP with Basic ISOP Elements* |
| NC Clean Energy Plan Rec. A-1**         | DEQ Stakeholder Working Group on CEP Rec. A-1 Policy Options |                 |                                    |         | Report Submitted 12/31                      |            |                                    |
| Integrated System & Operations Planning | Workshop #1  | Webinars 1 & 2  | Workshop #2/Final Report           |         |   |            |                                    |
|   | Stakeholder Engagement                                       |                 |                                    |         | Develop and Refine ISOP Tools and Processes |            |                                    |

In-Progress

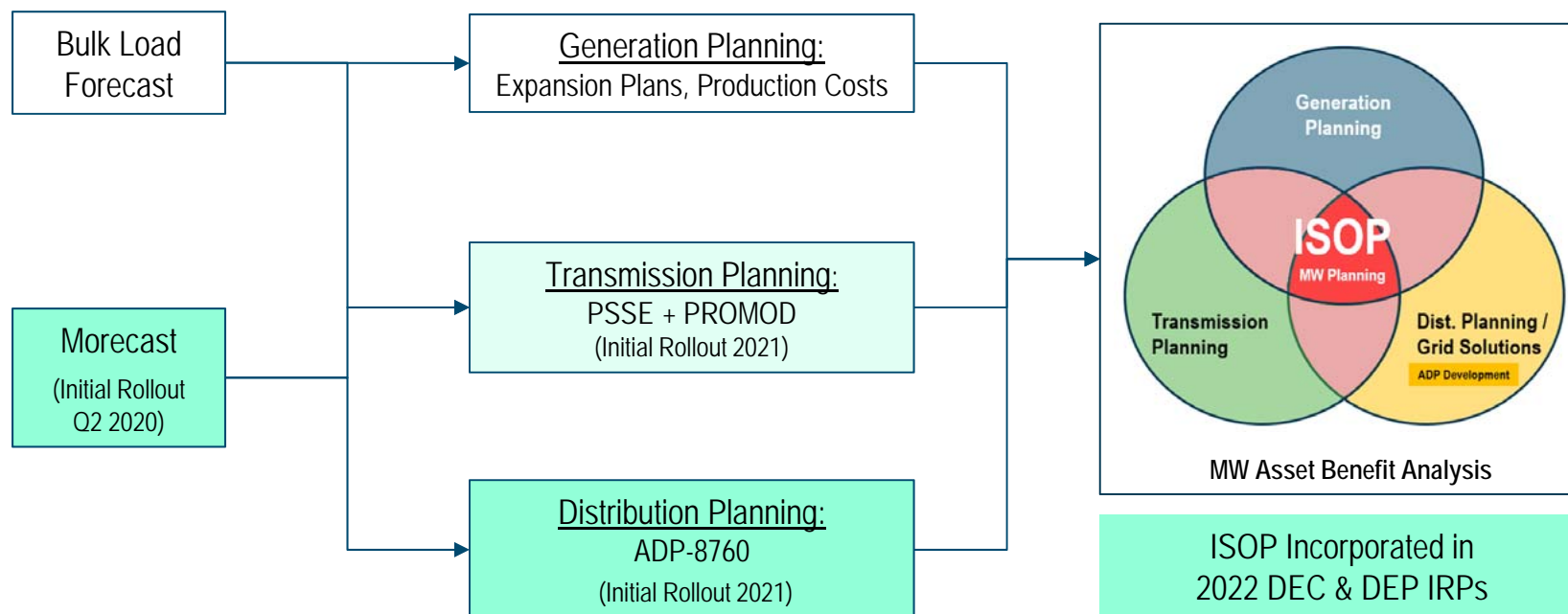
Not Started

\*Goal

\*\*A-1 directs NC DEQ to develop a report on potential carbon reduction policies.

Privileged & Confidential/Attorney-Client Communication; Attorney Work Product; Prepared at the direction of counsel in anticipation of litigation

# ISOP Development Timeline



*Stakeholders are invited to visit the Reference Information Portal to learn more about the ISOP vision (<https://www.duke-energy.com/isop>)*

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# Non-traditional Solution Evaluations

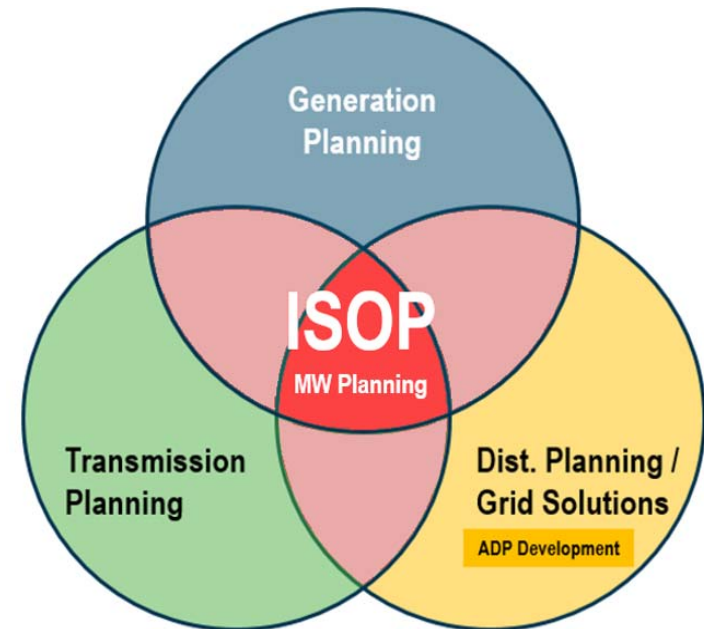
*The initial screening phase ...*



# ISOP Development for Non-Traditional Solutions Evaluations



- ISOP is developing new tools, processes and methodologies to screen for and evaluate non-traditional solutions.
- Simulations and case studies are being used to refine the new processes and help identify gaps in approach.
- This iterative development approach is focused on integrating these new processes into the 2022 Carolinas Integrated Resource Plans.
- Today's discussion will focus on high-level screening processes which help identify NTS candidates for more detailed analysis and review.
- *The information provided in this presentation reflects work in progress and will change as development progresses.*



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## Traditional Solutions



Historically, growth in customer demand for electricity was solved through traditional infrastructure investments. These investments include:

- Generating stations for system capacity or energy needs
- Transmission or distribution lines, substations, and associated equipment to address issues on the transmission system or overloads on distribution circuits
- Additional feeders or small generators to address reliability for critical or remote circuits with a high outage history



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## Non-Traditional Solutions (NTS)



Non-traditional solutions (NTS) are alternative methods of solving utility system issues which would typically be addressed with traditional infrastructure investments

Non-traditional solutions may also be referred to as non-wires alternatives (NWAs)

*NTS/NWAs can include:*

- *Demand Response/Load Management (DR)*
- *Distributed Generation (DG)*
- *Energy Efficiency (EE)*
- *Electrical Storage Systems (ESS - Batteries)*
- *Pumped Storage and Thermal Storage Systems*
- *Rate Design*



## Non-Traditional Solution Evaluations



*Screening is the first cut in a complex planning process to help identify alternatives for further review.*

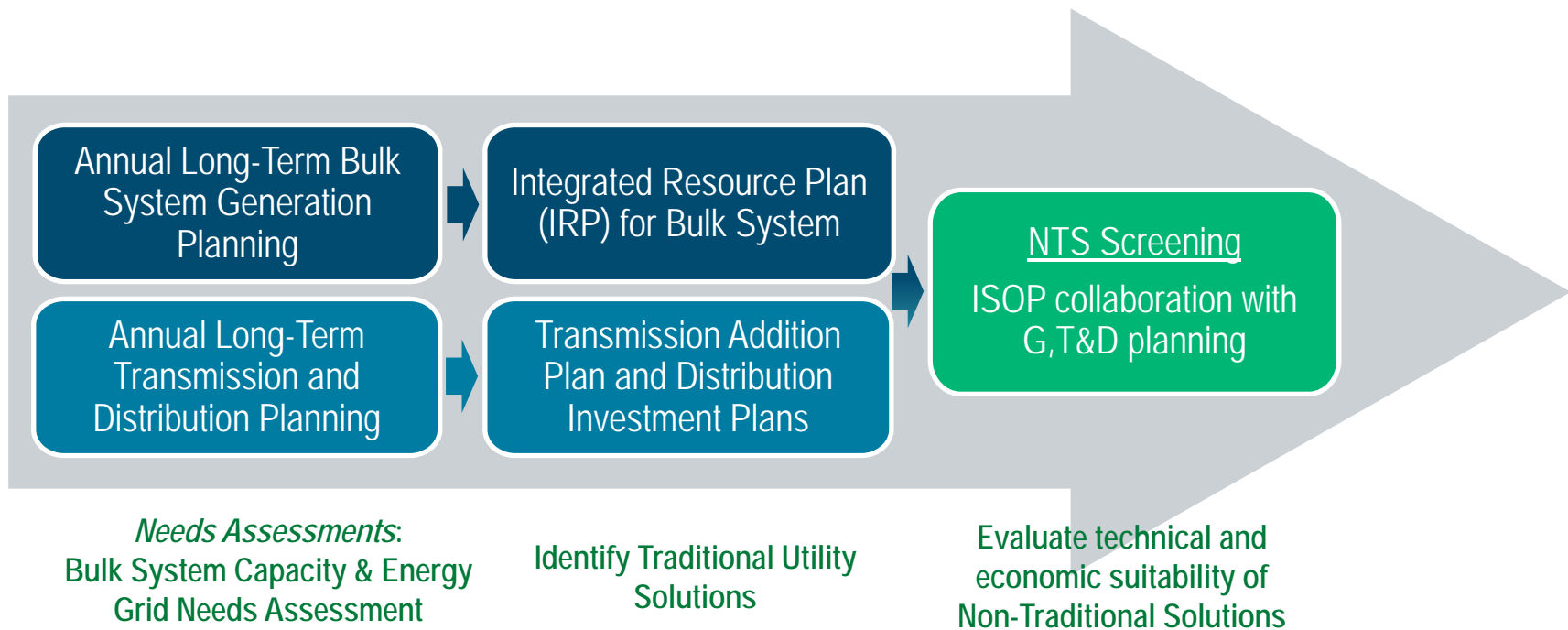
Some of the building blocks for NTS economic and technical potential screening assessments:

