

INFORMATION SHEET

PRESIDING: Chairman Finley, Presiding; and Commissioners Brown-Bland,  
Dockham, Patterson, Gray, Clodfelter, and Mitchell  
PLACE: Dobbs Building, Room 2115, Raleigh, NC  
DATE: Tuesday, January 29, 2019  
TIME: 2:00 p.m. to 5:30 p.m.  
DOCKET NO.: E-100, Sub 101; E-2, Sub 1159; E-7, Sub 1156  
VOLUME NUMBER: 4  
COMPANIES: Duke Energy Carolinas, LLC and Duke Energy Progress, LLC  
DESCRIPTION: Petition for Approval of Generator Interconnection Standard and  
Joint Petition of Duke Energy Carolinas, LLC, and Duke Energy  
Progress, LLC, for Approval of Competitive Procurement of  
Renewable Energy Program

APPEARANCES

Please see attached.

WITNESSES

Please see attached.

EXHIBITS

Please see attached.

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TRANSCRIPT COPIES ORDERED: E-mail: Kells, Jirak, Breitschwerdt, Kemerait, Smith Bowen,  
Olson, Snowden, Dodge, Cummings, Harrod and Townsend  
CONFIDENTIAL: Kells (CANNOT RECEIVE DUKE CONFIDENTIAL); Jirak, Breitschwerdt, Kemerait,  
Ledford, Smith, Dodge, Cummings, Harrod and Townsend  
REPORTED BY: Linda S. Garrett  
DATE FILED: February 13, 2019

TRANSCRIPT PAGES: 169  
PREFILED PAGES: 202  
TOTAL PAGES: 371

**FILED**

**FEB 13 2019**

Clerk's Office  
N.C. Utilities Commission

1 PLACE: Dobbs Building, Raleigh, North Carolina  
2 DATE: Tuesday, January 29, 2019  
3 TIME: 2:00 p.m. TO 5:30 p.m.  
4 DOCKET NO.: E-100, Sub 101  
5 E-2, Sub 1159  
6 E-7, Sub 1156  
7 BEFORE: Chairman Edward S. Finley, Jr., Presiding  
8 Commissioner ToNola D. Brown-Bland  
9 Commissioner Jerry C. Dockham  
10 Commissioner James G. Patterson  
11 Commissioner Lyons Gray  
12 Commissioner Daniel G. Clodfelter  
13 Commissioner Charlotte A. Mitchell  
14

15 IN THE MATTER OF:  
16 Petition for Approval of Generator  
17 Interconnection Standard  
18 and  
19 Joint Petition of Duke Energy Carolinas, LLC,  
20 and Duke Energy Progress, LLC, for  
21 Approval of Competitive Procurement of  
22 Renewable Energy Program

23 Volume 4  
24

1 A P P E A R A N C E S:

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3 DUKE ENERGY PROGRESS, LLC:

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5 Associate General Counsel

6 Duke Energy Corporation

7 410 S. Wilmington Street/NCRH 20

8 Raleigh, North Carolina 27602

9

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13 Raleigh, North Carolina 27601

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15 FOR VIRGINIA ELECTRIC AND POWER COMPANY, d/b/a

16 DOMINION ENERGY NORTH CAROLINA:

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18 McGuireWoods, LLP

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20 Raleigh, North Carolina 27601

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1 A P P E A R A N C E S Cont'd.:

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17 Lauren Bowen, Esq.

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20 Chapel Hill, North Carolina 27516

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3 Karen Kemerait, Esq.

4 Fox Rothschild, LLP

5 434 Fayetteville Street, Suite 2800

6 Raleigh, North Carolina 27601

7

8 FOR NORTH CAROLINA PORK COUNCIL:

9 Kurt J. Olson, Esq.

10 The Law Office of Kurt J. Olson

11 Post Office Box 10031

12 Raleigh, North Carolina 27605

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14 FOR CYPRESS CREEK RENEWABLES:

15 Benjamin Snowden, Esq.

16 Kilpatrick Townsend & Stockton LLP

17 4208 Six Forks Road, Suite 1400

18 Raleigh, North Carolina 27609

19

20

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24

1 A P P E A R A N C E S Cont'd.:

2 FOR THE USING AND CONSUMING PUBLIC ON BEHALF OF THE  
3 STATE AND ITS CITIZENS IN THIS MATTER THAT AFFECTS THE  
4 PUBLIC INTEREST:

5 Jennifer Harrod, Esq.

6 Special Deputy Attorney General

7 Teresa Townsend, Esq.

8 Special Deputy Attorney General

9 Department of Justice

10 114 West Edenton Street

11 Raleigh, North Carolina 27603

12

13 FOR THE USING AND CONSUMING PUBLIC:

14 Tim R. Dodge, Esq.

15 Layla Cummings, Esq.

16 Public Staff - North Carolina Utilities

17 Commission

18 4326 Mail Service Center

19 Raleigh, North Carolina 27699-4300

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21

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24

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**NORTH CAROLINA UTILITIES COMMISSION**  
**APPEARANCE SLIP**

DATE 1/28/2019  
DOCKET #: 2-100 Sub 101  
NAME OF ATTORNEY Andrea Kells  
TITLE Counsel  
FIRM NAME McGuire Woods LLP  
ADDRESS 434 Fayetteville St. Ste 2600  
CITY Raleigh NC  
ZIP 27601

**APPEARING FOR:**

Dominion Energy NC

**APPLICANT** ☒ **COMPLAINANT** ☐ **INTERVENOR** ☐  
**PROTESTANT** ☐ **RESPONDENT** ☐ **DEFENDANT** ☐

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NORTH CAROLINA UTILITIES COMMISSION  
APPEARANCE SLIP

DATE 1/28  
DOCKET #: 4100 Sub 1001  
NAME OF ATTORNEY Jack Jirak  
TITLE Associate General Counsel  
FIRM NAME Duke Energy  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_  
ZIP \_\_\_\_\_

APPEARING FOR: Duke Energy

APPLICANT ☒ COMPLAINANT \_\_\_\_\_ INTERVENOR \_\_\_\_\_  
PROTESTANT \_\_\_\_\_ RESPONDENT \_\_\_\_\_ DEFENDANT \_\_\_\_\_

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Signature: Jack Jirak

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NORTH CAROLINA UTILITIES COMMISSION  
APPEARANCE SLIP

DATE 1-28-18  
DOCKET #: E-100 Sub 101  
NAME OF ATTORNEY E. Brett Breitschwerdt  
TITLE McGuire Partner  
FIRM NAME McGuire Woods  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_  
ZIP \_\_\_\_\_

APPEARING FOR: Duke Energy

APPLICANT ☒ COMPLAINANT \_\_\_\_\_ INTERVENOR \_\_\_\_\_  
PROTESTANT \_\_\_\_\_ RESPONDENT \_\_\_\_\_ DEFENDANT \_\_\_\_\_

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Signature: E. Brett Breitschwerdt

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NORTH CAROLINA UTILITIES COMMISSION  
APPEARANCE SLIP

DATE 1/29/2019  
DOCKET #: E-100 sub 101  
NAME OF ATTORNEY Karen Kimerait  
TITLE attorney for NCUEN  
FIRM NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_  
ZIP \_\_\_\_\_

**APPEARING FOR:** \_\_\_\_\_  
\_\_\_\_\_

APPLICANT \_\_\_\_\_ COMPLAINANT \_\_\_\_\_ INTERVENOR ☒  
PROTESTANT \_\_\_\_\_ RESPONDENT \_\_\_\_\_ DEFENDANT \_\_\_\_\_

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Signature: Karen Kimerait

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NORTH CAROLINA UTILITIES COMMISSION  
APPEARANCE SLIP

DATE January 28, 2019  
DOCKET #: E-100 Sub 101  
NAME OF ATTORNEY Peter Hedford  
TITLE General Counsel  
FIRM NAME NJC Sustainable Energy Association  
ADDRESS 4800 Six Forks Road, Suite 300  
CITY Raleigh, NC  
ZIP 27609

APPEARING FOR: NJC Sustainable Energy Association  
APPLICANT \_\_\_\_\_  
COMPLAINANT \_\_\_\_\_  
INTERVENOR X  
PROTESTANT \_\_\_\_\_  
RESPONDENT \_\_\_\_\_  
DEFENDANT \_\_\_\_\_

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Email: Peter Hedford  
energy.nc.org  
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**NORTH CAROLINA UTILITIES COMMISSION**  
**APPEARANCE SLIP**

DATE 1/28/2019  
DOCKET #: E-100 Sub 101  
NAME OF ATTORNEY Benjamin Smith  
TITLE Regulatory Counsel  
FIRM NAME N/A  
ADDRESS 4800 Six Forks Road, Ste. 300  
CITY Raleigh  
ZIP 27609

APPEARING FOR: North Carolina Sustainable Energy Association

APPLICANT \_\_\_\_\_ COMPLAINANT \_\_\_\_\_ INTERVENOR ✓  
PROTESTANT \_\_\_\_\_ RESPONDENT \_\_\_\_\_ DEFENDANT \_\_\_\_\_

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Email: ben@energy.nc.org  
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**NORTH CAROLINA UTILITIES COMMISSION**  
**APPEARANCE SLIP**

DATE 1-28-2019  
DOCKET #: E 100 Sub 101  
NAME OF ATTORNEY Laura Beaton  
TITLE Attorney  
FIRM NAME Shute, Mihaly & Weinberger LLP  
ADDRESS 3916 Hayes St.  
CITY San Francisco, CA ~~94102~~  
ZIP 94102

**APPEARING FOR:** Interstate Renewable Energy Council, Inc.

**APPLICANT** \_\_\_\_\_ **COMPLAINANT** \_\_\_\_\_ **INTERVENOR** ☒  
**PROTESTANT** \_\_\_\_\_ **RESPONDENT** \_\_\_\_\_ **DEFENDANT** \_\_\_\_\_

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Email: ~~lbeaton~~ *[Signature]*  
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**NORTH CAROLINA UTILITIES COMMISSION**  
**APPEARANCE SLIP**

DATE Feb 13 2019  
DOCKET #: E-100 Sub 101  
NAME OF ATTORNEY Lauren Bowen  
TITLE Staff Attorney  
FIRM NAME Southern Environmental Law Center  
ADDRESS 601 W Rosemary St Ste 220  
CITY Chapel Hill, NC  
ZIP 27514

**APPEARING FOR:** Interstate Renewable Energy Council

**APPLICANT** \_\_\_\_\_ **COMPLAINANT** \_\_\_\_\_ **INTERVENOR** ☒

**PROTESTANT** \_\_\_\_\_ **RESPONDENT** \_\_\_\_\_ **DEFENDANT** \_\_\_\_\_

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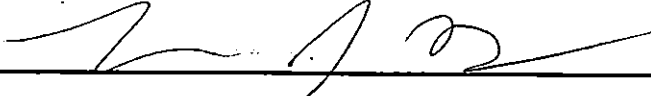
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Email: lbowen@selcnc.org  
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**NORTH CAROLINA UTILITIES COMMISSION**  
**APPEARANCE SLIP**

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DATE 1/28/19  
DOCKET #: E-100 Sub 101  
NAME OF ATTORNEY Kurt Olson  
TITLE Counsel  
FIRM NAME Law Office of Kurt & Olson  
ADDRESS P.O. Box 10031  
CITY Raleigh NC  
ZIP 27605

**APPEARING FOR:** North Carolina Pork Council

**APPLICANT** \_\_\_\_\_ **COMPLAINANT** \_\_\_\_\_ **INTERVENOR** ☒  
**PROTESTANT** \_\_\_\_\_ **RESPONDENT** \_\_\_\_\_ **DEFENDANT** \_\_\_\_\_

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Email:

kurtj.olson@gmail.com

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☐ Yes, I have signed the confidentiality agreement and would like an electronic copy of the confidential transcript(s)

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Signature:

Kurt J. Olson

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NORTH CAROLINA UTILITIES COMMISSION  
APPEARANCE SLIP

DATE 1/28/2019  
DOCKET #: E-100, Sub 101  
NAME OF ATTORNEY BENJAMIN SNOWDEN  
TITLE COUNSEL  
FIRM NAME KILPATRICK TOWNSEND STOCKTON LLP  
ADDRESS 4208 SIX FICKS RD., SUITE 1400  
CITY RALEIGH  
ZIP 27609

APPEARING FOR: CYPRESS CREEK RENEWABLES

APPLICANT \_\_\_\_\_ COMPLAINANT \_\_\_\_\_ INTERVENOR ☒  
PROTESTANT \_\_\_\_\_ RESPONDENT \_\_\_\_\_ DEFENDANT \_\_\_\_\_

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Email: bsnowden@kilpatricktownsend.com  
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Signature: Benj. L.S.

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**NORTH CAROLINA UTILITIES COMMISSION**  
**APPEARANCE SLIP**

DATE 8/28/19  
DOCKET #: E-100/Sub 101  
NAME OF ATTORNEY Tom Dodge & Layla Cummings  
TITLE Staff Attorneys  
FIRM NAME Public Staff  
ADDRESS 1503 Bellvue Ave 430 N. Salisbury St.  
CITY Durham Raleigh NC  
ZIP 27 27699-4300

APPEARING FOR: Public Staff

APPLICANT \_\_\_\_\_ COMPLAINANT \_\_\_\_\_ INTERVENOR ✓  
PROTESTANT \_\_\_\_\_ RESPONDENT \_\_\_\_\_ DEFENDANT \_\_\_\_\_

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Email: tom.dodge@psucuc.nc.gov  
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Signature: [Signature]

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NORTH CAROLINA UTILITIES COMMISSION  
APPEARANCE SLIP

DATE 1/28/19  
DOCKET #: E-100, Sub 101  
NAME OF ATTORNEY Teresa Townsend Jennifer Harrod  
TITLE Special Deputy Attorney General Special Deputy Atty Gen  
FIRM NAME DOJ- AGO  
ADDRESS 114 W. Edenton St.  
CITY Raleigh, NC  
ZIP 27603

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Feb 13 2019

APPEARING FOR: USDA + consuming public + on behalf of State + JP  
attorneys in this matter that affect the public interest

APPLICANT \_\_\_\_\_ COMPLAINANT \_\_\_\_\_ INTERVENOR ☒  
PROTESTANT \_\_\_\_\_ RESPONDENT \_\_\_\_\_ DEFENDANT \_\_\_\_\_

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Email: ttownsend@nedoj.gov + jharrod@nedoj.gov  
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10-K/A 1 duk-20171231x10ka.htm FORM 10-K/A

UNITED STATES SECURITIES AND EXCHANGE COMMISSION  
WASHINGTON, D.C. 20549

## FORM 10-K/A

## Amendment No. 1

(Mark One)




ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal period ended December 31, 2017 or



TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission file number	Registrant, State of Incorporation or Organization, Address of Principal Executive Offices and Telephone Number	IRS Employer Identification No.	
	 <b>DUKE ENERGY®</b>		
1-32853	<b>DUKE ENERGY CORPORATION</b> (a Delaware corporation) 550 South Tryon Street Charlotte, NC 28202-1803 704-382-3853	20-2777218	
Commission file number	Registrant, State of Incorporation or Organization, Address of Principal Executive Offices, Telephone Number and IRS Employer Identification Number	Commission file number	Registrant, State of Incorporation or Organization, Address of Principal Executive Offices, Telephone Number and IRS Employer Identification Number
1-4928	<b>DUKE ENERGY CAROLINAS, LLC</b> (a North Carolina limited liability company) 526 South Church Street Charlotte, North Carolina 28202-1803 704-382-3853 56-0205520	1-3274	<b>DUKE ENERGY FLORIDA, LLC</b> (a Florida limited liability company) 299 First Avenue North St. Petersburg, Florida 33701 704-382-3853 59-0247770
1-15929	<b>PROGRESS ENERGY, INC.</b> (a North Carolina corporation) 410 South Wilmington Street Raleigh, North Carolina 27601-1748 704-382-3853 56-2155481	1-1232	<b>DUKE ENERGY OHIO, INC.</b> (an Ohio corporation) 139 East Fourth Street Cincinnati, Ohio 45202 704-382-3853 31-0240030
1-3382	<b>DUKE ENERGY PROGRESS, LLC</b> (a North Carolina limited liability company) 410 South Wilmington Street Raleigh, North Carolina 27601-1748 704-382-3853 56-0165465	1-3543	<b>DUKE ENERGY INDIANA, LLC</b> (an Indiana limited liability company) 1000 East Main Street Plainfield, Indiana 46168 704-382-3853 35-0594457
1-6196	<b>PIEDMONT NATURAL GAS COMPANY, INC.</b> (a North Carolina corporation) 4720 Piedmont Row Drive Charlotte, North Carolina 28210 704-364-3120 56-0556998		

## SECURITIES REGISTERED PURSUANT TO SECTION 12(b) OF THE ACT:

Registrant	Title of each class	Name of each exchange on which registered
Duke Energy Corporation (Duke Energy)	Common Stock, \$0.001 par value	New York Stock Exchange, Inc.
Duke Energy	5.125% Junior Subordinated Debentures due January 15, 2073	New York Stock Exchange, Inc.

## SECURITIES REGISTERED PURSUANT TO SECTION 12(g) OF THE ACT: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act

Duke Energy	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Duke Energy Florida, LLC (Duke Energy Florida)	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Duke Energy Carolinas, LLC (Duke Energy Carolinas)	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Duke Energy Ohio, Inc. (Duke Energy Ohio)	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

**CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING INFORMATION**

This document includes forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. Forward-looking statements are based on management's beliefs and assumptions and can often be identified by terms and phrases that include "anticipate," "believe," "intend," "estimate," "expect," "continue," "should," "could," "may," "plan," "project," "predict," "will," "potential," "forecast," "target," "guidance," "outlook" or other similar terminology. Various factors may cause actual results to be materially different than the suggested outcomes within forward-looking statements; accordingly, there is no assurance that such results will be realized. These factors include, but are not limited to:

- State, federal and foreign legislative and regulatory initiatives, including costs of compliance with existing and future environmental requirements, including those related to climate change, as well as rulings that affect cost and investment recovery or have an impact on rate structures or market prices;
- The extent and timing of costs and liabilities to comply with federal and state laws, regulations and legal requirements related to coal ash remediation, including amounts for required closure of certain ash impoundments, are uncertain and difficult to estimate;
- The ability to recover eligible costs, including amounts associated with coal ash impoundment retirement obligations and costs related to significant weather events, and to earn an adequate return on investment through rate case proceedings and the regulatory process;
- The costs of decommissioning Crystal River Unit 3 and other nuclear facilities could prove to be more extensive than amounts estimated and all costs may not be fully recoverable through the regulatory process;
- Costs and effects of legal and administrative proceedings, settlements, investigations and claims;
- Industrial, commercial and residential growth or decline in service territories or customer bases resulting from sustained downturns of the economy and the economic health of our service territories or variations in customer usage patterns, including energy efficiency efforts and use of alternative energy sources, such as self-generation and distributed generation technologies;
- Federal and state regulations, laws and other efforts designed to promote and expand the use of energy efficiency measures and distributed generation technologies, such as private solar and battery storage, in Duke Energy service territories could result in customers leaving the electric distribution system, excess generation resources as well as stranded costs;
- Advancements in technology;
- Additional competition in electric and natural gas markets and continued industry consolidation;
- The influence of weather and other natural phenomena on operations, including the economic, operational and other effects of severe storms, hurricanes, droughts, earthquakes and tornadoes, including extreme weather associated with climate change;
- The ability to successfully operate electric generating facilities and deliver electricity to customers including direct or indirect effects to the company resulting from an incident that affects the U.S. electric grid or generating resources;
- The ability to complete necessary or desirable pipeline expansion or infrastructure projects in our natural gas business;
- Operational interruptions to our natural gas distribution and transmission activities;
- The availability of adequate interstate pipeline transportation capacity and natural gas supply;
- The impact on facilities and business from a terrorist attack, cybersecurity threats, data security breaches and other catastrophic events, such as fires, explosions, pandemic health events or other similar occurrences;
- The inherent risks associated with the operation of nuclear facilities, including environmental, health, safety, regulatory and financial risks, including the financial stability of third-party service providers;
- The timing and extent of changes in commodity prices and interest rates and the ability to recover such costs through the regulatory process, where appropriate, and their impact on liquidity positions and the value of underlying assets;
- The results of financing efforts, including the ability to obtain financing on favorable terms, which can be affected by various factors, including credit ratings, interest rate fluctuations, compliance with debt covenants and conditions and general market and economic conditions;
- Credit ratings of the Duke Energy Registrants may be different from what is expected;
- Declines in the market prices of equity and fixed-income securities and resultant cash funding requirements for defined benefit pension plans, other post-retirement benefit plans and nuclear decommissioning trust funds;
- Construction and development risks associated with the completion of the Duke Energy Registrants' capital investment projects, including risks related to financing, obtaining and complying with terms of permits, meeting construction budgets and schedules and satisfying operating and environmental performance standards, as well as the ability to recover costs from customers in a timely manner, or at all;
- Changes in rules for regional transmission organizations, including changes in rate designs and new and evolving capacity markets, and risks related to obligations created by the default of other participants;
- The ability to control operation and maintenance costs;
- The level of creditworthiness of counterparties to transactions;
- Employee workforce factors, including the potential inability to attract and retain key personnel;



## PART I

The electric operations and investments in projects are subject to the rules and regulations of the FERC, the North Carolina Utilities Commission (NCUC), the Public Service Commission of South Carolina (PSCSC), the Florida Public Service Commission (FPSC), the Indiana Utility Regulatory Commission (IURC), the Public Utilities Commission of Ohio (PUCO) and the Kentucky Public Service Commission (KPSC).

The following table represents the distribution of billed sales by customer class for the year ended December 31, 2017.

	Duke Energy Carolinas	Duke Energy Progress	Duke Energy Florida	Duke Energy Ohio	Duke Energy Indiana
Residential	30%	26%	49%	34%	26%
General service	33%	23%	37%	38%	25%
Industrial	25%	16%	8%	23%	32%
Total retail sales	88%	65%	94%	95%	83%
Wholesale and other sales	12%	35%	6%	5%	17%
Total sales	100%	100%	100%	100%	100%

The number of residential and general service customers within the Electric Utilities and Infrastructure service territory is expected to increase over time. While economic conditions within the service territory continue to improve, sales growth has been hampered by continued adoption of energy efficiencies and self-generation. The continued adoption of more efficient housing and appliances is expected to have a negative impact on average usage per residential customer over time. While residential sales increased in 2017 compared to 2016, the growth rate was modest when compared to historical periods.

#### Seasonality and the Impact of Weather

Revenues and costs are influenced by seasonal weather patterns. Peak sales of electricity occur during the summer and winter months, which results in higher revenue and cash flows during these periods. By contrast, lower sales of electricity occur during the spring and fall, allowing for scheduled plant maintenance. Residential and general service customers are more impacted by weather than industrial customers. Estimated weather impacts are based on actual current period weather compared to normal weather conditions. Normal weather conditions are defined as the long-term average of actual historical weather conditions.

The estimated impact of weather on earnings is based on the temperature variances from a normal condition and customers' historic usage patterns. The methodology used to estimate the impact of weather does not consider all variables that may impact customer response to weather conditions such as humidity in the summer or wind chill in the winter. The precision of this estimate may also be impacted by applying long-term weather trends to shorter-term periods.

Heating-degree days measure the variation in weather based on the extent the average daily temperature falls below a base temperature. Cooling-degree days measure the variation in weather based on the extent the average daily temperature rises above the base temperature. Each degree of temperature below the base temperature counts as one heating-degree day and each degree of temperature above the base temperature counts as one cooling-degree day.

#### Competition

##### Retail

Electric Utilities and Infrastructure's businesses operate as the sole supplier of electricity within their service territories, with the exception of Ohio, which has a competitive electricity supply market for generation service. Electric Utilities and Infrastructure owns and operates facilities necessary to transmit and distribute electricity and, except in Ohio, to generate electricity. Services are priced by state commission approved rates designed to include the costs of providing these services and a reasonable return on invested capital. This regulatory policy is intended to provide safe and reliable electricity at fair prices.

Competition in the regulated electric distribution business is primarily from the development and deployment of alternative energy sources including on-site generation from industrial customers and distributed generation, such as private solar, at residential, general service and/or industrial customer sites.

Duke Energy is not aware of any proposed legislation within any of its jurisdictions that would provide retail customers the right to choose their electricity provider or otherwise restructure or deregulate the electric industry, including broadly subsidizing distributed generation such as private solar.

Although there is no pending legislation at this time, if the retail jurisdictions served by Electric Utilities and Infrastructure become subject to deregulation, the recovery of stranded costs could become a significant consideration. Stranded costs primarily include the generation assets of Electric Utilities and Infrastructure whose value in a competitive marketplace may be less than their current book value, as well as above-market purchased power commitments from qualifying facilities (QFs). The Public Utility Regulatory Policies Act of 1978 (PURPA) established a new class of generating facilities as QFs, typically small power production facilities that generate power within a utility company's service territory for which the utility companies are legally obligated to purchase the energy at an avoided cost rate. Thus far, all states that have passed restructuring legislation have provided for the opportunity to recover a substantial portion of stranded costs.



## PART I

Electric Utilities and Infrastructure's largest stranded cost exposure is primarily related to Duke Energy Florida's purchased power commitments with QFs, under which it has future minimum expected capacity payments through 2043 of \$2.4 billion. Duke Energy Florida was obligated to enter into these contracts under provisions of PURPA. Duke Energy Florida continues to seek ways to address the impact of escalating payments under these contracts. However, the FPSC allows full recovery of the retail portion of the cost of power purchased from QFs. For additional information related to these purchased power commitments, see Note 5 to the Consolidated Financial Statements, "Commitments and Contingencies."

In Ohio, Electric Utilities and Infrastructure conducts competitive auctions for electricity supply. The cost of energy purchased through these auctions is recovered from retail customers. Electric Utilities and Infrastructure earns retail margin in Ohio on the transmission and distribution of electricity and not on the cost of the underlying energy.

**Wholesale**

Duke Energy competes with other utilities and merchant generators for bulk power sales, sales to municipalities and cooperatives and wholesale transactions under primarily cost-based contracts approved by FERC. The principal factors in competing for these sales are price, availability of capacity and power and reliability of service. Prices are influenced primarily by market conditions and fuel costs.

Increased competition in the wholesale electric utility industry and the availability of transmission access could affect Electric Utilities and Infrastructure's load forecasts, plans for power supply and wholesale energy sales and related revenues. Wholesale energy sales will be impacted by the extent to which additional generation is available to sell to the wholesale market and the ability of Electric Utilities and Infrastructure to attract new customers and to retain existing customers.

**Energy Capacity and Resources**

Electric Utilities and Infrastructure owns approximately 49,506 megawatts (MW) of generation capacity. For additional information on owned generation facilities, see Item 2, "Properties."

Energy and capacity are also supplied through contracts with other generators and purchased on the open market. Factors that could cause Electric Utilities and Infrastructure to purchase power for its customers may include, but are not limited to, generating plant outages, extreme weather conditions, generation reliability, demand growth and price. Electric Utilities and Infrastructure has interconnections and arrangements with its neighboring utilities to facilitate planning, emergency assistance, sale and purchase of capacity and energy and reliability of power supply.

Electric Utilities and Infrastructure's generation portfolio is a balanced mix of energy resources having different operating characteristics and fuel sources designed to provide energy at the lowest possible cost to meet its obligation to serve retail customers. All options, including owned generation resources and purchased power opportunities, are continually evaluated on a real-time basis to select and dispatch the lowest-cost resources available to meet system load requirements.

**Potential Plant Retirements**

The Subsidiary Registrants periodically file Integrated Resource Plans (IRP) with state regulatory commissions. The IRPs provide a view of forecasted energy needs over a long term (10 to 20 years) and options being considered to meet those needs. Recent IRPs filed by the Subsidiary Registrants included planning assumptions to potentially retire certain coal-fired generating facilities earlier than their current estimated useful lives, primarily because these facilities do not have the requisite emission control equipment to meet United States Environmental Protection Agency (EPA) regulations recently approved or proposed. Duke Energy continues to evaluate the potential need to retire these coal-fired generating facilities earlier than the current estimated useful lives and plans to seek regulatory recovery for amounts that would not be otherwise recovered when any of these assets are retired. For additional information related to potential plant retirements, see Note 4 to the Consolidated Financial Statements, "Regulatory Matters."

On October 23, 2015, the EPA published in the Federal Register the final Clean Power Plan (CPP) rule that regulates carbon dioxide (CO<sub>2</sub>) emissions from existing fossil fuel-fired electric generating units (EGUs). The CPP establishes CO<sub>2</sub> emission rates and mass cap goals that apply to existing fossil fuel-fired EGUs. Petitions challenging the rule were filed by several groups and on February 9, 2016, the Supreme Court issued a stay of the final CPP rule, halting implementation of the CPP until legal challenges are resolved. States in which the Duke Energy Registrants operate have suspended work on the CPP in response to the stay. Oral arguments before 10 of the 11 judges on D.C. Circuit Court were heard on September 27, 2016. The court has not issued its opinion in the case.

On March 28, 2017, President Trump signed an executive order directing EPA to review the CPP and determine whether to suspend, revise or rescind the rule. On the same day, the Department of Justice (DOJ) filed a motion with the D.C. Circuit Court requesting that the court stay the litigation of the rule while it is reviewed by EPA. On April 28, 2017, the court issued an order to suspend the litigation for 60 days. On August 8, 2017, the court, on its own motion, extended the suspension of the litigation for an additional 60 days. On October 16, 2017, EPA issued a Notice of Proposed Rulemaking (NPR) to repeal the CPP based on a change to EPA's legal interpretation of the section of the Clean Air Act (CAA) on which the CPP was based. In the proposal, EPA indicates that it has not determined whether it will issue a rule to replace the CPP, and if it will do so, when and what form that rule will take. The comment period on EPA's NPR ends April 26, 2018. On December 28, 2017 EPA issued an Advance Notice of Proposed Rulemaking (ANPRM) in which it seeks public comment on various aspects of a potential CPP replacement rule. The comment period on the ANPRM ends February 26, 2018. If EPA decides to move forward with a CPP replacement rule, it will need to issue a formal proposal for public comment. Litigation of the CPP remains on hold in the D.C. Circuit and the February 2016 U.S. Supreme Court stay of the CPP remains in effect.

Attorney General's Office - Duke Panel  
Cross Exhibit # 2  
I/A

NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-7, SUB 1146

In the Matter of:	)	
	)	
Application of Duke Energy Carolinas, LLC	)	DIRECT TESTIMONY OF
For Adjustment of Rates and Charges	)	ROBERT M. SIMPSON, III
Applicable to Electric Service in North	)	FOR DUKE ENERGY
Carolina	)	CAROLINAS, LLC

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OFFICIAL COPY

Feb 13 2019

- 1 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.
- 2 A. My name is Robert M. Simpson III. My business address is 411 Fayetteville
- 3 Street, Raleigh, North Carolina.
- 4 Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?
- 5 A. I am employed by Duke Energy Progress, LLC ("DE Progress") as Director,
- 6 Grid Improvement Plan Integration for Duke Energy Corporation's ("Duke
- 7 Energy") Regulated Utilities Operations, including Duke Energy Carolinas,
- 8 LLP ("DE Carolinas" or the "Company").
- 9 Q. PLEASE BRIEFLY DESCRIBE YOUR DUTIES AS DIRECTOR, GRID
- 10 IMPROVEMENT PLAN INTEGRATION, FOR DUKE ENERGY.
- 11 A. My duties and responsibilities include ensuring grid improvements and
- 12 investments are effectively integrated.
- 13 Q. PLEASE SUMMARIZE YOUR EDUCATION AND PROFESSIONAL
- 14 QUALIFICATIONS.
- 15 A. I graduated from Clemson University with a Bachelor of Science degree in
- 16 Electrical Engineering in 1977. I joined the DE Progress' predecessor,
- 17 Carolina Power & Light, in 1977 as a junior engineer with responsibility for
- 18 designing electrical distribution systems to serve new customers and for
- 19 identifying and implementing system improvement and reliability programs. I
- 20 progressed through various engineering positions and was promoted to project
- 21 engineer responsible for supervision and oversight of distribution standards in
- 22 1987. Since that time I have worked in various management positions in the

1 distribution and transmission businesses, including engineering and operations  
2 manager, district manager, transmission system performance manager,  
3 business services manager, director of the distribution control center, major  
4 project manager for the Distribution System Demand Response ("DSDR")  
5 project.

6 From 2012 until 2017, I served as Director of Power Quality,  
7 Reliability & Integrity Engineering. While in that role my duties and  
8 responsibilities included providing management of the electric distribution  
9 systems' reliability programs for Duke Energy's regulated utility operations in  
10 North Carolina and South Carolina. The organization overlays both the DE  
11 Progress and DE Carolinas service areas, with almost 120 employees and  
12 dozens of operating centers. On a daily basis, it supports our basic mission of  
13 economically providing reliable and safe electricity to our customers. The  
14 organization is responsible for jurisdictional implementation of key  
15 functions in the areas of Capacity Planning, Power Quality, Reliability,  
16 Component Integrity Programs, and Protection & Automation. The  
17 organization is accountable for the technical analysis and economic solutions  
18 for capacity growth and system additions; including contingency projects, for  
19 the complete distribution delivery system infrastructure. This work also  
20 includes accountability for performing economic development studies, method  
21 of service studies, system protective coordination, automation and control  
22 engineering, distributed generation engineering studies and grid automation

1       asset management. Lastly, my responsibilities also included leading the  
2       financial management and prioritization of the operations and maintenance  
3       ("O&M") and Capital budgets in order to optimize the reliability program and  
4       project requirements. In May 2017, I assumed my current position.

5               I have held positions in Raleigh, Wilmington and Florence during my  
6       39-year career and have been the designated system storm director on three  
7       occasions. I am a registered Professional Engineer in the states of North  
8       Carolina, South Carolina and Florida and have served on the IEEE Surge  
9       Protective Devices Committee as a member and chairman of Working Group  
10      3.3.11 which developed the standards for metal oxide surge arresters.

11   **Q.   HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION**  
12       **OR ANY OTHER REGULATORY BODIES?**

13   **A.**   Yes, I testified in 2009 before this Commission in Docket No. E-2, Sub 926  
14       regarding the DSDR program. I have also appeared before the Public Service  
15       Commission of South Carolina ("PSCSC") in DE Progress' recent rate case in  
16       Docket 2016-227-E, as well as presented to the PSCSC in an allowable ex  
17       parte briefing on DE Progress' restoration efforts following Hurricane  
18       Matthew. I have also filed testimony with this Commission in the pending DE  
19       Progress rate case in Docket No. E-2, Sub 1142.

20   **Q.   WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

21   **A.**   The purpose of my testimony is to describe and support the DE Carolinas'  
22       transmission and distribution ("T&D") system, the operation and performance

1 of the T&D system and the costs necessary to operate, maintain and improve  
2 upon it. I also describe future challenges to our operations, and how we plan  
3 to address those challenges.

4 **Q. HOW IS YOUR TESTIMONY ORGANIZED?**

5 A. Following the introduction above, my testimony is organized as follows:

- 6 I. Summary of my testimony;
- 7 II. A description of DE Carolinas T&D system, describing notable  
8 investments made in our system since the Company's last rate case in  
9 North Carolina;
- 10 III. An overview of the operational performance of the Company's T&D  
11 system;
- 12 IV. An explanation of the challenges DE Carolinas is facing with our  
13 aging infrastructure and the need to continue to maintain and improve  
14 upon system reliability; and
- 15 V. A description of the specific Power/Forward Carolinas projects to be  
16 recovered by the proposed Grid Reliability and Resiliency Rider  
17 ("GRR Rider").

18 **I. SUMMARY OF TESTIMONY**

19 **Q. PLEASE SUMMARIZE YOUR TESTIMONY.**

20 A. DE Carolinas operates an extensive T&D system that has served North  
21 Carolina well for quite some time, but like any complex system it requires  
22 maintenance and upgrades to continue performing at the level expected by the

1 Company's customers. At customary funding levels the Company will not be  
2 able to meet those expectations. Our grid is challenged by more frequent and  
3 severe weather events, aging components, and the addition of distributed  
4 generation. Despite the Company's best efforts, we are already beginning to  
5 see the results of these challenges in our reliability statistics: we have seen an  
6 increase in the frequency of outages, and customers are spending more time  
7 without power than they have in the past. As a result, the Company must  
8 invest more in vegetation management as well as system upgrades. These  
9 system upgrades are part of an initiative called Power/Forward Carolinas, as  
10 introduced in this case by Witness Fountain, and this program will transform  
11 our T&D system into a more reliable, versatile and cost effective platform  
12 over the next ten years.

13 Through Power/Forward Carolinas, the Company will upgrade the grid  
14 via targeted undergrounding of key distribution lines; replacing aging  
15 components like transformers, cables and conductors; installing components  
16 that will allow the grid to self-optimize, reducing the number of customers  
17 affected by an outage; and reducing duration and installing components that  
18 will allow the system to backfeed power to areas affected by outages. In  
19 addition the Company will upgrade the system from a uni-directional to a  
20 digital, two-way, interconnected sensing and monitoring system.  
21 Power/Forward Carolinas will have a positive economic impact to the State

1 of North Carolina, providing thousands of jobs during construction and by  
2 minimizing costs to restore power after outages.