- Establish forecasts for system load and energy delivery requirements
  - Morecast, traditional circuit level and bulk system forecasts
- Characterize traditional and non-traditional solutions to enable comparison of alternatives
  - Technology characterization studies provide cost and performance attributes for use in planning
- Estimate values for bulk system services to support G, T and D planners
  - Proxy values for system capacity services and energy arbitrage potential
  - Proxy values for system support services including reserves and ancillary services
- Characterize additional potential value for deferral of traditional T or D investments

*Each of these steps involves new processes and tools that are being developed as part of ISOP*

# Non-Traditional Solution Evaluations

High-level NTS Screening

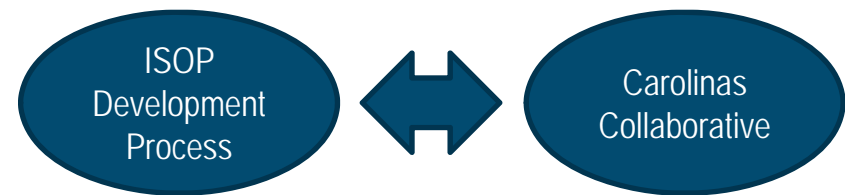


*The process depicted focuses on the initial screening phase for traditional and non-traditional solutions*

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### Discussion questions

- Is there a practical way for ISOP to engage with the Collaborative?
- What are the practical limitations for counting on EE/Customer Programs to defer Distribution and Transmission investments?
- Which use cases are you most interested in / are most important to you?

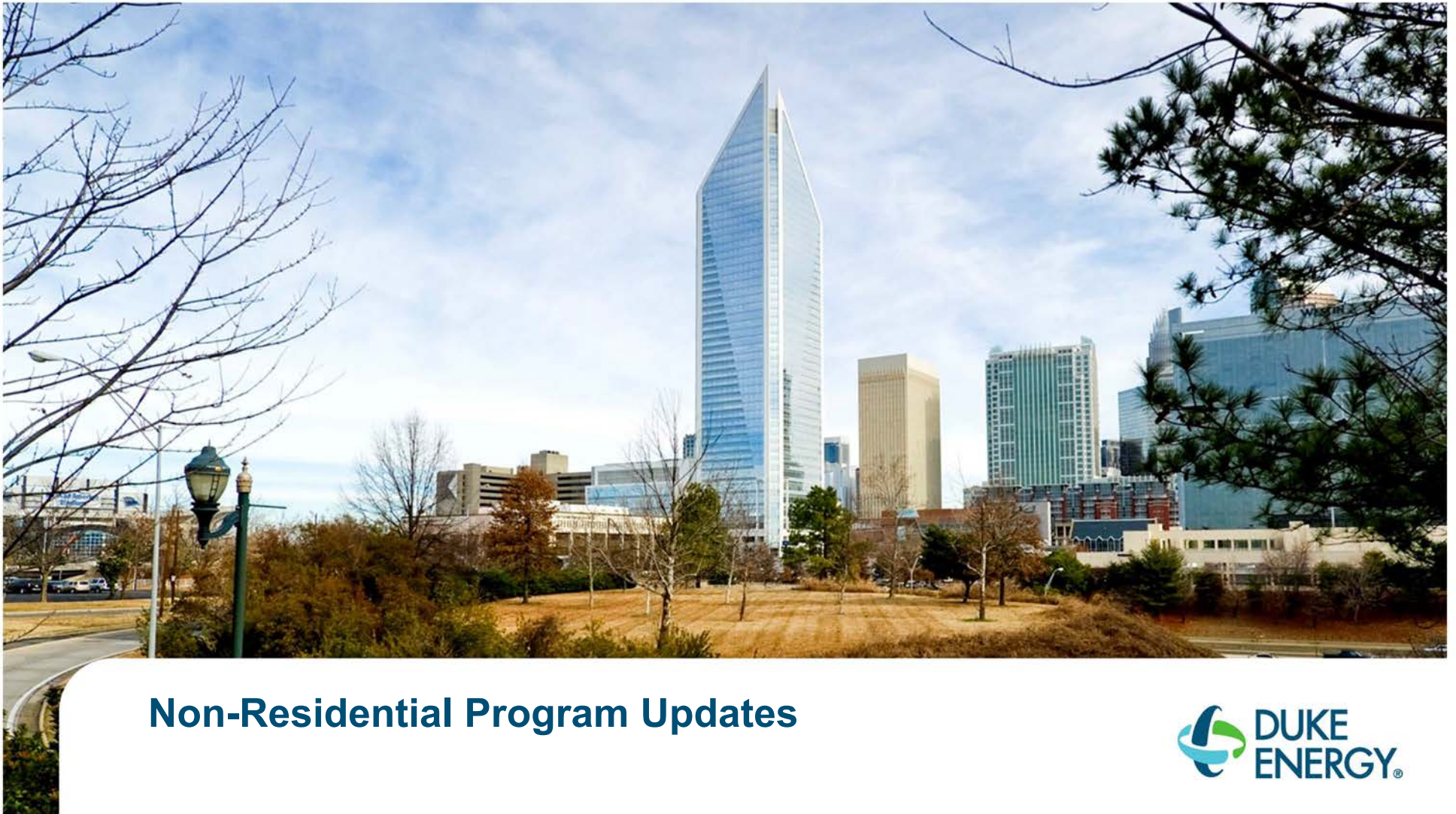




*BUILDING A **SMARTER** ENERGY FUTURE<sup>SM</sup>*

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## Non-Residential Program Updates





# Prescriptive Programs

## Small Business Energy Saver

### Small Business Energy Saver<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$37.9                   | \$25.7                                | 68%            |
| Program Cost                   | \$14.6                   | \$11.4                                | 78%            |
| MW                             | 14.5                     | 9.2                                   | 63%            |
| MWH                            | 75,258.1                 | 53,674.2                              | 71%            |
| Units <sup>2</sup>             | 61,700,000               | 51,421,356                            | 83%            |

1) Values are reflected at the system level.

2) Units reflect gross kWh.

| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | 46,011          | 34,745               | -11,266   |
| Savings (MW)          | 8.95            | 5.82                 | -3.13     |
| Participants          |                 | 33,301,332           |           |
| 2019 Program Expenses |                 | \$7,346,426          |           |

## DEC Small Business Energy Saver

Small Business Energy Saver Program Budget, Savings & Number of Measures

| Program Year | Expenditures |              |     | Energy Savings |        |      | Demand Savings |        |      | Participants |            |      |
|--------------|--------------|--------------|-----|----------------|--------|------|----------------|--------|------|--------------|------------|------|
|              | Budget       | Actual       | %   | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual     | %    |
| 2017         | \$17,505,451 | \$17,350,972 | 99% | 61,629         | 90,297 | 147% | 12.84          | 17.26  | 134% | 65,000,000   | 79,986,749 | 123% |
| 2018         | \$17,602,867 | \$15,977,993 | 91% | 93,136         | 76,697 | 82%  | 17.12          | 13.37  | 78%  | 75,800,000   | 73,493,029 | 97%  |
| 2016         | \$21,459,213 | \$15,360,852 | 72% | 68,899         | 85,688 | 124% | 16.60          | 16.11  | 97%  | 72,805,295   | 70,239,423 | 96%  |
| 2019         | \$14,602,066 | \$11,418,264 | 78% | 75,258         | 53,674 | 71%  | 14.50          | 9.20   | 63%  | 61,700,000   | 51,421,356 | 83%  |