3 To enable the implementation of the Power/Forward Carolinas  
4 program, DE Carolinas is proposing the GRR Rider to make these critical  
5 investments in the T&D system while ensuring timely recovery of the  
6 expenses. The GRR Rider will be subject to annual approval by the  
7 Commission. Power/Forward Carolinas will ensure that North Carolina  
8 customers will continue to experience reliable service for generations to come.

9 **II. DE CAROLINAS' T&D SYSTEM**

10 **Q. PLEASE GENERALLY DESCRIBE DE CAROLINAS' T&D SYSTEM**  
11 **IN THE CAROLINAS.**

12 **A.** DE Carolinas' T&D system delivers electric service to approximately 2.5  
13 million retail customers located throughout a 24,000 square mile service area  
14 in central and western North Carolina and western South Carolina.  
15 Approximately 2 million of the Company's retail customers are in North  
16 Carolina. In addition to its retail customers, DE Carolinas also sells electricity  
17 at wholesale rates to municipal, cooperative, and other investor-owned  
18 utilities.

19 DE Carolinas operates as a single balancing authority to economically  
20 manage the Company's integrated electric delivery systems in both North  
21 Carolina and South Carolina, collectively. This system interconnects with



1 nine other balancing authority areas<sup>1</sup> and includes 13,100 circuit miles of  
2 transmission lines. The distribution system is comprised of approximately  
3 66,600 miles of overhead distribution lines and 37,100 miles of underground  
4 distribution lines. DE Carolinas' T&D system also includes 198 transmission  
5 substations, and 1,422 distribution and industrial substations with a combined  
6 capacity of approximately 98 million KVA. In addition to power lines and  
7 substations, the system includes various other equipment and facilities such as  
8 control rooms, computers, poles, transformers, capacitors, street lights,  
9 meters, and protective relays. Together, these assets provide the Company  
10 considerable operational flexibility with its T&D system and allow DE  
11 Carolinas to provide safe, reliable, and economical power to the Company's  
12 customers in North Carolina.

13 **Q. HAS DE CAROLINAS' T&D SYSTEM GROWN SINCE THE LAST**  
14 **RATE CASE?**

15 **A.** Yes, the T&D system has expanded over time to ensure adequate system  
16 voltage and capacity, based on projected system loading, and contingency  
17 requirements related to providing safe and reliable service to our customers.  
18 Transmission system growth has also occurred as a result of new generation  
19 and/or decommissioning of existing generation assets. For the distribution  
20 system, approximately 2,300 distribution line miles and 18,700 transformers

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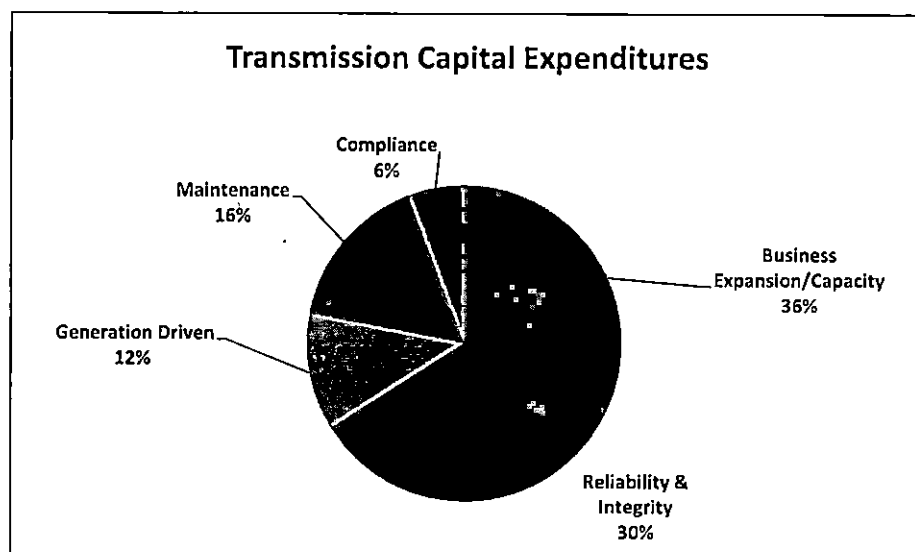
<sup>1</sup> The PJM Regional Transmission Organization, Carolina Power and Light – East, Carolina Power and Light – West, Southern Company, Santee Cooper, Tennessee Valley Authority, Cube Hydro Carolins, SC Electric & Gas and Southeastern Power Authority.

1 were added over the last four years. Overall, we have added approximately  
2 \$2.6 billion to electric plant in service for T&D infrastructure in the last four  
3 years.

4 **Q. CAN YOU PROVIDE MORE DETAIL ABOUT THE ADDITIONAL**  
5 **INVESTMENTS THE COMPANY HAS MADE IN ITS T&D SYSTEM**  
6 **SINCE THE LAST RATE CASE?**

7 A. Additional investments in the Company's T&D system have been made to  
8 provide capacity to serve system growth, ensure adequate system voltage,  
9 support new generation and decommissioning, and improve system reliability.  
10 Over the past four years, more than \$770 million was invested in the  
11 transmission system and approximately \$1.8 billion in the distribution system.

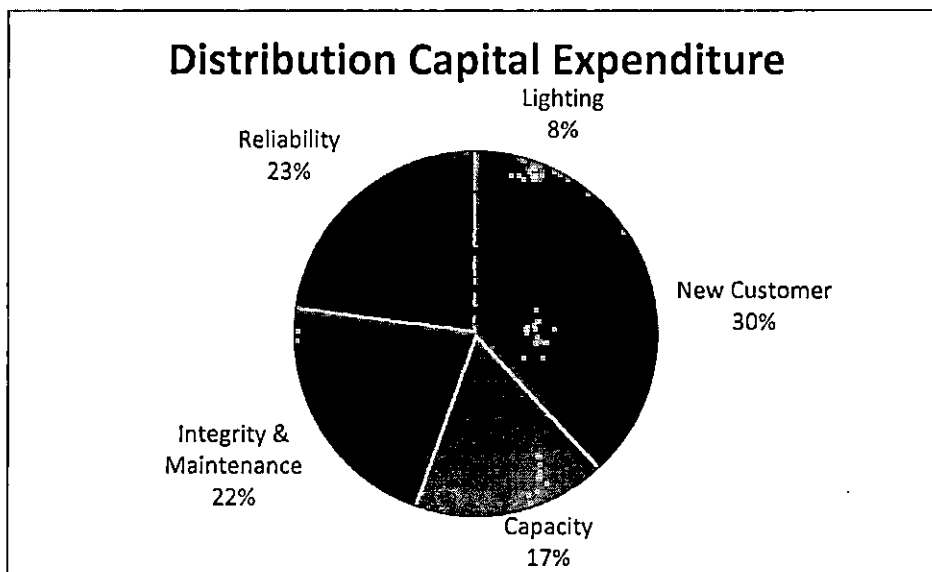
12 The chart below illustrates the major categories of the transmission  
13 system capital investment over the last several years.



1 In the transmission system, approximately 36 percent of investment was  
2 driven by capacity requirements to serve load and to meet the North American  
3 Reliability Council ("NERC") Planning Standards. For example, the  
4 Company invested in its Parkwood 230-100 kV Tie Station, Hook 100-kV  
5 Line, and Elizabeth 100-kV Line Upgrade projects to prevent line and  
6 transformer overloads that could occur during certain failure contingencies on  
7 the transmission system. The Company also improved Conley and Fourth  
8 Creek substations by adding many breakers to reduce the likelihood of  
9 customer outages and improve operating flexibility. Approximately 12 percent  
10 of investment is driven by generation projects. These include new generator  
11 interconnections as well as decommissioning. Examples of these generation  
12 driven projects include the decommissioning of Riverbend Station and the  
13 addition of the Lee Combined Cycle plant. Approximately 6 percent of the  
14 investment was driven by compliance projects, including the Light Detection  
15 and Ranging ("LIDAR") program to survey the Transmission Grid using  
16 LIDAR technology; identify and resolve physical limitations that might  
17 prevent lines from being operated at required capacity; and cyber security and  
18 physical security programs driven by requirements defined in NERC CIP  
19 Standards CIP-002-5.1 and CIP-014-2. Approximately 46 percent of  
20 investment was driven by reliability improvement and maintenance  
21 programs. Examples of this type of investment include the replacement of

1 deteriorated wood poles and replacement of obsolete substation and line  
2 equipment.

3 The chart below illustrates the major categories of the distribution  
4 system and the capital expenditures over the last four years.



5 North Carolina continues to be a desirable place to live and work, as  
6 evidenced by the more than 36,400 new retail customer meters added during  
7 the 12-month period ending December 31, 2016. Typically, new customers  
8 locate in areas where DE Carolinas has to build new distribution facilities to  
9 serve them, including expenses for new customer connections or capacity  
10 work needed to support overall load growth. Approximately 55 percent of  
11 the Company's distribution expenditures over the last four years are for  
12 expansion-related work, including serving new customers, lighting  
13 installations, and additional capacity.

1           The remaining investments on the Company's system relate to capital  
2           improvements to our existing infrastructure, reliability improvements and  
3           other capital maintenance. Approximately 22 percent of the distribution  
4           capital expenditures in the last four years were for infrastructure maintenance  
5           activities such as pole replacement and underground cable replacement.  
6           Approximately 23 percent of expenditures were for targeted reliability  
7           improvements. The targeted reliability improvement investments are for the  
8           purpose of reducing the number and frequency of power outages on the  
9           distribution system and to provide reliable electric service and customer  
10          satisfaction. Examples include the transformer retrofit program, the  
11          sectionalization program, and self-healing teams that apply state-of-the-art  
12          technology to automatically isolate the cause of an outage and restore service  
13          to customers. Through the Company's inspection and maintenance programs,  
14          DE Carolinas regularly identifies system components that require replacement  
15          or refurbishment to ensure the integrity of the system. Inspection and  
16          maintenance activities include items such as distribution line inspections to  
17          identify and replace wooden poles on a regular cycle, underground primary  
18          cable replacement where outage history and cable analysis predict failures,  
19          distribution line rebuilds and relocations, as well as programs to replace  
20          equipment like house power panels that have reached the end of life.

21               Capital maintenance spending also includes amounts associated with  
22          the replacement of capital units of property during routine outage events, the

1 relocation of lines to accommodate highway projects, urban renewal projects,  
2 and conductor replacements. One particularly large project, referred to as the  
3 Carolinas West Primary Control Center will close to service by the cut off  
4 period in this case, and has a value of approximately \$120 million. This  
5 project is part of an enterprise program whereby Duke Energy is updating and  
6 consolidating multiple regional centers into purpose-built, highly reliable and  
7 hardened facilities. Maintaining the integrity of the electric grid is at the core  
8 of what we do and these new facilities will allow us to provide dependable  
9 and consistent service for many years into the future.

10 **Q. IN YOUR OPINION, ARE ALL OF THE T&D FACILITIES**  
11 **INCLUDED IN DE CAROLINAS' BASE RATE REQUEST USED AND**  
12 **USEFUL IN PROVIDING SERVICE TO DE CAROLINAS' RETAIL**  
13 **ELECTRIC CUSTOMERS IN NORTH CAROLINA?**

14 **A.** Yes. Including the projects that will be completed prior to the evidentiary  
15 hearing in this case, all additions to DE Carolinas' T&D system requested for  
16 recovery in base rates is used and useful to its approximately 2 million  
17 customers in North Carolina.

1                                    **III.    OPERATIONAL PERFORMANCE**

2    **Q.    WHAT ARE DE CAROLINAS' GOALS WITH RESPECT TO**  
3           **OPERATIONAL       PERFORMANCE       AND       CUSTOMER**  
4           **SATISFACTION?**

5    **A.**    DE Carolinas' principal goal is to deliver safe and reliable electric service at  
6           reasonable prices. The Company strives to be a leader in electric utility  
7           operational performance, measured in terms of customer satisfaction, safety,  
8           and reliability of the Company's T&D systems, while managing operational  
9           and capital expenditures for the benefit of our customers. However, the  
10          problems with our aging grid are escalating, as described below.

11   **Q.    PLEASE EXPLAIN THE METRICS THE COMPANY USES TO**  
12          **MEASURE THE EFFECTIVENESS OF ITS T&D OPERATIONS.**

13   **A.**    DE Carolinas utilizes several industry-standard metrics to assess the overall  
14          effectiveness of its operations. These metrics include reliability indices to  
15          measure the performance of the transmission and distribution system, and  
16          customer satisfaction scores to determine how well the Company is meeting  
17          the needs of its customers.

18                DE Carolinas' reliability-related activities are focused on reducing the  
19          frequency and duration of customer outages. When outages do occur, we are  
20          committed to timely and safe restoration. In addition to outage frequency and  
21          duration, the Company also works to reduce other power quality concerns that  
22          may arise as part of our commitment to continually improve reliability of

1 service for customers. DE Carolinas uses customer satisfaction metrics to  
2 ensure that reliability and power quality programs are meeting customer  
3 expectations.

4 The Company uses a number of industry-accepted transmission and  
5 distribution performance metrics as defined in IEEE Standard 1366-2012.

- 6 • **System Average Interruption Frequency Index (“SAIFI”)** is a ratio  
7 that indicates how often the average customer experiences a sustained  
8 interruption over a predefined period of time.
- 9 • **System Average Interruption Duration Index (“SAIDI”)** is a ratio  
10 that indicates the total duration of interruption for the average  
11 customer during a predefined period of time.
- 12 • **Customers Experiencing Multiple Interruptions (“CEMI 6”)** is a  
13 measure of the percentage of customers who experience six or more  
14 outages in a 12-month period.

15 **Q. HOW HAS DE CAROLINAS' TRANSMISSION AND DISTRIBUTION**  
16 **SYSTEM PERFORMED UNDER THESE METRICS?**

17 **A.** Over the past eight years, both SAIFI and SAIDI show an unfavorable trend,  
18 with the frequency and duration of outages increasing across the DE Carolinas  
19 system. Although reliability performance can be influenced by weather,  
20 continued investments, such as an integrated vegetation management program  
21 and grid improvement programs which reduce customer impact when outages  
22 occur, which I discuss later in my testimony, will result in improved customer



1 experience with respect to the frequency and duration of outages. We  
 2 continue to invest in reliability programs that reduce the root causes of  
 3 outages while continuing the reliability programs that mitigate the number of  
 4 customers impacted when outages do occur. Graphs displaying the trends for  
 5 these metrics are set forth below:

6  
**Figure 1 – Duke Energy Carolinas' Historic System Average Interruption Frequency Index (SAIFI)**

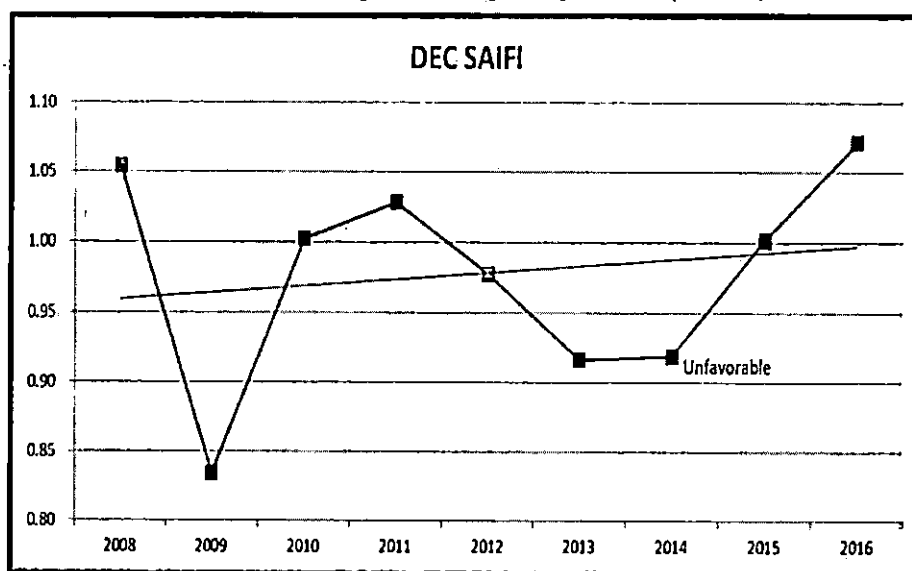
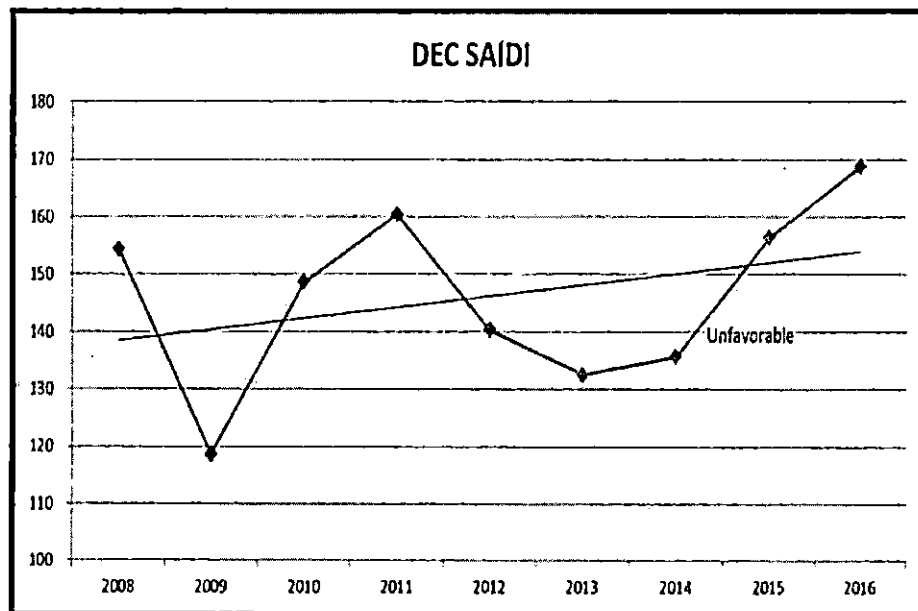


Figure 2 – Duke Energy Carolinas' Historic System Average Interruption Duration Index (SAIDI)



- 1 In summary, reliability performance is worsening due to the increase in the
- 2 number of outage events. While investments have been made to reduce
- 3 customer impacts, we need to make more investments, including vegetation
- 4 management and system upgrades, to stop this negative trend in in SAIFI and
- 5 SAIDI and reduce the frequency and duration of outages on the system.
- 6 Q. PLEASE EXPLAIN HOW DE CAROLINAS' APPROACH TO
- 7 DISTRIBUTION VEGETATION MANAGEMENT AFFECTS
- 8 OPERATIONS.
- 9 A. Vegetation management is a critical component of the Company's power
- 10 delivery operations and the continued effort to drive performance for
- 11 customers' benefit. DE Carolinas uses a reliability-based prioritization model
- 12 to drive its routine integrated vegetation management program. In addition to

1 routine circuit maintenance, there are four other very important components to  
2 the Company's overall vegetation management approach.

3 (1) Herbicide spraying of the "floor" of the right-of-way is planned on a  
4 periodic basis to control the re-growth of incompatible vegetation in  
5 non-landscaped areas and where property owners allow us to spray;

6 (2) Cutting down of "hazard trees" outside of the area normally  
7 maintained on a distribution line. The Company implemented this  
8 program in 2014 and has been successful in targeting removal of  
9 diseased, decayed or dying trees to preserve the integrity and safety of  
10 our lines;

11 (3) Unplanned work performed at the direction of reliability engineering  
12 as a result of outage follow-up investigations or by customer-initiated  
13 requests; and

14 (4) Disciplined vegetation management outage follow-up process tied to a  
15 formal internal reliability review process.

16 Overall, SAIDI and SAIFI performance has worsened as shown in  
17 Figures 1 and 2 within the Operational Performance section of my testimony.  
18 Corresponding with that trend, DE Carolinas has experienced a slight uptick  
19 in the frequency of vegetation management-related outages.

20 In addition, performance expectations of the industry have changed  
21 over the past few years primarily as a result of significant damage to power  
22 systems caused by the two major east coast events – Hurricane Irene in 2011

1 and Hurricane Sandy in 2012. Although these storms only had a minimal  
 2 impact on the DE Carolinas service territory, history indicates that the area is  
 3 not immune to events of this magnitude. In 2016, Hurricane Matthew caused  
 4 damage to DE Progress' electric system on a scale similar to Hurricane Hugo  
 5 in 1989. The total number of customers impacted in the DE Progress service  
 6 territory during the storm was 1.4 million and the cost was significant.  
 7 Damage to facilities and service restoration times, from major events, can be  
 8 lessened through an effective vegetation management program.

9 **Q. DOES THE COMPANY PROPOSE AN INCREASE TO FUNDING FOR**  
 10 **VEGETATION MANAGEMENT?**

11 **A.** Yes. As explained by Witness McManeus we have included a pro forma  
 12 adjustment related to an expected \$15.8 million increase in system  
 13 expenditures for vegetation management. As a result of the Company's  
 14 worsening trends in SAIDI and SAIFI and the increased industry focus and  
 15 the Company's commitment to continue to improve reliability, DE Carolinas  
 16 is enhancing its vegetation management program through a focus on the  
 17 following areas, all of which require additional funding:

- 18 • An increase in the frequency of trimming to stabilize and  
 19 improve the vegetation management impact on overall  
 20 reliability performance.
- 21 • Increase frequency of herbicide application where appropriate.

- 1                   • Evaluate the feasibility of a Tree Growth Regulator program;
- 2                   and
- 3                   • Continuing other aspects of the current program, such as
- 4                   distribution line “hazard tree” cutting and a disciplined
- 5                   vegetation management outage follow-up process.

6                   This increase in funding will strengthen DE Carolinas’ vegetation  
7                   management plan and help maximize the effectiveness of planned Grid  
8                   Improvements discussed in more detail later in this testimony. The Company  
9                   believes that the additional funding and implementation of its plan, with these  
10                  noted enhancements, will benefit customers.

11    **Q. WILL THE PERFORMANCE OF THE SYSTEM CONTINUE TO**  
12    **DECLINE WITHOUT CAPITAL INVESTMENT ABOVE HISTORIC**  
13    **LEVELS?**

14    **A.** Yes. While increased funding for vegetation management will help, we still  
15                  need to invest heavily in capital upgrades to our grid. Over the next ten years  
16                  approximately 30 percent of the Company’s grid infrastructure will be beyond  
17                  asset life. As a result of the aging grid, outage events and duration are  
18                  increasing. We are also seeing longer restoration times following major storm  
19                  events.

20                  At the same time we are faced with replacing our aging assets, new  
21                  technology has become available which can identify areas of the system that

1 most need improvement. This technology enables the Company to achieve the  
2 highest operational gains at the least cost to customers.

3 Finally, every degradation in service carries a greater impact to  
4 customers than ever before. When you think about how energy-reliant our  
5 phones, water systems, communications and economies have become, even  
6 momentary pulses can result in damage or lost time that would have not been  
7 as impactful decades ago. We must ensure a high quality of service for  
8 customers and we must have a near-term, strategic plan for doing so. I discuss  
9 our plans to enhance quality of service later in my testimony.

10 **IV. OUTLOOK FOR DE CAROLINAS TRANSMISSION AND**  
11 **DISTRIBUTION INFRASTRUCTURE**

12 **Q. WHAT IS THE OUTLOOK FOR DE CAROLINAS' T&D SYSTEMS?**

13 **A.** We have made excellent use of our existing grid system, but we have come to  
14 a point where operational realities, the age of our facilities and equipment, and  
15 customer needs are driving us to significant levels of investment over the next  
16 several years in our T&D systems infrastructure. As described above in my  
17 testimony, we have new technologies that will allow us to efficiently target  
18 investment to the areas of our system that need it the most. Below I describe  
19 the challenges we are facing and the categories of investment needed to  
20 address those challenges.

1 Q. COULD YOU PLEASE DESCRIBE HOW THE COMPANY SETS ITS  
2 PRIORITIES FOR SYSTEM MAINTENANCE AND UPDATES?

3 A. The Company has historically managed a comprehensive asset maintenance  
4 program which is funded, based on the primary root causes of outages and  
5 manages risk through specific reliability improvement programs such as: our  
6 transformer retrofit program to reduce the number of outages per 100 line  
7 miles and reduce the impact on customers due to equipment failure and  
8 animal intrusion; and our sectionalization programs designed to reduce the  
9 impact of outages on customers. This level of investment has been included  
10 in rates, historically. However, we have reached a point where the current  
11 level of investment is not enough to address the needs of today and  
12 tomorrow.

13 Like other utilities across the nation, the grid requires substantial  
14 investment. Due to the age and dynamic demands on our infrastructure,  
15 without significant improvements, frequency and durations of outages will  
16 increase. The Company needs to make investments to address grid hardening,  
17 cyber and physical security and to accommodate the continued growth of  
18 renewables. The good news is that at the same time many components of the  
19 system are nearing the end of their useful lives, new technology is available  
20 that will allow us to meet many of those needs at the same time we are  
21 addressing our primary focus areas in an integrated manner. Even better, we  
22 now have data analytics that allow the Company to target investments to get

1 the best value for every dollar spent to serve customers. This is especially  
2 important given the storm activity explained above and experienced in other  
3 parts of the country. These improvements can help with restoration time  
4 following major events such as ice storms, hurricanes and severe  
5 thunderstorms.

6 **Q. PLEASE DESCRIBE THE COMPANY'S CUSTOMARY PROJECTED**  
7 **CAPITAL EXPENDITURES RELATING TO ITS T&D FACILITIES.**

8 **A.** The Company needs to continue its investments in the T&D system to  
9 maintain the grid and add new customers. The Company's current financial  
10 plans include expenditures of approximately \$4.5 billion on its T&D system in  
11 calendar years 2017 through 2021. However, our Power/Forward Carolinas  
12 investments are incremental to these amounts, as discussed below.

13 **V. POWER/FORWARD CAROLINAS AND THE GRR RIDER**

14 **Q. PLEASE DESCRIBE THE COMPANY'S PLANS FOR CAPITAL AND**  
15 **O&M EXPENDITURES OVER AND ABOVE ITS CUSTOMARY**  
16 **LEVEL OF SPEND.**

17 **A.** Through the Power/Forward Carolinas initiative introduced by Witness  
18 Fountain, DE Carolinas targets spending \$2.9 billion in capital and \$130  
19 million in O&M over the next five years, from 2017 through 2021, to improve  
20 the performance and capacity of the aging grid, making it smarter and more  
21 resilient, to better serve our customers. These expenditures are necessary to  
22 fulfill the Company's intentions to provide safe and reliable service for our



1 customers at a time when the aging transmission and distribution system is  
2 increasingly asked to adapt to dynamic conditions. The Company's  
3 Power/Forward Carolinas initiative will primarily focus on projects that:

- 4 • Improve the reliability and hardiness of the system while making it
- 5 smarter
- 6 • Build a foundation for customer-focused innovation and new
- 7 technologies
- 8 • Comply with prescriptive federal transmission reliability and security
- 9 standards
- 10 • Address maintenance requirements for aging assets
- 11 • Further integrate and optimize intermittent distributed renewable
- 12 generation

13 DE Carolinas has started and intends to continue integrating modernization  
14 efforts into the grid to reduce interruptions, provide customers with more  
15 information about their energy use, and support the growth of distributed  
16 resources. The intention is to create a grid that is customer enabling,  
17 sustainable, reliable and smart.

18 Modernization investments in capacity, grid connectivity and  
19 automation seek to improve system performance by replacing technology  
20 designed to deliver electricity in an analog world of one-way communication  
21 with a variety of digital, two-way, interconnected sensing, monitoring, and  
22 communications-related equipment. These technologies can enhance the

1 resiliency and reliability of the system, improve power quality, help integrate  
2 and manage intermittent distributed renewable resources and position the grid  
3 for emerging technologies such as battery storage, all while improving  
4 situational awareness of the grid. In order to execute on these plans and  
5 ensure timely recovery of investments, DE Carolinas proposes the GRR Rider  
6 as part of this rate case. Witnesses Pirro and McManeus discuss specifics of  
7 the GRR Rider.

8 **Q. WHAT POWER/FORWARD CAROLINAS INVESTMENTS ARE**  
9 **INCLUDED IN THE FIRST YEAR OF THE GRR RIDER?**

10 A. Initiatives such as targeted undergrounding, distribution hardening &  
11 resiliency, and the self-optimizing grid are focused on the distribution system  
12 which is where the majority of the investment will occur. Investments in the  
13 transmission system; and in enterprise systems and communications upgrades  
14 will also occur. All are included in the first year of the GRR Rider and in  
15 subsequent years.

16 **Q. PLEASE DESCRIBE THE DISTRIBUTION SYSTEM INVESTMENTS**  
17 **THAT WILL BE INCLUDED IN THE GRR RIDER.**

18 A. **Targeted Underground:** Targeted undergrounding significantly reduces  
19 outages and momentary interruptions and will quicken restoration times after  
20 major events like storms. The targeted undergrounding approach uses data  
21 analytics to identify those overhead segments with lower multi-year reliability  
22 performance when compared to the remainder of overhead facilities. These

1 outlier segments drive a disproportionate amount of momentary interruptions  
2 (blinks) and outage events that affect customers and burden grid assets with  
3 faults that shorten the life of equipment.

4 Targeted undergrounding is the one program that does the most for  
5 stopping outages from occurring altogether, and has the greatest effect on  
6 reducing damage from major storms. A typical area that might be a candidate  
7 for targeted undergrounding would be an older neighborhood in which it was  
8 industry standard at the time to build power lines behind homes in backyards  
9 for aesthetic purposes. In that scenario, one tree falling on a segment of line  
10 in one person's backyard could interrupt service for the whole neighborhood,  
11 and create access issues for crews to repair the line. Undergrounding of  
12 power lines wasn't even done at the times many older homes were built. Over  
13 time our equipment and industry practice became focused on servicing lines  
14 from bucket trucks, but the Company can't get those trucks in backyards to  
15 service rear lot line areas. Typically it takes the Company twice as long to do  
16 a restoration in these areas because we can't get our equipment to the outage  
17 location. Absent being able to use the right equipment, the Company must  
18 instead use manual labor and hand-held equipment that can create damage to  
19 customers' backyards and add significant time to restoration.

20 Now that the Company has cost effective undergrounding technology,  
21 it is time to modernize the way we service and maintain equipment in these  
22 neighborhoods so that customers can maintain high reliability. As an added

1 benefit, this same program will also reduce not just storm- and tree-related  
2 outages, but will also reduce momentary power blinks that can cause  
3 equipment to reset or shut down. For example, a blink can require a reboot of  
4 a cable box, Wi-Fi router or a server, creating a nuisance for customers and  
5 interrupting their work and lives.

6 In 2018, DE Carolinas' planned targeted underground projects will  
7 occur within 37 counties in NC with the majority of overhead line  
8 conversions, by line miles, occurring in Mecklenburg, Forsyth, and Iredell  
9 counties.

10 **Distribution Hardening & Resiliency:** This work helps prevent  
11 outages, especially during storms, and provides faster restoration times when  
12 outages do occur. There are multiple components in the program as outlined  
13 in Simpson Exhibit 2, among these are (1) retrofitting transformers to  
14 eliminate common outage causes; (2) replacing aged and/or deteriorating  
15 cable and conductors; and (3) providing back feed capability to vulnerable  
16 communities.

17 (1) Transformer Retrofit: We have transformers that were originally  
18 purchased as far back as the 1950s. Some of these have been replaced over  
19 time, but usually as a result of equipment failure or changes required due to  
20 load growth. While we have extracted the value of these assets, the Company  
21 now needs to upgrade those transformers as we are increasingly seeing real  
22 system impacts – momentary and repeat outages – from this outdated

1 equipment. Technology exists today that will allow the Company to install or  
2 retrofit transformers so that they do not cause repeat outages and provide more  
3 reliable service to customers. Our industry has developed solutions for  
4 common outage causes such as animal interference with transformers and  
5 lighting strikes. We also have technologies to limit fusing issues so that if  
6 something does happen with a transformer, it limits the number of customers  
7 impacted.

8 (2) Aged/Deteriorating Cable and Conductors: Underground cable  
9 replacement consists of replacing end-of-life and obsolete underground power  
10 cables. Deteriorated conductor replacement consists of replacing end-of-life  
11 overhead conductors. We have about 2,800 miles of old underground cable in  
12 need of replacement and about 3,145 miles of overhead conductor that has  
13 corroded over the decades – most of it in rural areas. A lot of the routine  
14 investments the Company makes are driven by load growth, so by default,  
15 some rural areas have not had the conductor upgrades that more populated  
16 areas have had within the context of work to accommodate load growth.

17 (3) Back feed capability: For long duration outages: For small- and  
18 medium-sized towns there are situations when an entire town might lose  
19 electricity at one time as a result of a single outage. This is because they are  
20 served by long radial lines that the Company cannot backfeed from other  
21 sources due to lack of capacity and ties in place to other sources of electricity.  
22 This has become a quality-of-life issue for people in these towns. The lack of

1 electricity can, in cases, literally shut a town and its economy down. Gas  
2 stations, stores, restaurants cannot operate without electricity, impacting lives  
3 and businesses who depend on electricity for their livelihood. We need to add  
4 capacity and build hundreds of miles of line to create ties to provide  
5 vulnerable communities with other sources of power when they need it.  
6 Simpson Exhibit 3 provides just a few examples of some of the projects that  
7 are planned.

8 In 2018, our focus will be on projects to address aging cable and  
9 conductors replacements, and back feed capacity. These overhead cable  
10 replacements span 34 counties in NC in the first year with the most projects  
11 occurring in Guilford, Mecklenburg, and Rutherford counties. The  
12 underground cable replacements span 28 counties in NC, with the most  
13 projects occurring in Caswell, Mecklenburg, and Jackson Counties. Back  
14 feed projects to eliminate long-duration outages will occur in 30 counties in  
15 NC. Notable projects will improve reliability at airports, hospitals and on  
16 long-radial distribution lines.

17 **Self-Optimizing Grid:** The self-optimizing grid illustrated in  
18 Simpson Exhibit 1 is an improved delivery system that enhances reliability  
19 and improves system resiliency. This resiliency will enable the system to  
20 better recover from major events like storms. Key components of the projects  
21 will involve adding capacity to distribution circuits and substation  
22 transformers and connecting radial distribution circuits together with

1 automated switches. The enterprise system upgrades, and communication  
2 network upgrades mentioned below and the distribution management system  
3 software are also essential to enabling this capability. The self-optimizing  
4 grid will automatically reroute power around a problem area, like an outage  
5 caused by a car hitting a pole, animal interference, or storm activity. With this  
6 automation, the grid can self-identify problems and react to them by isolating  
7 affected areas and automatically rerouting power, shortening or even  
8 eliminating outages for many customers.

9 The self-optimizing grid program will limit the number of customers  
10 who experience an outage due to a single event to less than 400 customers.  
11 Right now that number could be as high as 1,500 or more customers. When  
12 completed, the grid will be much more resilient and recovery times will be  
13 faster. Any time there is an outage on a distribution feeder line, the system  
14 will self-correct, restoring as many customers as possible and leaving only  
15 those customers who must be out while the repair work is being done. For  
16 example, we have experienced outages caused by a big truck hitting a pole  
17 that resulted in thousands of customers being without service all night. Even  
18 though many linemen were working the issue, the lack of technology available  
19 on the line to isolate the outage and restore customers automatically resulted  
20 in an extended outage for many customers who would otherwise have been  
21 restored in a self-optimizing situation. This is a good example of how  
22 customers could have benefitted from technology that is now available and

1 ready to be deployed today. The target is to have 80 percent of customers on  
2 this technology so that the Company only has 300 to 500 customers on a  
3 circuit versus thousands. Once complete, when there is an outage event, fewer  
4 customers will be impacted because of the ability to reroute power to them.

5 The self-optimizing grid program consists of 216 projects spread  
6 across the DE Carolinas NC territory in 2018. The top three areas, by number  
7 of projects, are areas in and around Burlington, Greensboro, and Charlotte.  
8 Projects are also planned in Spindale and Hickory.

9 **Q. PLEASE DESCRIBE THE INVESTMENTS IN THE TRANSMISSION**  
10 **SYSTEM, INCLUDING 2018 INVESTMENT PLANS.**

11 A. The transmission system transports electricity from the power plant to the  
12 communities we serve. The transmission upgrades we are targeting will  
13 increase reliability by improving the weakest parts of the system, by updating  
14 and replacing equipment that is likely to fail in the near future, and by adding  
15 systems that will notify the Company of problems before they result in an  
16 outage. The improvements will also decrease the Company's environmental  
17 footprint and increase defenses against cyber intrusion.

18 The Company's investments will include substation and transmission  
19 facility upgrades, automation, equipment modernization, physical and cyber  
20 security, and system intelligence capabilities. This program will result in a  
21 system that is more resilient and sets higher design standards that will improve  
22 operational flexibility during outage situations. The upgrades will also allow



1 for proactive health monitoring of substation equipment via continuous  
2 diagnostic health data, resulting in reduced outage impacts for customers.

3 The Company will also upgrade the transmission system so that  
4 maintenance can be scheduled based on need, rather than on a set time  
5 schedule. The current transmission system relies on outdated manual and  
6 analog equipment maintained on a set schedule rather than on need. The  
7 scope of this effort is to install digital assets and system analytics—  
8 transmission system intelligence—capable of condition-based monitoring,  
9 automated switching, and auto-fault location and restoration.

10 To further increase reliability and ensure the well-being of our  
11 employees, customers, and the environment, we are removing breakers and  
12 other equipment that can release oil and/or gas during regular operation,  
13 maintenance, or when they fail. We are in the process of eliminating all oil-  
14 filled breakers, which will increase reliability and reduce environmental risks,  
15 and replacing them with the safest equipment possible.

16 The Company is also mindful of the security of the Company's assets  
17 and the need to continue to protect them to ensure we can reliably serve our  
18 customers. This program will increase protection from physical attacks to  
19 infrastructure, as well as cyber-attacks that affect the way the grid operates.  
20 Examples include gunshot and intrusion detection, high-security intruder  
21 fencing, security cameras inside the substations, security lighting, and card  
22 reader access to substations to control access to the property.

1           These investments that protect against malevolent forces will also  
2           provide protection against everyday occurrences like animal intrusion into  
3           substations causing power interruptions. This is a common and recurring  
4           problem on our system that will decrease as these investments are put into  
5           place.

6           In 2018, planned transmission projects focus primarily on hardening  
7           and resiliency to improve reliability and address environmental issues. This  
8           work includes replacing oil-filled and high-volume gas breakers in many  
9           substation locations across the system; and improvements on aged and  
10          deteriorated components. We will also be installing equipment to enhance the  
11          physical security at our substations. Lastly, planning, design, and installation  
12          for the system intelligence work will continue in 2018.

13   **Q.   PLEASE DESCRIBE THE INVESTMENTS IN THE ENTERPRISE**  
14   **SYSTEM AND COMMUNICATION NETWORK UPGRADE AND**  
15   **SPECIFICS ON THE 2018 INVESTMENT.**

16   **A.   Enterprise System Upgrades, and Communication Network Upgrades:**  
17          Duke Energy's communications systems are the bridge that connects our  
18          control and analytics systems to our devices in the field (e.g., automated  
19          switches and controllers, sensors, smart meters, and computers in trucks).  
20          Staying up to date with necessary communications capability is fundamental  
21          to enabling and maintaining a real-time view of grid conditions in the field  
22          and for our customers. The Company will be increasing the amount of

1 automated restoration capability on the system by installing automated  
2 switches and grid sensors. In addition, the increase in grid complexity will  
3 result in an increased amount of data collected at a higher frequency than ever  
4 before. Improving the communications capabilities to these devices will  
5 enable the Company to better manage the system's increasingly complex and  
6 dynamic nature with automated real-time response.

7 These systems are key to enabling the Self-optimizing Grid  
8 functionality mentioned previously to monitor, manage and control the grid  
9 remotely in near real-time rather than relying on our employees to provide  
10 manual updates at problem areas. For example, these systems will enable the  
11 ability to proactively identify issues between two poles where, historically,  
12 this required linemen patrolling or responding to customer calls to identify the  
13 location of the problem.

14 A key component of Duke Energy's communications work is focused  
15 on strategic communication fiber installations and replacements. The  
16 Company will install high-speed fiber connections on existing transmission  
17 and distribution infrastructure across key strategic locations. This will  
18 improve the reliability, speed and accuracy of transmitting electric system data  
19 to our control centers. The Company currently polls systems in 15 minute  
20 increments, but higher speed connections to substations and system  
21 components will allow the Company to better manage the system in real time.  
22 The Enterprise Systems Upgrades include essential upgrades to the back-

1 office systems needed to operate and manage the many new devices  
2 (automated switches, sensors, voltage management devices) on the grid. This  
3 includes upgrades to the Outage Management System (OMS), Distribution  
4 Management System (DMS), Volt/VAR Management System, Supervisory  
5 Control and Data Acquisition (SCADA) system and many others, enabling  
6 advanced analytics and control of the distribution grid. These are just some  
7 examples of the work we need to accomplish on our grid over the next five  
8 years.

9 **Q. WILL THESE POWER/FORWARD CAROLINAS INVESTMENTS**  
10 **CONTINUE THROUGH THE LIFE OF THE PROGRAM?**

11 **A.** Yes. The Power/Forward Carolinas program represents a ten-year  
12 commitment in North Carolina. The investments made in year one will  
13 continue. Every year, our work plans will be defined and will be able to be  
14 reviewed within the context of the GRR Rider. For example, the Company's  
15 detailed Transmission and Distribution planning cycle consists of a two-year  
16 detailed plan. Detailed work identification for plan year 2019 will be  
17 complete in November 2017. The graphic below explains the work planning  
18 cycle by plan year.

	2017	2018	2019	2020	2021
Plan Year 2018	Planning: Scope Identification, Engineering, Resource Planning	Construction	Benefit Verification		
Plan Year 2019	Planning: Scope Identification	Engineering Resource Planning	Construction	Benefit Verification	
Plan Year 2020		Planning: Scope Identification	Engineering Resource Planning	Construction	Benefit Verification
Plan Year 2021			Planning: Scope Identification	Engineering Resource Planning	Construction
	2018 scope identification completed 5/31/17 2019 detailed scope approval in Dec 2017	Grid Improvement Plan Management Team Governance	Grid Improvement Plan Management Team Governance	Grid Improvement Plan Management Team Governance	Grid Improvement Plan Management Team Governance

- 1 Q. HOW MUCH OF THE POWER/FORWARD CAROLINAS  
2 INVESTMENT IS REQUIRED TO MAINTAIN THE GRID AND HOW  
3 MUCH IS TO MODERNIZE THE GRID?
- 4 A. Approximately 90 percent of this investment is to modernize the grid.  
5 Specifically, Targeted Undergrounding, Self-Optimizing Grid, and Backfeed  
6 Capability are programs that are entirely designed to modernize the grid. The  
7 portion of the Hardening & Resiliency program which involves retrofitting  
8 transformers to eliminate common outage causes and replacing aged and/or  
9 deteriorating cable and conductors represents approximately 10 percent of the  
10 investment. The reason these are included in this request is because they have  
11 been clearly identified as major causes of outages and our customary

1 investment rate is not adequate to expeditiously remove these causes. Of the  
2 \$2.9 billion that DE Carolinas targets in spending over the next five years,  
3 from 2017 through 2021 in North Carolina for the Power/Forward Carolinas  
4 program, \$334 million is for retrofitting transformers to eliminate common  
5 outage causes, and for replacing aged and/or deteriorating cable and  
6 conductors.

7 **Q. WILL DEC NORTH CAROLINA CUSTOMERS SEE ANY OBVIOUS**  
8 **IMPROVEMENTS IN THE QUALITY OF THEIR SERVICE?**

9 A. Yes, DE Carolinas' North Carolina customers will experience less frequent  
10 outages and momentary interruptions (blinks), shorter outage durations when  
11 outages do occur, and faster restoration times during major storms.

12 **Q. WILL THESE INVESTMENTS DRIVE SAVINGS FOR CUSTOMERS**  
13 **DOWN THE ROAD?**

14 A. Yes, these investment in the grid should lead to savings in outage restoration  
15 costs over the life of the project. These savings will be used to offset rising  
16 costs in other areas.

1 Q. CAN YOU PROVIDE VISIBILITY AS TO THE UPCOMING YEARS OF  
 2 THE POWER/FORWARD CAROLINAS INITIATIVE AND  
 3 ASSOCIATED COSTS EXPECTED TO BE ALLOCATED TO DEC  
 4 NORTH CAROLINA RETAIL CUSTOMERS.

5 A. The DE Carolinas NC investment per program for the next five years (2017-  
 6 2021) is included in the table below. Dollar figures in the table are in  
 7 millions. Yearly totals are in the bottom row.

**DEC Grid Improvement Plan**  
 (\$ MM)

Program Name	Capital				
	2017	2018	2019	2020	2021
Enterprise Systems	13	30	28	18	19
Communication Total	0	25	32	33	30
Transmission Total	46	120	138	165	165
Self-Optimizing Grid	10	59	94	94	94
Targeted UG	-	19	158	258	435
Distribution Hardening & Resiliency	21	157	201	198	245
<b>Total</b>	<b>90</b>	<b>410</b>	<b>651</b>	<b>765</b>	<b>987</b>

8 Q. COULD THERE BE COST CHANGES IN THE FUTURE BASED ON  
 9 OPERATIONAL EXPERIENCE AND TIMING?

10 A. Yes, that is possible. Although our ten-year plan is well thought out, we have  
 11 built in processes for annual scope approvals that will enable the Company to  
 12 leverage lessons learned throughout the program. These governance  
 13 processes will also assure any such changes do not materially raise overall  
 14 program costs or lower projected customer benefits.

1 Q. WHAT ARE THE ECONOMIC BENEFITS TO THE STATE OF  
2 NORTH CAROLINA FROM THE POWER FORWARD  
3 INVESTMENTS?

4 A. Yes, as explained by Witness Fountain, we believe that the Power/Forward  
5 Carolinas initiative will greatly enhance the economy of the State of North  
6 Carolina.

7 Q. WILL THESE INVESTMENTS IMPROVE STORM RESTORATION  
8 TIMES AND HOW WILL THEY ACCOMPLISH THIS?

9 A. Yes, Power/Forward Carolinas will improve storm restoration times. First, the  
10 overhead lines included in the Targeted Undergrounding program are typically  
11 those that sustain the most damage during storms. Undergrounding these  
12 areas will greatly reduce that damage and improve restoration times. Second,  
13 the Self-optimizing Grid program significantly increases the resiliency of the  
14 distribution grid. This technology enables remote detection and isolation of  
15 faults on distribution circuits, enabling the system to automatically reroute  
16 power to restore service to as many customers as possible within a few a  
17 minutes or less. Finally, the Distribution and Transmission Hardening &  
18 Resiliency programs reduce the risk of damage during storms by replacing  
19 aged equipment with new and more modern equipment, and by building in  
20 resiliency options that allow faster recovery when damage does occur.



1 Q. WILL ANY OF THESE INVESTMENTS REDUCE COSTS FOR  
2 STORM RESTORATION IN THE FUTURE?

3 A. Yes, Power/Forward Carolinas is expected to reduce storm costs over time.  
4 This is especially important when you look at the severity of storms  
5 experienced in the Carolinas over the last few years. The reason for the  
6 reduction in storm costs is simple: as the Power/Forward Carolinas programs  
7 are implemented, the power grid will experience less damage when major  
8 storms do occur. Storm durations and costs are driven by the extent of system  
9 damage.

10 Q. PLEASE SUMMARIZE WHY THESE INVESTMENTS ARE  
11 NECESSARY TO SERVE CUSTOMERS IN NORTH CAROLINA?

12 A. The problems with our aging grid are escalating and will worsen over time  
13 unless we take a proactive approach. Making the right improvements now is  
14 critical; we are reaching the limits of performance of the existing system and  
15 now we need to address the next phase of modern operations. Customer needs  
16 are changing and service interruptions are become more disruptive in a  
17 technology-driven world. Even momentary interruptions can be disruptive to  
18 lives and businesses, and extended restoration times can have a very real  
19 impact on communities and the economy. As explained by Witness Fountain,  
20 the Company is very conscious of the economic impact to our State when  
21 customers, hospitals, employers, manufacturers and schools do not have  
22 power, even if the outage is momentary or resulting from a storm event.

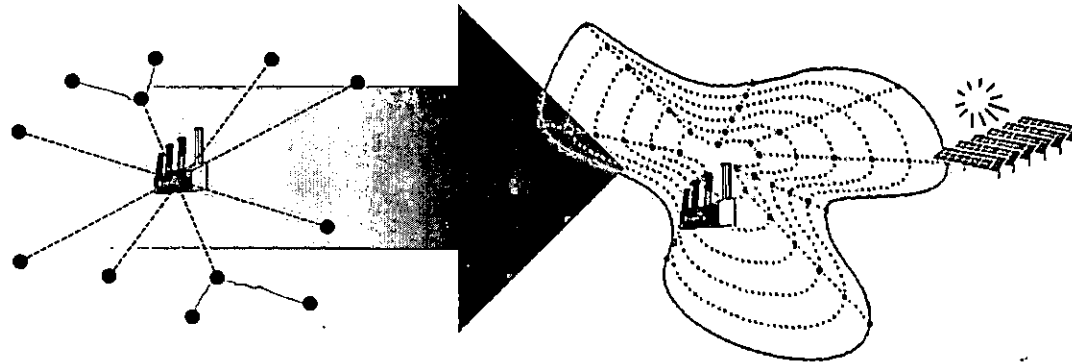
1           While we have been investing appropriately and reasonably in our  
2           grid, the infrastructure is reaching the natural end of its useful  
3           life. Infrastructure replacement in the past has been primarily driven by load  
4           growth. As our growth flattens (or in some cases declines), the replacement  
5           rate of older equipment will slow, thereby increasing older equipment on the  
6           system. Our urban areas are seeing most of the growth while rural areas are  
7           flat. Therefore, more rural infrastructure is likely to stay in service longer  
8           than urban.

9           The dynamic demands on our system such as the penetration of  
10          renewables is already exposing the limits of the legacy grid. Extreme weather  
11          events stress older equipment and lead to higher failure rates. Physical and  
12          cyber security requirements are tightening to protect energy  
13          independence. We need to ensure investment in our grid can support these  
14          new requirements. New technology is now available to address these  
15          concerns. For all these reasons, we are implementing the Power/Forward  
16          Carolinas initiative.

17   **Q.   DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**

18   **A.   Yes.**

## Our Vision for a Self-Optimizing Grid



**The Goal:** Customers experience less interruptions due to a dynamic self-optimizing grid which automatically reacts to & mitigates failures and accepts & effectively manages renewable energy.

**The Self Optimizing Grid** is transforming our radial distribution system to an automated distribution network that provides:

- ✓ **Connectivity** with automated devices between our circuits.
- ✓ **Capacity** on our circuits and substation banks to allow dynamic switching.
- ✓ **Automated Control** to manage our grid, control field devices and provide two-way communications.
- ✓ **Segmentation** such that our circuits have much smaller line segments, thus reducing the number of customers that are affected by outages.

# Distribution Hardening & Resiliency Programs

Simpson Exhibit 2  
Page 1 of 1

Hardening- Investments that lower system risk and prevent outage events from occurring:

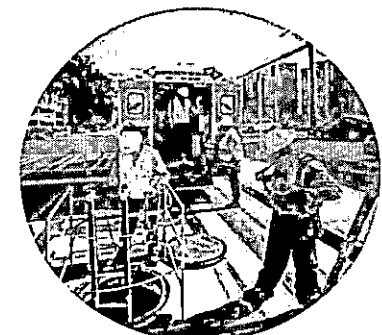
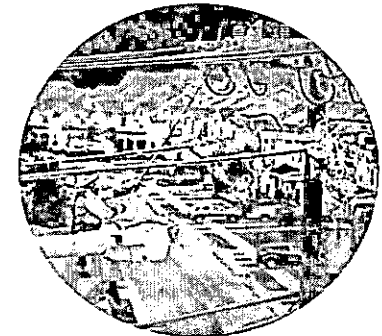
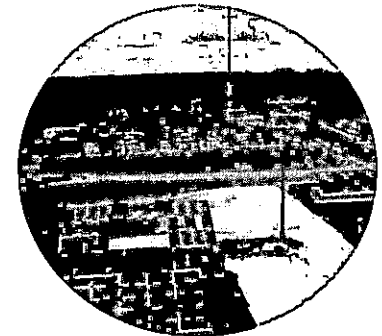
## Grid Integrity and Event Elimination

- Transformer Retrofit
- Deteriorated Conductor / UG Cable Replacement
- Physical & Cyber Security
- Urban UG uplift
- Oil filled equipment replacement

Resiliency- Investments that minimize impacts of events and improve ability to recover rapidly:

## Event Impact Reduction & Recovery

- Sectionalization
- Convert UG radials to loop
- Rural circuit ties
- High impact sites
- Capacity margin
- System Intelligence

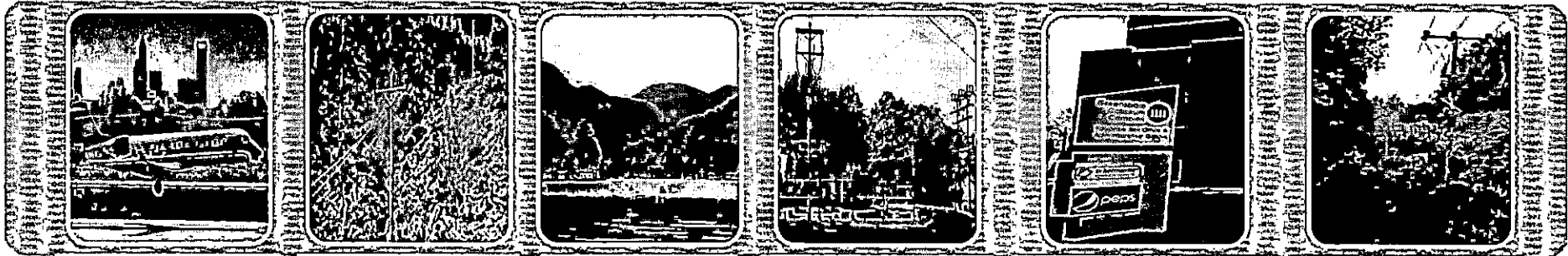


# NC GIP Hardening & Resiliency Examples

Simpson Exhibit 3  
Page 1 of 1

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Feb 13 2019



## Charlotte Douglas Airport

Critical infrastructure project to provide back-feed options

## Robbinsville Circuits

Long duration outages and high maintenance costs due to inaccessible ridgetop facilities

## Lake Lure

Long radial feed with no alternative back feed, high repeat and long duration outages

## High Point

Long duration outages due to inaccessible rear exiting substation feeder lines

## Greensboro Coliseum

Critical infrastructure project to provide back-feed options and automated self-healing

## Bryan Park

Industrial Park with long duration outages due to inaccessible overhead backline will be converted to underground

Aug 25 2017

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I/A

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-100, SUB 148

In the Matter of	)	<b>DIRECT TESTIMONY OF</b>
Biennial Determination of Avoided Cost	)	<b>KENDAL C. BOWMAN</b>
Rates for Electric Utility Purchases from	)	<b>ON BEHALF OF DUKE ENERGY</b>
Qualifying Facilities – 2016	)	<b>CAROLINAS, LLC AND DUKE</b>
	)	<b>ENERGY PROGRESS, LLC</b>

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Feb 21 2017  
Feb 13 2019

1 negative, of this changing landscape.”<sup>15</sup> In the Companies’ view, these  
2 rapidly changing economic and regulatory circumstances have caused the  
3 Commission’s continuation of its historic policies going forward to no longer  
4 be just and reasonable to the Company’s customers or to serve the public  
5 interest.

6 The Companies believe the following economic and regulatory  
7 circumstances should now be considered by the Commission in this  
8 proceeding to begin a transition of North Carolina’s energy landscape towards  
9 a smarter, more sustainable, and reliable future:

- 10 1) PURPA’s role in the recent surging and uncontrolled growth of utility-  
11 scale solar, including the significant long-term financial obligations  
12 now being imposed on the Companies’ customers;
- 13 2) The broader regulatory context of national PURPA implementation  
14 and the cost implications for customers should North Carolina  
15 continue to maintain the status quo in future PURPA standard offer  
16 implementation; and
- 17 3) The mandates of North Carolina’s energy policies set forth in the  
18 Public Utilities Act should also be recognized in evaluating the public  
19 interest and balancing PURPA’s goal of encouraging QF development  
20 with current economic and regulatory circumstances.

---

<sup>15</sup> *Order Establishing Standard Rates and Contract Terms for Qualifying Facilities* at 31, Docket No. E-100, Sub 136 (Feb. 21, 2014).

1 unconstrained solar power that they must take under PURPA. In contrast, the  
2 Companies' own solar facilities are subject to curtailment by the Companies'  
3 system operators, enabling them to cost-effectively integrate solar power from  
4 those facilities into operations without challenging reliable operations.

5 **Q. HOW WOULD A COMPETITIVE SOLICITATION SUPPORT SOLAR**  
6 **GROWTH IN A SMART, SUSTAINABLE WAY?**

7 A. The Companies believe that a competitive solicitation will lower costs for  
8 customers, provide improved operational controls, and open a new market for  
9 solar facilities outside of PURPA. As envisioned by the Companies,  
10 curtailment and dispatch capability will be incorporated into the PPAs,  
11 allowing system operators to better plan for, manage, and operate their  
12 systems. In addition, the Companies envision a process that allows DEC and  
13 DEP to plan where the new solar generation is located, while offering longer  
14 term contracts and procurement of an established amount of solar MW as an  
15 incentive to add additional new solar installations in a thoughtful and  
16 managed process overseen by an independent third party. For these reasons,  
17 the Companies have requested the Commission initiate a separate proceeding,  
18 with interested stakeholders, to collaborate on the development of a  
19 competitive solicitation process for North Carolina.

20 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

21 A. Yes, it does.



STATE OF NORTH CAROLINA  
UTILITIES COMMISSION  
RALEIGH

DOCKET NO. E-100, SUB 101

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of	)	ORDER REGARDING DUKE
Generator Interconnection Standard,	)	SETTLEMENT AGREEMENT
Tariffs and Contract Forms	)	WITH GENERATION
	)	INTERCONNECTION
	)	CUSTOMERS

BY THE COMMISSION: On August 29, 2016, Duke Energy Carolinas, LLC, and Duke Energy Progress, LLC, (collectively Duke), jointly filed for informational purposes a Settlement Agreement among Duke and seven solar developers representing 33 generation interconnection customers.

On September 8, 2016, the Commission issued an Order directing Duke to answer questions attached to the Order by September 22, 2016. The Public Staff was also requested to file comments as indicated in the Order and any other matters raised by the Settlement Agreement.

On September 16, 2016, Strata Solar, LLC, (Strata Solar) filed a petition to intervene and file comments that was granted by Order dated September 21, 2016.

On September 22, 2016, O2 EMC, LLC, (O2 EMC) filed a petition to intervene and to allow responses to answers Duke provides to the questions posed in the September 8, 2016 Order.

Duke filed its response on September 22, 2016, to the questions included in the September 8, 2016 Order. The Public Staff and Strata Solar each filed comments on that same date.

On September 23, 2016, O2 EMC filed a supplement to its petition to intervene.

On September 28, 2016, the Commission issued an Order granting the petition of O2 EMC to intervene but denying their request to file comments in response to DEP and DEC.

On October 11, 2016, O2 EMC filed a supplemental request to file comments, as well as providing such comments to responses to certain questions posed in Appendix A of the Commission's Order dated September 8, 2016.

The Commission finds the comments and answers to questions are complete and responsive to the Order. The Commission also finds that the Settlement Agreement among Duke Energy Carolinas, LLC, and Duke Energy Progress, LLC, and the settling interconnection customers does not create a need for the Interconnection Standard to be revised. The Commission is satisfied that Duke is taking appropriate steps to ensure electric service to retail customers is not degraded due to the operations of newly interconnected generation facilities. Therefore, the Commission finds there is no need for additional action at this time.

The Commission is of the opinion that good cause exists to accept the comments of O2 EMC, LLC, included in its Second Supplement to Petition to Intervene and Request for Leave to File Comments dated October 11, 2016.

The Commission recognizes that the Settlement Agreement required parties to mutually agree to specific additional language not included in the Commission-approved North Carolina Interconnection Procedures (NCIP). In the future, similar language or details shall not be presented as revisions to the NCIP but rather additional terms and conditions. The Commission concludes that all changes to the Interconnection Standard approved in Docket E-100, Sub 101 shall be presented to the Commission for review and approval.

ISSUED BY ORDER OF THE COMMISSION.

This the 1st day of November, 2016.

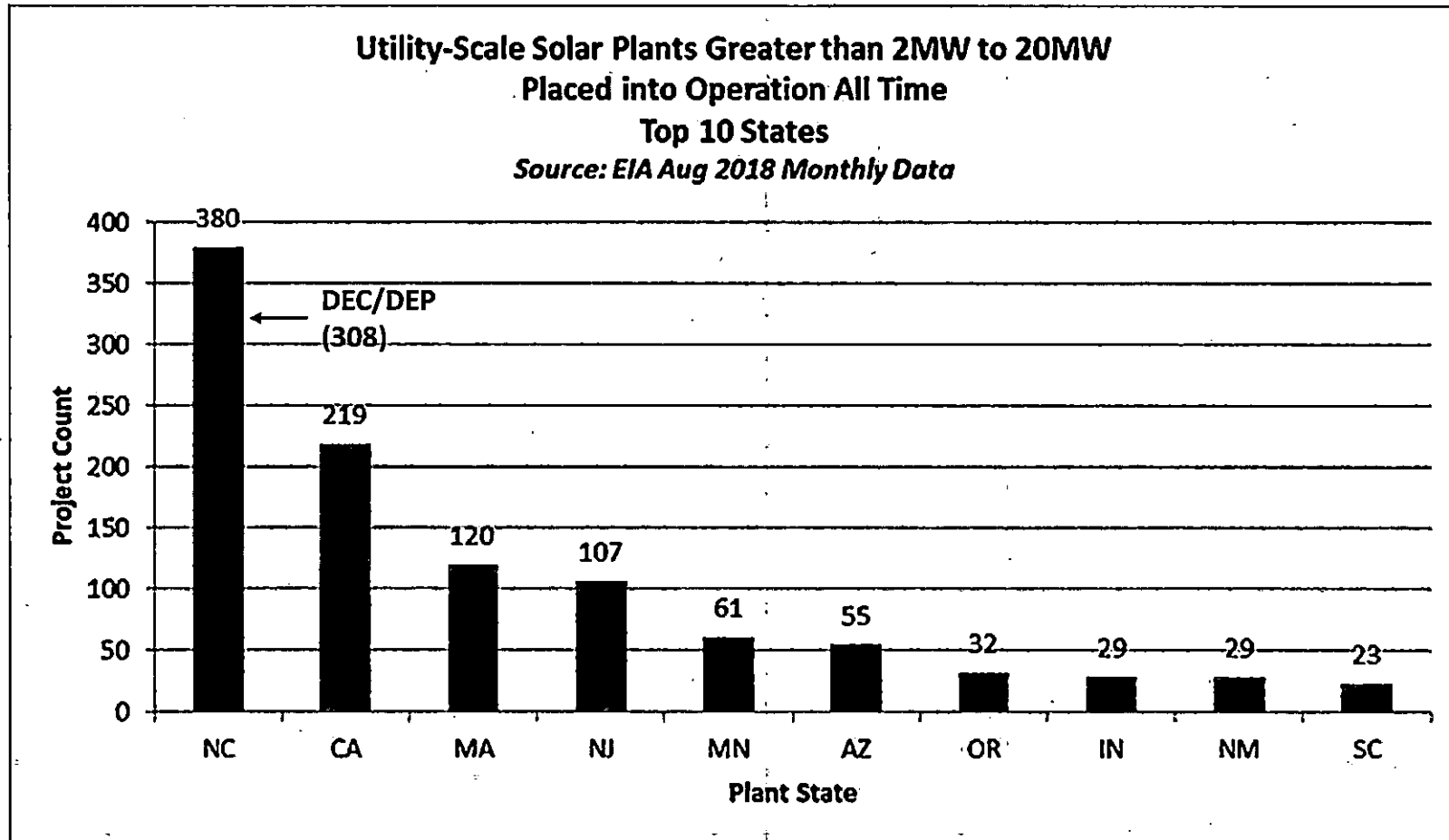
NORTH CAROLINA UTILITIES COMMISSION

*Paige J. Morris*

Paige J. Morris, Deputy Clerk

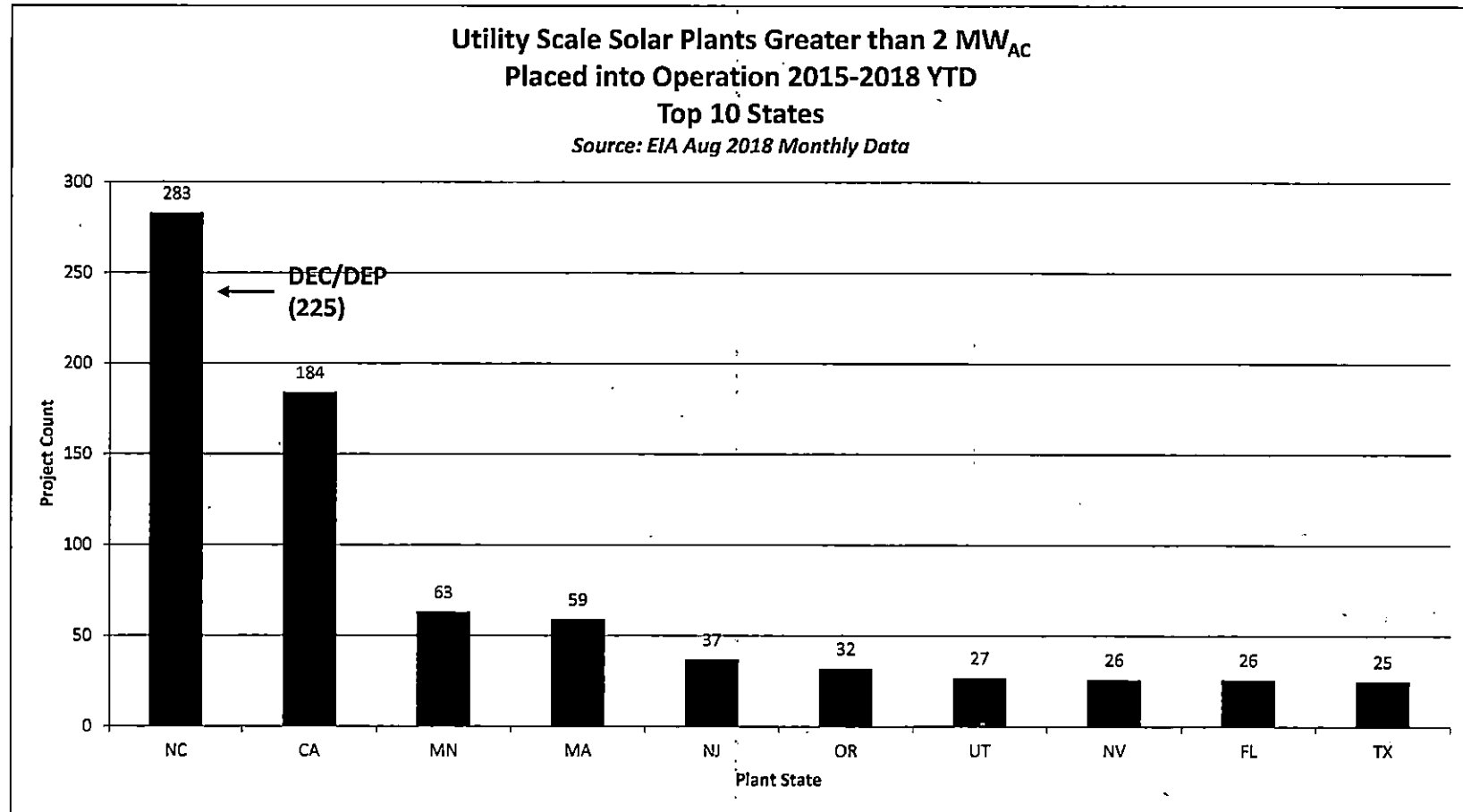
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Freeman Direct Figure 1 (Page 10)



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### Freeman Direct Figure 3 (Page 12)



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Nov 19 2018  
Feb 13 2019

**NORTH CAROLINA**  
**INTERCONNECTION PROCEDURES,**  
**FORMS, AND AGREEMENTS**  
**For State-Jurisdictional Generator Interconnections**

JOINT UTILITIES  
REVISIONS  
Effective  
5XX/XX15/2015XX  
XX

Docket No. E-100, Sub 101

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Nov 19 2018  
Feb 13 2019

## Section 1. General Requirements

### 1.1 Applicability

- 1.1.1 This Standard contains the requirements, in addition to applicable tariffs and service regulations, for the interconnection and parallel operation of Generating Facilities with Utility Systems in North Carolina. These procedures apply to Generating Facilities that are interconnecting to Utility Systems in North Carolina where the Interconnection Customer is not selling the output of its Generating Facility to an entity other than the Utility to which it is interconnecting.

Interconnection Requests for new Generating Facilities shall be submitted to the Utility for approval at the final design stage and prior to the beginning of construction.

The submission of a written request for a Section 1.2 Pre-Request Response and/or Section 1.3 Pre-Application Report is encouraged to identify potential interconnection issues unforeseen by the Interconnection Customer.

Revised Interconnection Requests for equipment or design changes should be submitted pursuant to Section 1.5.

Notification by the Interconnection Customer to the Utility of change of ownership or change in control should be submitted pursuant to Section 6.11.

- 1.1.1.1 A request to interconnect a certified inverter-based Generating Facility no larger than 20 kW shall be evaluated under the Section 2, 20 kW Inverter Process. (See Attachments 4 and 5 for certification criteria.)
- 1.1.1.2 A request to interconnect a certified Generating Facility no larger than the capacity specified in Section 3.1 shall be evaluated under the Section 3 Fast Track Process. (See Attachments 4 and 5 for certification criteria.)
- 1.1.1.3 A request to interconnect a Generating Facility larger than the capacity stated in Section 3.1, or a Generating Facility that does not qualify for or pass the Fast Track Process or qualify for the 20 kW Inverter Process, shall be evaluated under the Section 4 Study Process. Interconnection Customers that qualify for Section 2 or Section 3 may also choose to proceed directly to Section 4 if they believe Section 4 review is likely to be necessary.



1.1.2 Capitalized terms used herein shall have the meanings specified in the Glossary of Terms in Attachment 1 or the body of these procedures.

1.1.3 The ~~201785~~ revisions to the Commission's interconnection standard shall not apply to Generating Facilities ~~already interconnected having a fully executed Interconnection Agreement as of the effective date of the 201578~~ revisions to this Standard, unless the Interconnection Customer proposes a Material Modification, transfers ownership of the Generating Facility, or application of the ~~201785~~ revisions to the Commission's interconnection standard are agreed to in writing by the Utility and the Interconnection Customer. This Standard shall apply if the Interconnection Customer does not have a fully executed Interconnection Agreement for has not actually interconnected the Generating Facility as of the effective date of the 201578 revisions. Revised fees and new deposits will only apply to new Interconnection Requests and future transactions involving existing Interconnection Requests occurring after the effective date of the 20178 revisions to this Standard involving existing projects in the interconnection queue, such as a Change In Control.

Any Interconnection Customer that has not executed an interconnection agreement with the Utility prior to the effective date of the ~~2015-2018~~ revisions to this Standard shall have ~~30 Calendar Days~~ 45 Business Days following the later of the effective date of the Standards or the posted date of notice in writing from the Utility to ~~demonstrate site control pursuant to Section 1.6, and to post the deposit outlined in Section 1.4~~ make prepayment or provide Financial Security in a form reasonably acceptable to the Utility for any Network Upgrades identified in the Interconnection Customer's System Impact Study Report as required by Section 4.3.9 of the Procedures.

~~Any Interconnection Customer that has executed an interconnection agreement with the Utility prior to the effective date of this Standard but the Utility has not actually interconnected the Generating Facility, shall have 60 Calendar Days to submit Upgrade and Interconnection Facility payments (or Financial Security acceptable to the Utility for Interconnection Facilities only) required pursuant to Section 5.2. Any amounts previously paid by the Interconnection Customer at the time deposit or payment is due under this Section shall be credited towards the deposit amount or other payment required under this Section.~~

~~1.1.4 Prior to submitting its Interconnection Request, the Interconnection Customer may ask the Utility's interconnection contact employee or office whether the proposed interconnection is subject to these procedures. The Utility shall respond within 10 Business Days.~~

~~1.1.54~~ Infrastructure security of electric system equipment and operations and control hardware and software is essential to ensure day-to-day reliability

and operational security. All Utilities are expected to meet basic standards for electric system infrastructure and operational security, including physical, operational, and cyber-security practices.

- 1.1.65 References in these procedures to Interconnection Agreement are to the North Carolina Interconnection Agreement. (See Attachment 9.)

## 1.2 Pre-Request Response

- 1.2.1 The Utility shall designate an employee or office from which information on the application process can be obtained through informal requests from the Interconnection Customer presenting a proposed project for a specific site. The name, telephone- number, -and- e-mail- address- of- such- contact employee or office shall be made available on the Utility's Internet web site.
- 1.2.2 The Interconnection Customer may request a Pre-Request Response by providing the Utility details of a potential project in writing, including site address, grid coordinates, project size, project developer name, and proposed Point of Interconnection.