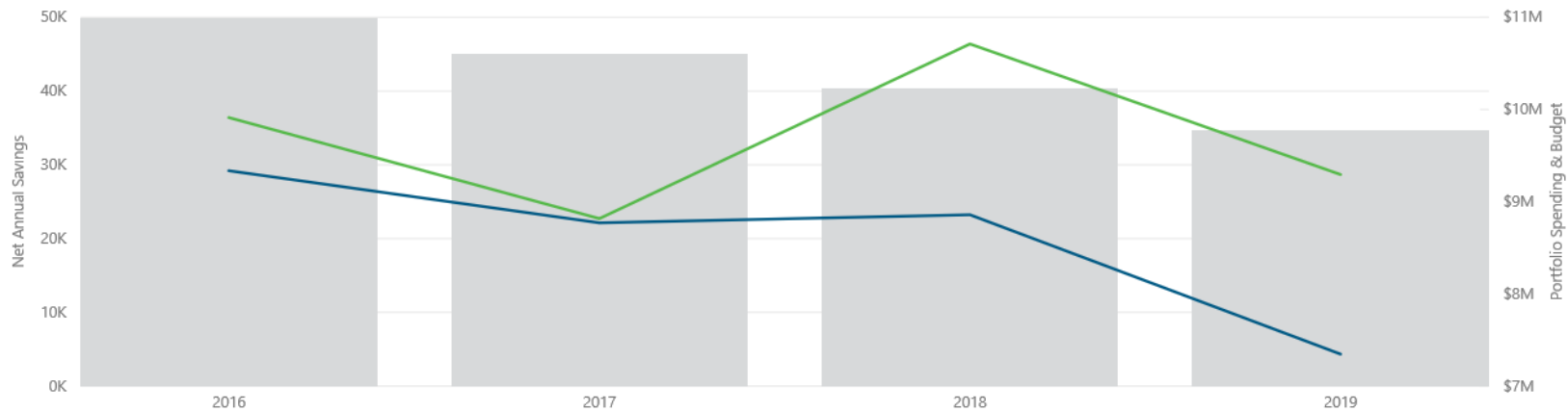


## DEP Small Business Energy Saver

Small Business Energy Saver Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |     | Energy Savings |        |      | Demand Savings |        |      | Participants |            |      |
|--------------|--------------|-------------|-----|----------------|--------|------|----------------|--------|------|--------------|------------|------|
|              | Budget       | Actual      | %   | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual     | %    |
| 2016         | \$9,913,059  | \$9,336,274 | 94% | 39,581         | 49,979 | 126% | 7.55           | 8.67   | 115% | 40,500,000   | 42,784,494 | 106% |
| 2017         | \$8,816,714  | \$8,770,755 | 99% | 35,281         | 45,011 | 128% | 6.73           | 8.50   | 126% | 36,100,000   | 40,204,550 | 111% |
| 2018         | \$10,712,026 | \$8,858,213 | 83% | 53,576         | 40,298 | 75%  | 9.94           | 6.67   | 67%  | 44,500,000   | 38,604,480 | 87%  |
| 2019         | \$9,294,966  | \$7,346,426 | 79% | 46,011         | 34,745 | 76%  | 8.95           | 5.82   | 65%  | 38,500,000   | 33,301,332 | 86%  |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



## Smart \$aver Prescriptive

Non Residential Smart Saver Prescriptive<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$84.3                   | \$103.6                               | 123%           |
| Program Cost                   | \$27.8                   | \$23.7                                | 85%            |
| MW                             | 23.6                     | 30.0                                  | 127%           |
| MWH                            | 160,730.5                | 158,072.3                             | 98%            |
| Units                          | 14,784,792               | 8,510,436                             | 58%            |

1) Values are reflected at the system level.

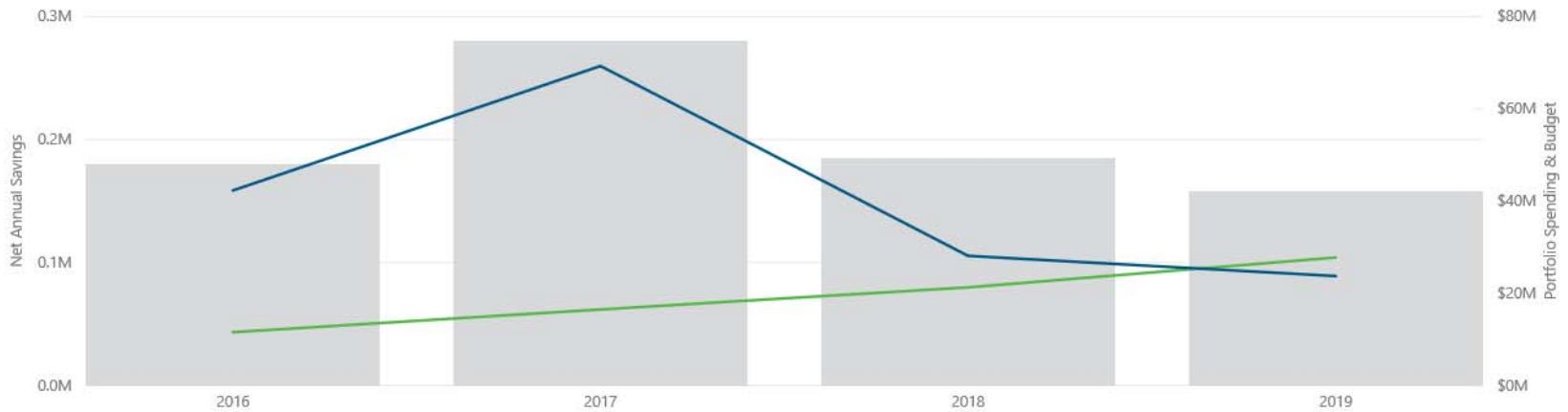
| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | 48,474          | 55,043               | 6,569     |
| Savings (MW)          | 7.34            | 10                   | 2.87      |
| Participants          |                 | 1,685,457            |           |
| 2019 Program Expenses |                 | \$7,948,870          |           |

## DEC Smart Saver Prescriptive

All Program Budget, Savings & Number of Measures

| Program Year | Expenditures |              |      | Energy Savings |         |      | Demand Savings |        |      | Participants |           |       |
|--------------|--------------|--------------|------|----------------|---------|------|----------------|--------|------|--------------|-----------|-------|
|              | Budget       | Actual       | %    | Budget         | Actual  | %    | Budget         | Actual | %    | Budget       | Actual    | %     |
| 2019         | \$27,756,994 | \$23,730,040 | 85%  | 160,731        | 158,072 | 98%  | 23.64          | 29.97  | 127% | 14,784,792   | 8,510,436 | 58%   |
| 2017         | \$16,484,450 | \$69,309,592 | 420% | 87,299         | 280,372 | 321% | 15.25          | 49.11  | 322% | 381,368      | 5,323,913 | 1396% |
| 2016         | \$11,553,041 | \$42,304,359 | 366% | 105,657        | 179,738 | 170% | 18.01          | 30.96  | 172% | 2,165,635    | 5,159,447 | 238%  |
| 2018         | \$21,277,469 | \$28,110,902 | 132% | 103,721        | 184,840 | 178% | 14.90          | 33.00  | 222% | 19,681,171   | 5,050,134 | 26%   |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending

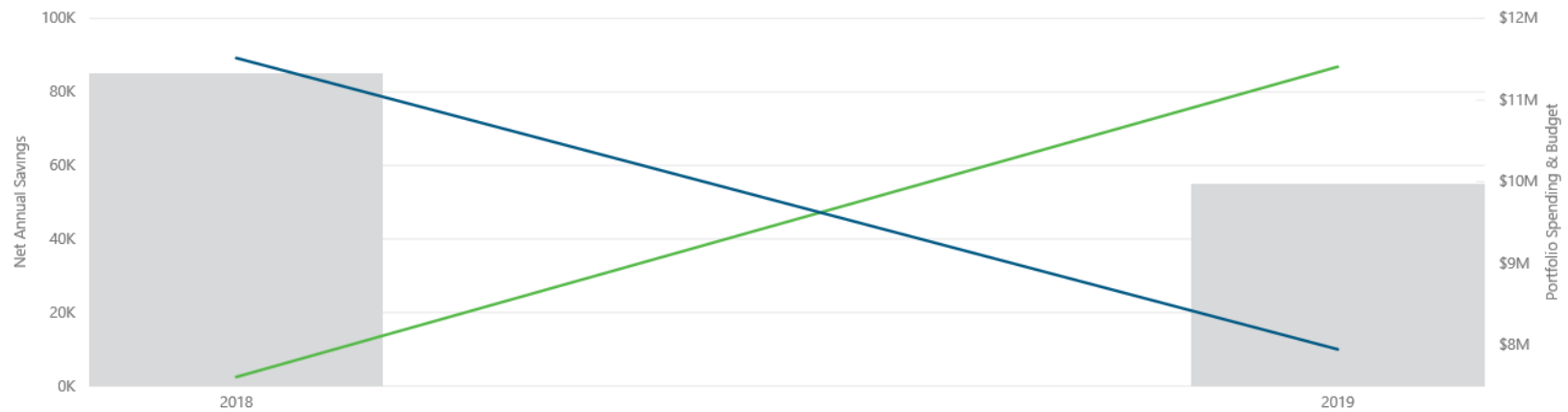


## DEP Smart \$aver Prescriptive

Non-Residential Smart\$aver Prescriptive Program Budget, Savings & Number of Measures

| Program Year | Expenditures |              |      | Energy Savings |        |      | Demand Savings |        |      | Participants |           |      |
|--------------|--------------|--------------|------|----------------|--------|------|----------------|--------|------|--------------|-----------|------|
|              | Budget       | Actual       | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual    | %    |
| 2019         | \$11,408,405 | \$7,948,870  | 70%  | 48,474         | 55,043 | 114% | 7.34           | 10.21  | 139% | 889,128      | 1,685,457 | 190% |
| 2018         | \$7,610,009  | \$11,515,913 | 151% | 29,919         | 85,112 | 284% | 3.15           | 14.78  | 470% | 2,927,380    | 1,098,692 | 38%  |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