Electric system information provided to the Interconnection Customer should include number of phases and voltage of closest circuit, distance to existing source, distance to substation, and other information and/or materials useful to an understanding of an interconnection at a particular point on the Utility's System, to the extent such provision does not violate confidentiality provisions of prior agreements or critical infrastructure requirements. The Utility shall comply with reasonable requests for such information in a timely manner, not to exceed ten (10) Business Days. The Pre-Request Response produced by the Utility is non-binding and does not confer any rights. The Interconnection Customer must still meet the Section 1.4 requirements to apply to interconnect to the Utility's system and to obtain a Queue Number. Any one developer shall have no more than five (5) requests for Pre-Request Responses in the Pre-Request Response queue at one time.

## 1.3 Pre-Application Report

- 1.3.1 In addition to, or instead of, requesting an informal Pre-Request Response, an Interconnection Customer may submit a formal written Pre-Application Report request form (see Attachment 3) along with a non-refundable fee of ~~\$500~~\$300 for a Pre-Application Report on a proposed project at a specific site. The Utility shall provide the Pre-Application data described in Section 1.3.2 to the Interconnection Customer within ten (10) Business Days of receipt of the completed request form and payment of the ~~\$500~~\$300 fee. The Pre-Application- Report -produced- by- the- Utility is non-binding, does not confer any rights, and the Interconnection Customer must still successfully apply to interconnect to the Utility's system and to obtain a Queue Number. The written Pre-Application Report request form shall include the information in Sections 1.3.1.1 through 1.3.1.8 below to clearly and sufficiently identify the location of the proposed Point of Interconnection. Any one developer shall have no more than five (5) requests for Pre-Application Reports in the Pre-Application Report queue at one time.

- 1.3.1.1 Project contact information, including name, address, phone number, and email address.
- 1.3.1.2 Project location (street address, location map with nearby cross streets and town, grid coordinates of anticipated Point of Interconnection, etc.).
- 1.3.1.3 Meter number, pole number, location map or other equivalent information identifying proposed Point of Interconnection, if available.
- 1.3.1.4 Generator or Storage Type (e.g., solar, wind, combined heat and power, battery, etc.)
- 1.3.1.5 Size (alternating current kW, and for storage kWh).
- 1.3.1.6 Single or three phase generator configuration.
- 1.3.1.7 Stand-alone generator- (no onsite load, not including station service – Yes or No?)
- 1.3.1.8 Is new service requested? Yes or No? If there is existing service, include the customer account number, site minimum and maximum current or proposed electric loads in kW (if available) and specify if the load is expected to change.

1.3.2. Using the information provided by the Interconnection Customer in the Pre-Application Report request form in Section 1.3.1, the Utility shall identify the substation/area bus, bank or circuit likely to serve the proposed Point of Interconnection. This selection by the Utility does not necessarily indicate, after application of the screens and/or study, that this would be the circuit the project ultimately connects to. The Interconnection Customer must request additional Pre-Application Reports if information about multiple Points of Interconnection is requested. Subject to Section 1.3.3, the Pre-Application Report shall include the following information:

- 1.3.2.1 Total capacity (in MW) of substation/area bus, bank or circuit based on normal- or- operating- ratings- likely- to- serve- the proposed Point of Interconnection.
- 1.3.2.2 Existing aggregate generation capacity (in MW) interconnected to a substation/area bus, bank or circuit (i.e., amount of generation online) likely to serve the proposed Point of Interconnection.

- 1.3.2.3 Aggregate queued generation capacity (in MW) for a substation/area bus, bank or circuit (i.e., amount of generation in the queue) likely to serve the proposed Point of Interconnection.
- 1.3.2.4 Substation nominal distribution voltage and/or transmission nominal voltage if applicable.
- 1.3.2.5 Nominal distribution circuit voltage at the proposed Point of Interconnection.
- 1.3.2.6 Approximate circuit distance between the proposed Point of Interconnection and the substation.
- 1.3.2.7 Relevant line section(s) actual or estimated peak load and minimum load data, including daytime minimum load and absolute minimum load, when available.
- 1.3.2.8 Number, location, and rating of protective devices, and number, location, and type (standard, bi-directional) of voltage regulating devices between the proposed Point of Interconnection and the substation/area. Identify whether the substation has a load tap changer.
- 1.3.2.9 Number of phases available at the proposed Point of Interconnection. If a single phase, distance from the three-phase circuit.
- 1.3.2.10 Limiting conductor ratings from the proposed Point of Interconnection to the distribution substation.
- 1.3.2.11 Whether the Point of Interconnection is located on a spot network, grid network, or radial supply.
- 1.3.2.12 Based on the proposed Point of Interconnection, existing or known constraints such as, but not limited to, electrical dependencies at that location, short circuit interrupting capacity issues, power quality or stability issues on the circuit, capacity constraints, or secondary networks.
- 1.3.2.13 Other information regarding an Affected System the Utility deems relevant to the Interconnection Customer.

- 1.3.3 The Pre-Application Report need only include existing data. A Pre-Application Report request does not obligate the Utility to conduct a study or other analysis of the proposed generator in the event that data is not readily available. If the Utility cannot complete all or some of the Pre-Application Report due to lack of available data, the Utility shall provide the Interconnection Customer with a Pre-Application Report that includes the data that is readily available. Notwithstanding any of the provisions of this section, the Utility shall, in good faith, include data in the Pre-Application Report that represents the best available information at the time of reporting. Further, the total capacity provided in Section 1.3.2.1 does not indicate that an interconnection of aggregate generation up to this level may be completed without impacts since there are many variables studied as part of the interconnection review process, and data provided in the Pre-Application Report may become outdated at the time of the submission of the complete Interconnection Request.

#### 1.4 Interconnection Request

- 1.4.1 The Interconnection Customer shall submit its Interconnection Request to the Utility, and the Utility shall notify the Interconnection Customer confirming receipt of the Interconnection Request within three (3) Business Days of receiving the Interconnection Request.

The Interconnection Request Application Form shall be date- and time-stamped upon receipt of the following:

- 1.4.1.1 A substantially complete Interconnection Request Application Form contained in Attachment 2 submitted by a valid legal entity registered with the North Carolina Secretary of State, and signed by the Interconnection Customer.
- 1.4.1.2 The applicable fee or Interconnection Request Deposit: The applicable fee is specified in the Interconnection Request Application Form and applies to a certified inverter-based Generating Facility no larger than 20 kW reviewed under Section 2 and to any certified Generating Facility no larger than the capacity specified in Section 3.1 to be evaluated under the Section 3 Fast Track Process.

For all Generating Facilities that do not qualify for the 20 kW Inverter Process or the Fast Track Process, fail the Fast Track and Supplemental Review Process under Section 3.0 and are to be evaluated under the Section 4 Study Process, an Interconnection Request Deposit is required. The Interconnection Request Deposit shall equal \$20,000 plus one dollar (\$1.00) per kWac of capacity specified in the Interconnection Request Application Form, not to exceed an aggregate Interconnection

Request Deposit of \$100,000. The Interconnection Request Deposit is intended to cover the Utility's reasonably anticipated costs including overheads for conducting the System Impact Study and the Facilities Study. Such deposit shall, however, be applicable towards the cost of all studies, Upgrades and Interconnection Facilities including overheads.

- 1.4.1.3 A Site Control Verification letter (sample included within Attachment 2).
  - 1.4.1.4 A site plan indicating the location of the project, the property lines and the desired Point of Interconnection.
  - 1.4.1.5 An electrical one-line diagram for the Generating Facility.
  - 1.4.1.6 Inverter specification sheets for the Interconnection Customer's equipment that will be utilized.
- 1.4.2 The original date- and time-stamp applied to the Interconnection Request Application Form shall be accepted as the qualifying date- and time-stamp for the purposes of establishing Queue Position and any timetable in these procedures.
- 1.4.3 The Utility shall notify the Interconnection Customer in writing within ten (10) Business Days of the receipt of the Interconnection Request Application Form as to whether the Form and initial supporting documentation specified in Sections 1.4.1.1 through 1.4.1.6 are complete or incomplete. An Interconnection Request will be deemed complete upon submission of the listed information in Section 1.4.1 to the Utility.
- 1.4.4 If the Interconnection Request Application Form and/or the initial supporting documentation or any other information requested by the Utility is incomplete, the Utility shall provide, along with notice that the information is incomplete, a written list detailing all information that must be provided. The Interconnection Customer will have ten (10) Business Days after receipt of the notice to submit the listed information. If the Interconnection Customer does not provide the listed information or a written request for an extension of time, not to exceed ten (10) additional Business Days, within the deadline, the Interconnection Request will be deemed withdrawn.
- 1.5 Modification of the Interconnection Request

~~"Material Modification" means a modification to machine data or equipment~~

~~configuration or to the interconnection site of the Generating Facility that has a material impact on the cost, timing or design of any Interconnection Facilities or Upgrades or that may adversely impact other Interdependent Interconnection Requests with higher Queue Numbers, which includes any required study revisions resulting from the modification. The Utility shall allow for modifications submitted before the execution of a System Impact Study Agreement which do not change the nature of the interconnection request, as determined by the Utility. Material Modifications include certain project revisions as defined in Section 1.5.1 Material Modifications include project revisions proposed at any time after receiving notification by the Utility of a complete Interconnection Request pursuant to Section 1.4.3 that 1) alters the size or output characteristics of the~~

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Generating Facility from its Utility-approved Interconnection Request submission; or 2) may adversely impact other Interdependent Interconnection Requests with higher Queue Numbers.

1.5.1 Indicia of a Material Modification, include, but are not limited to:

~~1.5.1.1 A change in Point of Interconnection (POI) to a new location, unless the change in a POI is on the same circuit less than two (2) structures away from the original location, on the same side of any prior connections to the circuit, and the new POI is within the same protection zone as the original location~~  
A change in Point of Interconnection (POI) to a new location, unless the change in a POI is on the same circuit less than two (2) poles away from the original location, and the new POI is within the same protection zone as the original location;

~~1.5.1.2 A change or replacement of generating equipment such as generator(s), inverter(s), transformers, relaying, controls, etc. that is not a like-kind substitution in size, ratings, impedances, efficiencies or capabilities of the equipment specified in the original or preceding Interconnection Request;~~

~~1.5.1.3 A change from certified to non-certified devices ("certified" means certified by an OSHA recognized Nationally Recognized Test Laboratory (NRTL), to relevant UL and IEEE standards, authorized to perform tests to such standards);~~

~~1.5.1.4 A change of transformer connection(s) or grounding from that originally proposed;~~

~~1.5.1.5 A change to certified inverters with different specifications or different inverter control specifications or set-up than originally proposed;~~

~~1.5.1.6 An increase of the AC output of a Generating Facility; or~~

~~1.5.1.6 A change reducing the AC output of the generating facility by more than 10%.~~

"Material Modification" means a modification to machine data or equipment configuration or to the interconnection site of the Generating Facility that has a material impact on the cost, timing or design of any Interconnection Facilities or Upgrades or that may adversely impact other Interdependent Interconnection Requests with higher Queue Numbers. Material Modifications include certain project revisions as defined in Section 1.5.1.

1.5.1 (a) Indicia of a Material Modification before the System Impact Study Agreement has been fully-executed begun by the Interconnection Customer include only:

1.5.1.1 A change in Point of Interconnection (POI) to a new location, unless the change in a POI is on the same circuit less than two (2) poles away from the original location, and the new POI is within the same protection zone as the original location;

1.5.1.2 A change or replacement of generating equipment such as generator(s), inverter(s), transformers, relaying, controls, etc. that is not a like-kind substitution in size, ratings, impedances, efficiencies or capabilities of the equipment specified in the original or preceding Interconnection Request;

1.5.1.23 A change from certified to non-certified devices ("certified" means certified by an OSHA recognized Nationally Recognized Test Laboratory (NRTL), to relevant UL and IEEE standards, authorized to perform tests to such standards);

1.5.1.4 A change of transformer connection(s) or grounding from that originally proposed;

1.5.1.5 A change to certified inverters with different specifications or different inverter control specifications or set up than originally proposed;

1.5.1.36 An increase of the Maximum Generating Capacity of a Generating Facility; or

1.5.1.46 A change reducing the AC output of the generating facility by more than 10%.

1.5.1 (b) Indicia of a Material Modification after the System Impact Study Agreement has been fully executed by the Interconnection Customer include, but are not limited to:

1.5.1.1 A change in Point of Interconnection (POI) to a new location, unless the change in a POI is on the same circuit less than two (2) poles away from the original location, and the new POI is within the same protection zone as the original location;

1.5.1.2 A change or replacement of generating equipment such as generator(s), inverter(s), transformers, relaying, controls, etc. that is not a like-kind substitution in size, ratings, impedances, efficiencies or capabilities of the equipment specified in the original or preceding Interconnection Request;

1.5.1.3 A change from certified to non-certified devices ("certified" means certified by an OSHA recognized Nationally Recognized Test Laboratory (NRTL), to relevant UL and IEEE standards,

authorized to perform tests to such standards);

1.5.1.4 A change of transformer connection(s) or grounding from that originally proposed;

1.5.1.5 A change to certified inverters with different specifications or different inverter control specifications or set-up than originally proposed;

1.5.1.6 An increase of the Maximum Generating Capacity of a Generating Facility; or

1.5.1.6 A change reducing the Maximum Generating Capacity of the generating facility by more than 10%.

1.5.2 The following are not indicia of a Material Modification at any time:

1.5.2.1 A change in ownership of a Generating Facility; the new owner, however, will be required to execute a new Interconnection Agreement and Study agreement(s) for any Study which has not been completed and the Report issued by the Utility.

1.5.2.2 A change or replacement of generating equipment such as generator(s), inverter(s), solar panel(s), transformers, relaying, controls, etc. that is a like-kind substitution in size, ratings, impedances, efficiencies or capabilities of the equipment specified in the original or preceding Interconnection Request;

1.5.2.3 -An increase in the DC/AC ratio that does not increase the maximum AC output capability of the generating facility;

1.5.2.4 A decrease in the DC/AC ratio that does not reduce the AC output capability of the generating facility by more than 10%.

1.5.2.5 A change in the DC system configuration to include additional equipment that does not impact the Maximum Generating Capacity, daily production profile or the proposed AC configuration of the Generating Facility including: DC optimizers, DC-DC converters, DC charge controllers, static VAR compensators, power plant controllers, and energy storage devices such that the output is delivered during the same periods and with the same profile considered during the System Impact Study.

1.5.3 To the extent Interconnection Customer proposes to modify any information provided in the Interconnection Request deemed complete by the Utility, the Interconnection Customer shall submit any such modifications to the Utility in writing. If the Utility determines that the proposed modification(s) constitutes a Material Modification, the Utility shall notify the Interconnection Customer in writing within ten (10) Business Days that the modification is a Material Modification and the Interconnection Request shall be withdrawn from the Queue unless the Interconnection Customer withdraws the proposed Material Modification within 15 Calendar Days of receipt of the Utility's written notification. If the modification is determined by the Utility not to be a Material Modification, then the Utility shall notify the Interconnection Customer in writing that the modification has been accepted and that the Interconnection Customer shall retain its Queue Number. Any dispute as to the Utility's determination that a modification constitutes a Material Modification- shall proceed in accordance with Section 6.2 below.

#### 1.5.4 Modification Inquiry

1.5.4.1 Prior to making any modification, the Interconnection Customer may first submit an informal modification inquiry in writing that requests the Utility to evaluate whether such modification to the original or most recent Interconnection Request is a Material Modification. The Interconnection Customer shall provide specific details on all changes that are to be considered by the Utility.

1.5.4.2 In response to Interconnection Customer's informal request, if the Utility evaluates the proposed modification(s) and determines that the changes are not Material Modifications, the Utility shall inform the Interconnection Customer in writing within ten (10) Business Days. If the Interconnection Customer wishes to proceed with the

proposed modification(s), the Interconnection Customer shall submit a revised Interconnection Request Application Form that reflects the approved modifications.

## 1.6 Site Control

Documentation of site control shall be submitted to the utility with the Interconnection Request using the sample site control verification form included in the Interconnection Request in Attachment 3.

Site control may be demonstrated through:

1. Ownership of, a leasehold interest in, or a right to develop a site for the purpose of constructing the Generating Facility;
2. An option to purchase or acquire a leasehold site for such purpose; or
3. An exclusivity or other business relationship between the Interconnection Customer and the entity having the right to sell, lease, or grant the Interconnection Customer the right to possess or occupy a site for such purpose.

Should Interconnection Customer's site control lapse at any point in time prior to interconnection and such lapse is brought to the attention of Utility, the Utility shall notify the Interconnection Customer in writing of the alleged lapse in site control. The Interconnection Customer shall have ten (10) Business Days from the posted date on the notice from the Utility to cure and submit documentation of re-established site control, where failure to cure the lapse will result in the Interconnection Request being deemed withdrawn.

## 1.7 Queue Number

1.7.1 The Utility shall assign a Queue Number pursuant to Section 1.4.2. Subject to an Interconnection Customer's election to participate in an optional Utility-sponsored System Impact Grouping Study, as described in Section 4.3.4, the Queue Number of each Interconnection Request shall be used to determine the cost responsibility for the Upgrades necessary to accommodate the interconnection. Subject to Section 1.8 and Section 4.3.4, the Queue Number of each Interconnection Request shall also determine the order in which each Interconnection Request is studied.

1.7.2 Subject to the provisions of Sections 1.4, 1.5, and 1.6, Generating Facilities shall retain the Queue Number assigned to their initial Interconnection Request throughout the review process, including where moving through the processes covered by Sections 2, 3, and 4.

1.7.3 A Utility-sponsored Queue Number established for purposes of administering a Competitive Resource Solicitation under Section 4.3.4 shall not be subject to the Interdependency provisions of Section 1.8. Any Interconnection Customer that elects to participate in the Utility-sponsored System Impact Grouping Study and is selected through the Competitive Resource

Solicitation shall complete the Section 4 Study process based upon the Queue Position of the Utility-sponsored Queue Number and the Interconnection Customer's cost responsibility shall be determined based upon the terms of the Competitive Resource Solicitation. Any Interconnection Customer that elects to participate in the Utility-sponsored System Impact Grouping Study but is not selected through the Competitive Resource Solicitation shall maintain its original Queue Position for purposes of determining cost responsibility for Upgrades in relation to other Interconnection Customers, except that such an Interconnection Customer's Queue Position shall be deemed subordinate to the Utility-sponsored Queue Number or an Interconnection Customer that has completed System Impact Study and committed to Upgrades under Section 4.3.9.

## 1.8 Interdependent Projects

"Interdependent Customer" (or "Project"), "Project A" and "Project B", and "Project C" are defined in the gGlossary of tTerms (see Attachment 1).

- 1.8.1 Upon an Interconnection Customer's submission of a Section 1.4 Interconnection Request for the Section 3 Fast Track Process or Section 4 Study Process, the Utility shall review the Interconnection Request and make a preliminary determination whether any known Interdependency exists between the Interconnection Customer's proposed Generating Facility and any other Interconnection Customer with a lower Queue Number. Any preliminary determination by the Utility that the Generating Facility does not create an Interdependency will result in the Interconnection Request being preliminarily designated as a Project A and the Utility shall proceed immediately to either the Section 3 Fast Track Process or the Section 4 Study process, as applicable. The Utility shall advise the Interconnection Customer in writing or at the Section 4.2 Scoping-scoping Meetingmeeting, if requested by the Interconnection Customer, regarding its preliminary determination of whether Interdependency would be created by the Generating Facility. A Generating Facility designated and reviewed for system impacts as a Project A may still be determined to create an Interdependency and may be designated by the Utility as an Interdependent Project during the Section 4.3 System Impact Study Process. Once the System Impact Study report is issued by the Utility designated a Generating Facility as a Project A for purposes of the Section 4.4 Facilities Study, the Interconnection Request shall retain this designation without change.

1.8.2 If the Utility determines that that the Interconnection Customer's proposed Generating Facility is Interdependent with one (1) other Interconnection Request with a lower Queue Number, the Utility shall notify the Interconnection Customer in writing or at the Section 4.2 Scoping-scoping Meeting-meeting that the Interconnection Request is designated as a Project B.

1.8.2.1 Following the Section 4.2 Scoping-scoping Meeting-meeting and execution of the System Impact Study Agreement, the Project B shall proceed to the Section 4.3 Study process. Project B shall receive a System Impact Study report that assumes the interdependent Project A Interconnect Request with the lower Queue Number completes construction and interconnection and another System Impact Study report that assumes the interdependent Project A Interconnect Request with the lower Queue Number is not constructed and is withdrawn.

1.8.2.2 -The Utility shall not proceed to a Project B Facilities Study until after the Project B Interconnection Customer returns a signed Facilities Study Agreement to the Utility and the Utility has issued the Section 4.4.4 Facilities Study report for the Interdependent Project A. The Project B Interconnection Customer shall then have the option of whether to proceed with a Facility Study, or wait until the Interdependent Project A executes a Final Interconnection Agreement and makes payment for any required Upgrade, Interconnection Facilities, and other charges under Section 5.2. If the Project B Interconnection Customer with a signed Facilities Study Agreement prior to Interdependent Project A committing to Section 5 construction, the Project B's Facility Study shall assume that the interdependent Project A Interconnection Request with ~~the lower Queue Number~~ completes construction and interconnection. If Project A is later cancelled prior to the Project A Interconnection Customer making payment for the required Upgrade, the Utility will revise the Project B Facility Study at Project B Interconnection Customer's expense. If Project B Interconnection Customer chooses to wait to request the Project B Facility Study, Project B is not required to adhere to the timeline in Section 4.4.1 until Project A has signed an Interconnection Agreement and paid the payment charge specified in Section 5.2.4 of these Interconnection Procedures or withdrawn.



1.8.3 If the Utility determines that that the Interconnection Customer's proposed Generating Facility is Interdependent with more than one (1) other Interconnection Request with lower Queue Numbers, the Utility shall make a preliminary determination and notify the Interconnection Customer in writing or at the Section 4.2 scoping meeting, if requested by the Interconnection Customer describing generally the number and type of Interdependencies of Interconnection Requests with lower Queue Numbers.

1.8.3.1 Except as provided in Section 1.8.3.3 below, ~~The~~ Utility shall not study a project if it is interdependent with more than one project, each of which has a lower Queue Number. The utility will study a project when interdependency with only one lower Queue Number project exists. The removal of interdependency with multiple projects may be the result of  
1) upgrades to the Utility System which eliminate the cause of the interdependency, 2) withdrawal of interdependent project(s) with lower Queue Numbers, or 3) a lower Queue Number project signing an Interconnection Agreement and making payments required in Section 5.2.4.

1.8.3.2 Within five (5) Business Days of an Interconnection Request becoming a Project B Interconnection Request that is Interdependent with only one (1) other Interconnection Request with a lower Queue Number, the Utility shall schedule the Section 4.2 ~~Scoping~~ scoping Meeting ~~meeting~~ and provide the new Project B an executable System Impact Study Agreement. Upon being designated by the Utility as a Project B the Interconnection Customer's Queue Number will be used to determine the order in which the Interconnection Request is studied under section 4.3 relative to all other Interconnection Requests.

1.8.3.3 When an Interconnection Customer is proposing to interconnect a Small Animal Waste Facility and that facility is interdependent with more than one project, each of which has a lower Queue Number, the utility shall designate the Small Animal Waste Facility for expedited Section 4 study ahead of other interdependent Interconnection Customers that have not commenced the Section 4 study process pursuant to Section 1.8.3.1, as either (i) Project B, if the project with the next lowest Queue number to Project A has not completed the Section 4.2 Scoping Meeting or executed a System Impact Study Agreement; or (ii) Project C, if a Project B has already been designated by the Utility, completed the Section 4.2 Scoping Meeting, and/or executed a System Impact Study Agreement. Upon being designated by the Utility as a Project C,



the Small Animal Waste Facility shall be the next facility to become a Project B, regardless of whether a project another interdependent Interconnection Request with a lower Queue Number exists for that interconnection location. Notwithstanding Section 1.7.1, a Small Animal Waste Facility will take on the payment obligations be responsible for Interconnection Facilities and any Upgrades arising from its new designated Project B or Project C position in the Queue as provided for in this Section such that if upgrades are needed, the upgrade obligations will be those of the Small Animal Waste Facility.

1.8.3.4 When an Interconnection Customer is proposing to interconnect a Standby Generation Facility with zero export requested, the Utility shall designate the Standby Generation Facility for expedited Section 4 study as a Project A and also ahead of all other Section 4 studies currently underway in the Utility study queue, unless there are other Standby Generation Facilities currently under study, in which case such Standby Generation Facilities shall be studied in their own queue order. Notwithstanding Section 1.7.1, a Standby Generation Facility will be responsible for Interconnection Facilities and any Upgrades arising from its designated Project A position in the Queue as provided for in this section.

#### 1.9 Interconnection –Requests –Submitted Prior- to the Effective Date of these Procedures

Other than as set forth in Section 1.1.3, nothing in this Standard affects an Interconnection Customer's Queue Number assigned before the effective date of these procedures. Interconnection Requests which have received a System Impact Study report as of the effective date of these procedures that did not identify any interdependency with another project shall be deemed a Project A. Any Interconnection Requests for which the Utility has not completed the System Impact Study and issued a System Impact Study report to the Interconnection

Customer as of the effective date of these procedures shall be reviewed for Interdependency pursuant to Section 1.8.

~~Should an Interconnection Customer fail to comply with Section 1.1.3 following receipt of written notice specifying how the Interconnection Customer failed to comply and the expiration of an opportunity to cure by the close of business on the tenth (10<sup>th</sup>) Business Day following the posted date of such notice to cure, such Interconnection Customer will lose its Queue Number and such Interconnection Request shall be deemed withdrawn.~~

## **Section 2. Optional 20 kW Inverter Process for Certified Inverter-Based Generating Facilities No Larger than 20 kW**

### **2.1 Applicability**

The 20 kW Inverter Process is available to an Interconnection Customer proposing to interconnect its inverter-based Generating Facility with the Utility's System if the Generating Facility is no larger than 20 kW and if the Interconnection Customer's proposed Generating Facility meets the codes, standards, and certification requirements of Attachments 4 and 5 of these procedures, or the Utility has reviewed the design or tested the proposed Generating Facility and is satisfied that it is safe to operate.

The Utility may require the Interconnection Customer to install a manual load-break disconnect switch or safety switch as a clear visible indication of switch position between the Utility System and the Interconnection Customer. When the installation of the switch is not otherwise required (e.g. National Electric Code, state or local building code) and is deemed necessary by the Utility for certified, inverter-based generators no larger than 10 kW, the Utility shall reimburse the Interconnection Customer for the reasonable cost of installing a switch that meets the Utility's specifications (see also Section 6.16).

### **2.2 Interconnection Request**

The Interconnection Customer ~~shall complete the Interconnection Request Application Form for a certified inverter-based Generating Facility no larger than 20 kW in the form provided in Attachment 6 and submit it to the Utility, together with the non-refundable processing fee specified in the Interconnection Request Application Form and the documentation required pursuant to Section 1.4.1.~~

2.2.1 The Utility shall verify that the Generating Facility can be interconnected safely and reliably using the screens contained in the Fast Track Process. (See Section 3.2.1.) The Utility has 15 Business Days to complete this process. Unless the Utility determines and demonstrates that the Generating Facility cannot be interconnected safely and reliably, the Utility shall approve the Interconnection Request upon fulfillment of all

requirements in Section 1.4 and return the Interconnection Request Application Form to the Interconnection Customer.

2.2.1.2 If the proposed interconnection passes the screens but the Utility determines that minor Utility construction is required to interconnect the Generating Facility to the Utility's system, the Interconnection Request shall be approved and the Utility will provide the Interconnection Customer a non-binding good faith estimate of the cost of interconnection along with the Interconnection Request Application Form within 15 Business Days after the determination.

2.2.1.3 If the proposed interconnection passes the screens, but the costs of interconnection including System Upgrades and Interconnection Facilities cannot be determined without further study or review, the Utility will notify the Interconnection Customer that the Utility will need to complete a Facilities Study under Section 4.4 to determine the necessary costs of interconnection and will charge the actual cost of the Facilities Study to the Interconnection Customer.

2.2.2 Screens failure: Despite the failure of one or more screens, the Utility, at its sole option, may approve the interconnection provided such approval is consistent with safety and reliability. If the Utility cannot determine that the Generating Facility may be interconnected consistent with safety, reliability, and power quality standards, the Utility shall provide the Interconnection Customer with detailed information on the reasons for failure in writing. In addition, the Utility shall either:

2.2.2.1 Notify the Interconnection Customer in writing that the Utility is continuing to evaluate the Generating Facility under Section 3.4 Supplemental Review if the Utility concludes that the Supplemental Review might determine that the Generating Facility could continue to qualify for interconnection pursuant to Fast Track: or

2.2.2.2 Offer to continue evaluating the Interconnection Request under the Section 4 Study Process.

### 2.3 Certificate of Completion

2.3.1 After installation of the Generating Facility, the Interconnection Customer shall submit the Certificate of Completion in the form provided in Attachment 6 to the Utility. Prior to parallel operation, the Utility may inspect the Generating Facility for compliance with standards including a witness test and the scheduling of an appropriate metering replacement, if necessary.

2.3.2 The Utility shall notify the Interconnection Customer in writing that interconnection of the Generating Facility is authorized. If the witness test is not satisfactory, the Utility has the right to disconnect the Generating Facility. The Interconnection Customer has no right to operate in parallel with the Utility until a witness test has been performed, or previously waived on the Interconnection Request. The Utility is obligated to complete this witness test within ten (10) Business Days of the receipt of the Certificate of Completion. If the Utility does not inspect within ten (10) Business Days or by mutual agreement of the Parties, the witness test is deemed waived.

2.3.3 Interconnection and parallel operation of the Generating Facility is subject to the Terms and Conditions stated in Attachment 6 of these procedures.

## 2.4 Contact Information

The Interconnection Customer must provide its contact information. If another entity is responsible for interfacing with the Utility, that contact information must also be provided on the Interconnection Request Application Form.

## 2.5 Ownership Information

The Interconnection Customer shall provide the legal name(s) of the owner(s) of the Generating Facility.

## 2.6 UL 1741 Listed

The Underwriters' Laboratories (UL) 1741 standard (Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources) addresses the electrical interconnection design of various forms of generating equipment. Many manufacturers submit their equipment to a nationally recognized testing laboratory that verifies compliance with UL 1741. This "listing" is then marked on the equipment and supporting documentation.

# Section 3. Optional Fast Track Process for Certified Generating Facilities

## 3.1 Applicability

The Fast Track Process is available to an Interconnection Customer proposing to interconnect its Generating Facility with the Utility's System if the Generating Facility's capacity does not exceed the size limits identified in the table below. Generating Facilities below these limits are eligible for Fast Track review. However, Fast Track eligibility is distinct from the Fast Track Process itself, and eligibility does not imply or indicate that a Generating Facility will pass the Fast Track screens in Section 3.2 below or the Supplemental Review screens in Section 3.4 below.

Fast Track eligibility is determined based upon the generator type, the size of the generator, voltage of the line and the location of and the type of line at the Point of Interconnection. All Generating Facilities connecting to lines greater or equal to 35 kilovolt (kV) are ineligible for the Fast Track Process regardless of size. ~~For inverter-based systems, Only certified inverter-based systems are eligible for the Fast Track Process and the size limit varies according to the voltage of the line at the proposed Point of Interconnection.~~ Certified inverter-based Generating Facilities located within 2.5 electrical circuit miles of a substation and on a mainline (as defined in the table below) are eligible for the Fast Track Process under the higher thresholds set forth in the table below. In addition to the size threshold, the Interconnection Customer's proposed Generating Facility must ~~meets~~meet the codes, standards, and certification requirements of Attachments 4 and 5 of these procedures, or the Utility has to have reviewed the design or tested the proposed Generating Facility and be satisfied that it is safe to operate.

Fast Track Eligibility for Inverter-Based Systems <sup>1</sup>		
Line Voltage	Fast Track Eligibility Regardless of Location	Fast Track Eligibility on a Mainline <sup>2</sup> and ≤ 2.5 Electrical Circuit Miles from Substation <sup>3</sup>
< 5 kV	≤ 100 kW	≤ 500 kW
≥ 5 kV and < 15 kV	≤ 1 MW	≤ 2 MW
≥ 15 kV and < 35 kV	≤ 2 MW	≤ 2 MW

<sup>1</sup> Must be an UL certified inverter.

<sup>2</sup> For purposes of this table, a mainline is the three-phase backbone of a circuit. It will typically constitute lines with wire sizes of 4/0 American wire gauge, 336.4 kcmil, 397.5 kcmil, 477 kcmil and 795 kcmil.

<sup>3</sup>An Interconnection Customer can determine this information about its proposed interconnection location in advance by requesting a pre-application report pursuant to section 1.2.

3.1.1 The Interconnection Customer may elect in the Interconnection Request Application Form to proceed directly to the Supplemental Review, in order to minimize overall processing time in the event of any Fast Track screen failures the Utility deems Supplemental Review is appropriate. This is accomplished by selecting both the Fast Track and Supplemental Review options on the Interconnection Request Application Form and paying the applicable Fast Track fee and Supplemental Review deposit fee.

## 3.2 Initial Review

Within 15 Business Days after the Utility notifies the Interconnection Customer it has received a complete Interconnection Request pursuant to Section 1.4, the Utility shall perform an initial review using the screens set forth below, shall notify the Interconnection Customer of the results, and include with the notification copies of the analysis and data underlying the Utility's determinations under the screens.

### 3.2.1 Screens

3.2.1.1 The- proposed- Generating- Facility's- Point- of- Interconnection must be on a portion of the Utility's Distribution System.

3.2.1.2 For interconnection of a proposed Generating Facility to a radial distribution circuit, the aggregated generation, including the proposed Generating Facility, on the circuit shall not exceed 15% of the line section annual peak load as most recently measured at the substation. A line section is that portion of a Utility's System connected to a customer bounded by automatic sectionalizing devices or the end of the distribution line.

3.2.1.3 For interconnection of a proposed Generating Facility to a radial distribution circuit, the aggregated generation, including the proposed Generating Facility, on the circuit shall not exceed 90% of the circuit and/or bank minimum load at the substation.

~~3.2.1.4 All synchronous and induction machines must be connected to a distribution circuit where the local minimum load to generation ratio on the circuit line segment is larger than 3 to 1. A 3-1 load to generation ratio screen utilizes actual recorded data that is sufficient to establish the minimum threshold.~~

3.2.1.45 For interconnection of a proposed Generating Facility to the load side of spot network protectors, the proposed Generating Facility must utilize an inverter-based equipment package and, together with the aggregated other inverter-based generation, shall not exceed the smaller of 5% of a spot network's maximum load or 50 kW.

3.2.1.56 The proposed Generating Facility, in aggregation with other generation on the distribution circuit, shall not contribute more than 10% to the distribution circuit's maximum fault current at the point on the high voltage (primary) level nearest the proposed point of change of ownership.

3.2.1.67 The proposed Generating Facility, in aggregate with other generation on the distribution circuit, shall not cause any

distribution protective devices and equipment (including, but not limited to, substation breakers, fuse cutouts, and line reclosers), or Interconnection Customer equipment on the system to exceed 87.5% of the short circuit interrupting capability; nor shall the interconnection be proposed for a circuit that already exceeds 87.5% of the short circuit interrupting capability.

- 3.2.1.78 Using the table below, determine the type of interconnection to a primary distribution line. This screen includes a review of the type of electrical service to be provided to the Interconnection Customer, including line configuration and the transformer connection for the purpose of limiting the potential for creating over-voltages on the Utility's System due to a loss of ground during the operating time of any anti-islanding function.

Primary Distribution Line Type	Type of Interconnection to Primary Distribution Line	Result/Criteria
Three-phase, three wire	3-phase or single phase, phase-to-phase	Pass Screen
Three-phase, four wire	Effectively-grounded three-phase or single phase, line-to-neutral	Pass Screen

- 3.2.1.89 If the proposed Generating Facility is to be interconnected on a single-phase shared secondary, the aggregate Generating Facility capacity on the shared secondary, including the proposed Generating Facility, shall not exceed 65% of the transformer nameplate rating.

- 3.2.1.949 If the proposed Generating Facility is single-phase and is to be interconnected on a center tap neutral of a 240 volt service, its addition shall not create an imbalance between the two sides of the 240 volt service of more than 20% of the nameplate rating of the service transformer.

- 3.2.1.104 The Generating Facility, in aggregate with other generation interconnected to the transmission side of a substation transformer feeding the circuit where the Generating Facility proposes to interconnect shall not exceed 10 MW in an area where there are known, or posted, transient stability limitations to generating units located in the general electrical vicinity (e.g., three or four transmission busses from the point of interconnection).

### 3.2.2 Screen Results

- 3.2.2.1 If the proposed interconnection passes the screens and requires no construction by the Utility on its own System, the Interconnection Request shall be approved and the Utility will provide the Interconnection Customer an executable



- Interconnection Agreement within ten (10) Business Days after the determination.
- 3.2.2.2 If the proposed interconnection passes the screens and the Utility is able to determine without further study or review that only minor Utility construction is required to interconnect the Generating Facility to the Utility's system, the Interconnection Request shall be approved and the Utility will provide the Interconnection Customer a non-binding good faith estimate of the cost of interconnection along with an executable Interconnection Agreement within 15 Business Days after the determination.
- 3.2.2.3 If the proposed interconnection passes the screens, but the costs of interconnection including System Upgrades and Interconnection Facilities cannot be determined without further study or review, the Utility will notify the Interconnection Customer that the Utility will need to complete a Facilities Study under Section 4.4 to determine the necessary costs of interconnection.
- 3.2.2.4 If the proposed interconnection fails the screens, but the Utility determines that the Generating Facility may nevertheless be interconnected consistent with safety, reliability, and power quality standards, and requires no construction by the Utility on its own System, the Interconnection Request shall be approved and the Utility shall provide the Interconnection Customer an executable Interconnection Agreement within ten (10) Business Days after the determination.
- 3.2.2.5 If the proposed interconnection fails the screens, but the Utility determines that the Generating Facility may nevertheless be interconnected consistent with safety, reliability, and power quality standards and the Utility is able to determine without further study or review that only minor Utility construction is required to interconnect with the Generating Facility, the Interconnection Request shall be approved and the Utility will provide the Interconnection Customer a non-binding good faith estimate of the cost of interconnection along with an executable Interconnection Agreement within 15 Business Days after the determination.
- 3.2.2.6 If the proposed interconnection fails the screens, and the Utility does not or cannot determine from the initial review that the Generating Facility may nevertheless be interconnected consistent with safety, reliability, and power quality standards unless the Interconnection Customer is willing to consider minor modifications or further study, the Utility shall provide the Interconnection Customer with the opportunity to attend a customer options meeting as described in Section 3.3 below.



### 3.3 Customer Options Meeting

If the Utility determines the Interconnection Request cannot be approved without (1) minor modifications at minimal cost, (2) a supplemental study or other additional studies or actions, or (3) incurring significant cost to address safety, reliability, or power quality problems, the Utility shall notify the Interconnection Customer of that determination within five (5) Business Days after the determination, and upon request provide copies of all data and analyses underlying its conclusion. Within ten (10) Business Days of the Utility's determination, the Utility shall offer to convene a customer options meeting to review possible Interconnection Customer facility modifications or the screen analysis and related results, to determine what further steps are needed to permit the Generating Facility to be connected safely and reliably. At the time of notification of the Utility's determination, or at the customer options meeting, the Utility shall:

- 3.3.1 Offer to perform facility modifications or minor modifications to the Utility's System (e.g., changing meters, fuses, relay settings) and provide a non-binding good faith estimate of the limited cost to make such modifications to the Utility's System. The Interconnection Customer shall have ten (10) Business Days to agree to pay for the modifications to the Utility's electric system or the Interconnection Request shall be deemed to be withdrawn. If the Interconnection Customer agrees to pay for the modifications to the Utility's electric system, the Utility will provide the Interconnection Customer with an executable Interconnection Agreement within ten (10) Business Days of the Interconnections Customer's agreement to pay; or
- 3.3.2 Offer to perform a supplemental review under Section 3.4 if the Utility concludes that the supplemental review might determine that the Generating Facility could continue to qualify for interconnection pursuant to the Fast Track Process, and provide a non-binding good faith estimate of the costs of such review. The Interconnection Customer shall have ten (10) Business Days to accept in writing the Utility's offer to perform a Supplemental Review and post any deposit requirement for the Supplemental Review, or the Interconnection Request shall be deemed to be withdrawn; or
- 3.3.3 Offer to continue evaluating the Interconnection Request under the Section 4 Study Process. The Interconnection Customer shall have ten (10) Business Days to agree in writing to its Interconnection Request continuing to be evaluated under the Section 4 Study Process, and post any deposit requirement for the Study Process, or the Interconnection Request shall be deemed to be withdrawn.

### 3.4 Supplemental Review

If the Interconnection Customer agrees to a supplemental review, the Interconnection Customer shall agree in writing within ~~fifteen~~ ten (10) Business Days of the offer, and submit a deposit for the estimated costs or the request shall be deemed to be withdrawn. The Interconnection Customer shall be responsible for the Utility's actual costs for conducting the supplemental review. The Interconnection Customer must pay any review costs that exceed the deposit within 20 Business Days of receipt of the invoice or resolution of any dispute. If the deposit exceeds the invoiced costs, the Utility will return such excess within 20 Business Days of the invoice without interest.

3.4.1 Within ten (10) Business Days following receipt of the deposit for a supplemental review, the Utility will determine if the Generating Facility can be interconnected safely and reliably.

3.4.1.1 If so, the Utility shall forward an executable Interconnection Agreement to the Interconnection Customer within ten (10) Business Days.

3.4.1.2 If so, and Interconnection Customer facility modifications are required to allow the Generating Facility to be interconnected consistent with safety, reliability, and power quality standards under these procedures, the Utility shall ask if the customer agrees to make the necessary modifications. The customer will be given 10 Business Days to agree, in writing, to the required modifications. The Utility will forward an executable Interconnection Agreement to the Interconnection Customer within 15 Business Days after confirmation that the Interconnection Customer has agreed to make the necessary modifications at the Interconnection Customer's cost.

3.4.1.3 If so, –and minor modifications to the Utility's System are required to allow the Generating Facility to be interconnected consistent with safety, reliability, and power quality standards under these procedures, the Utility shall forward an executable Interconnection Agreement to the Interconnection Customer within ten (10) Business Days that requires the Interconnection Customer to pay the costs of such System modifications prior to interconnection.

If not, the Interconnection Request will continue to be evaluated under the Section 4 Study Process, provided the Interconnection Customer indicates it wants to proceed and submits the required deposit within 15 Business Days.

## Section 4. Study Process

### 4.1 Applicability

The Study Process shall be used by an Interconnection Customer proposing to interconnect its Generating Facility with the Utility's System if the Generating Facility exceeds the size limits for the Section 3 Fast Track Process, is not certified, or is certified but did not pass the Fast Track Process or the 20 kW Inverter Process. The Interconnection Customer may be required to submit additional information or documentation, as may be requested by the Utility in writing, during the Study Process.

### 4.2 Scoping Meeting

4.2.1 A scoping meeting will be held within ~~ten (10)~~ thirty (30) Business Days after the Interconnection Request is deemed complete or as otherwise mutually agreed to by the Parties. The Utility and the Interconnection Customer will bring to the meeting personnel, including system engineers and other resources as may be reasonably required to accomplish the purpose of the meeting. The scoping meeting may be omitted by mutual agreement in writing.

4.2.2 The purpose of the scoping meeting is to discuss the Interconnection Request and review existing studies relevant to the Interconnection Request. The Parties shall further discuss whether the Utility should perform a System Impact Study, a Facilities Study, or proceed directly to an Interconnection Agreement.

4.2.3 If the Utility, after consultation with the Interconnection Customer, determines the project should proceed to a System Impact Study or Facilities Study, the Utility shall provide the Interconnection Customer, no later than ten (10) Business Days after the scoping meeting, either a System Impact Study Agreement (Attachment 7) or a Facilities Study Agreement (Attachment 8), as appropriate, including an outline of the scope of the study or studies and a nonbinding good faith estimate of the cost to perform the study or studies, which cost shall be subtracted from the deposit outlined in Section 1.4.1.2..

4.2.4 If the Parties agree not to perform a System Impact Study or Facilities Study, but to proceed directly to an Interconnection Agreement, the Parties shall proceed to the Construction Planning Meeting as called for in Section 5.

### 4.3 System Impact Study

4.3.1 In order to retain its Queue Position the Interconnection Customer must return a System Impact Study Agreement signed by the Interconnection Customer within 15 Business Days of receiving an executable System Impact Study Agreement as provided for in Section 4.2.3.

4.3.2 The scope of and cost responsibilities for a System Impact Study are described in the System Impact Study Agreement. The time allotted for completion of the System Impact Study shall be as set forth in the System Impact Study Agreement.

4.3.3 The System Impact Study shall identify and detail the electric system impacts that would result if the proposed Generating Facility were interconnected without project modifications or electric system modifications, or to study potential impacts, including, but not limited to, those identified in the scoping meeting. The System Impact Study shall evaluate the impact of the proposed interconnection on the reliability of the electric system, including the distribution and transmission systems, if required.

4.3.4 At the Utility's option, and solely for purposes of administering a Commission-approved Competitive Resource Solicitation, a Utility may designate a Utility-sponsored Queue Number and act as authorized representative for Interconnection Customer(s) proposing a Generating Facility requesting to interconnect to the Utility's Transmission-System for evaluation through the Solicitation. The Utility shall evaluate combinations of such Interconnection Requests for purposes of conducting the System Impact Grouping Study(ies) of all combinations of Generating Facilities within the Utility-sponsored Queue Number in order to achieve the resource need identified in the Competitive Resource Solicitation. Such studies in connection with a Competitive Resource Solicitation Process shall be implemented based upon the Utility-Sponsored Queue Number relative to the Queue Position of all other Interconnection Requests. The Utility may also study an Interconnection Request separately to the extent provided for under the terms of the Competitive Resource Solicitation or if otherwise warranted by Good Utility Practice such as to evaluate the locational remoteness of a proposed Generating Facility.

After Through completing the System Impact Grouping Study(ies) of the requested combinations of Interconnection Requests, the Utility must select one of the studied combinations that achieves the resource need solicited through the Resource Solicitation Process prior to the start of any Interconnection Facilities Study. While conducting the Interconnection Facilities Study(ies) for the selected combination of resources, the Utility may suspend further action on study of the Interconnection Requests Customers

that have opted in to the System Impact Grouping Study that are not included in the selected combination and such customers may elect during this period to return to their original Queue Position or participate in a new Competitive Resource Solicitation, if available.

- 4.3.5 The System Impact Study report will provide the Preliminary Estimated Upgrade Charge, which is a preliminary indication of the cost and length of time that would be necessary to correct any System problems identified in those analyses and implement the interconnection.
- 4.3.65 The System Impact Study report will provide the Preliminary Estimated Interconnection Facilities Charge, which is a preliminary non-binding indication of the cost and length of time that would be necessary to provide the Interconnection Facilities.
- 4.3.76 If the Utility has determined that an Interdependency exists and the Project is designated as a Project B, the Project B Interconnection Request shall receive a System Impact Study report, addressing a scenario assuming Project A is constructed and a second scenario assuming Project A is not constructed.
- 4.3.87 After receipt of the System Impact Study report(s), the Interconnection Customer shall inform the Utility in writing ~~h~~ if it wishes to withdraw the Interconnection Request and to request an accounting of any remaining deposit amount pursuant to Section 6.3.
- ~~4.3.8 If requested by the Interconnection Customer following delivery of the System Impact Study report, the Utility shall provide the Interconnection Customer an executable Interim Interconnection Agreement within ten (10) Business Days. The Interim Interconnection Agreement shall be identical in form and content to the Final Interconnection Agreement, but will not include Detailed Estimated Upgrade Charges, Detailed Estimated Interconnection Facility Charge, Appendix 4 (Construction Milestone schedule listing tasks, dates and the party responsible for completing each task), and other information that otherwise would be determined in Section 5.~~
- 4.3.9 At the time the System Impact Study Report is provided to the Interconnection Customer, the Utility shall also deliver an executable Facilities Study Agreement to the Interconnection Customer. After receipt of the System Impact Study report Report and Facilities Study Agreement, when the Interconnection Customer is ready to proceed with the design and construction of the Upgrades and Interconnection Facilities, the Interconnection Customer shall return the signed Facilities Study Agreement to the Utility in accordance with Section 4.4 below and shall also submit payment or Financial Security reasonably acceptable to the Utility equal to the cost of any Network Upgrades identified in the Preliminary Estimated Upgrade Charge, as set forth in the System Impact Study Report, that would

be borne by the Interconnection Customer under a future Interconnection Agreement. This payment or Financial Security shall be held by the Utility as a non-refundable prepayment for the estimated cost of Network Upgrades to be designed by the Utility in the Section 4.4 Facilities Study. The preliminary Network Upgrade prepayment amount shall be trued up by the Utility in the Detailed Estimated Upgrade Charges included in a future Interconnection Agreement or shall be forfeited to the Utility to construct the Network Upgrades if the Interconnection Request is subsequently withdrawn by the Interconnection Customer.

#### **4.4 Facilities Study**

- 4.4.1** A solar Interconnection Customer must request a Facilities Study by returning the signed Facilities Study Agreement within 60 Calendar Days of the date the Facilities Study Agreement was provided. Any other Interconnection Customer must request a Facility Study by returning the signed Facilities Study Agreement within 180 Calendar Days of the date the Facilities Study Agreement was provided. Failure to return the signed Facilities Study Agreement within the foregoing applicable time period will result in the Interconnection Request being deemed withdrawn.
- 4.4.2** When an Interdependent Project A exists, a Project B Interconnection Request will not be required to comply with Section 4.4.1 until Project A has signed the Final Interconnection Agreement, and made payments and provided Financial Security as specified in Section 5.2 or withdrawn. If Project B has not provided written notice of its intent to proceed to a Facilities Study under Section 1.8.2.2, upon the Project A fulfilling the requirements in Section 5.2 or withdrawing the Interconnection Request, the Utility shall notify the Project B Interconnection Customer that it has the time specified in Section 4.4.1 to return the signed Facilities Study Agreement or the Interconnection Request shall be deemed withdrawn.
- 4.4.3** The scope of and cost responsibilities for the Facilities Study are described in the Facilities Study Agreement. The time allotted for completion of the Facilities Study is described in the Facilities Study Agreement.
- 4.4.4** The Facilities Study report shall specify and estimate the cost of the equipment, engineering, procurement and construction work (including overheads) needed to implement the System Impact Studies and to allow the Generating Facility to be interconnected and operated safely and reliably.



- 4.4.5 The Utility shall design any required Interconnection Facilities and/or Upgrades under the Facilities Study Agreement. The Utility may contract with consultants to perform activities required under the Facilities Study Agreement. The Interconnection Customer and the Utility may agree to allow the Interconnection Customer to separately arrange for the design of some of the Interconnection Facilities. In such cases, facilities design will be reviewed and/or modified prior to acceptance by the Utility, under the provisions of the Facilities Study Agreement. If the Parties agree to separately arrange for design and construction, and provided that critical infrastructure security and confidentiality requirements can be met, the Utility shall make sufficient information available to the Interconnection Customer in accordance with confidentiality and critical infrastructure requirements to permit the Interconnection Customer to obtain an independent design and cost estimate for any necessary facilities.

## **Section 5. Interconnection Agreement and Scheduling**

### **5.1. Construction Planning Meeting**

- 5.1.1. Within ten (10) Business Days of receipt of the Facility Study report, the Interconnection Customer shall request a Construction Planning Meeting, where failure to comply shall result in the Interconnection Request being deemed withdrawn. The Construction Planning Meeting request shall be in writing and shall include the Interconnection Customer's reasonably requested date for completion of the construction of the Upgrades and Interconnection Facilities.
- 5.1.2. The Construction Planning Meeting shall be scheduled within ten (10) Business Days of the Section 5.1.1 request from the Interconnection Customer, or as otherwise mutually agreed to in writing by the parties.
- 5.1.3. The purpose of the Construction Planning Meeting is to identify the tasks for each party and discuss and determine the milestones for the construction of the Upgrades and Interconnection Facilities. Agreed upon milestones shall be specific as to scope of action, responsible party, and date of deliverable and shall be recorded in the ~~Final~~ Interconnection Agreement (see Appendix 4 to Attachment 9) to be provided to Interconnection Customer pursuant to Section 5.2.1 below.

5.1.4. If the Utility cannot complete the installation of the required Upgrades and Interconnection Facilities within two (2) months of the Interconnection Customer's reasonably requested In-Service Date, the Interconnection Customer shall have the option of payment for work outside of normal business hours or hiring a Utility-approved subcontractor to perform the distribution Upgrades. Any Utility-approved subcontractor performance remains subject to Utility oversight during construction. The Utility shall make a list of Utility-approved subcontractors available to the Interconnection Customer promptly upon request.

## 5.2. ~~Final Interconnection Agreement~~ Interconnection Agreement

5.2.1. Within fifteen (15) Business Days of the Construction Planning Meeting, the Utility shall provide an executable ~~Final Interconnection Agreement~~ containing the Detailed Estimated Upgrade Charges, Detailed Estimated Interconnection Facility Charge, Appendix 4 (Construction Milestone and payment schedule listing tasks, dates and the party responsible for completing each task), and other appropriate information, requirements, and charges. ~~The Final Interconnection Agreement will replace any Interim Interconnection Agreement, which shall terminate upon execution of the Final Interconnection Agreement by the Interconnection Customer and the Utility.~~

5.2.2. Within ten (10) Business Days of receiving the ~~Final Interconnection Agreement~~, the Interconnection Customer must execute and return the ~~Final Interconnection Agreement~~, where failure to comply results in the Interconnection Request being deemed withdrawn.

5.2.3. After the Parties execute the ~~Final Interconnection Agreement~~, the Utility shall return a copy of the ~~Final Interconnection Agreement~~ to the Interconnection Customer and interconnection of the Generating Facility shall proceed under the provisions of the ~~Final Interconnection Agreement~~.

5.2.4. The ~~Final Interconnection Agreement~~ shall specify milestones for payment for Upgrades and Interconnection facilities and/or, provision of Financial Security for Interconnection facilities, if acceptable to the Utility, that are required prior to the start of design and construction of Upgrades and Interconnection Facilities. Payment and Financial Security must be received by close of business ~~forty-fivesixty (60/45)~~ Business Calendar Days after the date the Interconnection Agreement is delivered to the Interconnection Customer for signature, where failure to comply results in the Interconnection Request being deemed withdrawn.

## 5.3 Interconnection Construction

Construction of the Upgrades and Interconnection Facilities will proceed as called for in the ~~Final Interconnection Agreement~~ and Appendices.



## **Section 6. Provisions that Apply to All Interconnection Requests**

### **6.1 Reasonable Efforts**

The Utility shall make reasonable efforts to meet all time frames provided in these procedures unless the Utility and the Interconnection Customer agree to a different schedule. If the Utility cannot meet a deadline provided herein, it shall at its earliest opportunity notify the Interconnection Customer, explain the reason for the failure to meet the deadline, and provide an estimated time by which it will complete the applicable interconnection procedure in the process.

### **6.2 Disputes**

6.2.1 The Parties agree to attempt to resolve all disputes arising out of the interconnection process according to the provisions of this section. Where an Interconnection Customer seeks to resolve a dispute involving its Queue Number according to the provisions of this section, any disputed loss of Queue Number shall not be final until Interconnection Customer abandons the process set out in this section or a final Commission order is entered.

6.2.2 In the event of a dispute, either Party shall provide the other Party with a written Notice of Dispute. Such Notice shall describe in detail the nature of the dispute.

6.2.3 If the dispute has not been resolved within ten (10) Business Days after receipt of the Notice, either Party may contact the Public Staff for assistance in informally resolving the dispute. If the Parties are unable to informally resolve the dispute, either Party may then file a formal complaint with the Commission.

6.2.4 Each Party agrees to conduct all negotiations in good faith.

### **6.3 Withdrawal of An Interconnection Request**

6.3.1 An Interconnection Customer may withdraw an Interconnection Request at any time prior to executing a Final Interconnection Agreement by providing the Utility with a written request for withdrawal.

6.3.2 An Interconnection Request shall be deemed withdrawn if the Interconnection Customer fails to meet its obligations specified in the Interconnection Procedures, System Impact Study Agreement or Facility Study Agreement or to take advantage of any express opportunity to cure.

6.3.3 Within ninety (90) Calendar-Business Days of any voluntary or deemed withdrawal of the Interconnection Request, the Utility will provide the Interconnection Customer with a final accounting report of any difference between (1) the Interconnection Customer's cost responsibility for the actual cost of such work performed, and (2) the Interconnection

Customer's previous aggregate Interconnection Facility Request Deposit payments to the Utility for such work. If the Interconnection Customer's cost responsibility exceeds its previous aggregate payments, the Utility shall invoice the Interconnection Customer for the amount due and the Interconnection Customer shall make payment to the Utility within 30 Calendar Days. If the Interconnection Customer's previous aggregate payments exceed its cost responsibility under this Agreement, the Utility shall refund to the Interconnection Customer an amount equal to the difference within 30 Calendar Days of the final accounting report.

#### 6.4 Interconnection Metering

Any metering necessitated by the use of the Generating Facility shall be installed at the Interconnection Customer's expense in accordance with all applicable regulatory requirements or the Utility's specifications.

#### 6.5 Commissioning

Commissioning tests of the Interconnection Customer's installed equipment shall be performed pursuant to applicable codes and standards. If the Interconnection Customer is not proceeding under Section 2.3.2, the Utility must be given at least ten (10) Business Days ~~written notice~~, or as otherwise mutually agreed to in writing by the Parties, of the tests and may be present to witness the commissioning tests.

#### 6.6 Confidentiality

6.6.1 Confidential Information shall mean any confidential and/or proprietary information provided by one Party to the other Party that is clearly marked or otherwise designated "Confidential." For purposes of these procedures all design, operating specifications, and metering data provided by the Interconnection Customer shall be deemed Confidential Information regardless of whether it is clearly marked or otherwise designated as such.

6.6.2 Confidential Information does not include information previously in the public domain, required to be publicly submitted or divulged by Governmental Authorities (after notice to the other Party and after exhausting any opportunity to oppose such publication or release), or necessary to be divulged in an action to enforce these procedures. Each Party receiving Confidential Information shall hold such information in confidence and shall not disclose it to any third party nor to the public without the prior written authorization from the Party providing that information, except to fulfill obligations under these procedures, or to fulfill legal or regulatory requirements.

6.6.2.1 Each Party shall employ at least the same standard of care to protect Confidential Information obtained from the other Party as it employs to protect its own Confidential Information.

6.6.2.2 Each Party is entitled to equitable relief, by injunction or otherwise, to enforce its rights under this provision to prevent the release of Confidential Information without bond or proof of damages, and may seek other remedies available at law or in equity for breach of this provision.

6.6.3 If information is requested by the Commission from one of the Parties that is otherwise required to be maintained in confidence pursuant to these procedures, the Party shall provide the requested information to the Commission within the time provided for in the request for information. In providing the information to the Commission, the Party may request that the information be treated as confidential and non-public in accordance with North Carolina law and that the information be withheld from public disclosure.

6.6.4 All information pertaining to a project will be provided to the new owner in the case of a change of control of the existing legal entity or a change of ownership to a new legal entity.

## 6.7 Comparability

The Utility shall receive, process, and analyze all Interconnection Requests received under these procedures in a timely manner, as set forth in these procedures. The Utility shall use the same reasonable efforts in processing and analyzing Interconnection Requests from all Interconnection Customers, whether the Generating Facility is owned or operated by the Utility, its subsidiaries or affiliates, or others.

## 6.8 Record Retention

The Utility shall maintain for three (3) years records, subject to audit, of all Interconnection Requests received under these procedures, the times required to complete Interconnection Request approvals and disapprovals, and justification for the actions taken on the Interconnection Requests.

## 6.9 Coordination with Affected Systems

The Utility shall develop Affected System communication protocol with potential Affected Systems, upon request by the Affected System, such that reciprocal notification of Interconnection Requests, as applicable per the specified communication protocol, between the Utility and the Affected System can be addressed and implemented.

The Utility shall coordinate the conduct of any studies required to determine the Interconnection Procedures

impact of the Interconnection Request on Affected Systems with Affected System operators and, if possible, include those results (if available) in its applicable studies within the time frame specified in these procedures. The Utility will include such Affected System operators in all meetings held with the Interconnection Customer as required by these procedures. The Interconnection Customer will cooperate with the Utility in all matters related to the conduct of studies and the determination of modifications to Affected Systems. A Utility which may be an Affected System shall cooperate with the Utility with whom interconnection has been requested in all matters related to the conduct of studies and the determination of modifications to Affected Systems.

## 6.10 Capacity of the Generating Facility

6.10.1 If the Interconnection Request is for a Generating Facility that includes multiple energy production devices at a site for which the Interconnection Customer seeks a single Point of Interconnection, the Interconnection Request shall be evaluated on the basis of the aggregate capacity of the multiple devices, unless otherwise agreed to by the Utility and the Interconnection Customer.

6.10.2 For the purposes of this Standard, the capacity of the Generating Facility shall be considered the maximum rated capacity of the Generating Facility, except where the gross generating capacity of the Generating Facility is limited (e.g., through the use of a control system, power relay(s), or other similar device settings or adjustments as mutually agreed upon by the Utility and Interconnection customer). The Generating Facility's capacity shall be considered the Maximum Generating Capacity specified by the Interconnection Customer in the Interconnection Request. The Maximum Generating Capacity approved in the study process will subsequently be included as a limitation in the Interconnection Agreement. The Interconnection Request shall be evaluated using the maximum rated capacity of the Generating Facility, unless otherwise agreed to by the Utility and the Interconnection Customer.

## 6.11 Sale of a Generation Facility

6.11.1 The Interconnection Customer shall notify the Utility of the pending sale of a proposed Generation Facility in writing. The Interconnection Customer shall provide the Utility with information regarding whether the sale is a change of ownership of the Generation Facility to a new legal entity, or a change of control of the existing legal entity.

The Interconnection Customer shall promptly notify the Utility of the final date of sale and transfer date of ownership in writing. The purchaser of the Generation Facility shall confirm to the Utility the final date of sale and transfer date of ownership in writing, and submit an Interconnection Request requesting transfer control or change of ownership together with the change of ownership fee listed in Attachment 2.

6.11.2 Existing Interconnection Agreements are non-transferable. If the Generation Facility is sold to a new legal entity, a new Interconnection

Agreement must be executed by the new legal entity prior to the interconnection or for the continued interconnection of the Generating Facility to the Utility's system. The Utility shall not withhold or delay the execution of an Interconnection Agreement with the new owner provided the Generation facility or proposed Generation facility complies with requirements of 6.11.

- 6.11.3 The technical requirements in the Interconnection Agreement shall be grandfathered for subsequent owners as long as (1) the Generating Facility's maximum rated capacity has not been changed; (2) the Generating Facility has not been modified so as to change its electrical characteristics; and (3) the interconnection system has not been modified.

#### 6.12 Isolating or Disconnecting the Generating Facility

- 6.12.1 The Utility may isolate the Interconnection Customer's premises and/or Generating Facility from the Utility's System when necessary in order to construct, install, repair, replace, remove, investigate or inspect any of the Utility's equipment or part of Utility's System; or if the Utility determines that isolation of the Interconnection Customer's premises and/or Generating Facility from the Utility's System is necessary because of emergencies, forced outages, force majeure or compliance with prudent electrical practices.
- 6.12.2 Whenever feasible, the Utility shall give the Interconnection Customer reasonable notice of the isolation of the Interconnection Customer's premises and/or Generating Facility from the Utility's System.
- 6.12.3 Notwithstanding any other provision of this Standard, if at any time the Utility determines that the continued operation of the Generating Facility may endanger either (1) the Utility's personnel or other persons or property or (2) the integrity or safety of the Utility's System, or otherwise cause unacceptable power quality problems for other electric consumers, the Utility shall have the right to isolate the Interconnection Customer's premises and/or Generating Facility from the Utility's System.
- 6.12.4 The Utility may disconnect from the Utility's System any Generating Facility determined to be malfunctioning, or not in compliance with this Standard. The Interconnection Customer must provide proof of compliance with this Standard before the Generating Facility will be reconnected.

#### 6.13 Limitation of Liability

Each Party's liability to the other Party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission hereunder, shall be limited to the amount of direct damage actually incurred. In no event shall either Party be liable to the other Party for any indirect,

special, incidental, consequential, or punitive damages of any kind.

#### 6.14 Indemnification

The Parties shall at all times indemnify, defend and save the other Party harmless from any and all damages, losses, claims, including claims and actions relating to injury or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney's fees, and all other obligations by or to third parties, arising out of or resulting from the other Party's action or inaction of its obligations hereunder on behalf of the indemnifying Party, except in cases of gross negligence or intentional wrongdoing by the indemnified Party.

#### 6.15 Insurance

The Interconnection Customer shall obtain and retain, for as long as the Generating Facility is interconnected with the Utility's System, liability insurance which protects the Interconnection Customer from claims for bodily injury and/or property damage. The amount of such insurance shall be sufficient to insure against all reasonably foreseeable direct liabilities given the size and nature of the generating equipment being interconnected, the interconnection itself, and the characteristics of the system to which the interconnection is made. This insurance shall be primary for all purposes. The Interconnection Customer shall provide certificates evidencing this coverage as required by the Utility. Such insurance shall be obtained from an insurance provider authorized to do business in North Carolina. The Utility reserves the right to refuse to establish or continue the interconnection of the Generating Facility with the Utility's System, if such insurance is not in effect.

- 6.15.1 For an Interconnection Customer that is a residential customer of the Utility proposing to interconnect a Generating Facility no larger than 250 kW, the required coverage shall be a standard homeowner's insurance policy with liability coverage in the amount of at least \$100,000 per occurrence.
- 6.15.2 For an Interconnection Customer that is a non-residential customer of the Utility proposing to interconnect a Generating Facility no larger than 250 kW, the required coverage shall be comprehensive general liability insurance with coverage in the amount of at least \$300,000 per occurrence.
- 6.15.3 For an Interconnection Customer that is a non-residential customer of the Utility proposing to interconnect a Generating Facility greater than 250 kW, the required coverage shall be comprehensive general liability insurance with coverage in the amount of at least \$1,000,000 per occurrence.
- 6.15.4 An Interconnection Customer of sufficient credit-worthiness may propose to provide this insurance via a self-insurance program if it has a self-insurance program established in accordance with commercially acceptable risk management practices, and such a proposal shall not be unreasonably rejected.



#### 6.16 Disconnect Switch

The Utility may require the Interconnection Customer to install a manual load-break disconnect switch or safety switch as a clear visible indication of switch position between the Utility System and the Interconnection Customer. The switch must have padlock provisions for locking in the open position. The switch must be visible to, and accessible to Utility personnel. The switch must be in close proximity to, and on the Interconnection Customer's side of the point of electrical interconnection with the Utility's system. The switch must be labeled "Generator Disconnect Switch." The switch may isolate the Interconnection Customer and its associated load from the Utility's System or disconnect only the Generator from the Utility's System and shall be accessible to the Utility at all times. The Utility, in its sole discretion, determines if the switch is suitable and necessary. When the installation of the switch is not otherwise required (e.g. National Electric Code, state or local building code) and is deemed necessary by the Utility for certified, inverter-based generators no larger than 10 kW, the Utility shall reimburse the Interconnection Customer for the reasonable cost of installing a switch that meets the Utility's specifications.

#### 6.17 Certification Codes and Standards

Attachment 4 specifies codes and standards the Generating Facility must comply with.

#### 6.18 Certification of Generator Equipment Packages

Attachment 5 specifies the certification requirements for the Generating Facility.

## ATTACHMENT 1

**Glossary of Terms**

**20 kW Inverter Process** - The procedure for evaluating an Interconnection Request for a certified inverter-based Generating Facility no larger than 20 kW that uses the Section 3 screens. The application process uses an all-in-one document that includes a simplified Interconnection Request Application Form, simplified procedures, and a brief set of Terms and Conditions. (See Attachment 6.)

**Affected System** = ~~A Utility~~ electric system other than the interconnecting Utility's System that may be affected by the proposed interconnection. The owner of an Affected System might be a Party to the Interconnection Agreement or other study agreements needed to interconnect the Generating Facility.

**Applicable Laws and Regulations** - All duly promulgated applicable federal, state and local laws, regulations, rules, ordinances, codes, decrees, judgments, directives, or judicial or administrative orders, permits and other duly authorized actions of any Governmental Authority.

**Auxiliary Load** – The term “Auxiliary Load” shall mean power used to operate auxiliary equipment in the facility necessary for power generation (such as pumps, blowers, fuel preparation machinery, exciters, etc.)

**Business Day** - Monday through Friday, excluding State Holidays. **Calendar Days** – Sunday through Saturday, including all holidays. **Commission** - The North Carolina Utilities Commission.

**Competitive Resource Solicitation** – A competitive generation procurement process approved by the North Carolina Utilities Commission through which a Utility solicits, or Utilities jointly solicit, new Generating Facilities offering to deliver energy to the Utility for purpose of meeting the requirements of applicable North Carolina laws or regulations, including but not limited to G.S. § 62-110.8.

**Default** - The failure of a breaching Party to cure its breach under the Interconnection Agreement.

**Detailed Estimated Interconnection Facilities Charge** - The estimated charge for Interconnection Facilities that is based on field visits and/or detailed engineering cost calculations and is presented in the Facility Study report and ~~Final~~ Interconnection Agreement. This charge is not final.

**Detailed Estimated Upgrade Charge** - The estimated charge for Upgrades that is based on field visits and/or detailed engineering cost calculations and is presented in the Facility Study report and ~~Final~~ Interconnection Agreement.



**Distribution System** - The Utility's facilities and equipment used to transmit electricity to ultimate usage points such as homes and industries from nearby generators or from interchanges with higher voltage transmission networks which transport bulk power over longer distances. The voltage levels at which Distribution Systems operate differ among areas.

**Distribution Upgrades** - The additions, modifications, and upgrades to the Utility's Distribution System at or beyond the Point of Interconnection to facilitate interconnection of the Generating Facility and render the service necessary to allow the Generating Facility to operate in parallel with the Utility and to inject electricity onto the Utility's System. Distribution Upgrades do not include Interconnection Facilities.

**Fast Track Process** - The procedure for evaluating an Interconnection Request for a certified Generating Facility no larger than 2 MW that meets the eligibility requirements of Section 3.1, customer options meeting, and optional supplemental review.

~~**Final Interconnection Agreement** - The Interconnection Agreement that specifies the Detailed Estimated Upgrade Charge, Detailed Interconnection Facility Charge, mutually agreed upon Milestones, etc. and terminates and replaces the Interim Interconnection Agreement.~~

**Financial Security** - A letter of credit or other financial arrangement that is reasonably acceptable to the Utility and is consistent with the Uniform Commercial Code of North Carolina that is sufficient to cover the costs for constructing, designing, procuring, and installing the applicable portion of the Utility's Interconnection Facilities. Where appropriate, the Utility may deem Financial Security to exist where its credit policies show that the financial risks involved are de minimus, or where the Utility's policies allow the acceptance of an alternative showing of credit-worthiness from the Interconnection Customer.

**Generating Facility** - The Interconnection Customer's device for the production and/or storage for later injection of electricity identified in the Interconnection Request, but shall not include the Interconnection Customer's Interconnection Facilities.

**Good Utility Practice** - Any of the practices, methods and acts engaged in or approved by a significant portion of the electric industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.

**Governmental Authority** - Any federal, state, local or other governmental regulatory or administrative agency, court, commission, department, board, or other governmental subdivision, legislature, rulemaking board, tribunal, or other governmental authority having jurisdiction over the Parties, their respective facilities, or the respective services

they provide, and exercising or entitled to exercise any administrative, executive, police, or taxing authority or power; provided, however, that such term does not include the Interconnection Customer, the Utility, or any affiliate thereof.

**In-Service Date** – The date upon which the construction of the Utility's facilities is completed and the facilities are capable of being placed into service.

**Interconnection Agreement** – The Interconnection Agreement that specifies the Detailed Estimated Upgrade Charge, Detailed Interconnection Facility Charge, mutually agreed upon Milestones, etc.

**Interconnection Customer** - Any valid legal entity, including the Utility, that proposes to interconnect its Generating Facility with the Utility's System.

**Interconnection Facilities** – Collectively, the Utility's Interconnection Facilities and the Interconnection Customer's Interconnection Facilities. Collectively, Interconnection Facilities include all facilities and equipment between the Generating Facility and the Point of Interconnection, including any modification, additions or upgrades that are necessary to physically and electrically interconnect the Generating Facility to the Utility's System. Interconnection Facilities are sole use facilities and shall not include Upgrades.

**Interconnection Facilities Delivery Date** – The Interconnection Facilities Delivery Date shall be the date upon which the Utility's Interconnection Facilities are first made operational for the purposes of receiving power from the Interconnection Customer.

**Interconnection Request** - The Interconnection Customer's written request, in accordance with these procedures, to interconnect a new Generating Facility, or make changes to a prior Interconnection Request (such as items including but not limited to changes in capacity, equipment substitution requests, etc.), or to change the capacity of, or make an equipment substitution request ~~Material Modification to, make changes to an existing Generating Facility that is interconnected with the Utility's System.~~

**Interdependent Customer (or Interdependent Project)** means an Interconnection Customer- (or- Project) whose Upgrade or Interconnection Facilities requirements are impacted by another Generating Facility, as determined by the Utility.