# Custom Programs



## Smart \$aver Custom

### Non Residential Smart Saver Custom<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$24.1                   | \$35.9                                | 149%           |
| Program Cost                   | \$10.1                   | \$8.9                                 | 88%            |
| MW                             | 6.9                      | 10.1                                  | 146%           |
| MWH                            | 60,678.5                 | 52,522.6                              | 87%            |
| Units                          | 48,280                   | 34,709                                | 72%            |

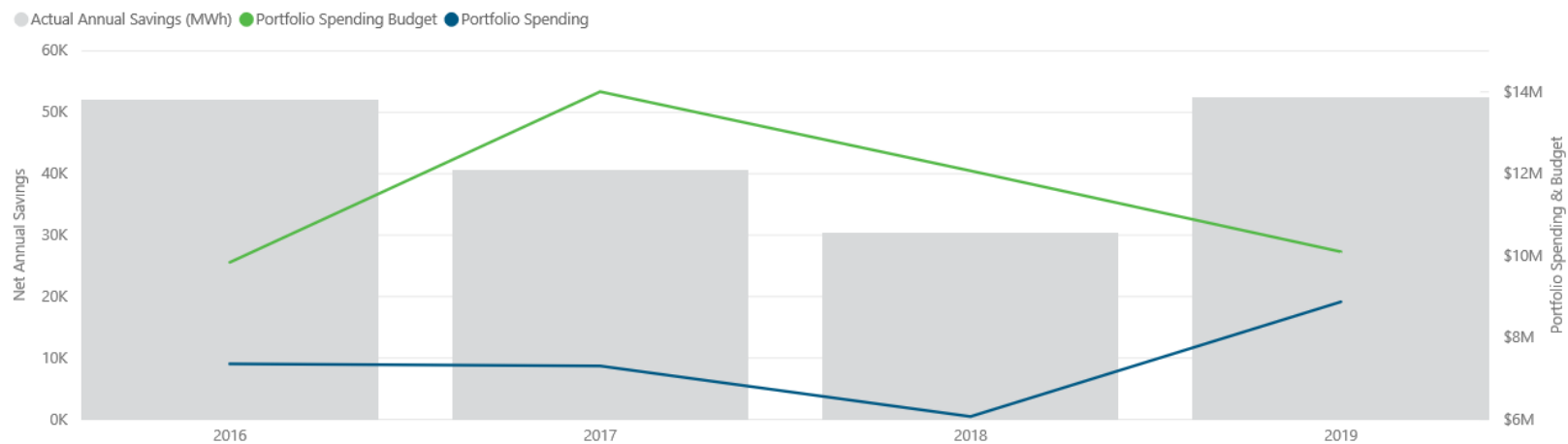
1) Values are reflected at the system level.

| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | 13,879          | 13,130               | -749      |
| Savings (MW)          | 1.58            | 3.12                 | 1.54      |
| Participants          |                 | 10,996               |           |
| 2019 Program Expenses |                 | \$2,769,305          |           |

## DEC Smart Saver Custom

Non Residential Smart Saver Custom Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |     | Energy Savings |        |     | Demand Savings |        |      | Participants |        |     |
|--------------|--------------|-------------|-----|----------------|--------|-----|----------------|--------|------|--------------|--------|-----|
|              | Budget       | Actual      | %   | Budget         | Actual | %   | Budget         | Actual | %    | Budget       | Actual | %   |
| 2017         | \$14,005,768 | \$7,304,838 | 52% | 90,102         | 40,610 | 45% | 10.29          | 6.01   | 58%  | 73,002       | 40,134 | 55% |
| 2019         | \$10,095,189 | \$8,871,440 | 88% | 60,679         | 52,523 | 87% | 6.93           | 10.11  | 146% | 48,280       | 34,709 | 72% |
| 2016         | \$9,835,671  | \$7,356,509 | 75% | 78,437         | 52,155 | 66% | 8.95           | 7.93   | 89%  | 63,551       | 34,098 | 54% |
| 2018         | \$12,072,548 | \$6,068,902 | 50% | 95,316         | 30,333 | 32% | 10.88          | 4.05   | 37%  | 62,136       | 23,345 | 38% |

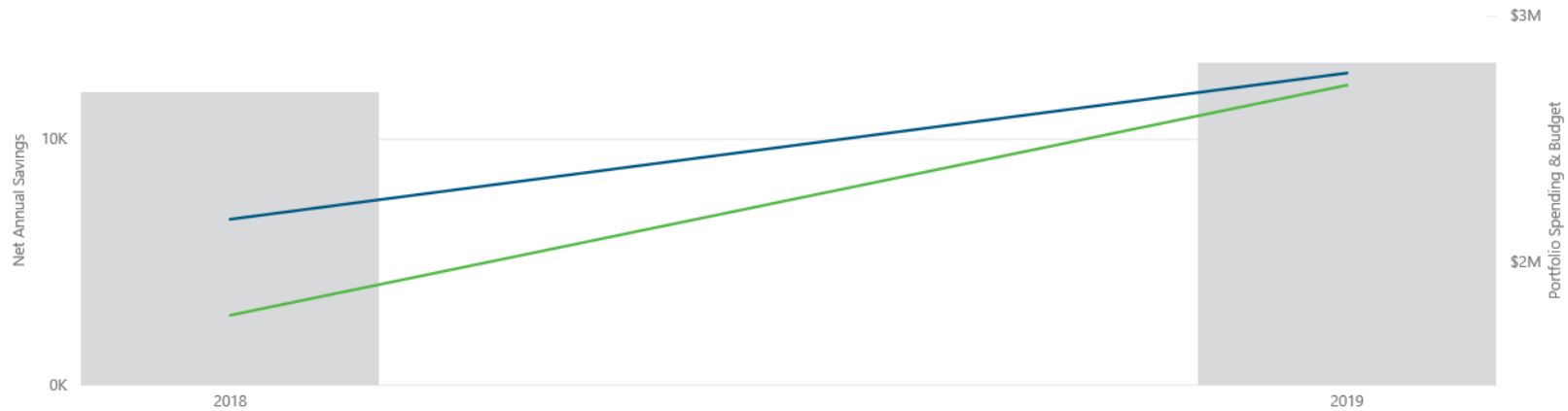


## DEP Smart \$aver Custom

Non-Residential Smart\$aver Custom Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |      | Energy Savings |        |      | Demand Savings |        |      | Participants |        |      |
|--------------|--------------|-------------|------|----------------|--------|------|----------------|--------|------|--------------|--------|------|
|              | Budget       | Actual      | %    | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual | %    |
| 2018         | \$1,783,447  | \$2,174,163 | 122% | 11,484         | 11,901 | 104% | 1.31           | 1.88   | 144% | 8,760        | 11,338 | 129% |
| 2019         | \$2,719,960  | \$2,769,305 | 102% | 13,879         | 13,130 | 95%  | 1.58           | 3.12   | 197% | 10,308       | 10,996 | 107% |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



## Custom Assessments

### Non Residential Smart Saver Custom Technical Assessments<sup>1</sup>

| <i><u>\$ in millions, rounded</u></i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|---------------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost                   | \$3.5                    | \$0.7                                 | 20%            |
| Program Cost                          | \$1.6                    | \$0.3                                 | 18%            |
| MW                                    | 1.0                      | 0.1                                   | 15%            |
| MWH                                   | 8,831.6                  | 1,930.8                               | 22%            |
| Units                                 | 6,125                    | 4                                     | 0%             |

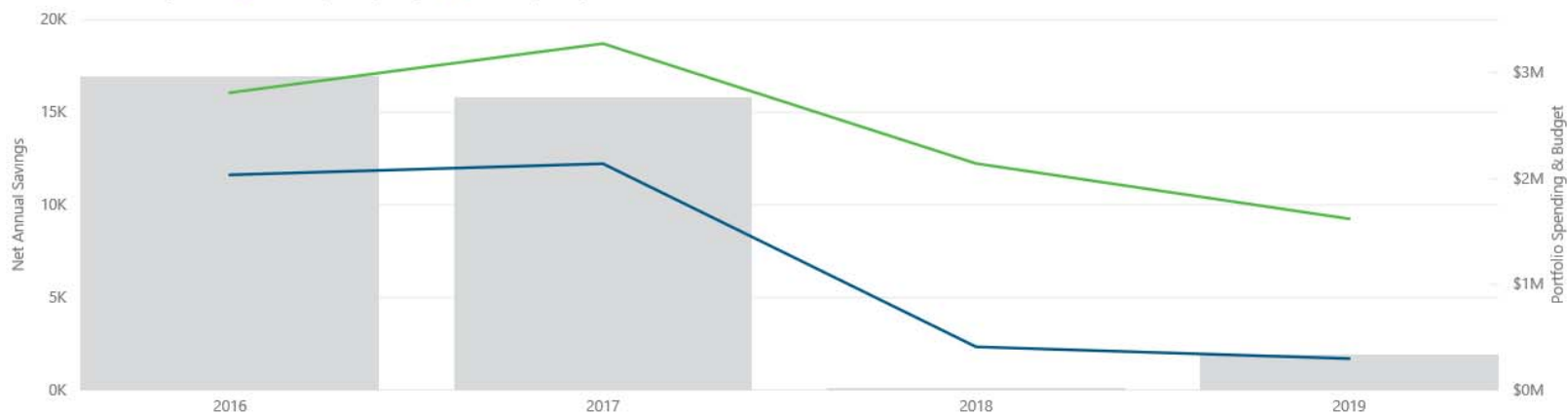
1) Values are reflected at the system level.