**Material Modification** means a modification to machine data or equipment configuration or to the interconnection site of the Generating Facility that has a material impact on the cost, timing or design of any Interconnection Facilities or Upgrades or that may adversely impact other Interdependent Interconnection Requests with higher Queue Numbers, which includes any required study revisions resulting from the modification. Material Modifications include certain project revisions as defined in Section 1.5.1. ~~**Material Modification** means a modification to machine data or equipment configuration or to the interconnection site of the Generating Facility that has a material impact on the cost, timing or design of any Interconnection Facilities or Upgrades. Material Modifications include project revisions proposed at any time after receiving notification by the Utility of a complete Interconnection Request pursuant to Section 1.4.3 that 1) alters the size or output characteristics of the Generating Facility from its Utility approved Interconnection~~

Request submission; or 2) may adversely impact other Interdependent Interconnection Requests with higher Queue Numbers;

Indicia of a Material Modification, include, but are not limited to:

- A change in Point of Interconnection (POI) to a new location, unless the change in a POI is on the same circuit less than two (2) poles away from the original location, and the new POI is within the same protection zone as the original location;
  - A change or replacement of generating equipment such as generator(s), inverter(s), transformers, relaying, controls, etc. that is not a like-kind substitution in size, ratings, impedances, efficiencies or capabilities of the equipment specified in the original or preceding Interconnection Request;
  - A change from certified to non-certified devices ("certified" means certified by an OSHA recognized Nationally Recognized Test Laboratory (NRTL), to relevant UL and IEEE standards, authorized to perform tests to such standards);
  - A change of transformer connection(s) or grounding from that originally proposed;
  - A change to certified inverters with different specifications or different inverter control specifications or set up than originally proposed;
  - An increase of the AC output of a Generating Facility; or
  - A change reducing the AC output of the generating facility by more than 10%;
- The following are not indicia of a Material Modification:
- A change in ownership of a Generating Facility; the new owner, however, will be required to execute a new Interconnection Agreement and Study agreement(s) for any Study which has not been completed and the Report issued by the Utility;
  - A change or replacement of generating equipment such as generator(s), inverter(s), solar panel(s), transformers, relaying, controls, etc. that is a like-kind substitution in size, ratings, impedances, efficiencies or capabilities of the equipment specified in the original or preceding Interconnection Request;
  - An increase in the DC/AC ratio that does not increase the maximum AC output capability of the generating facility;

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- ~~— A decrease in the DC/AC ratio that does not reduce the AC output capability of the generating facility by more than 10%.~~

**Maximum Generating Capacity** - The term shall mean the maximum continuous electrical output of the Generating Facility at any time as measured at the Point of Interconnection and the maximum kW delivered to the Utility during any metering period. Requested Maximum Generating Capacity will be specified by the Interconnection Customer in the Interconnection Request and an approved Maximum Generating capacity will subsequently be included as a limitation in the Interconnection Agreement. ~~**Maximum Physical Export Capability Requested** - The term shall mean the maximum continuous electrical output of the Generating Facility at any time at a power factor of approximately unity as measured at the Point of Interconnection and the maximum kW delivered to the Utility during any metering period.~~

~~**Interim Interconnection Agreement** - The Interconnection Agreement that specifies the Preliminary Estimated Interconnection Facilities Charge, Preliminary Estimated Upgrade Charge, excludes Milestones, and must be cancelled and replaced with a Final Interconnection Agreement.~~

~~**"Material Modification"** means a modification to machine data or equipment configuration or to the interconnection site of the Generating Facility that has a material impact on the cost, timing or design of any Interconnection Facilities or Upgrades. Material Modifications include project revisions proposed at any time after receiving notification by the Utility of a complete Interconnection Request pursuant to Section 1.4.3 that 1) alters the size or output characteristics of the Generating Facility from its Utility approved Interconnection Request submission; or 2) may adversely impact other Interdependent Interconnection Requests with higher Queue Numbers.~~

Indicia of a Material Modification, include, but are not limited to:

- ~~• A change in Point of Interconnection (POI) to a new location, unless the change in a POI is on the same circuit less than two (2) poles away from the original location, and the new POI is within the same protection zone as the original location;~~

~~A change or replacement of generating equipment such as generator(s), inverter(s), transformers, relaying, controls, etc. that is not a like-kind substitution in size, ratings, impedances, efficiencies or capabilities of the equipment specified in the original or preceding Interconnection Request;~~

~~A change from certified to non-certified devices ("certified" means certified by an OSHA recognized Nationally Recognized Test Laboratory (NRTL), to relevant UL and IEEE standards, authorized to perform tests to such standards);~~

~~A change of transformer connection(s) or grounding from that originally proposed;~~

~~A change to certified inverters with different specifications or different inverter control specifications or set-up than originally proposed;~~

~~An increase of the AC output of a Generating Facility; or~~

~~A change reducing the AC output of the generating facility by more than 10%.~~

~~The following are not indicia of a Material Modification:~~

~~A change in ownership of a Generating Facility; the new owner, however, will be required to execute a new Interconnection Agreement and Study agreement(s) for any Study which has not been completed and the Report issued by the Utility.~~

~~A change or replacement of generating equipment such as generator(s), inverter(s), solar panel(s), transformers, relaying, controls, etc. that is a like-kind substitution in size, ratings, impedances, efficiencies or capabilities of the equipment specified in the original or preceding Interconnection Request;~~

~~An increase in the DC/AC ratio that does not increase the maximum AC output capability of the generating facility;~~

~~A decrease in the DC/AC ratio that does not reduce the AC output capability of the generating facility by more than 10%.~~

~~**Maximum Physical Export Capability Requested** – The term shall mean the maximum continuous electrical output of the Generating Facility at any time at a power factor of approximately unity as measured at the Point of Interconnection and the maximum kW delivered to the Utility during any metering period.~~

**Month** – The term “Month” means the period intervening between readings for the purpose of routine billing, such readings usually being taken once per month.

**Nameplate Capacity** – The term “Nameplate Capacity” shall mean the manufacturer’s nameplate rated output capability of the generator. For multi-unit generator facilities, the “Nameplate Capacity” of the facility shall be the sum of the individual manufacturer’s nameplate rated output capabilities of the generators.

**Net Capacity** – The term “Net Capacity” shall mean the Nameplate Capacity of the Customer’s generating facilities, less the portion of that capacity needed to serve the Generating Facility’s Auxiliary Load.



**Net Power** - The term "Net Power" shall mean the total amount of electric power produced by the Customer's Generating Facility less the portion of that power used to supply the Generating Facility's Auxiliary Load.

**Network Upgrades** - Additions, modifications, and upgrades to the Utility's Transmission System required to accommodate the interconnection of the Generating Facility to the Utility's System. Network Upgrades do not include Distribution Upgrades.

**North Carolina Interconnection Procedures** - The term "North Carolina Interconnection Procedures" shall refer to the most recent North Carolina Interconnection Procedures, Forms, and Agreements for State-Jurisdictional Generator Interconnections as approved by the North Carolina Utilities Commission.

**Operating Requirements** - Any operating and technical requirements that may be applicable due to Regional Reliability Organization, Independent System Operator, control area, or the Utility's requirements, including those set forth in the Interconnection Agreement.

**Party or Parties** - The Utility, Interconnection Customer, and possibly the owner of an Affected System, or any combination of the above.

**Point of Interconnection** - The point where the Interconnection Facilities connect with the Utility's System.

**Preliminary Estimated Interconnection Facilities Charge** - The estimated charge for Interconnection Facilities that is developed using high level estimates unit cost, including overheads and is presented in the System Impact Study report and Interim Interconnection Agreement. This charge is not based on field visits and/or detailed engineering cost calculations.

**Preliminary Estimated Upgrade Charge** - The estimated charge for Upgrades that is developed using high level estimates including unit costs and overheads estimates, if applicable, and is presented in the System Impact Study report and Interim Interconnection Agreement. This charge is not based on field visits and/or detailed engineering cost calculations.

**Project A** - An Interconnection Customer that has a lower Queue Number than Interdependent Project B.

**Project B** - An Interconnection Customer that has a higher Queue Number than Interdependent Project A.

**Project C** - An Interconnection Customer that has a higher Queue Number than Interdependent Project B.

**Public Staff** - The Public Staff of the North Carolina Utilities Commission.

**Queue Number** - The number assigned by the Utility that establishes a Customer's Interconnection Request's position in the study queue relative to all other valid Interconnection Requests. A lower Queue Number will be studied prior to a higher Queue Number, except in the case of Interdependent Projects. The Queue Number of each Interconnection Request shall be used to determine the cost responsibility for the Upgrades necessary to accommodate the interconnection.

**Queue Position** - The order of a valid Interconnection Request, relative to all other pending valid Interconnection Requests, based on Queue Number.

**Reasonable Efforts** - With respect to an action required to be attempted or taken by a Party under the Interconnection Agreement, efforts that are timely and consistent with Good Utility Practice and are otherwise substantially equivalent to those a Party would use to protect its own interests.

**Small Animal Waste to Energy Facility** – An electric generating facility 2 MW or less in capacity that uses swine or poultry waste as its energy source, and is eligible for an expedited review study process pursuant to G.S. 62-133.8(i)(4).

**Standard** - The interconnection procedures, forms and agreements approved by the Commission for interconnection of Generating Facilities to Utility Systems in North Carolina.

**Standby Generation Facility** - An electric generating facility primarily designed for standby or backup power in the event of a loss of power supply from the Utility. Such facilities may operate in parallel with the Utility for a brief period of time when transferring load back to the Utility after an outage, or when testing the operation of the Facility and transferring load from and back to the Utility.

**Study Process** - The procedure for evaluating an Interconnection Request that includes the Section 4 scoping meeting, system-impact study System Impact Study, and facilities study.

**System** - The facilities owned, controlled or operated by the Utility that are used to provide electric service in North Carolina.

**Utility** - The entity that owns, controls, or operates facilities used for providing electric service in North Carolina.

**Transmission System** - The facilities owned, controlled or operated by the Utility that are used to transmit electricity in North Carolina.

**Upgrades** - The required additions and modifications to the Utility's System at or beyond the Point of Interconnection. Upgrades may be Network Upgrades or Distribution Upgrades. Upgrades do not include Interconnection Facilities.

ATTACHMENT 2

**NORTH CAROLINA  
INTERCONNECTION REQUEST APPLICATION FORM**

Utility: \_\_\_\_\_

Designated Utility Contact: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Fax: \_\_\_\_\_

An Interconnection Request Application Form is considered complete when it provides all applicable and correct information required below.

**Preamble and Instructions**

An Interconnection Customer who requests a North Carolina Utilities Commission jurisdictional interconnection must submit this Interconnection Request Application Form by hand delivery, mail, e-mail, or fax to the Utility.

Request for: Fast Track Process \_\_\_\_\_ Supplemental Review \_\_\_\_\_  
 Study Process \_\_\_\_\_ Standby Generator / Closed Transition \_\_\_\_\_  
 —(Refer to Section 3 of the Interconnection Standards for guidance in selecting Fast Track Review options. All Generating Facilities larger than 2 MW must use the Section 4 Study Process.)

**Processing Fee or Deposit****Fast Track Process – Non-Refundable Processing Fees**

- If the Generating Facility is 20 kW or smaller, the fee is \$100.
- If the Generating Facility is larger than 20 kW but not larger than 100 kW, the fee is ~~\$750~~\$250.
- If the Generating Facility is larger than 100 kW but not larger than 2 MW, the fee is ~~\$1,000~~\$500.

**Supplemental Review - Deposit**



- If the Generating Facility is larger than 20 kW but not larger than 100 kW, the deposit is \$750.
- If the Generating Facility is larger than 100 kW but not larger than 2 MW, the deposit is \$1,000.

#### Study Process – Deposit

If the Interconnection Request is submitted under the Study Process, whether a new submission or an Interconnection Request that did not pass the Fast Track Process, the Interconnection Customer shall submit to the Utility an Interconnection Facilities Deposit Charge of \$20,000 plus \$1.00 per kW<sub>AC</sub>.

#### Standby Generator / Closed Transition - Deposit

- If the Facility is less than 1 MW, deposit is \$2,500.
- If the Facility is equal to or greater than 1 MW the deposit is \$5,000.

#### Change in Ownership – Non-Refundable Processing Fee

If the Interconnection Request is submitted solely due to a transfer of ownership or change of control of the Generating Facility, the fee is ~~\$50.~~\$500

**Interconnection Customer Information**

Legal Name of the Interconnection Customer (or, if an individual, individual's name)

Name: \_\_\_\_\_

Primary Contact Name: \_\_\_\_\_

Title: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

County: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_

Secondary Contact Name: \_\_\_\_\_

Title: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

County: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_

Facility Location (if different from above):

Project Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

County: \_\_\_\_\_

Alternative Contact Information (if different from the Interconnection Customer)

Contact Name: \_\_\_\_\_

Title: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Telephone (Day) \_\_\_\_\_ (Evening) \_\_\_\_\_  
Fax: \_\_\_\_\_

Application is for: \_\_\_\_\_ New Generating Facility

\_\_\_\_\_ Capacity Change to a Proposed or Existing Generating Facility

\_\_\_\_\_ Change of Ownership of a Proposed or Existing Generating Facility to a  
new legal entity

\_\_\_\_\_ Change of Control of a Proposed or Existing Generating Facility of the  
existing legal entity.

\_\_\_\_\_ Equipment Substitution

\_\_\_\_\_ Other

~~If capacity addition change to existing Generating Facility, please provide additional~~  
information regarding the proposed change(s) describe:

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

Will the Generating Facility be used for any of the following?

Net Metering? Yes \_\_\_\_\_ No \_\_\_\_\_

To Supply Power to the Interconnection Customer? Yes \_\_\_\_\_ No \_\_\_\_\_

To Supply Power to the Utility? Yes \_\_\_\_\_ No \_\_\_\_\_

To Supply Power to Others? Yes \_\_\_\_\_ No \_\_\_\_\_

(If yes, discuss with the Utility whether the interconnection is covered by the NC Interconnection Standard.)

Requested Point of Interconnection: \_\_\_\_\_

Requested In-Service Date: \_\_\_\_\_

For installations at locations with existing electric service to which the proposed Generating Facility will interconnect, provide:

Local Electric Service Provider\*: \_\_\_\_\_

Existing Account Number: \_\_\_\_\_

To be provided by the Interconnection Customer if the local electric service provider is different from the Utility

Contact Name: \_\_\_\_\_

Title: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_

### **Generating Facility Information**

~~Data applies only to the Generating Facility, not the Interconnection Facilities.~~

Prime Mover: \_\_\_\_\_ Photovoltaic (PV) \_\_\_\_\_ Fuel Cell \_\_\_\_\_ Reciprocating Engine \_\_\_\_\_

\_\_\_\_\_ Gas Turbine \_\_\_\_\_ Steam Turbine \_\_\_\_\_ Micro turbine \_\_\_\_\_

\_\_\_\_\_ Other \_\_\_\_\_

**Energy Source:**Renewable

- ☐ Solar — Photovoltaic  
☐ Solar — thermal  
☐ Biomass — landfill gas  
☐ Biomass — manure digester gas  
☐ Biomass — directed biogas  
☐ Biomass — solid waste  
☐ Biomass — sewage digester gas  
☐ Biomass — wood  
☐ Biomass — other (specify below)  
☐ Hydro power — run of river  
☐ Hydro power — storage  
☐ Hydro power — tidal  
☐ Hydro power — wave  
☐ Wind  
☐ Geothermal  
☐ Other (specify below)

Non-Renewable

- ☐ Fossil Fuel — Diesel  
☐ Fossil Fuel — Natural Gas (not waste)  
☐ Fossil Fuel — Oil  
☐ Fossil Fuel — Coal  
☐ Fossil Fuel — Other (specify below)  
☐ Other (specify below)

**Generating Facility Information**

Data applies only to the Generating Facility, not the Interconnection Facilities.

Prime Mover Information (Refer to U.S. EIA Form 860 Instructions, Table 2 Prime Mover Codes and Descriptions at [https://www.eia.gov/survey/form/eia\\_860/instructions.pdf](https://www.eia.gov/survey/form/eia_860/instructions.pdf))

Prime Mover Code \_\_\_\_\_

Prime Mover Description \_\_\_\_\_

Energy Source Information (Refer to U.S. EIA Form 860 Instructions, Table 28 Energy Source Codes and Heat Content at [https://www.eia.gov/survey/form/eia\\_860/instructions.pdf](https://www.eia.gov/survey/form/eia_860/instructions.pdf))

<u>Fuel Type</u>	<u>Energy Source Code</u>	<u>Energy Source Description</u>

Type of Generator: Synchronous \_\_\_\_\_ Induction \_\_\_\_\_ Inverter \_\_\_\_\_

Total Generator Nameplate Rating: \_\_\_\_\_ kW<sub>AC</sub> (Typical) \_\_\_\_\_ kVAR Total  
Generator/Storage Nameplate Capacity: \_\_\_\_\_ kW<sub>AC</sub> (Typical) \_\_\_\_\_ kVAR

Storage Nameplate Energy: \_\_\_\_\_ kWh

Interconnection Customer or Customer-Site Load: \_\_\_\_\_ kW<sub>AC</sub> (if none, so state)

Interconnection Customer Generator Auxiliary Load: \_\_\_\_\_ kW<sub>AC</sub>

Typical Reactive Load (if known): \_\_\_\_\_ kVAR

Maximum Generating Capacity requested Maximum Physical Export Capability Requested:  
\_\_\_\_\_ kW<sub>AC</sub>

(The maximum continuous electrical output of the Generating Facility at any time at a power factor of approximately unity- as measured at the Point of Interconnection and the maximum kW delivered to the Utility during any metering period)

Production profile: provide below the maximum import and export levels (as a percentage of the Maximum Physical Export Capability Requested) for each hour of the day, as measured at the Point Of Interconnection. Power flow in excess of these levels during the corresponding hour shall be considered an Adverse Operating Effect per section 3.4.4. of the Interconnection Agreement.

Maximum import and export, hour ending:

<u>0100</u> <u>imp:</u> <u>exp:</u> %	<u>0200</u> <u>imp:</u> <u>exp:</u> %	<u>0300</u> <u>imp:</u> <u>exp:</u> %
<u>0400</u> <u>imp:</u> <u>exp:</u> %	<u>0500</u> <u>imp:</u> <u>exp:</u> %	<u>0600</u> <u>imp:</u> <u>exp:</u> %
<u>0700</u> <u>imp:</u> <u>exp:</u> %	<u>0800</u> <u>imp:</u> <u>exp:</u> %	<u>0900</u> <u>imp:</u> <u>exp:</u> %
<u>1000</u> <u>imp:</u> <u>exp:</u> %	<u>1100</u> <u>imp:</u> <u>exp:</u> %	<u>1200</u> <u>imp:</u> <u>exp:</u> %

<u>1300</u> <u>imp:</u> <u>exp:</u> %	<u>1400</u> <u>imp:</u> <u>exp:</u> %	<u>1500</u> <u>imp:</u> <u>exp:</u> %
<u>1600</u> <u>imp:</u> <u>exp:</u> %	<u>1700</u> <u>imp:</u> <u>exp:</u> %	<u>1800</u> <u>imp:</u> <u>exp:</u> %
<u>1900</u> <u>imp:</u> <u>exp:</u> %	<u>2000</u> <u>imp:</u> <u>exp:</u> %	<u>2100</u> <u>imp:</u> <u>exp:</u> %
<u>2200</u> <u>imp:</u> <u>exp:</u> %	<u>2300</u> <u>imp:</u> <u>exp:</u> %	<u>2400</u> <u>imp:</u> <u>exp:</u> %

Please provide any additional pertinent information regarding the daily operating characteristics of the facility here or attached as noted. Also note information about intended reactive flows:

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List components of the Generating Facility equipment package that are currently certified:

Number	Equipment Type	Certifying Entity
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____

**Generator (or solar panel information)**

Manufacturer, Model &amp; Quantity: \_\_\_\_\_

Nameplate Output Power Rating in kW<sub>AC</sub>: Summer \_\_\_\_\_ Winter \_\_\_\_\_

Nameplate Output Power Rating in kVA: Summer \_\_\_\_\_ Winter \_\_\_\_\_

Individual Generator Rated Power Factor: \_\_\_\_\_ Leading \_\_\_\_\_ Lagging

Total Number of Generators in wind farm to be interconnected pursuant to this  
Interconnection Request (if applicable): \_\_\_\_\_ Elevation: \_\_\_\_\_

Inverter Manufacturer, Model &amp; Quantity: \_\_\_\_\_

~~For solar projects provide the following information:~~Latitude: \_\_\_\_\_ Degrees (decimal format, to at least 4 places) \_\_\_\_\_  
\_\_\_\_\_ Minutes NorthLongitude: \_\_\_\_\_ Degrees (decimal format, to at least 4 places) \_\_\_\_\_  
\_\_\_\_\_ Minutes WestFor solar projects provide the following information:

Orientation: \_\_\_\_\_ Degrees (Due South=180°)

☐ Fixed Tilt Array ☐ Single Axis Tracking Array ☐ Double Axis Tracking Array

Fixed Tilt Angle: \_\_\_\_\_ Degrees

**Impedance Diagram** - If interconnecting to the Utility System at a voltage of 44-kV or greater, provide an Impedance Diagram. An Impedance Diagram may be required by the Utility for proposed interconnections at lower interconnection voltages. The Impedance Diagram shall provide, or be accompanied by a list that shall provide, the collector system impedance of the generation plant. The collector system impedance data shall include equivalent impedances for all components, starting with the inverter transformer(s) up to the utility level Generator Step-Up transformer.

**Load Flow Data Sheet** - If interconnecting to the Utility System at a voltage of 44-kV or greater, provide a completed Power Systems Load Flow data sheet. A Load Flow data sheet may be required by the Utility for proposed interconnections at lower interconnection voltages.

**Excitation and Governor System Data for Synchronous Generators** - If interconnecting to the Utility System at a voltage of 44-kV or greater, provide appropriate IEEE model block diagram of excitation system, governor system and power system stabilizer (PSS) in accordance with the regional reliability council criteria. A PSS may be required at lower interconnection voltages. A copy of the manufacturer's



block diagram may not be substituted.

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**Generating Facility Characteristic Data (for inverter-based machines)**

Max design fault contribution current: \_\_\_\_\_ Instantaneous \_\_\_\_\_ or RMS \_\_\_\_\_

Harmonics Characteristics: \_\_\_\_\_

Start-up requirements: \_\_\_\_\_

**Inverter Short-Circuit Model Data**

Model and parameter data required for short-circuit analysis is specific to each PV inverter make and model. All data to be provided in per-unit ohms, on the equivalent inverter MVA base.

Inverter Equivalent MVA Base: \_\_\_\_\_ MVA

Values below are valid for initial 2 to 6 cycles:

Short-Circuit Equivalent Pos. Seq. Resistance (R1): \_\_\_\_\_ p.u.

Short-Circuit Equivalent Pos. Seq. Reactance (XL1): \_\_\_\_\_ p.u.

Short-Circuit Equivalent Neg. Seq. Resistance (R2): \_\_\_\_\_ p.u.

Short-Circuit Equivalent Neg. Seq. Reactance (XL2): \_\_\_\_\_ p.u.

Short-Circuit Equivalent Zero Seq. Resistance (R0): \_\_\_\_\_ p.u.

Short-Circuit Equivalent Zero Seq. Reactance (XL0): \_\_\_\_\_ p.u.

Special notes regarding short-circuit modeling assumptions:

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**Generating Facility Characteristic Data (for rotating machines)**

RPM Frequency: \_\_\_\_\_

(\*) Neutral Grounding Resistor (if applicable): \_\_\_\_\_

**Synchronous Generators:**Direct Axis Synchronous Reactance,  $X_d$ : \_\_\_\_\_ P.U.Direct Axis Transient Reactance,  $X'_d$ : \_\_\_\_\_ P.U.Direct Axis Subtransient Reactance,  $X''_d$ : \_\_\_\_\_ P.U.Negative Sequence Reactance,  $X_2$ : \_\_\_\_\_ P.U.Zero Sequence Reactance,  $X_0$ : \_\_\_\_\_ P.U.

KVA Base: \_\_\_\_\_

Field Volts: \_\_\_\_\_

Field Amperes: \_\_\_\_\_

**Induction Generators:**

Motoring Power (kW): \_\_\_\_\_

 $I_2^2t$  or K (Heating Time Constant): \_\_\_\_\_Rotor Resistance,  $R_r$ : \_\_\_\_\_Stator Resistance,  $R_s$ : \_\_\_\_\_Stator Reactance,  $X_s$ : \_\_\_\_\_Rotor Reactance,  $X_r$ : \_\_\_\_\_Magnetizing Reactance,  $X_m$ : \_\_\_\_\_Short Circuit Reactance,  $X_d''$ : \_\_\_\_\_

Exciting Current: \_\_\_\_\_

Temperature Rise: \_\_\_\_\_

Frame Size: \_\_\_\_\_

Design Letter: \_\_\_\_\_

Reactive Power Required In Vars (No Load): \_\_\_\_\_

Reactive Power Required In Vars (Full Load): \_\_\_\_\_

Total Rotating Inertia, H: \_\_\_\_\_ Per Unit on kVA Base

Note: Please contact the Utility prior to submitting the Interconnection Request to determine if the specified information above is required.

**Interconnection Facilities Information**

Will more than one transformer be used between the generator and the point of common coupling?

Yes \_\_\_\_ No \_\_\_\_ (If yes, copy this section and provide the information for each transformer used. This information must match the single-line drawing and transformer specification sheets.)

Will the transformer be provided by the Interconnection Customer? Yes \_\_\_\_ No \_\_\_\_

**Transformer Data (if applicable, for Interconnection Customer-owned transformer):**

Is the transformer: Single phase \_\_\_\_ Three phase \_\_\_\_ Size: \_\_\_\_ kVA

Transformer Impedance: \_\_\_\_ % on \_\_\_\_ kVA Base

If Three Phase:

Transformer Primary Winding \_\_\_\_ Volts,

☐ Delta ☐ WYE, grounded neutral ☐ WYE, ungrounded neutral

Primary Wiring Connection

☐ 3-wire ☐ 4-wire, grounded neutral

Transformer Secondary Winding \_\_\_\_ Volts,

☐ Delta ☐ WYE, grounded neutral ☐ WYE, ungrounded neutral

Secondary Wiring Connection

☐ 3-wire ☐ 4-wire, grounded neutral

Transformer Tertiary Winding \_\_\_\_ Volts,

☐ Delta ☐ WYE, grounded neutral ☐ WYE, ungrounded neutral

**Transformer Fuse Data (if applicable, for Interconnection Customer-owned fuse):**

(Attach copy of fuse manufacturer's Minimum Melt and Total Clearing Time-Current Curves)

Manufacturer: \_\_\_\_ Type: \_\_\_\_ Size: \_\_\_\_ Speed: \_\_\_\_

**Interconnecting Circuit Breaker (if applicable):**

Manufacturer: \_\_\_\_ Type: \_\_\_\_

Load Rating (Amps): \_\_\_\_ Interrupting Rating (Amps): \_\_\_\_

Trip Speed (Cycles): \_\_\_\_

**Interconnection Protective Relays (if applicable):****If Microprocessor-Controlled:**

List of Functions and Adjustable Setpoints for the protective equipment or software:

	Setpoint Function	Minimum	Maximum
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____

**If Discrete Components:**

(Enclose Copy of any Proposed Time-Overcurrent Coordination Curves)

Manufacturer	Type:	Style/Catalog No.	Proposed Setting
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

**Current Transformer Data (if applicable):**

(Enclose Copy of Manufacturer's Excitation and Ratio Correction Curves)

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_

Accuracy Class: \_\_\_\_\_ Proposed Ratio Connection: \_\_\_\_\_

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_

Accuracy Class: \_\_\_\_\_ Proposed Ratio Connection: \_\_\_\_\_

**Potential Transformer Data (if applicable):**

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_

Accuracy Class: \_\_\_\_\_ Proposed Ratio Connection: \_\_\_\_\_

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_

Accuracy Class: \_\_\_\_\_ Proposed Ratio Connection: \_\_\_\_\_

**General Information**

1. **One-line diagram**  
Enclose site electrical one-line diagram showing the configuration of all Generating Facility equipment, current and potential circuits, and protection and control schemes.
  - The one-line diagram should include the project owner's name, project name, project address, model numbers and nameplate sizes of equipment, including number and nameplate electrical size information for solar panels, inverters, wind turbines, disconnect switches, latitude and longitude of the project location, and tilt angle and orientation of the photovoltaic array for solar projects.
  - The diagram should also depict the metering arrangement required whether installed on the customer side of an existing meter ("net metering/billing") or directly connected to the grid through a new or separate delivery point requiring a separate meter.
  - List of adjustable set points for the protective equipment or software should be included on the electrical one-line drawing.
  - This one-line diagram must be signed and stamped by a licensed Professional Engineer if the Generating Facility is larger than 50 kW.
  - Is One-Line Diagram Enclosed? Yes \_\_\_ No \_\_\_
2. **Site Plan**
  - Enclose copy of any site documentation that indicates the precise physical location of the proposed Generating Facility (Latitude & Longitude Coordinates and USGS topographic map, or other diagram) and the proposed Point of Interconnection.
  - Proposed location of protective interface equipment on property (include address if different from the Interconnection Customer's address) \_\_\_\_\_
  - Is Site Plan Enclosed? Yes \_\_\_ No \_\_\_
3. **Is Site Control Verification Form Enclosed?** Yes \_\_\_ No \_\_\_
4. **Equipment Specifications**  
Include equipment specification information (product literature) for the solar panels and inverter(s) that provides technical information and certification information for the equipment to be installed with the application.
  - Are Equipment Specifications Enclosed? Yes \_\_\_ No \_\_\_
5. **Protection and Control Schemes**
  - Enclose copy of any site documentation that describes and details the operation of the protection and control schemes.
  - Is Available Documentation Enclosed? Yes \_\_\_ No \_\_\_
  - Enclose copies of schematic drawings for all protection and control circuits, relay current circuits, relay potential circuits, and alarm/monitoring circuits (if applicable).
  - Are Schematic Drawings Enclosed? Yes \_\_\_ No \_\_\_
6. **Register with North Carolina Secretary of State** (if not an individual)

**Applicant Signature**

I hereby certify that, to the best of my knowledge, all the information provided in this Interconnection Request Application Form is true and correct.

For Interconnection Customer:

Signature \_\_\_\_\_ Date: \_\_\_\_\_  
(Authorized Agent of the Legal Entity)

Print Full Name \_\_\_\_\_

Company Name \_\_\_\_\_

Title With Company \_\_\_\_\_

E-Mail Address \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

County: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_

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In the Matter of the Application of )  
 [Developer Name] for an )  
 Interconnection Agreement )  
 with [Utility Name] )

## SITE CONTROL VERIFICATION

I, [Authorized Signatory Name], [Title] of [Developer Name], under penalty of perjury, hereby certify that, [Developer Name] or its affiliate has executed a written contract with the landowner(s) noted below, concerning the property described below. I further certify that our written contract with the landowner(s) specifies the agreed rental rate or purchase price for the property, as applicable, and allows [Developer Name] or its affiliates to construct and operate a renewable energy power generation facility on the property described below.

This verification is provided to [Utility Name] in support of our application for an Interconnection Agreement.

Landowner Name(s): \_\_\_\_\_

Land Owner Contact information (Phone or e-mail): \_\_\_\_\_

Parcel or PIN Number: \_\_\_\_\_

County: \_\_\_\_\_

Site Address: \_\_\_\_\_

Number of Acres under Contract (state range, if applicable): \_\_\_\_\_

Date Contract was executed \_\_\_\_\_

Term of Contract \_\_\_\_\_

\_\_\_\_\_  
 [signature]

[Authorized Signatory Name]

[Authorized Signatory Name], being first duly sworn, says that [he/she] has read the foregoing verification, and knows the contents thereof to be true to [his/her] actual knowledge.

Sworn and subscribed to before me this \_\_\_\_\_ day of \_\_\_\_\_, 201\_\_\_\_.

\_\_\_\_\_  
 [signature]

[Authorized Signatory Name]

[Title], [Developer Name]

\_\_\_\_\_  
 [Signature of Notary Public]

Notary Public

\_\_\_\_\_  
 Name of Notary Public [typewritten or printed]

My Commission expires \_\_\_\_\_



## ATTACHMENT 3

**Generating Facility Pre-Application Report Form****Preamble and Instructions**

An Interconnection Customer who requests a Pre-Application Report must submit this Pre-Application Report Request by hand delivery, mail, e-mail, or fax to the Utility along with the non-refundable fee of \$500-\$300.

**DISCLAIMER:** Be aware that this Pre-Application Report is simply a snapshot in time and is non-binding. System conditions can and do change frequently.

☐ Check here if payment is enclosed. Fee is required for application to be considered complete.

Date: \_\_\_\_\_

Interconnecting Customer Name (print): \_\_\_\_\_

Contact Person: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone (Daytime): \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Alternative Contact Information (e.g., system installation contractor or coordinating company) Name (print): \_\_\_\_\_

\_\_\_\_\_

Role: \_\_\_\_\_

\_\_\_\_\_

Contact Person: \_\_\_\_\_

\_\_\_\_\_

Mailing Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone (Daytime): \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

## Facility Information:

## 1) Proposed Facility Location

Address (or cross-roads): \_\_\_\_\_  
\_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

☐ Site Map provided (Google, MapQuest, etc.)☐ Grid Coordinates (decimal) - Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_  
\_\_\_\_\_☐ Pole or Tower number if available: \_\_\_\_\_

## 2) Primary Energy Source

Choose one:

Renewable	Non-Renewable
<input type="checkbox"/> 1. Solar Photovoltaic	<input type="checkbox"/> 17. Fossil Fuel Diesel
<input type="checkbox"/> 2. Solar thermal	<input type="checkbox"/> 18. Fossil Fuel Natural Gas (not waste)
<input type="checkbox"/> 3. Biomass landfill gas	<input type="checkbox"/> 19. Fossil Fuel Oil
<input type="checkbox"/> 4. Biomass manure digester gas	<input type="checkbox"/> 20. Fossil Fuel Coal
<input type="checkbox"/> 5. Biomass directed biogas	<input type="checkbox"/> 21. Fossil Fuel Other (specify below)
<input type="checkbox"/> 6. Biomass solid waste	<input type="checkbox"/> 22. Other (specify below)
<input type="checkbox"/> 7. Biomass sewage digester gas	
<input type="checkbox"/> 8. Biomass wood	
<input type="checkbox"/> 9. Biomass other (specify below)	
<input type="checkbox"/> 10. Hydro power run of river	
<input type="checkbox"/> 11. Hydro power storage	
<input type="checkbox"/> 12. Hydro power tidal	
<input type="checkbox"/> 13. Hydro power wave	
<input type="checkbox"/> 14. Wind	
<input type="checkbox"/> 15. Geothermal	
<input type="checkbox"/> 16. Other (specify below)	

## 3) Prime Mover

Choose one:

1. <input type="checkbox"/> Photovoltaic (PV)	5. <input type="checkbox"/> Steam Turbine
2. <input type="checkbox"/> Fuel Cell	6. <input type="checkbox"/> Micro-turbine
3. <input type="checkbox"/> Reciprocating Engine	7. <input type="checkbox"/> Other, including Combined Heat and Power (specify below)
4. <input type="checkbox"/> Gas Turbine	

(Refer to U.S. EIA Form 860 Instructions, Table 28 Energy Source Codes and Heat Content at [https://www.eia.gov/survey/form/eia\\_860/instructions.pdf](https://www.eia.gov/survey/form/eia_860/instructions.pdf))

<u>Fuel Type</u>	<u>Energy Source Code</u>	<u>Energy Source Description</u>

3) Prime Mover (Refer to U.S. EIA Form 860 Instructions, Table 2 Prime Mover Codes and Descriptions at [https://www.eia.gov/survey/form/eia\\_860/instructions.pdf](https://www.eia.gov/survey/form/eia_860/instructions.pdf))

Prime Mover Code \_\_\_\_\_

Prime Mover Description \_\_\_\_\_

4) Type of Generator

**Choose one:**

1. <input type="checkbox"/> Inverter-based Machine	
2. <input type="checkbox"/> Rotating Machine	
3. <input type="checkbox"/> Rotating Machine with Inverters	

5) Size: \_\_\_\_\_ kW<sub>AC</sub>

5) Generator/Storage Nameplate Capacity: kW

Maximum Generating Capacity requested: kW<sub>AC</sub>

Storage Nameplate Energy: kWh

6) Generator Configuration:

☐ Single-phase      ☐ Three Phase

## 7) Interconnection Configuration

☐ New Generation☐ Stand-alone☐ Addition to existing commercial or industrial customer's delivery

Customer's Electric Utility account number: \_\_\_\_\_

Customer's Electric meter number: \_\_\_\_\_

Is Customer's kW load going to increase or decrease?

☐ No☐ Yes, Details \_\_\_\_\_Proposed Point of Interconnection on Customer-side of Utility meter  
\_\_\_\_\_

\*\*\*OR\*\*\*

☐ Addition to existing generation☐ Stand-alone☐ Addition to existing commercial or industrial customer's delivery

Customer's Electric Utility account number: \_\_\_\_\_

Customer's Electric meter number: \_\_\_\_\_

Is Customer's kW load going to increase or decrease?

☐ No☐ Yes, Details \_\_\_\_\_

Type of Existing Generation: \_\_\_\_\_

Size of Existing Generation: \_\_\_\_\_ kW<sub>AC</sub>Proposed Point of Interconnection on Customer-side of Utility meter  
\_\_\_\_\_Additional Comments  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### **Certification Codes and Standards**

ANSI C84.1-1995 Electric Power Systems and Equipment – Voltage Ratings (60 Hertz)

IEEE 1547, Standard for Interconnecting Distributed Resources with Electric Power Systems (including –use of IEEE 1547.1 testing protocols to establish conformity)

IEEE Std 100-2000, IEEE Standard Dictionary of Electrical and Electronic Terms

IEEE Std 519-1992, IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems

IEEE Std C37.108-1989 (R2002), IEEE Guide for the Protection of Network Transformers

IEEE Std C37.90.1-1989 (R1994), IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems

IEEE Std C37.90.2 (1995), IEEE Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers

IEEE Std C57.12.44-2000, IEEE Standard Requirements for Secondary Network Protectors

IEEE Std C62.41.2-2002, IEEE Recommended Practice on Characterization of Surges in Low Voltage (1000V and Less) AC Power Circuits

IEEE Std C62.45-1992 (R2002), IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000V and Less) AC Power Circuits

NEMA MG 1-1998, Motors and Small Resources, Revision 3

NEMA MG 1-2003 (Rev 2004), Motors and Generators, Revision 1

NFPA 70 (2002), National Electrical Code

UL1741, Inverters, Converters, Controllers and Interconnection System\_Equipment for Use With Distributed Energy Resources

### **Certification of Generator Equipment Packages**

1.0 Generating Facility equipment proposed for use separately or packaged with other equipment in an interconnection system shall be considered certified for interconnected operation if (1) it has been tested in accordance with industry standards for continuous utility interactive operation in compliance with the appropriate codes and standards referenced below by any Nationally Recognized Testing Laboratory (NRTL) recognized by the United States Occupational Safety and Health Administration to test and certify interconnection equipment pursuant to the relevant codes and standards listed in Attachment 4 of the North Carolina Interconnection Procedures, (2) it has been labeled and is publicly listed by such NRTL at the time of the Interconnection Request, and (3) such NRTL makes readily available for verification all test standards and procedures it utilized in performing such equipment certification, and, with consumer approval, the test data itself. The NRTL may make such information available on its website and by encouraging such information to be included in the manufacturer's literature accompanying the equipment.

2.0 The Interconnection Customer must verify that the intended use of the equipment falls within the use or uses for which the equipment was tested, labeled, and listed by the NRTL.

3.0 Certified equipment shall not require further type-test review, testing, or additional equipment to meet the requirements of this interconnection procedure; however, nothing herein shall preclude the need for an on-site commissioning test by the Parties to the interconnection nor follow-up production testing by the NRTL.

4.0 If the certified equipment package includes only interface components (switchgear, inverters, or other interface devices), then an Interconnection Customer must show that the generator or other electric source being utilized with the equipment package is compatible with the equipment package and is consistent with the testing and listing specified for this type of interconnection equipment.

5.0 Provided the generator or electric source, when combined with the equipment package, is within the range of capabilities for which it was tested by the NRTL, and does not violate the interface components' labeling and listing performed by the NRTL, no further design review, testing or additional equipment on the Interconnection Customer's side of the point of common coupling shall be required to meet the requirements of the North Carolina Interconnection Procedures.

6.0 An equipment package does not include equipment provided by the Utility.

## Attachment 6

**Interconnection Request Application Form  
for Interconnecting a Certified Inverter-  
Based Generating Facility No Larger than  
20 kW**

This Interconnection Request Application Form is considered complete when it provides all applicable and correct information required below. Additional information to evaluate the Interconnection Request may be required.

**Processing Fee**

A non-refundable processing fee of ~~\$350~~ \$100 must accompany this Interconnection Request Application Form.

If the Interconnection Request is submitted solely due to a transfer of ownership of the Generating Facility, the non-refundable fee is ~~\$500~~ \$50.

**Interconnection Customer**

Name: \_\_\_\_\_

Primary Contact Person: \_\_\_\_\_

Title \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

County: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_

Secondary Contact Name: \_\_\_\_\_

Title: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

County: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_

Contact (if different than Interconnection Customer)

Name: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

County: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_

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Owner(s) of the Generating Facility: \_\_\_\_\_

Generating Facility Information

Facility Location (if different from above):

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

County: \_\_\_\_\_

Utility: \_\_\_\_\_

Account Number: \_\_\_\_\_

Inverter Manufacturer: \_\_\_\_\_ Model: \_\_\_\_\_

Nameplate Rating (each inverter): \_\_\_\_\_ kW<sub>(AC)</sub> (each inverter)\_\_\_\_\_ kVA<sub>(AC)</sub> (each inverter)\_\_\_\_\_ Volts<sub>(AC)</sub> (each inverter)

Single Phase: \_\_\_\_\_ Three Phase: \_\_\_\_\_

System Design Capacity<sup>1</sup>: \_\_\_\_\_ kW<sub>(AC)</sub> (system total)\_\_\_\_\_ kVA<sub>(AC)</sub> (system total)

For photovoltaic sources only:

Total panel capacity: \_\_\_\_\_ kW<sub>(DC)</sub> (system total)~~Maximum Generating Capacity requested~~ ~~Maximum Physical Export~~Capacity Requested:<sup>2</sup> (calculated)<sup>3</sup> kW<sub>(AC)</sub>

For other sources:

~~Maximum Physical Export Capacity Requested~~ ~~Maximum Generating~~Capacity requested:<sup>2</sup> \_\_\_\_\_ kW<sub>(AC)</sub>Prime Mover: ~~Photovoltaic~~ ☐ ~~Reciprocating Engine~~ ☐<sup>1</sup> Total inverter capacity.<sup>2</sup> At the Point of Interconnection, this is the maximum possible export power that could flow back to the utility. Unless special circumstances apply, load should not be subtracted from the System Design Capacity.<sup>3</sup> For a photovoltaic installation, the utility will calculate this value as the lesser of (1) the total kW inverter capacity and (2) the total kW panel capacity (no DC to AC losses included, for simplicity).

Fuel Cell ☐

Turbine ☐

Other ☐

## ENERGY SOURCE TABLE

Renewable	Non-Renewable
<del>H 1. Solar — Photovoltaic</del>	<del>H 17. Fossil Fuel — Diesel</del>
<del>H 2. Solar — thermal</del>	<del>H 18. Fossil Fuel — Natural Gas (not waste)</del>
<del>H 3. Biomass — landfill gas</del>	<del>H 19. Fossil Fuel — Oil</del>
<del>H 4. Biomass — manure digester gas</del>	<del>H 20. Fossil Fuel — Coal</del>
<del>H 5. Biomass — directed biogas</del>	<del>H 21. Fossil Fuel — Other (specify below)</del>
<del>H 6. Biomass — solid waste</del>	<del>H 22. Other (specify below)</del>
<del>H 7. Biomass — sewage digester gas</del>	
<del>H 8. Biomass — wood</del>	
<del>H 9. Biomass — other (specify below)</del>	
<del>H 10. Hydro power — run of river</del>	
<del>H 11. Hydro power — storage</del>	
<del>H 12. Hydro power — tidal</del>	
<del>H 13. Hydro power — wave</del>	
<del>H 14. Wind</del>	
<del>H 15. Geothermal</del>	
<del>H 16. Other (specify below)</del>	

Energy Source: \_\_\_\_\_ (choose from list above)

Prime Mover Information (Refer to U.S. EIA Form 860 Instructions, Table 2 Prime Mover Codes and Descriptions at [https://www.eia.gov/survey/form/eia\\_860/instructions.pdf](https://www.eia.gov/survey/form/eia_860/instructions.pdf))

Prime Mover Code \_\_\_\_\_

Prime Mover Description \_\_\_\_\_

Energy Source Information (Refer to U.S. EIA Form 860 Instructions, Table 28 Energy Source Codes and Heat Content at [https://www.eia.gov/survey/form/eia\\_860/instructions.pdf](https://www.eia.gov/survey/form/eia_860/instructions.pdf))

Fuel Type	Energy Source Code	Energy Source Description

Is the equipment UL 1741 Listed? Yes \_\_\_\_ No \_\_\_\_

If Yes, attach manufacturer's cut-sheet showing UL 1741 listing

Estimated Installation Date: \_\_\_\_\_ Estimated In-Service Date: \_\_\_\_\_

The 20 kW Inverter Process is available only for inverter-based Generating Facilities no larger than 20 kW that meet the codes, standards, and certification requirements of Attachments 3 and 4 of the North Carolina Interconnection Procedures, or the Utility has reviewed the design or tested the proposed Generating Facility and is satisfied that it is safe to operate.

List components of the Generating Facility equipment package that are currently certified:

Number	Equipment Type	Certifying Entity
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____

Interconnection Customer Signature

I hereby certify that, to the best of my knowledge, the information provided in this Interconnection Request Application Form is true. I agree to abide by the Terms and Conditions for Interconnecting a Certified Inverter-Based Generating Facility No Larger than 20 kW and return the Certificate of Completion when the Generating Facility has been installed.

Signed: \_\_\_\_\_:

Full Name \_\_\_\_\_

Company Name \_\_\_\_\_

Title With Company \_\_\_\_\_

E-Mail Address \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

County: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_

Contingent Approval to Interconnect the Generating Facility (For Utility use only)

Interconnection of the Generating Facility is approved contingent upon the Terms and Conditions for Interconnecting a Certified Inverter-Based Generating Facility No Larger than 20 kW and return of the Certificate of Completion.

Utility Signature: \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_

Interconnection Request ID number: \_\_\_\_\_

Utility waives inspection/witness test? Yes \_\_\_\_ No \_\_\_\_

-----

OFFICIAL COPY  
OFFICIAL COPY

Nov 19 2018  
Feb 13 2019

**Certificate of Completion  
for Interconnecting a Certified Inverter-Based  
Generating Facility No Larger than 20 kW**

Is the Generating Facility owner-installed? Yes \_\_\_\_\_ No \_\_\_\_\_

Interconnection Customer

Name: \_\_\_\_\_

Contact Person: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

County: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_

Location of the Generating Facility (if different from above)

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Electrician

Name: \_\_\_\_\_

Company: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

County: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_

License Number: \_\_\_\_\_

Date Approval to Install Generating Facility granted by the Utility: \_\_\_\_\_

Interconnection Request ID Number: \_\_\_\_\_

Inspection:

The Generating Facility has been installed and inspected in compliance with the local building/electrical code of \_\_\_\_\_

Signed (Local electrical wiring inspector, or attach signed electrical inspection):

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_ Date: \_\_\_\_\_

As a condition of interconnection, you are required to send/ email/ fax a copy of this form along with a copy of the signed electrical permit to (insert Utility information below):

Utility Name: \_\_\_\_\_

Attention: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Fax: \_\_\_\_\_

Approval to Energize the Generating Facility (For Utility use only)

Energizing the Generating Facility is approved contingent upon the Terms and Conditions for Interconnecting a Certified Inverter-Based Generating Facility No Larger than 20 kW.

Utility Signature: \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_



**Terms and Conditions  
for Interconnecting a Certified Inverter-Based  
Generating Facility No Larger than 20 kW**

**1.0 Construction of the Facility**

The Interconnection Customer (Customer) may proceed to construct (including operational testing not to exceed two hours) the Generating Facility when the Utility approves the Interconnection Request and returns it to the Customer.

**2.0 Interconnection and Operation**

The Customer may interconnect the Generating Facility with the Utility's System and operate in parallel with the Utility's System once all of the following have occurred:

2.1 Upon completing construction, the Customer will cause the Generating Facility to be inspected or otherwise certified by the appropriate local electrical wiring inspector with jurisdiction, and

2.2 The Customer returns the Certificate of Completion to the Utility, and

2.3 The Utility has either:

2.3.1 Completed its inspection of the Generating Facility to ensure that all equipment has been appropriately installed and that all electrical connections have been made in accordance with applicable codes. All inspections must be conducted by the Utility, at its own expense, within ten Business Days after receipt of the Certificate of Completion and shall take place at a time agreeable to the Parties. The Utility shall provide a written statement that the Generating Facility has passed inspection or shall notify the Customer of what steps it must take to pass inspection as soon as practicable after the inspection takes place; or

2.3.2 If the Utility does not schedule an inspection of the Generating Facility within ten Business Days after receiving the Certificate of Completion, the witness test is deemed waived (unless the Parties agree otherwise); or

2.3.3 The Utility waives the right to inspect the Generating Facility.

2.4 The Utility has the right to disconnect the Generating Facility in the event of improper installation or failure to return the Certificate of Completion.

2.5 Revenue quality metering equipment must be installed and tested in accordance with applicable American National Standards Institute (ANSI) standards and all applicable regulatory requirements.

### 3.0 Safe Operations and Maintenance

The Customer shall be fully responsible to operate, maintain, and repair the Generating Facility as required to ensure that it complies at all times with the interconnection standards to which it has been certified.

The Customer shall not operate the Generating Facility in such a way that the Generating Facility would exceed the Maximum Generating Capacity.

### 4.0 Access

The Utility shall have access to the disconnect switch (if a disconnect switch is required) and metering equipment of the Generating Facility at all times. The Utility shall provide reasonable notice to the Customer, when possible, prior to using its right of access.

### 5.0 Disconnection

The Utility may temporarily disconnect the Generating Facility upon the following conditions:

5.1 For scheduled outages upon reasonable notice.

5.2 For unscheduled outages or emergency conditions.

5.3 If the Generating Facility does not operate in a manner consistent with these Terms and Conditions.

5.4 The Utility shall inform the Customer in advance of any scheduled disconnection, or as soon as is reasonable after an unscheduled disconnection.

### 6.0 Indemnification

The Parties shall at all times indemnify, defend, and save the other Party harmless from, any and all damages, losses, claims, including claims and actions relating to injury to or death of any person or damage to property,

demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the other Party's action or inactions of its obligations hereunder on behalf of the indemnifying Party, except in cases of gross negligence or intentional wrongdoing by the indemnified Party.

#### 7.0 Insurance

All insurance policies must be maintained with insurers authorized to do business in North Carolina. The Parties agree to the following insurance requirements:

- 7.1 If the Customer is a residential customer of the Utility, the required coverage shall be a standard homeowner's insurance policy with liability coverage in the amount of at least \$100,000 per occurrence.
- 7.2 For an Interconnection Customer that is a non-residential customer of the Utility proposing to interconnect a Generating Facility no larger than 250 kW, the required coverage shall be comprehensive general liability insurance with coverage in the amount of at least \$300,000 per occurrence.
- 7.3 The Customer may provide this insurance via a self-insurance program if it has a self-insurance program established in accordance with commercially acceptable risk management practices.

#### 8.0 Limitation of Liability

Each Party's liability to the other Party for any loss, cost, claim, injury, or expense, including reasonable attorney's fees, relating to or arising from any act or omission hereunder, shall be limited to the amount of direct damage actually incurred. In no event shall either Party be liable to the other Party for any indirect, special, incidental, consequential, or punitive damages of any kind.

#### 9.0 Termination

The agreement to interconnect and operate in parallel may be terminated under the following conditions:

##### 9.1 By the Customer

By providing written notice to the Utility and physically and permanently disconnecting the Generating Facility.

9.2 By the Utility

If the Generating Facility fails to operate for any consecutive 12-month period or the Customer fails to remedy a violation of these Terms and Conditions.

9.3 Permanent Disconnection

In the event this Agreement is terminated, the Utility shall have the right to disconnect its facilities or direct the Customer to disconnect its Generating Facility.

9.4 Survival Rights

This Agreement shall continue in effect after termination to the extent necessary to allow or require either Party to fulfill rights or obligations that arose under the Agreement.

10.0 Assignment/Transfer of Ownership of the Facility

10.1 This Agreement shall not survive the transfer of ownership of the Generating Facility to a new owner.

10.2 The new owner must complete and submit a new Interconnection Request agreeing to abide by these Terms and Conditions for interconnection and parallel operations within 20 Business Days of the transfer of ownership. The Utility shall acknowledge receipt and return a signed copy of the Interconnection Request Application Form within ten Business Days.

10.3 The Utility shall not study or inspect the Generating Facility unless the new owner's Interconnection Request Application Form indicates that a Material Modification has occurred or is proposed.

## ATTACHMENT 7

**System Impact Study Agreement**

**THIS AGREEMENT** ("Agreement") is made and entered into this \_\_\_\_ day of 20\_\_ by \_\_\_\_ and between \_\_\_\_\_, a \_\_\_\_\_ organized and existing under the laws of the State of \_\_\_\_\_, ("Interconnection Customer,") and \_\_\_\_\_, a \_\_\_\_\_ existing under the laws of the State of \_\_\_\_\_, ("Utility"). The Interconnection Customer and the Utility each may be referred to as a "Party," or collectively as the "Parties."

**RECITALS**

**WHEREAS**, the Interconnection Customer is proposing to develop a Generating Facility or generating capacity addition to an existing Generating Facility consistent with the Interconnection Request completed by the Interconnection Customer, Dated \_\_\_\_\_ and received by the Utility on \_\_\_\_\_; and

**WHEREAS**, the Interconnection Customer desires to interconnect the Generating Facility with the Utility's System; and

**WHEREAS**, the Interconnection Customer has requested the Utility to perform a system impact study to assess the impact of interconnecting the Generating Facility with the Utility's System, and of any Affected Systems;

**NOW, THEREFORE**, in consideration of and subject to the mutual covenants contained herein the Parties agree as follows:

1. When used in this Agreement, with initial capitalization, the terms specified shall have the meanings indicated or the meanings specified in the North Carolina Interconnection Procedures.
2. The Interconnection Customer elects and the Utility shall cause to be performed a system impact study consistent with the North Carolina Interconnection Procedures.
3. The scope of the system impact study shall be subject to the assumptions set forth in Appendix A to this Agreement.
4. A system impact study will be based upon the technical information provided by Interconnection Customer in the Interconnection Request. The Utility reserves the right to request additional technical information from the Interconnection Customer as may reasonably become necessary consistent with Good Utility Practice during the course of

the system impact study. If the information requested by the Utility is not provided by the Interconnection Customer within a reasonable timeframe to be identified by the Utility in writing, the Utility shall provide the Interconnection Customer written notice providing an opportunity to cure such failure by the close of business on the tenth (10<sup>th</sup>) Business Day following the posted date of such notice, where failure to provide the information requested within this period shall result in the study being terminated and the Interconnection Request being deemed withdrawn. If the Interconnection Customer modifies its Interconnection Request or the technical information provided therein is modified, the time to complete the system impact study may be extended. The period of time for the Utility to complete the Ssystem ilmpact Sstudy shall be tolled during any period that the Utility has requested information in writing from the Interconnection Customer necessary to complete the Sstudy and such request is outstanding.

5. In performing the study, the Utility shall rely, to the extent reasonably practicable, on existing studies of recent vintage. The Interconnection Customer shall not be charged for such existing studies; however, the Interconnection Customer shall be responsible for charges associated with any new study or modifications to existing studies that are reasonably necessary to perform the Ssystem ilmpact feasibility Sstudy.
6. The System Impact Study Report shall provide the following analyses for the purpose of identifying any potential adverse system impacts that would result from the interconnection of the Generating Facility as proposed:
  - 6.1. Initial identification of any circuit breaker short circuit capability limits exceeded as a result of the interconnection, considering the Nameplate Capacity of the Generating Facility;
  - 6.2. Initial identification of any thermal overload or voltage limit violations resulting from the interconnection, considering the Maximum Generating Capacity of the Generating Facility;
  - 6.3. Initial review of grounding requirements and electric system protection
7. The System Impact Study shall model the impact of the Generating Facility regardless of purpose in order to avoid the further expense and interruption of operation for reexamination of feasibility and impacts if the Interconnection Customer later changes the purpose for which the Generating Facility is being installed.
8. The study shall include the feasibility of any interconnection at a proposed project site where there could be multiple potential Points of

Interconnection, as requested by the Interconnection Customer and at the Interconnection Customer's cost.

9. A System Impact Study shall consist of a short circuit analysis, a stability analysis, a power flow analysis, voltage drop and flicker studies, protection and set point coordination studies, and grounding reviews, as necessary.
10. The System Impact Study will also include an analysis of distribution and transmission impacts as may be necessary to understand the impact of the proposed Generation Facility on electric system operation.
11. A System Impact Study shall state the assumptions upon which it is based, state the results of the analyses, and provide the requirement or potential impediments to providing the requested interconnection service.
12. The System Impact Study will provide the Preliminary Estimated Upgrade Charge, which is a preliminary indication of the cost and length of time that would be necessary to correct any System problems identified in those analyses and implement the interconnection.
13. The System Impact Study will provide the Preliminary Estimated Interconnection Facilities Charge, which is a preliminary indication of the cost and length of time that would be necessary to provide the Interconnection Facilities.
- ~~14. A system impact study shall provide the information outlined in Section 1.3.2 of the Interconnection Procedures.~~
- ~~145.~~ A distribution System system impact impact Study shall incorporate a distribution load flow study, an analysis of equipment interrupting ratings, protection coordination study, voltage drop and flicker studies, protection and set point coordination studies, grounding reviews, and the impact on electric system operation, as necessary.
- ~~156.~~ Affected Systems may participate in the preparation of a System Impact Study, with a division of costs among such entities as they may agree. All Affected Systems shall be afforded an opportunity to review and comment upon a System Impact Study that covers potential adverse system impacts on their electric systems, and the Utility has 20 additional Business Days to complete a system impact study requiring review by Affected Systems.
- ~~167.~~ The Utility shall have an additional 15 Business Days from the time set forth in Section 19.0 the System Impact Study Agreement to complete the dual scenario System Impact Study reports for a Project B.



**178.** If the Utility uses a queuing procedure for sorting or prioritizing projects and their associated cost responsibilities for any required Network Upgrades, the System Impact Study shall consider all generating facilities (and with respect to paragraph 18.3 below, any identified Upgrades associated with such interconnection with a lower Queue Number) that, on the date the system impact study is commenced –

**178.1.** Are directly interconnected with the Utility's electric system; or

**178.2.** Are interconnected with Affected Systems and may have an impact on the proposed interconnection; and

**178.3.** Have a pending Interconnection Request to interconnect with the Utility's electric system with a lower Queue Number.

**1849.** The System Impact Study shall be completed within a total of 65 Business Days if transmission system impacts are studied, and 50 Business Days if distribution system impacts are studied, but in any case, shall not take longer than a total of 65 Business Days unless the study involves Affected Systems per Section 16.0 or the studied Interconnection Request is a Project B per Section 17.0 or the System Impact Study is a Grouping Study implemented pursuant to Section 4.3.4 of the Interconnection Procedures, which shall be completed during the timeframe of the Competitive Resource Solicitation. The period of time for the Utility to complete the System Impact Study shall be tolled during any period that the Utility has requested information in writing from the Interconnection Customer necessary to complete the Study and such request is outstanding.

**1920.** Any study fees shall be based on the Utility's actual costs and will be deducted from the Interconnection Facilities deposit made by the Interconnection Customer at the time of the Interconnection Request. After the study is completed, the Utility shall deliver a summary of costs incurred. ~~professional time.~~

**240.** The Interconnection Customer must pay any study costs that exceed the Interconnection Request Deposit without interest within 20 Business Days of receipt of the invoice. If the deposit exceeds the invoiced fees or the Interconnection Customer's costs exceed the aggregate deposits received and the Interconnection Customer withdraws the Interconnection Request, the amount of funds equal to the difference will be settled in accordance with Section 6.3 of the NC Interconnection ~~interconnection~~ Standard.

**212.** Governing Law, Regulatory Authority, and Rules

The validity, interpretation and enforcement of this Agreement and each of its provisions shall be governed by the laws of the State of North



Carolina, without regard to its conflicts of law principles. This Agreement is subject to all Applicable Laws and Regulations. Each Party expressly reserves the right to seek changes in, appeal, or otherwise contest any laws, orders, or regulations of a Governmental Authority.

**223. Amendment**

The Parties may amend this Agreement by a written instrument duly executed by both Parties.

**234. No Third-Party Beneficiaries**

This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest and where permitted, their assigns.

**245. Waiver**

**245.1.** The failure of a Party to this Agreement to insist, on any occasion, upon strict performance of any provision of this Agreement will not be considered a waiver of any obligation, right, or duty of, or imposed upon, such Party.

**245.2.** Any waiver at any time by either Party of its rights with respect to this Agreement shall not be deemed a continuing waiver or a waiver with respect to any other failure to comply with any other obligation, right, duty of this Agreement. Termination or default of this Agreement for any reason by Interconnection Customer shall not constitute a waiver of the Interconnection Customer's legal rights to obtain an interconnection from the Utility. Any waiver of this Agreement shall, if requested, be provided in writing.

**256. Multiple Counterparts**

This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

**267. No Partnership**

This Agreement shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership between the Parties or to impose any partnership obligation or partnership liability upon either Party. Neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party.

**287. Severability**

If any provision or portion of this Agreement shall for any reason be held or adjudged to be invalid or illegal or unenforceable by any court of competent jurisdiction or other Governmental Authority, (1) such portion or provision shall be deemed separate and independent, (2) the Parties shall negotiate in good faith to restore insofar as practicable the benefits to each Party that were affected by such ruling, and (3) the remainder of this Agreement shall remain in full force and effect.

**289. Subcontractors**

Nothing in this Agreement shall prevent a Party from utilizing the services of any subcontractor as it deems appropriate to perform its obligations under this Agreement; provided, however, that each Party shall require its subcontractors to comply with all applicable terms and conditions of this Agreement –in providing such services and each Party shall remain primarily liable to the other Party for the performance of such subcontractor.

**298.1.** The creation of any subcontract relationship shall not relieve the hiring Party of any of its obligations under this Agreement. The hiring Party shall be fully responsible to the other Party for the acts or omissions of any subcontractor the hiring Party hires as if no subcontract had been made; provided, however, that in no event shall the Utility be liable for the actions or inactions of the Interconnection Customer or its subcontractors with respect to obligations of the Interconnection Customer under this Agreement. Any applicable obligation imposed by this Agreement upon the hiring Party shall be equally binding upon, and shall be construed as having application to, any subcontractor of such Party.

**298.2.** The obligations under this article will not be limited in any way by any limitation of subcontractor's insurance.

**2930. Reservation of Rights**

The Utility shall have the right to make a unilateral filing with the Commission to modify this Agreement with respect to any rates, terms and conditions, charges, or classifications of service, and the Interconnection Customer shall have the right to make a unilateral filing with the Commission to modify this Agreement; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before the Commission in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties except to the extent that the Parties otherwise agree as provided herein.

**IN WITNESS WHEREOF**, the Parties have caused this Agreement to be duly executed by their duly authorized officers or agents on the day and year first above written.

[Insert name of Utility]

[Insert name of Interconnection Customer]

\_\_\_\_\_  
Signed \_\_\_\_\_

\_\_\_\_\_  
Signed \_\_\_\_\_

Name (Printed):

Name (Printed):

\_\_\_\_\_  
Title \_\_\_\_\_

\_\_\_\_\_  
Title \_\_\_\_\_

### **Assumptions Used in Conducting the System Impact Study**

The system impact study shall be based upon the Interconnection Request subject to any modifications in accordance with the Interconnection Procedures, and the following assumptions:

1) Designation of Point of Interconnection and configuration to be studied (to be completed by the Interconnection Customer and the Utility).

~~2) Designation of alternative Points of Interconnection and configuration.~~

~~1) and 2) are to be completed by the Interconnection Customer. Other assumptions (listed below) are to be provided by the Interconnection Customer and the Utility.~~

## Facilities Study Agreement

**THIS AGREEMENT** ("Agreement") is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ by and between \_\_\_\_\_, a \_\_\_\_\_ organized and existing under the laws of the State of \_\_\_\_\_, ("Interconnection Customer,") and, \_\_\_\_\_, a \_\_\_\_\_ existing under the laws of the State of \_\_\_\_\_, ("Utility"). The Interconnection Customer and the Utility each may be referred to as a "Party," or collectively as the "Parties."

### RECITALS

**WHEREAS**, the Interconnection Customer is proposing to develop a Generating Facility or generating capacity in addition to an existing Generating Facility consistent with the Interconnection Request Application Form completed by the Interconnection Customer, dated \_\_\_\_\_ and received by the Utility on \_\_\_\_\_; and the single-line drawing provided by the Interconnection Customer, dated \_\_\_\_\_ and received by the Utility on \_\_\_\_\_ and

**WHEREAS**, the Interconnection Customer desires to interconnect the Generating Facility with the Utility's System; and

**WHEREAS**, the Utility has completed a System Impact Study and provided the results of said study to the Interconnection Customer (this recital to be omitted if the Parties have agreed to forego the system impact study); and

**WHEREAS**, the Interconnection Customer has requested the Utility to perform a Facilities Study to specify and estimate the cost of the equipment, engineering, procurement and construction work needed to implement the conclusions of the system impact study and/or any other relevant studies in accordance with Good Utility Practice to physically and electrically connect the Generating Facility with the Utility's System;

**NOW, THEREFORE**, in consideration of and subject to the mutual covenants contained herein the Parties agree as follows:

1. When used in this Agreement, with initial capitalization, the terms specified shall have the meanings indicated or the meanings specified in the North Carolina Interconnection Procedures.
2. The Interconnection Customer elects and the Utility shall cause to be performed a facilities study consistent with the North Carolina Interconnection Procedures.
3. The scope of the facilities study shall be subject to data provided in Appendix A to this Agreement.

- DENC Exhibit MJN-1
4. The facilities study shall specify and estimate the cost of the equipment, engineering, procurement and construction work (including overheads) needed to implement the conclusions of the system impact studies. The facilities study shall also identify (1) the electrical switching configuration of the equipment, including, without limitation, transformer, switchgear, meters, and other station equipment, (2) the nature and estimated cost of the Utility's Interconnection Facilities and Upgrades necessary to accomplish the interconnection, and (3) an estimate of the construction time required to complete the installation of such facilities.

If the study is for a Project B, the study shall assume the interdependent Project A is interconnected.

5. The Utility may propose to group facilities required for more than one Interconnection Customer in order to minimize facilities costs through economies of scale, but any Interconnection Customer may require the installation of facilities required for its own Generating Facility if it is willing to pay the costs of those facilities
6. A deposit of the good faith estimated facilities study cost is required from the Interconnection Customer. If the unexpended portion of the Interconnection Request deposit made for the Interconnection Request exceeds the estimated cost of the facilities study, no payment will be required of the Interconnection Customer.
7. In cases where Upgrades are required, the facilities study must be completed within 45 Business Days of the Utility's receipt of this Agreement, or completion of the Facilities Study for an Interdependent Project A whichever is later. In cases where no Upgrades are necessary, and the required facilities are limited to Interconnection Facilities, the facilities study must be completed within 30 Business Days. The Utility reserves the right to request additional technical information from the Interconnection Customer as may reasonably become necessary consistent with Good Utility Practice during the course of the facilities study. If the information requested by the Utility is not provided by the Interconnection Customer within a reasonable timeframe to be identified by the Utility in writing, the Utility shall provide the Interconnection Customer written notice providing an opportunity to cure such failure by the close of business on the tenth (10<sup>th</sup>) Business Day following the posted date of such notice, where failure to provide the information requested within this period shall result in the study being terminated and the Interconnection Request being deemed withdrawn.—The period of time for the Utility to complete the Facilities Study shall be tolled during any period that the Utility has requested information in writing from the Interconnection Customer necessary to complete the Study and such request is outstanding.
8. Once the facilities study is completed, a facilities study report shall be prepared and transmitted to the Interconnection Customer.
9. Any study fees shall be based on the Utility's actual costs and will be deducted from the Interconnection Request deposit made by the Interconnection

Customer at the time of the Interconnection Request. After the study is completed the Utility shall deliver a summary of costs incurred ~~professional time.~~

10. The Interconnection Customer must pay any study costs that exceed the Interconnection Request deposit without interest within 20 Business Days of receipt of the invoice. If the unexpended portion of the Interconnection Request deposit exceeds the invoiced fees and the Interconnection Customer withdraws the Interconnection Request, the Utility shall make refund to the Customer pursuant to Section 6.3 of the North Carolina Interconnection Procedures.

~~10.11.~~ If the Interconnection Customer submitted prepayment or Financial Security reasonably acceptable to the Utility for Network Upgrades under Section 4.3.9 of the North Carolina Interconnection Procedures, the Parties agree that this prepayment or Financial Security shall be held by the Utility as a non-refundable prepayment for the estimated cost of Network Upgrades and Interconnection Customer expressly agrees this prepayment amount shall be forfeited to the Utility to construct the Network Upgrades if the Interconnection Request is subsequently withdrawn. The Network Upgrades prepayment amount shall be trued up by the Utility in the Detailed Estimated Upgrade Charges amount calculated during Facilities Study and identified in a Facilities Study Report to be included in a future Interconnection Agreement.

#### 11.12. Governing Law, Regulatory Authority, and Rules

The validity, interpretation and enforcement of this Agreement and each of its provisions shall be governed by the laws of the State of North Carolina, without regard to its conflicts of law principles. This Agreement is subject to all Applicable Laws and Regulations. Each Party expressly reserves the right to seek changes in, appeal, or otherwise contest any laws, orders, or regulations of a Governmental Authority.

#### 12.13. Amendment

The Parties may amend this Agreement by a written instrument duly executed by both Parties.

#### 13.14. No Third-Party Beneficiaries

This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest and where permitted, their assigns.

#### 14.15. Waiver

The failure of a Party to this Agreement to insist, on any occasion, upon strict performance of any provision of this Agreement will not be considered a waiver of any obligation, right, or duty of, or imposed upon, such Party.

Any waiver at any time by either Party of its rights with respect to this Agreement shall not be deemed a continuing waiver or a waiver with respect to any other failure to comply with any other obligation, right, duty of this Agreement. Termination or default of this Agreement for any reason by Interconnection Customer shall not constitute a waiver of the Interconnection Customer's legal rights to obtain an interconnection from the Utility. Any waiver of this Agreement shall, if requested, be provided in writing.

#### 15-16. Multiple Counterparts

This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

#### 16-17. No Partnership

This Agreement shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership between the Parties or to impose any partnership obligation or partnership liability upon either Party. Neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party.

#### 17-18. Severability

If any provision or portion of this Agreement shall for any reason be held or adjudged to be invalid or illegal or unenforceable by any court of competent jurisdiction or other Governmental Authority, (1) such portion or provision shall be deemed separate and independent, (2) the Parties shall negotiate in good faith to restore insofar as practicable the benefits to each Party that were affected by such ruling, and (3) the remainder of this Agreement shall remain in full force and effect.

#### 18-19. Subcontractors

Nothing in this Agreement shall prevent a Party from utilizing the services of any subcontractor as it deems appropriate to perform its obligations under this Agreement; provided, however, that each Party shall require its subcontractors to comply with all applicable terms and conditions of this Agreement in providing such services and each Party shall remain primarily liable to the other Party for the performance of such subcontractor.

The creation of any subcontract relationship shall not relieve the hiring Party of any of its obligations under this Agreement. The hiring Party shall be fully responsible to the other Party for the acts or omissions of any subcontractor the hiring Party hires as if no subcontract had been made; provided, however, that in no event shall the Utility be liable for the actions or inactions of the



DENC Exhibit MJN-1  
Interconnection Customer or its subcontractors with respect to obligations of the Interconnection Customer under this Agreement. Any applicable obligation imposed by this Agreement upon the hiring Party shall be equally binding upon, and shall be construed as having application to, any subcontractor of such Party.

The obligations under this article will not be limited in any way by any limitation of subcontractor's insurance.

49-20. Reservation of Rights

The Utility shall have the right to make a unilateral filing with the Commission to modify this Agreement with respect to any rates, terms and conditions, charges, or classifications of service, and the Interconnection Customer shall have the right to make a unilateral filing with the Commission to modify this Agreement; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before the Commission in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties except to the extent that the Parties otherwise agree as provided herein.

**IN WITNESS WHEREOF**, the Parties have caused this Agreement to be duly executed by their duly authorized officers or agents on the day and year first above written.

For the Utility

Name: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date \_\_\_\_\_

For the Interconnection Customer

Name: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date \_\_\_\_\_

Facilities Study Agreement  
Appendix A

**Data to Be Provided by the Interconnection Customer with the Facilities  
Study Agreement**

Provide location plan and simplified one-line diagram of the plant and station facilities. For staged projects, please indicate future generation, circuits, etc.

On the one-line diagram, indicate the Maximum Generating Capacity generation capacity attached at each metering location. (Maximum load on CT/PT)

On the one-line diagram, indicate the location of auxiliary power. (Minimum load on CT/PT) Amps

One set of metering is required for each generation connection to the new ring bus or existing Utility station. Number of generation connections: \_\_\_\_\_

Will an alternate source of auxiliary power be available during CT/PT maintenance?

Yes \_\_\_\_\_ No \_\_\_\_\_

Will a transfer bus on the generation side of the metering require that each meter set be designed for the total plant generation? Yes \_\_\_\_\_ No \_\_\_\_\_

(Please indicate on the one-line diagram).

What type of control system or PLC will be located at the Generating Facility?