## DEC Custom Assessments

Non Residential Smart Saver Custom Technical Assessments Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |     | Energy Savings |        |      | Demand Savings |        |      | Participants |        |    |
|--------------|--------------|-------------|-----|----------------|--------|------|----------------|--------|------|--------------|--------|----|
|              | Budget       | Actual      | %   | Budget         | Actual | %    | Budget         | Actual | %    | Budget       | Actual | %  |
| 2018         | \$2,141,618  | \$407,293   | 19% | 20,322         | 84     | 0%   | 2.32           | 0.01   | 1%   | 13,248       | 218    | 2% |
| 2016         | \$2,811,494  | \$2,034,308 | 72% | 17,529         | 16,953 | 97%  | 2.00           | 1.58   | 79%  | 14,202       | 199    | 1% |
| 2017         | \$3,276,235  | \$2,139,875 | 65% | 13,281         | 15,792 | 119% | 1.52           | 1.63   | 107% | 10,760       | 9      | 0% |
| 2019         | \$1,618,240  | \$295,925   | 18% | 8,832          | 1,931  | 22%  | 1.01           | 0.15   | 15%  | 6,125        | 4      | 0% |

● Actual Annual Savings (MWh)
 ● Portfolio Spending Budget
 ● Portfolio Spending



## Performance Incentive

### Non Residential Smart Saver Performance Incentive<sup>1</sup>

| <u>\$ in millions, rounded</u> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost            | \$8.5                    | \$2.2                                 | 26%            |
| Program Cost                   | \$3.2                    | \$0.8                                 | 25%            |
| MW                             | 2.5                      | 0.4                                   | 16%            |
| MWH                            | 21,489.5                 | 4,546.0                               | 21%            |
| Units                          | 23,254,911               | 19                                    | 0%             |

1) Values are reflected at the system level.

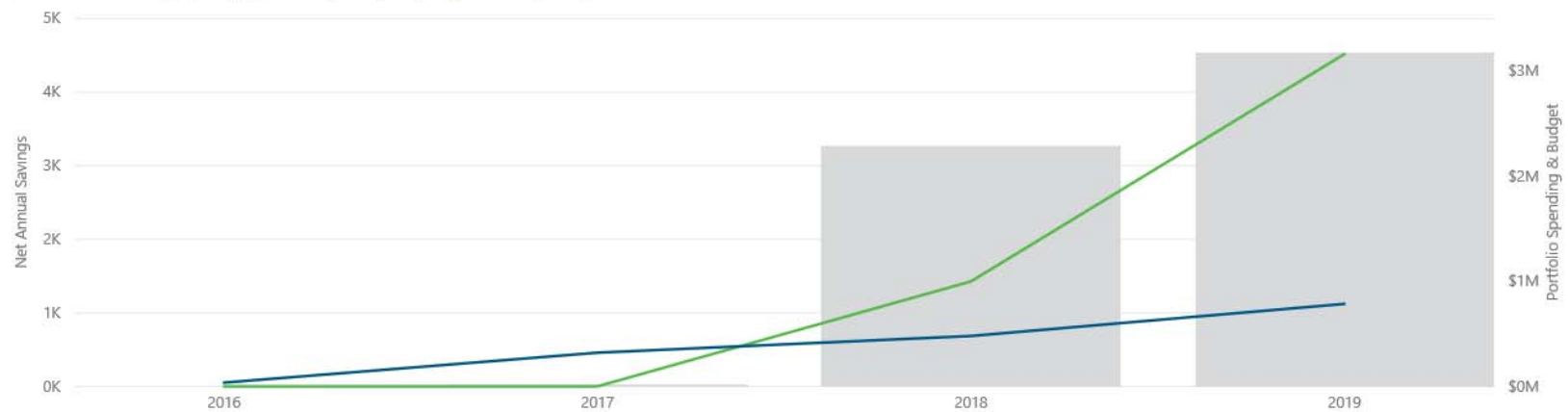
| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | 6,577           | 1,357                | -5,220    |
| Savings (MW)          | 0.75            | 0.10                 | -0.65     |
| Participants          |                 | 62                   |           |
| 2019 Program Expenses |                 | \$269,460            |           |

## DEC Performance Incentive

Non Residential Smart Saver Performance Incentive Program Budget, Savings & Number of Measures

| Program Year | Expenditures |           |     | Energy Savings |        |     | Demand Savings |        |     | Participants |        |    |
|--------------|--------------|-----------|-----|----------------|--------|-----|----------------|--------|-----|--------------|--------|----|
|              | Budget       | Actual    | %   | Budget         | Actual | %   | Budget         | Actual | %   | Budget       | Actual | %  |
| 2018         | \$998,804    | \$479,610 | 48% | 5,706          | 3,271  | 57% | 0.65           | 0.17   | 26% | 6,174,765    | 118    | 0% |
| 2017         | \$0          | \$320,559 | 0%  | 0              | 12     | 0%  | 0.00           | 0.00   | 0%  | 0            | 19     | 0% |
| 2019         | \$3,162,160  | \$784,949 | 25% | 21,489         | 4,546  | 21% | 2.45           | 0.39   | 16% | 23,254,911   | 19     | 0% |
| 2016         | \$0          | \$35,670  | 0%  | 0              | 0      | 0%  | 0.00           | 0.00   | 0%  | 0            | 0      | 0% |

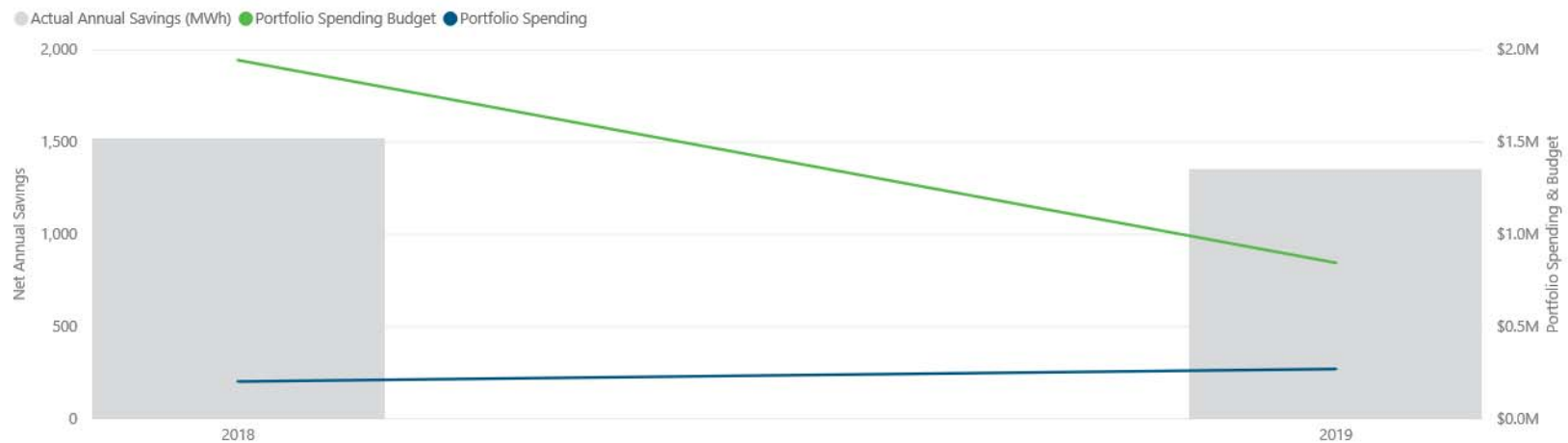
● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



## DEP Performance Incentive

Non-Residential Smart\$aver Performance Program Budget, Savings & Number of Measures

| Program Year | Expenditures |           |     | Energy Savings |        |     | Demand Savings |        |     | Participants |        |    |
|--------------|--------------|-----------|-----|----------------|--------|-----|----------------|--------|-----|--------------|--------|----|
|              | Budget       | Actual    | %   | Budget         | Actual | %   | Budget         | Actual | %   | Budget       | Actual | %  |
| 2019         | \$845,910    | \$269,460 | 32% | 6,577          | 1,357  | 21% | 0.75           | 0.10   | 13% | 6,320,736    | 62     | 0% |
| 2018         | \$1,945,905  | \$201,559 | 10% | 1,729          | 1,519  | 88% | 0.20           | 0.13   | 65% | 1,662,148    | 37     | 0% |





# Demand Response

## EnergyWise Business

### EnergyWise for Business<sup>1</sup>

| <i>\$ in millions, rounded</i> | Vintage 2019<br>As Filed <sup>3</sup> | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|--------------------------------|---------------------------------------|---------------------------------------|----------------|
| <b>NPV of Avoided Cost</b>     | <b>\$3.3</b>                          | <b>\$2.7</b>                          | <b>83%</b>     |
| <b>Program Cost</b>            | <b>\$4.0</b>                          | <b>\$3.7</b>                          | <b>93%</b>     |
| <b>MW</b>                      | <b>16.7</b>                           | <b>11.6</b>                           | <b>70%</b>     |
| <b>MWH</b>                     | <b>2,885.9</b>                        | <b>2,704.1</b>                        | <b>94%</b>     |
| <b>Units<sup>2</sup></b>       | <b>19,023</b>                         | <b>15,053</b>                         | <b>79%</b>     |

1) Values are reflected at the system level.

2) Units represent average monthly kW at meter for demand response measures (10,071), plus individual participants for smart thermostat energy efficiency measures (4,982).

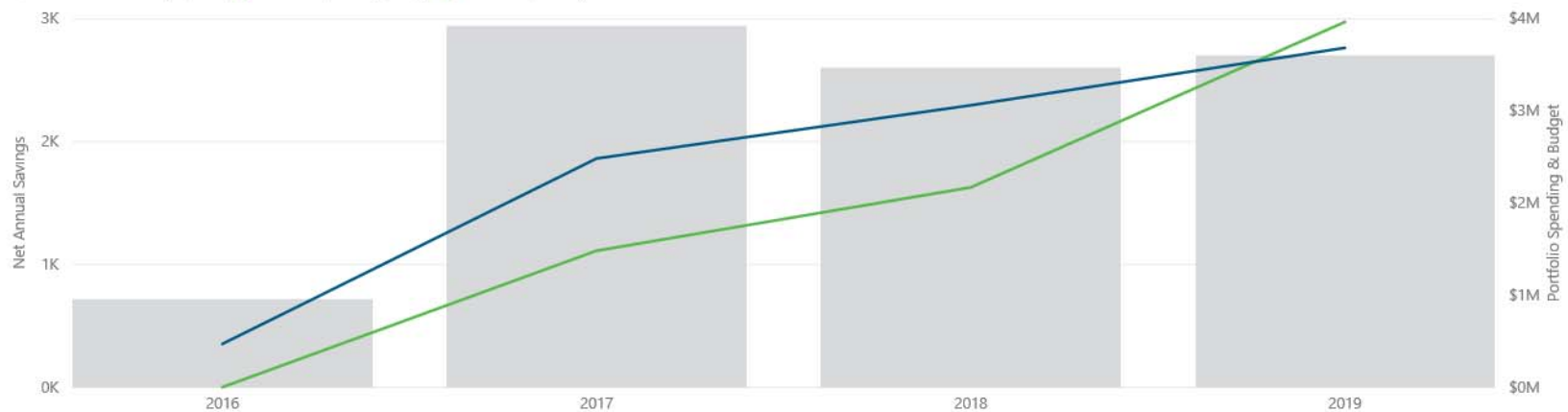
| <b>2019 YTD Results</b> | <b>Annual Forecast</b> | <b>Actual at 12/31/2019</b> | <b>Variation</b> |
|-------------------------|------------------------|-----------------------------|------------------|
| Savings (MWH)           | 1,537                  | 55.15                       | -1,481           |
| Savings (MW)            | 8.89                   | 4.79                        | -4.09            |
| Participants (EE & DR)  |                        | 7,460                       |                  |
| 2019 Program Expenses   |                        | \$2,382,632                 |                  |

## DEC Energy Wise Business

EnergyWise for Business Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |      | Energy Savings |        |      | Demand Savings |        |     | Participants |        |      |
|--------------|--------------|-------------|------|----------------|--------|------|----------------|--------|-----|--------------|--------|------|
|              | Budget       | Actual      | %    | Budget         | Actual | %    | Budget         | Actual | %   | Budget       | Actual | %    |
| 2019         | \$3,967,504  | \$3,686,451 | 93%  | 2,886          | 2,704  | 94%  | 16.66          | 11.60  | 70% | 19,023       | 15,053 | 79%  |
| 2018         | \$2,170,686  | \$3,062,816 | 141% | 3,530          | 2,600  | 74%  | 17.03          | 8.00   | 47% | 6,863        | 11,505 | 168% |
| 2017         | \$1,482,746  | \$2,484,618 | 168% | 1,757          | 2,944  | 168% | 8.97           | 5.45   | 61% | 3,342        | 8,537  | 255% |
| 2016         | \$0          | \$470,304   | 0%   | 0              | 719    | 0%   | 0.00           | 1.20   | 0%  | 0            | 1,960  | 0%   |

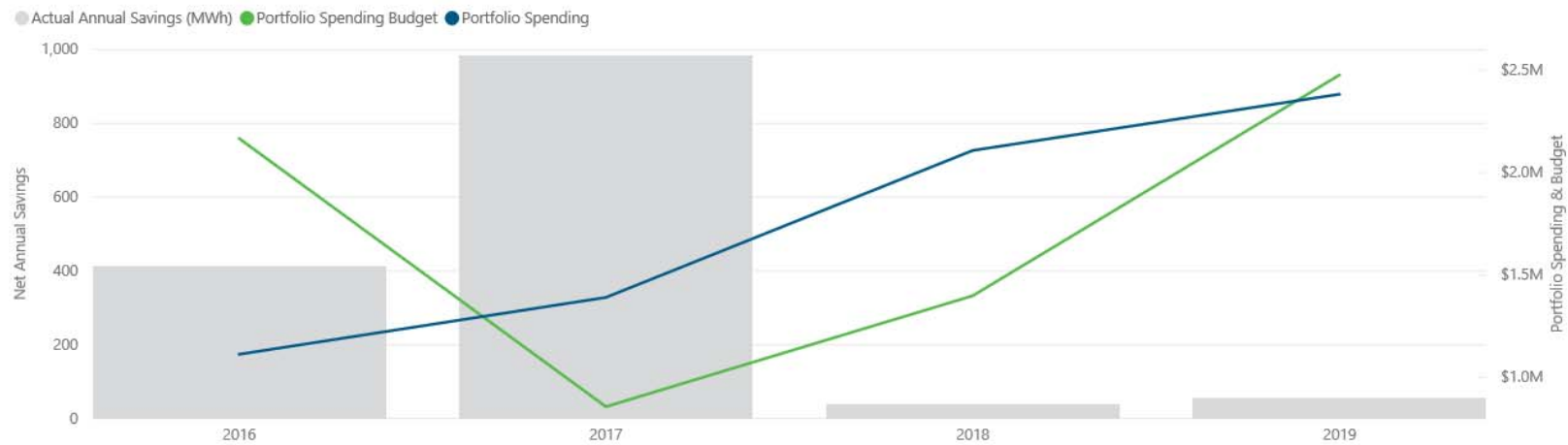
● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



## DEP EnergyWise for Business

EnergyWise for Business Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |      | Energy Savings |        |      | Demand Savings |        |     | Participants |        |      |
|--------------|--------------|-------------|------|----------------|--------|------|----------------|--------|-----|--------------|--------|------|
|              | Budget       | Actual      | %    | Budget         | Actual | %    | Budget         | Actual | %   | Budget       | Actual | %    |
| 2019         | \$2,476,808  | \$2,382,632 | 96%  | 1,537          | 55     | 4%   | 8.89           | 4.79   | 54% | 6,750        | 7,460  | 111% |
| 2018         | \$1,398,553  | \$2,108,030 | 151% | 2,158          | 38     | 2%   | 10.54          | 2.66   | 25% | 2,838        | 2,017  | 71%  |
| 2017         | \$857,190    | \$1,390,549 | 162% | 986            | 984    | 100% | 5.04           | 2.89   | 57% | 1,896        | 1,664  | 88%  |
| 2016         | \$2,166,386  | \$1,112,815 | 51%  | 649            | 412    | 64%  | 1.55           | 0.52   | 34% | 781          | 697    | 89%  |



## PowerShare

PowerShare<sup>1</sup>

| <i><u>\$ in millions, rounded</u></i> | Vintage 2019<br>As Filed | Vintage 2019<br>YTD December 31, 2019 | % of<br>Target |
|---------------------------------------|--------------------------|---------------------------------------|----------------|
| NPV of Avoided Cost                   | \$38.5                   | \$42.1                                | 109%           |
| Program Cost                          | \$13.3                   | \$13.0                                | 98%            |
| MW <sup>2</sup>                       | 337.9                    | 342.6                                 | 101%           |
| MWH                                   | 0.0                      | N/A                                   | -              |
| Units <sup>3</sup>                    | 318,083                  | 322,533                               | 101%           |

### Notes on Tables:

1) Values are reflected at the system level.

2) MW capability derived by taking average over specific PowerShare contract periods. At month-end December 2019, we had the ability to shed 342.6 MW (at the plant), representing 101% of the as filed capacity.

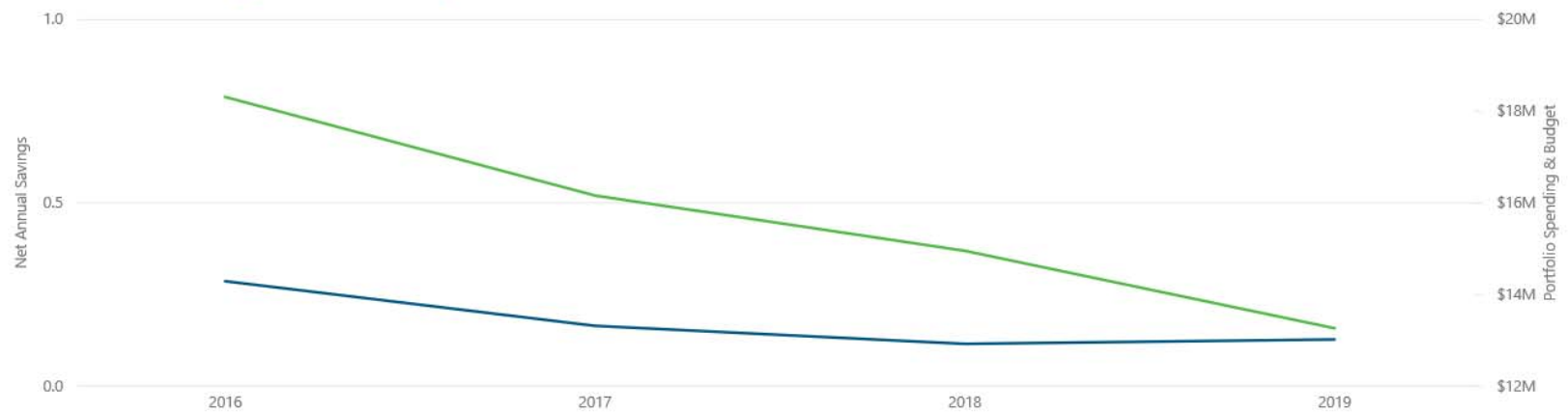
3) Units included in filing represented KW at meter, rather than number of participants.

# DEC PowerShare

PowerShare Program Budget, Savings & Number of Measures

| Program Year | Expenditures |              |     | Energy Savings |        |    | Demand Savings |        |      | Participants |         |      |
|--------------|--------------|--------------|-----|----------------|--------|----|----------------|--------|------|--------------|---------|------|
|              | Budget       | Actual       | %   | Budget         | Actual | %  | Budget         | Actual | %    | Budget       | Actual  | %    |
| 2016         | \$18,313,920 | \$14,291,024 | 78% | 0              | 0      | 0% | 424.80         | 368.90 | 87%  | 399,929      | 347,302 | 87%  |
| 2019         | \$13,263,911 | \$13,019,606 | 98% | 0              | 0      | 0% | 337.86         | 342.59 | 101% | 318,083      | 322,533 | 101% |
| 2017         | \$16,161,676 | \$13,316,535 | 82% | 0              | 0      | 0% | 371.37         | 340.37 | 92%  | 349,625      | 320,442 | 92%  |
| 2018         | \$14,955,081 | \$12,922,977 | 86% | 0              | 0      | 0% | 388.03         | 332.63 | 86%  | 365,308      | 313,157 | 86%  |

● Actual Annual Savings (MWh) ● Portfolio Spending Budget ● Portfolio Spending



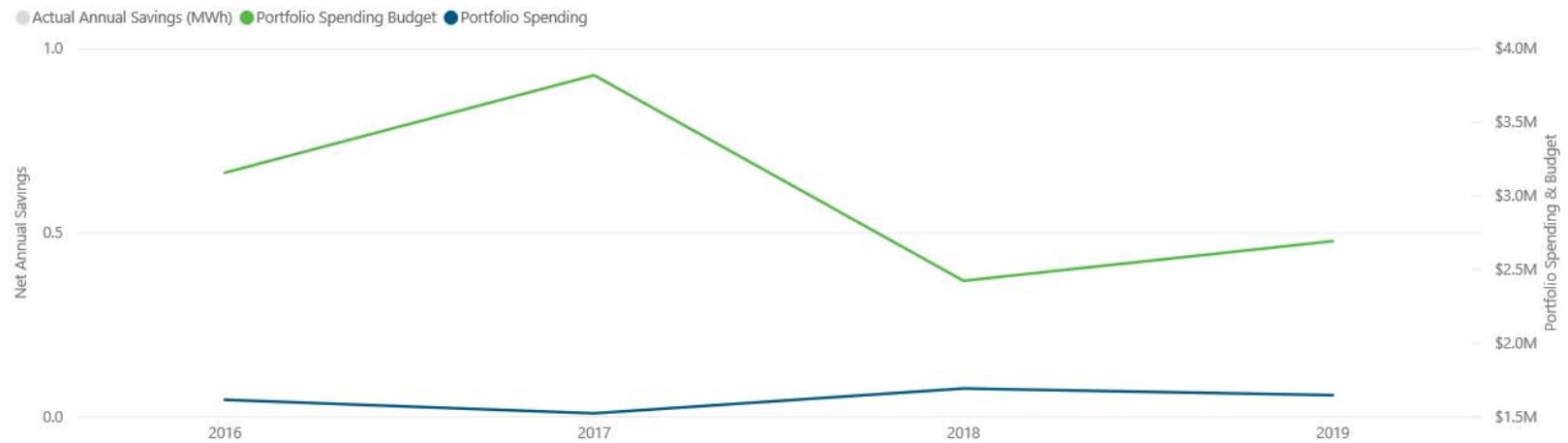
## CIG DRA

| 2019 YTD Results      | Annual Forecast | Actual at 12/31/2019 | Variation |
|-----------------------|-----------------|----------------------|-----------|
| Savings (MWH)         | N/A             | N/A                  | N/A       |
| Savings (MW)          | 29.95           | 25.16                | -4.79     |
| Participants          |                 | 71                   |           |
| 2019 Program Expenses |                 | \$1,647,027          |           |

## DEP CIG DRA

Commercial, Industrial, & Governmental Demand Response Program Budget, Savings & Number of Measures

| Program Year | Expenditures |             |     | Energy Savings |        |    | Demand Savings |        |      | Participants |        |     |
|--------------|--------------|-------------|-----|----------------|--------|----|----------------|--------|------|--------------|--------|-----|
|              | Budget       | Actual      | %   | Budget         | Actual | %  | Budget         | Actual | %    | Budget       | Actual | %   |
| 2019         | \$2,694,260  | \$1,647,027 | 61% | 0              | 0      | 0% | 7.36           | 2.57   | 35%  | 7,000        | 2,442  | 35% |
| 2017         | \$3,822,330  | \$1,523,514 | 40% | 0              | 0      | 0% | 14.71          | 1.97   | 13%  | 14,000       | 1,873  | 13% |
| 2018         | \$2,424,856  | \$1,692,473 | 70% | 0              | 0      | 0% | 7.36           | 1.63   | 22%  | 7,000        | 1,550  | 22% |
| 2016         | \$3,159,367  | \$1,615,703 | 51% | 0              | 0      | 0% | 12.93          | -5.34  | -41% | 12,300       | 0      | 0%  |







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**Upstream Channel**

## Upstream Channel

- Launch an Upstream channel as part of our existing prescriptive program to work directly with HVAC and Food Service manufacturers. Point of sale rebates would be offered to customers who purchase high-efficiency equipment. Goal is to drive more participation in these technologies.
- Currently, we are not capturing the participation for manufacturer direct sales in many instances. This modification to our existing prescriptive program would provide a direct extension of the core rebates through manufacturers.
- The Upstream channel would work the same as our current Midstream channel but with manufacturers instead of distributors.
- Potential manufacturers:
  - HVAC: Nest, Daikin
  - Food Service: Accutemp, Avantco

## Upstream Channel

- Rebates would match the measures offered in Midstream and cost effectiveness would remain the same as the current prescriptive numbers.

| Cost Effectiveness<br>2019 | Food Service<br>DEC | HVAC<br>DEC | Food Service<br>DEP | HVAC<br>DEP |
|----------------------------|---------------------|-------------|---------------------|-------------|
| UCT                        | 1.12                | 2.13        | 1.21                | 2.14        |
| TRC                        | 0.66                | 1.81        | 0.66                | 1.86        |
| RIM                        | 0.58                | 0.54        | 0.62                | 0.76        |
| PCT                        | 1.32                | 3.79        | 1.45                | 3.44        |

- Next steps:
  - Develop process and communications
  - Launch early Q2



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## **Non-Residential Program Modification Ideas**

DEC/DEP Collaborative March 19, 2020

## Review of January Discussion

- Discussed the barriers for Business Customers to invest in EE
- Recommended Updates to Small Business Energy Saver program
  - Trade Ally centric model
  - Provide third-party, no-money upfront payment alternatives - such as project financing, equipment leases, efficiency as a service (pay through savings), etc.
  - Accessible to business customers of all sizes and segments
    - Support/incentives/carve-out for small businesses
    - Extending to low-income communities
  - Sub-metering equipment and data analysis to accurately track energy savings
  - Performance-based incentives paid per actual kWh saved
  - Performance reporting back to the customer

## Proposed Program Updates

- Program Name updated to “Business Energy Saver” with two channels
  - Small Business Energy Saver
    - To ensure that the smallest businesses are still served, keep the current single-provider direct install model for customers **up to 50 kW**
      - Research on past SBES participants indicates **50 kW** and below is appropriate for smaller projects (< \$15K) that do not fit SmartPath model
    - SmartPath TAs may be an option if the customer requests this (Ex: multi-site customers or special equipment)
  - SmartPath (official name TBD – running through legal)
    - Customers **> 50 kW**
    - Authorized Trade Allies perform the work
    - SBES vendor may be an option if no authorized TAs are suitable (Ex: rural areas, low income communities)
- For both options, incentive payments based on the projected energy savings, for EE equipment such as in lighting; refrigeration; HVAC; variable frequency drives; and other commercial and industrial equipment.

## Proposed Program Updates, cont.

### ■ SmartPath

- In most cases, require a minimum amount of usage history and/or pre-monitoring of equipment energy usage
- The program will identify Authorized Trade Allies, and enter into agreements with them to follow program rules and processes
- Authorized Trade Allies will



- Financing options will be between the customer and the TA or another lender.
- The program will provide information on projected savings which the customer could plan to use for repayment

## Development Activities to Date

### Program Administrator - Request for Proposal

- Scope of work to include a web-based platform for Trade Allies and the Program team, resources for training, TA and customer support
- 22 prospective bidders invited; 16 expressed interest so far
- Proposals due April 10

### Marketing

- Working name "SmartPath" still subject to final business and legal approval
- SMB Customer Panel Survey scheduled for April to validate assumptions around barriers and help prioritize the Program emphasis

### TA feedback

- Informal feedback received from 3 existing S\$ trade allies; very interested but questions point to need for training and tools for them to adjust to this new model

### Customer Journey Mapping



## Timeline

- March 9 – RFP issued
- March 19 – DEC/DEP Collaborative
- April 10 – program administrator proposals due
- April – SMB customer panel survey
- April/May – file updated Business Energy Saver tariff
  - Timing subject to the proposal pricing, and issues identified by bidders
- Summer - Program approval
- Following program approval
  - Sign contract with program administrator
  - Recruit trade allies
  - Train trade allies
- Late 2020 - Begin marketing SmartPath

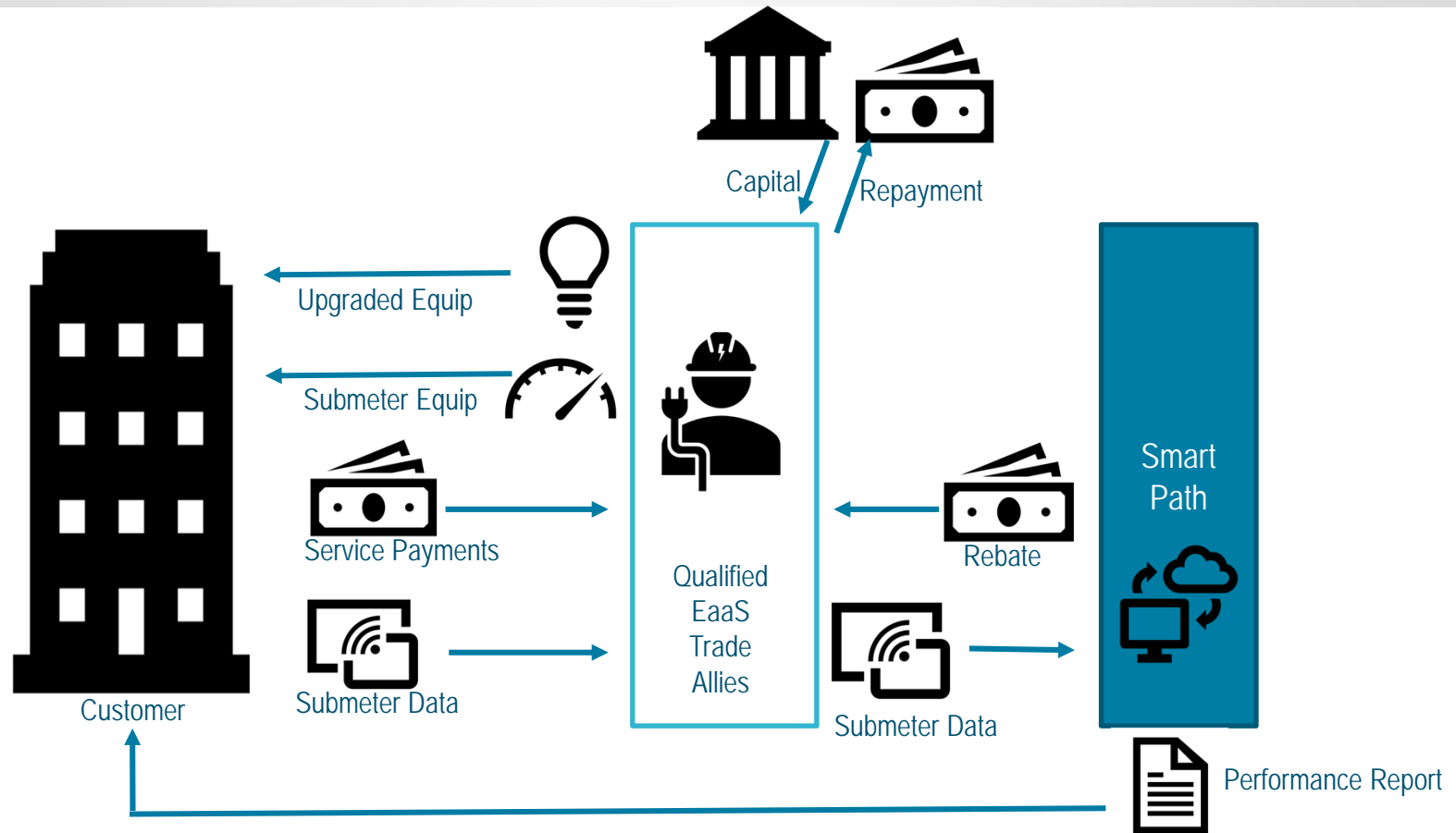
## Cost Effectiveness

- Preliminary assessment
  - Avg UCT 2.9
  - Avg TRC 1.6
- To be updated with revised program administration costs

## EaaS Measure Details

| Measure Name                        | Notes   | Measure Life |
|-------------------------------------|---|--------------|
| HVAC AC New System                  | New air conditioning systems  | 15           |
| HVAC HP New System                  | New heat pump systems   | 15           |
| HVAC AC Optimization                | Air conditioning only = Full tune-up (w/ refrigerant charge), VFD HVAC fans, Advanced RTU controls, EC motors on compressors, network control thermostats, etc. | 15           |
| HVAC HP Optimization                | All optimization above but for AC + electric heat (heat pumps)  | 15           |
| HVAC AC New System w/ Optimize      | New AC system with optimization measures  | 15           |
| HVAC HP New System w/ Optimize      | New heat pump system with optimization measures   | 15           |
| Lighting 8760                       | all LED measures (retrofits & new fixtures, lamps) operating at least 8,040 hours per year (335 days, 24 hrs/day)   | 15           |
| Lighting Day                        | all LED measures (retrofits & new fixtures, lamps) operating mostly within normal business hours (generally 6a - 7p)  | 15           |
| Lighting Night                      | all LED measures (retrofits & new fixtures, lamps) operating mostly overnight   | 15           |
| Existing Lighting w/ Controls 8760  | lighting controls (connected or otherwise) added to existing lighting operating at least 8,040 hours per year (335 days, 24 hrs/day)                            | 8            |
| Existing Lighting w/ Controls Day   | lighting controls (connected or otherwise) added to existing lighting operating mostly within normal business hours   | 8            |
| Existing Lighting W/ Controls Night | lighting controls (connected or otherwise) added to existing lighting operating mostly overnight  | 8            |
| New Lighting w/ Controls 8760       | new LED measures with new controls operating at least 8,040 hours per year (335 days, 24 hrs/day)   | 15           |
| New Lighting w/ Controls Day        | new LED measures with new controls operating mostly within normal business hours (generally 6a - 7p)  | 15           |
| New Lighting W/ Controls Night      | new LED measures with new controls operating mostly overnight   | 15           |
| Refrigeration New Equipment         | All new refrigeration equipment   | 15           |
| Refrigeration Optimization          | Cooler/Freezer ECMS, anti-sweat heater controls, etc  | 12           |
| C&I Equipment                       | non-HVAC Optimization (incl VFDs), VSD Air Compressor   | 15           |

## Proposed Model





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## Proposed Customer Journey

1. Customer receives marketing from program
2. Customer fills out form, calls Duke or requests call back; provides basic information on facility
3. Customer is contacted by TA(s) to schedule audit(s)
4. Customer audit(s) performed by TA(s)
5. Customer receives proposal(s) from TA(s) to include Program Proposal & TA-Customer Contract
6. Customer says yes or no to TA
7. If applicable, Customer gives TA (or 3rd party) required data to qualify for project financing
8. TA installs submeters for pre-monitoring
9. Customer may receive revised proposal based on sub-metered data
10. Installation scheduled and started; Change Orders as needed
11. Installation complete
  - a. Start 2 week post-monitoring
  - b. If needed, TA contacts customer to address low savings
12. Customer begins payments to TA
13. Customer receives savings report from Program

## Trade Ally Draft Requirements

- Trade Allies must be qualified to participate in “SmartPath”
  - Sign an agreement with the Program
  - Agree to code of conduct
  - Participate in Program training
  - Agree to the SmartPath process
  - Compete with other trade allies during the process
  - Update the Program on projects via a web-based platform provided by the Program Administrator
  - Address projects with savings lower than expected
  - Provide or help arrange project financing for customers



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## DEP Weatherization Recap



Wrap Up,  
Scheduling,  
Topics for Future Collaboratives