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

What protocol does the control system or PLC use?

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

Please provide a 7.5-minute quadrangle map of the site. Indicate the plant, station, distribution line, and property lines.

Physical dimensions of the proposed interconnection station:

\_\_\_\_\_

Bus length from generation to interconnection station:

\_\_\_\_\_

Line length from interconnection station to Utility's System.

\_\_\_\_\_

Tower number observed in the field (Painted on tower leg)\*:

\_\_\_\_\_

Number of third party easements required for lines\*:

\_\_\_\_\_

\* To be completed in coordination with Utility.

Is the Generating Facility located in Utility's service area?

Yes \_\_\_\_\_ No \_\_\_\_\_ If No, please provide name of local provider:

\_\_\_\_\_

Please provide the following proposed schedule dates:

Begin Construction Date: \_\_\_\_\_

Generator step-up transformers  
receive back feed power Date: \_\_\_\_\_

Generation Testing Date: \_\_\_\_\_

Commercial Operation Date: \_\_\_\_\_

ATTACHMENT Attachment 9

**NORTH CAROLINA**  
**INTERCONNECTION AGREEMENT**  
**For State-Jurisdictional Generator Interconnections**

Effective XX/XX/XXXX ~~May 15, 2015~~

Docket No. E-100, Sub 101

Between

Utility Name

And

Customer Name

"Project Name"

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This Interconnection Agreement ("Agreement") is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_, by \_\_\_\_\_ ("Utility"), and \_\_\_\_\_ ("Interconnection Customer") each hereinafter sometimes referred to individually as "Party" or both referred to collectively as the "Parties."

**Utility Information**

Utility: \_\_\_\_\_

Attention: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

**Interconnection Customer Information**

Name: \_\_\_\_\_

Project Name: \_\_\_\_\_

Attention: \_\_\_\_\_

E911 Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

County: \_\_\_\_\_

In consideration of the mutual covenants set forth herein, the Parties agree as follows:

## **Article 1. Scope and Limitations of Agreement**

### **1.1 Applicability**

This Agreement shall be used for all Interconnection Requests submitted under the North Carolina Interconnection Procedures except for those submitted under the 20 kW Inverter Process in Section 2 of the Interconnection Procedures.

### **1.2 Purpose**

~~If an Interim Interconnection Agreement, t~~This Agreement documents the Utility's ability to interconnect the Generating Facility and provides the Preliminary Estimated Interconnection Facilities Charge and the Preliminary Estimated System Upgrade Charge that was developed in the System Impact Study. Milestones have not been established and the Utility offers no estimate on when the required facilities might be installed.

~~If a Final Interconnection Agreement~~Interconnection Agreement, tThis Agreement governs the terms and conditions under which the Interconnection Customer's Generating Facility will interconnect with, and operate in parallel with, the Utility's System.

### **1.3 No Agreement to Purchase or Deliver Power or RECs**

This Agreement does not constitute an agreement to purchase or deliver the Interconnection Customer's power or Renewable Energy Certificates (RECs). The purchase or delivery of power, RECs that might result from the operation of the Generating Facility, and other services that the Interconnection Customer may require will be covered under separate agreements, if any. The Interconnection Customer will be responsible for separately making all necessary arrangements (including scheduling) for delivery of electricity with the applicable Utility.

### **1.4 Limitations**

Nothing in this Agreement is intended to affect any other agreement between the Utility and the Interconnection Customer.

### **1.5 Responsibilities of the Parties**

1.5.1 The Parties shall perform all obligations of this Agreement in accordance with all Applicable Laws and Regulations, Operating Requirements, and Good Utility Practice.

1.5.2 The Interconnection Customer shall construct, interconnect, operate and



maintain its Generating Facility and construct, operate, and maintain its Interconnection Facilities in accordance with the applicable manufacturer's recommended maintenance schedule, and in accordance with this Agreement, and with Good Utility Practice.

- 1.5.3 The Utility shall construct, operate, and maintain its System and Interconnection Facilities in accordance with this Agreement, and with Good Utility Practice.
- 1.5.4 The Interconnection Customer agrees to construct its facilities or systems in accordance with applicable specifications that meet or exceed those provided by the National Electrical Safety Code, the American National Standards Institute, IEEE, Underwriters' Laboratories,<sup>i</sup> and Operating Requirements in effect at the time of construction and other applicable national and state codes and standards. The Interconnection Customer agrees to design, install, maintain, and operate its Generating Facility so as to reasonably minimize the likelihood of a disturbance adversely affecting or impairing the System or equipment of the Utility and any Affected Systems.
- 1.5.5 Each Party shall operate, maintain, repair, and inspect, and shall be fully responsible for the facilities that it now or subsequently may own unless otherwise specified in the Appendices to this Agreement. Each Party shall be responsible for the safe installation, maintenance, repair and condition of their respective lines and appurtenances on their respective sides of the point of change of ownership. The Utility and the Interconnection Customer, as appropriate, shall provide Interconnection Facilities that adequately protect the Utility's System, personnel, and other persons from damage and injury. The allocation of responsibility for the design, installation, operation, maintenance and ownership of Interconnection Facilities shall be delineated in the Appendices to this Agreement.
- 1.5.6 The Utility shall coordinate with all Affected Systems to support the interconnection.
- 1.5.7 The Customer shall not operate the Generating Facility in such a way that the Generating Facility would exceed the Maximum Generating Capacity.

#### 1.6 Parallel Operation Obligations

Once the Generating Facility has been authorized to commence parallel operation, the Interconnection Customer shall abide by all rules and procedures pertaining to the parallel operation of the Generating Facility in the applicable control area, including, but not limited to: 1) any rules and procedures concerning the operation of generation set forth in Commission-approved tariffs or by the

applicable system operator(s) for the Utility's System and; 2) the Operating Requirements set forth in Appendix 5 of this Agreement.

### 1.7 Metering

The Interconnection Customer shall be responsible for the Utility's reasonable and necessary cost for the purchase, installation, operation, maintenance, testing, repair, and replacement of metering and data acquisition equipment specified in Appendices 2 and 3 of this Agreement. The Interconnection Customer's metering (and data acquisition, as required) equipment shall conform to applicable industry rules and Operating Requirements.

### 1.8 Reactive Power

1.8.1 The Interconnection Customer shall design its Generating Facility to maintain a composite power delivery at continuous rated power output at the Point of Interconnection at a power factor within the range of 0.95 leading to 0.95 lagging, unless the Utility has established different requirements that apply to all similarly situated generators in the control area on a comparable basis. The requirements of this paragraph shall not apply to wind generators.

1.8.2 The Utility is required to pay the Interconnection Customer for reactive power that the Interconnection Customer provides or absorbs from the Generating Facility when the Utility requests the Interconnection Customer to operate its Generating Facility outside the range specified in Article 1.8.1 or outside the range established by the Utility that applies to all similarly situated generators in the control area. In addition, if the Utility pays its own or affiliated generators for reactive power service within the specified range, it must also pay the Interconnection Customer.

1.8.3 Payments shall be in accordance with the Utility's applicable rate schedule then in effect unless the provision of such service(s) is subject to a regional transmission organization or independent system operator FERC-approved rate schedule. To the extent that no rate schedule is in effect at the time the Interconnection Customer is required to provide or absorb reactive power under this Agreement, the Parties agree to expeditiously file such rate schedule and agree to support any request for waiver of any prior notice requirement in order to compensate the Interconnection Customer from the time service commenced.

### 1.9 Capitalized Terms

Capitalized terms used herein shall have the meanings specified in the Glossary of Terms in Attachment 1 of the North Carolina Interconnection Procedures or the body of this Agreement.

## **Article 2. Inspection, Testing, Authorization, and Right of Access**

## 2.1 Equipment Testing and Inspection

2.1.1 The Interconnection Customer shall test and inspect its Generating Facility and Interconnection Facilities prior to interconnection. The Interconnection Customer shall notify the Utility of such activities no fewer than ten (10) Business Days (or as may be agreed to by the Parties) prior to such testing and inspection. Testing and inspection shall occur on a Business Day, unless otherwise agreed to by the Parties. The Utility may, at its own expense, send qualified personnel to the Generating Facility site to inspect the interconnection and observe the testing. The Interconnection Customer shall provide the Utility a written test report when such testing and inspection is completed.

2.1.2 The Utility shall provide the Interconnection Customer written acknowledgment that it has received the Interconnection Customer's written test report. Such written acknowledgment shall not be deemed to be or construed as any representation, assurance, guarantee, or warranty by the Utility of the safety, durability, suitability, or reliability of the Generating Facility or any associated control, protective, and safety devices owned or controlled by the Interconnection Customer or the quality of power produced by the Generating Facility.

2.1.3 In addition to the Utility's observation of the Interconnection Customer's testing and inspection of its Generating Facility and Interconnection Facilities pursuant to this Section, the Utility may also require inspection and testing of Interconnection Facilities which can impact the integrity or safety of the Utility's System or otherwise cause adverse operating effects, as described in Section 3.4.4. Such inspection and testing activities will be performed by the Utility or a third-party independent contractor approved by the Utility and at a time mutually agreed to with the Interconnection Customer and will be performed at the Interconnection Customer's expense. The scope of required inspection and testing will be consistent across similar types of generating facilities.

## 2.2 Authorization Required Prior to Parallel Operation

2.2.1 The Utility shall use Reasonable Efforts to list applicable parallel operation requirements in Appendix 5 of this Agreement. Additionally, the Utility shall notify the Interconnection Customer of any changes to these requirements as soon as they are known. The Utility shall make Reasonable Efforts to cooperate with the Interconnection Customer in meeting requirements necessary for the Interconnection Customer to commence parallel operations by the in-service date.

2.2.2 The Interconnection Customer shall not operate its Generating Facility in parallel with the Utility's System without prior written authorization of the Utility. The Utility will provide such authorization once the Utility receives

notification that the Interconnection Customer has complied with all applicable parallel operation requirements. Such authorization shall not be unreasonably withheld, conditioned, or delayed.

## 2.3 Right of Access

2.3.1 ~~Upon reasonable notice, the Utility may send a qualified person to the premises of the Interconnection Customer at or immediately before the time the Generating Facility first produces energy to inspect the interconnection, and observe the commissioning of the Generating Facility (including any required testing), startup, and operation for a period of up to three (3) Business Days after initial start-up of the unit. In addition, the Interconnection Customer shall notify the Utility at least five (5) Business Days prior to conducting any on-site verification testing of the Generating Facility. Upon reasonable notice, the Utility may send a qualified person to the premises of the Interconnection Customer at or before the time the Generating Facility first produces energy to inspect the interconnection and those Interconnection Customer facilities which can impact the integrity or safety of the Utility's System or otherwise cause adverse operating effects, as described in Section 3.4.4, and observe the commissioning of the Generating Facility (including any required testing), startup, and operation for a period of up to three (3) Business Days after initial start-up of the unit. In addition, the Interconnection Customer shall notify the Utility at least five (5) Business Days prior to conducting any on-site verification testing of the Generating Facility.~~

2.3.12 Following the initial inspection process described above, at reasonable hours, and upon reasonable notice, or at any time without notice in the event of an emergency or hazardous condition, the Utility shall have access to the Interconnection Customer's premises for any reasonable purpose in connection with the performance of the obligations imposed on it by this Agreement or if necessary to meet its legal obligation to provide service to its customers.

2.3.23 Each Party shall be responsible for its own ~~costs~~ associated with following this Article, with the exception of Utility-required inspection and testing described in Section 2.1.3, the costs for which shall be the responsibility of the Interconnection Customer.

## Article 3. Effective Date, Term, Termination, and Disconnection

### 3.1 Effective Date

This Agreement shall become effective upon execution by the Parties.

### 3.2 Term of Agreement

This Agreement shall become effective on the Effective Date and shall remain in

effect for a period of ten (10) years from the Effective Date or such other longer period as the Interconnection Customer may request and shall be automatically renewed for each successive one-year period thereafter, unless terminated earlier in accordance with Article 3.3 of this Agreement.

### 3.3 Termination

No termination shall become effective until the Parties have complied with all Applicable Laws and Regulations applicable to such termination.

3.3.1 The Interconnection Customer may terminate this Agreement at any time by giving the Utility 20 Business Days written notice and physically and permanently disconnecting the Generating Facility from the Utility's System.

3.3.2 The Utility may terminate this agreement ~~for~~ upon the Interconnection Customer's failure to timely make the payment(s) required by Article 6.1.1 pursuant to the milestones specified in Appendix 4, or to comply with the requirements of Article 7.1.2 or Article 7.1.3.

3.3.3 Either Party may terminate this Agreement after Default pursuant to Article 7.6.

3.3.4 Upon termination of this Agreement, the Generating Facility will be disconnected from the Utility's System. All costs required to effectuate such disconnection shall be borne by the terminating Party, unless such termination resulted from the non-terminating Party's Default of this Agreement or such non-terminating Party otherwise is responsible for these costs under this Agreement.

3.3.5 The termination of this Agreement shall not relieve either Party of its liabilities and obligations, owed or continuing at the time of the termination, including any remaining term requirements for payment of Charges that are billed under a monthly payment option as prescribed in Article 6.

3.3.6 The provisions of this article shall survive termination or expiration of this Agreement.

### 3.4 Temporary Disconnection

Temporary disconnection shall continue only for so long as reasonably necessary under Good Utility Practice.

#### 3.4.1 Emergency Conditions

"Emergency Condition" shall mean a condition or situation: (1) that in the judgment of the Party making the claim is imminently likely to endanger life or property; or (2) that, in the case of the Utility, is imminently likely

(as determined in a non-discriminatory manner) to cause a material adverse effect on the security of, or damage to the Utility's System, the Utility's Interconnection Facilities or the systems of others to which the Utility's System is directly connected; or (3) that, in the case of the Interconnection Customer, is imminently likely (as determined in a non-discriminatory manner) to cause a material adverse effect on the security of, or damage to, the Generating Facility or the Interconnection Customer's Interconnection Facilities.

Under Emergency Conditions, the Utility may immediately suspend interconnection service and temporarily disconnect the Generating Facility. The Utility shall notify the Interconnection Customer promptly when it becomes aware of an Emergency Condition that may reasonably be expected to affect the Interconnection Customer's operation of the Generating Facility. The Interconnection Customer shall notify the Utility promptly when it becomes aware of an Emergency Condition that may reasonably be expected to affect the Utility's System or any Affected Systems. To the extent information is known, the notification shall describe the Emergency Condition, the extent of the damage or deficiency, the expected effect on the operation of both Parties' facilities and operations, its anticipated duration, and the necessary corrective action.

#### 3.4.2 Routine Maintenance, Construction, and Repair

The Utility may interrupt interconnection service or curtail the output of the Generating Facility and temporarily disconnect the Generating Facility from the Utility's System when necessary for routine maintenance, construction, and repairs on the Utility's System. The Utility shall provide the Interconnection Customer with ~~two~~five (25) Business Day notice prior to such interruption. The Utility shall use Reasonable Efforts to coordinate such reduction or temporary disconnection with the Interconnection Customer.



### 3.4.3 Forced Outages

During any forced outage, the Utility may suspend interconnection service to effect immediate repairs on the Utility's System. The Utility shall use Reasonable Efforts to provide the Interconnection Customer with prior notice. If prior notice is not given, the Utility shall, upon request, provide the Interconnection Customer written documentation after the fact explaining the circumstances of the disconnection.

### 3.4.4 Adverse Operating Effects

The Utility shall notify the Interconnection Customer as soon as practicable if, based on Good Utility Practice, operation of the Generating Facility may cause disruption or deterioration of service to other customers served from the same electric system, or if operating the Generating Facility could cause damage to the Utility's System or Affected Systems. Supporting documentation used to reach the decision to disconnect shall be provided to the Interconnection Customer upon request. If, after notice, the Interconnection Customer fails to remedy the adverse operating effect within a reasonable time, the Utility may disconnect the Generating Facility. The Utility shall provide the Interconnection Customer with five (5) Business Day notice of such disconnection, unless the provisions of Article 3.4.1 apply.

### 3.4.5 Modification of the Generating Facility

The Interconnection Customer must receive written authorization from the Utility before making a Material Modification or any other change to the Generating Facility that may have a material impact on the safety or reliability of the Utility's System. Such authorization shall not be unreasonably withheld. Modifications shall be done in accordance with Good Utility Practice. If the Interconnection Customer makes such modification without the Utility's prior written authorization, the latter shall have the right to temporarily disconnect the Generating Facility.

### 3.4.6 Reconnection

The Parties shall cooperate with each other to restore the Generating Facility, Interconnection Facilities, and the Utility's System to their normal operating state as soon as reasonably practicable following a temporary or emergency disconnection.

## **Article 4. Cost Responsibility for Interconnection Facilities and Distribution Upgrades**

### **4.1 Interconnection Facilities**

4.1.1 The Interconnection Customer shall pay for the cost of the Interconnection Facilities itemized in Appendix 2 of this Agreement. The Utility shall provide a best estimate cost, including overheads, for the purchase and construction of its Interconnection Facilities and provide a detailed itemization of such costs. Costs associated with Interconnection Facilities may be shared with other entities that may benefit from such facilities by agreement of the Interconnection Customer, such other entities, and the Utility.

4.1.2 The Interconnection Customer shall be responsible for its share of all reasonable expenses, including overheads, associated with (1) owning, operating, maintaining, repairing, and replacing its own Interconnection Facilities, and (2) operating, maintaining, repairing, and replacing the Utility's Interconnection Facilities.

### **4.2 Distribution Upgrades**

The Utility shall design, procure, construct, install, and own the Distribution Upgrades described in Appendix 6 of this Agreement. If the Utility and the Interconnection Customer agree, the Interconnection Customer may construct Distribution Upgrades that are located on land owned by the Interconnection Customer. The actual cost of the Distribution Upgrades, including overheads, on-going operations, maintenance, repair, and replacement, shall be directly assigned to the Interconnection Customer.

## **Article 5. Cost Responsibility for Network Upgrades**

### **5.1 Applicability**

No portion of this Article 5 shall apply unless the interconnection of the Generating Facility requires Network Upgrades.

### **5.2 Network Upgrades**

The Utility shall design, procure, construct, install, and own the Network Upgrades described in Appendix 6 of this Agreement. If the Utility and the Interconnection Customer agree, the Interconnection Customer may construct Network Upgrades that are located on land owned by the Interconnection Customer. Unless the Utility elects to pay for Network Upgrades, the actual cost of the Network Upgrades, including overheads, on-going operations, maintenance, repair, and replacement shall be borne by the Interconnection Customer.



## **Article 6. Billing, Payment, Milestones, and Financial Security**

### **6.1 Billing and Payment Procedures and Final Accounting**

- 6.1.1 The Interconnection Customer shall pay 100% of required Interconnection Facilities and any other charges as required in Appendix 2 pursuant to the milestones specified in Appendix 4.

The Interconnection Customer shall pay 100% of required Upgrades and any other charges as required in Appendix 6 pursuant to the milestones specified in Appendix 4.

Upon receipt of 100% of the foregoing pre-payment charges for Upgrades, the payment is not refundable due to cancellation of the Interconnection Request for any reason.

- 6.1.2 If implemented by the Utility or requested by the Interconnection Customer in writing within 15 Business Days of the Interconnection Facilities Delivery Date, the Utility shall provide the Interconnection Customer a final accounting report within 120 Business Days addressing any difference between (1) the Interconnection Customer's cost responsibility for the actual cost of such facilities or Upgrades, and (2) the Interconnection Customer's previous aggregate payments to the Utility for such facilities or Upgrades. If the Interconnection Customer's cost responsibility exceeds its previous aggregate payments, the Utility shall invoice the Interconnection Customer for the amount due and the Interconnection Customer shall make payment to the Utility within 20 Business Days. If the Interconnection Customer's previous aggregate payments exceed its cost responsibility under this Agreement, the Utility shall refund to the Interconnection Customer an amount equal to the difference within 20 Business Days of the final accounting report. If necessary and appropriate as a result of the final accounting, the Utility may also adjust the monthly charges set forth in Appendix 2 of the Interconnection Agreement.
- 6.1.3 The Utility shall also bill the Interconnection Customer for the costs associated with operating, maintaining, repairing and replacing the Utility's System Upgrades, as set forth in Appendix 6 of this Agreement. The Utility shall bill the Interconnection Customer for the costs of providing the Utility's Interconnection Facilities including the costs for on-going operations, maintenance, repair and replacement of the Utility's Interconnection Facilities under a Utility rate schedule, tariff, rider or service regulation providing for extra facilities or additional facilities charges, as set forth in Appendix 2 of this Agreement, such monthly charges to continue throughout the entire life of the interconnection.

### **6.2 Milestones**

The Parties shall agree on milestones for which each Party is responsible and list

them in Appendix 4 of this Agreement. A Party's obligations under this provision may be extended by agreement, except for timing for Payment or Financial Security-related requirements set forth in the milestones, which shall adhere to Section 5.2.4 of the Standards. If a Party anticipates that it will be unable to meet a milestone for any reason other than a Force Majeure Event, it shall immediately notify the other Party of the reason(s) for not meeting the milestone and (1) propose the earliest reasonable alternate date by which it can attain this and future milestones, and (2) request appropriate amendments to Appendix 4. The Party affected by the failure to meet a milestone shall not unreasonably withhold agreement to such an amendment unless (1) it will suffer significant uncompensated economic or operational harm from the delay, (2) the delay will materially affect the schedule of another Interconnection Customer with subordinate Queue Position, (3) attainment of the same milestone has previously been delayed, or (4) it has reason to believe that the delay in meeting the milestone is intentional or unwarranted notwithstanding the circumstances explained by the Party proposing the amendment.

### 6.3 Financial Security Arrangements

Pursuant to the Interconnection Agreement Milestones Appendix 4, the Interconnection Customer shall provide the Utility a letter of credit or other financial security arrangement that is reasonably acceptable to the Utility and is consistent with the Uniform Commercial Code of North Carolina. Such security for payment shall be in an amount sufficient to cover the costs for constructing, designing, procuring, and installing the applicable portion of the Utility's Interconnection Facilities and shall be reduced on a dollar-for-dollar basis for payments made to the Utility under this Agreement during its term. In addition:

- 6.3.1 The guarantee must be made by an entity that meets the creditworthiness requirements of the Utility, and contain terms and conditions that guarantee payment of any amount that may be due from the Interconnection Customer, up to an agreed-to maximum amount.
- 6.3.2 The letter of credit must be issued by a financial institution or insurer reasonably acceptable to the Utility and must specify a reasonable expiration date.
- 6.3.3 The Utility may waive the security requirements if its credit policies show that the financial risks involved are de minimus, or if the Utility's policies allow the acceptance of an alternative showing of creditworthiness from the Interconnection Customer.

## **Article 7. Assignment, Liability, Indemnity, Force Majeure, Consequential Damages, and Default**

### 7.1 Assignment

- 7.1.1 The Interconnection Customer shall notify the Utility of the pending sale of an existing Generation Facility in writing. The Interconnection

Customer shall provide the Utility with information regarding whether the sale is a change of ownership of the Generation Facility to a new legal entity, or a change of control of the existing legal entity.

7.1.2 The Interconnection Customer shall promptly notify the Utility of the final date of sale and transfer date of ownership in writing. The purchaser of the Generation Facility shall confirm to the Utility the final date of sale and transfer date of ownership in writing

7.1.3 This Agreement shall not survive the transfer of ownership of the Generating Facility to a new legal entity owner. The new owner must complete a new Interconnection Request and submit it to the Utility within 20 Business Days of the transfer of ownership or the Utility's Interconnection Facilities shall be removed or disabled and the Generating Facility disconnected from the Utility's System. The Utility shall not study or inspect the Generating Facility unless the new owner's Interconnection Request indicates that a Material Modification has occurred or is proposed.

7.1.4 This Agreement shall survive a change of control of the Generating Facility' legal entity owner, where only the contact information in the Interconnection Agreement must be modified. The new owner must complete a new Interconnection Request and submit it to the Utility within 20 Business Days of the change of control and provide the new contact information. The Utility shall not study or inspect the Generating Facility unless the new owner's Interconnection Request indicates that a Material Modification has occurred or is proposed.

7.1.5 The Interconnection Customer shall have the right to assign this Agreement, without the consent of the Utility, for collateral security purposes to aid in providing financing for the Generating Facility, provided that the Interconnection Customer will promptly notify the Utility of any such assignment. Assignment shall not relieve a Party of its obligations, nor shall a Party's obligations be enlarged, in whole or in part, by reason thereof.

7.1.6 Any attempted assignment that violates this article is void and ineffective.

## 7.2 Limitation of Liability

Each Party's liability to the other Party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission in its performance of this Agreement, shall be limited to the amount of direct damage actually incurred. In no event shall either Party be liable to the other Party for any indirect, special, incidental, consequential, or punitive damages of any kind, except as authorized by this Agreement.

## 7.3 Indemnity

- 7.3.1 This provision protects each Party from liability incurred to third parties as a result of carrying out the provisions of this Agreement. Liability under this provision is exempt from the general limitations on liability found in Article 7.2.
- 7.3.2 The Parties shall at all times indemnify, defend, and save the other Party harmless from, any and all damages, losses, claims, including claims and actions relating to injury to or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the other Party's action or inaction of its obligations under this Agreement on behalf of the indemnifying Party, except in cases of gross negligence or intentional wrongdoing by the indemnified Party.
- 7.3.3 If an indemnified Party is entitled to indemnification under this Article as a result of a claim by a third party, and the indemnifying Party fails, after notice and reasonable opportunity to proceed under this Article, to assume the defense of such claim, such indemnified Party may at the expense of the indemnifying Party contest, settle or consent to the entry of any judgment with respect to, or pay in full, such claim.
- 7.3.4 If an indemnifying Party is obligated to indemnify and hold any indemnified Party harmless under this Article, the amount owing to the indemnified Party shall be the amount of such indemnified Party's actual loss, net of any insurance or other recovery.
- 7.3.5 Promptly after receipt by an indemnified Party of any claim or notice of the commencement of any action or administrative or legal proceeding or investigation as to which the indemnity provided for in this Article may apply, the indemnified Party shall notify the indemnifying Party of such fact. Any failure of or delay in such notification shall not affect a Party's indemnification obligation unless such failure or delay is materially prejudicial to the indemnifying Party.

#### 7.4 Consequential Damages

Other than as expressly provided for in this Agreement, neither Party shall be liable under any provision of this Agreement for any losses, damages, costs or expenses for any special, indirect, incidental, consequential, or punitive damages, including but not limited to loss of profit or revenue, loss of the use of equipment, cost of capital, cost of temporary equipment or services, whether based in whole or in part in contract, in tort, including negligence, strict liability, or any other theory of liability; provided, however, that damages for which a Party may be liable to the other Party under another agreement will not be considered to be special, indirect, incidental, or consequential damages hereunder.

#### 7.5 Force Majeure

7.5.1 As used in this article, a Force-Majeure Event shall mean any act of God, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment, any order, regulation or restriction imposed by governmental, military or lawfully established civilian authorities, or any other cause beyond a Party's control. A Force Majeure Event does not include an act of negligence or intentional wrongdoing.

7.5.2 If a Force Majeure Event prevents a Party from fulfilling any obligations under this Agreement, the Party affected by the Force Majeure Event (Affected Party) shall promptly notify the other Party, either in writing or via the telephone, of the existence of the Force Majeure Event. The notification must specify in reasonable detail the circumstances of the Force Majeure Event, its expected duration, and the steps that the Affected Party is taking to mitigate the effects of the event on its performance. The Affected Party shall keep the other Party informed on a continuing basis of developments relating to the Force Majeure Event until the event ends. The Affected Party will be entitled to suspend or modify its performance of obligations under this Agreement (other than the obligation to make payments) only to the extent that the effect of the Force Majeure Event cannot be mitigated by the use of Reasonable Efforts. The Affected Party will use Reasonable Efforts to resume its performance as soon as possible.

## 7.6 Default

7.6.1 No Default shall exist where such failure to discharge an obligation (other than the payment of money or provision of Financial Security) is the result of a Force Majeure Event as defined in this Agreement or the result of an act or omission of the other Party. Upon a Default, the non-defaulting Party shall give written ~~notice of~~ such ~~Default~~ to ~~the defaulting~~ Party. Except ~~as provided in Article 7.6.2~~, the defaulting Party shall have five (5) Business Days from receipt of the Default notice within which to cure such Default.

7.6.2 If a Default is not cured as provided in this Article, the non-defaulting Party shall have the right to terminate this Agreement by written notice at any time until cure occurs, and be relieved of any further obligation hereunder and, whether or not that Party terminates this Agreement, to recover from the defaulting Party all amounts due hereunder, plus all other damages and remedies to which it is entitled at law or in equity. The provisions of this article will survive termination of this Agreement.

## Article 8. Insurance

8.1 The Interconnection Customer shall obtain and retain, for as long as the Generating Facility is interconnected with the Utility's System, liability insurance which protects

the Interconnection Customer from claims for bodily injury and/or property damage. The amount of such insurance shall be sufficient to insure against all reasonably foreseeable direct liabilities given the size and nature of the generating equipment being interconnected, the interconnection itself, and the characteristics of the system to which the interconnection is made. This insurance shall be primary for all purposes. The Interconnection Customer shall provide certificates evidencing this coverage as required by the Utility. Such insurance shall be obtained from an insurance provider authorized to do business in North Carolina. The Utility reserves the right to refuse to establish or continue the interconnection of the Generating Facility with the Utility's System, if such insurance is not in effect.

- 8.1.1 For an Interconnection Customer that is a residential customer of the Utility proposing to interconnect a Generating Facility no larger than 250 kW, the required coverage shall be a standard homeowner's insurance policy with liability coverage in the amount of at least \$100,000 per occurrence.
- 8.1.2 For an Interconnection Customer that is a non-residential customer of the Utility proposing to interconnect a Generating Facility no larger than 250 kW, the required coverage shall be comprehensive general liability insurance with coverage in the amount of at least \$300,000 per occurrence.
- 8.1.3 For an Interconnection Customer that is a non-residential customer of the Utility proposing to interconnect a Generating Facility greater than 250 kW, the required coverage shall be comprehensive general liability insurance with coverage in the amount of at least \$1,000,000 per occurrence.
- 8.1.4 An Interconnection Customer of sufficient credit-worthiness may propose to provide this insurance via a self-insurance program if it has a self-insurance program established in accordance with commercially acceptable risk management practices, and such a proposal shall not be unreasonably rejected.
- 8.2 The Utility agrees to maintain general liability insurance or self-insurance consistent with the Utility's commercial practice. Such insurance or self-insurance shall not exclude coverage for the Utility's liabilities undertaken pursuant to this Agreement.
- 8.3 The Parties further agree to notify each other whenever an accident or incident occurs resulting in any injuries or damages that are included within the scope of coverage of such insurance, whether or not such coverage is sought.

## **Article 9. Confidentiality**

- 9.1 Confidential Information shall mean any confidential and/or proprietary information provided by one Party to the other Party that is clearly marked or otherwise designated "Confidential." For purposes of this Agreement all design, operating



specifications, and metering data provided by the Interconnection Customer shall be deemed Confidential Information regardless of whether it is clearly marked or otherwise designated as such.

- 9.2 Confidential Information does not include information previously in the public domain, required to be publicly submitted or divulged by Governmental Authorities (after notice to the other Party and after exhausting any opportunity to oppose such publication or release), or necessary to be divulged in an action to enforce this Agreement. Each Party receiving Confidential Information shall hold such information in confidence and shall not disclose it to any third party nor to the public without the prior written authorization from the Party providing that information, except to fulfill obligations under this Agreement, or to fulfill legal or regulatory requirements.

9.2.1 Each Party shall employ at least the same standard of care to protect Confidential Information obtained from the other Party as it employs to protect its own Confidential Information.

9.2.2 Each Party is entitled to equitable relief, by injunction or otherwise, to enforce its rights under this provision to prevent the release of Confidential Information without bond or proof of damages, and may seek other remedies available at law or in equity for breach of this provision.

9.2.3 All information pertaining to a project will be provided to the new owner in the case of a change of control of the existing legal entity or a change of ownership to a new legal entity.

- 9.3 If information is requested by the Commission from one of the Parties that is otherwise required to be maintained in confidence pursuant to this Agreement, the Party shall provide the requested information to the Commission within the time provided for in the request for information. In providing the information to the Commission, the Party may request that the information be treated as confidential and non-public in accordance with North Carolina law and that the information be withheld from public disclosure.

## **Article 10. Disputes**

- 10.1 The Parties agree to attempt to resolve all disputes arising out of the interconnection process according to the provisions of this Article.

- 10.2 In the event of a dispute, either Party shall provide the other Party with a written notice of dispute. Such notice shall describe in detail the nature of the dispute.

- 10.3 If the dispute has not been resolved within 20 Business Days after receipt of the notice, either Party may contact the Public Staff for assistance in informally resolving the dispute. If the Parties are unable to informally resolve the dispute, either Party may then file a formal complaint with the Commission.

- 10.4 Each Party agrees to conduct all negotiations in good faith.

**Article 11. Taxes**

- 11.1 The Parties agree to follow all applicable tax laws and regulations, consistent with North Carolina and federal policy and revenue requirements.
- 11.2 Each Party shall cooperate with the other to maintain the other Party's tax status. Nothing in this Agreement is intended to adversely affect the Utility's tax exempt status with respect to the issuance of bonds including, but not limited to, local furnishing bonds.

**Article 12. Miscellaneous****12.1 Governing Law, Regulatory Authority, and Rules**

The validity, interpretation and enforcement of this Agreement and each of its provisions shall be governed by the laws of the State of North Carolina, without regard to its conflicts of law principles. This Agreement is subject to all Applicable Laws and Regulations. Each Party expressly reserves the right to seek changes in, appeal, or otherwise contest any laws, orders, or regulations of a Governmental Authority.

**12.2 Amendment**

The Parties may amend this Agreement by a written instrument duly executed by both Parties, or under Article 12.12 of this Agreement.

**12.3 No Third-Party Beneficiaries**

This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest and where permitted, their assigns.

**12.4 Waiver**

12.4.1 The failure of a Party to this Agreement to insist, on any occasion, upon strict performance of any provision of this Agreement will not be considered a waiver of any obligation, right, or duty of, or imposed upon, such Party.

12.4.2.1 Any waiver at any time by either Party of its rights with respect to this Agreement shall not be deemed a continuing waiver or a waiver with respect to any other failure to comply with any other obligation, right, duty of this Agreement. Termination or default of this Agreement for any reason by Interconnection Customer shall not constitute a waiver of the Interconnection Customer's legal rights to obtain an interconnection from the Utility. Any waiver of this Agreement shall, if requested, be provided in writing.



## 12.5 Entire Agreement

This Agreement, including all Appendices, constitutes the entire agreement between the Parties with reference to the subject matter hereof, and supersedes all prior and contemporaneous understandings or agreements, oral or written, between the Parties with respect to the subject matter of this Agreement. There are no other agreements, representations, warranties, or covenants which constitute any part of the consideration for, or any condition to, either Party's compliance with its obligations under this Agreement.

## 12.6 Multiple Counterparts

This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

## 12.7 No Partnership

This Agreement shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership between the Parties or to impose any partnership obligation or partnership liability upon either Party. Neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party.

## 12.8 Severability

If any provision or portion of this Agreement shall for any reason be held or adjudged to be invalid or illegal or unenforceable by any court of competent jurisdiction or other Governmental Authority, (1) such portion or provision shall be deemed separate and independent, (2) the Parties shall negotiate in good faith to restore insofar as practicable the benefits to each Party that were affected by such ruling, and (3) the remainder of this Agreement shall remain in full force and effect.

## 12.9 Security Arrangements

Infrastructure security of electric system equipment and operations and control hardware and software is essential to ensure day-to-day reliability and operational security. All Utilities are expected to meet basic standards for electric system infrastructure and operational security, including physical, operational, and cyber-security practices.

## 12.10 Environmental Releases

Each Party shall notify the other Party, first orally and then in writing, of the release of any hazardous substances, any asbestos or lead abatement activities, or any type of remediation activities related to the Generating Facility or the Interconnection Facilities, each of which may reasonably be expected to affect the other Party. The notifying Party shall (1) provide the notice as soon as practicable, provided

such Party makes a good faith effort to provide the notice no later than 24 hours after such Party becomes aware of the occurrence, and (2) promptly furnish to the other Party copies of any publicly available reports filed with any Governmental Authorities addressing such events.

#### 12.11 Subcontractors

Nothing in this Agreement shall prevent a Party from utilizing the services of any subcontractor as it deems appropriate to perform its obligations under this Agreement; provided, however, that each Party shall require its subcontractors to comply with all applicable terms and conditions of this Agreement in providing such services and each Party shall remain primarily liable to the other Party for the performance of such subcontractor.

12.11.2 The creation of any subcontract relationship shall not relieve the hiring Party of any of its obligations under this Agreement. The hiring Party shall be fully responsible to the other Party for the acts or omissions of any subcontractor the hiring Party hires as if no subcontract had been made; provided, however, that in no event shall the Utility be liable for the actions or inactions of the Interconnection Customer or its subcontractors with respect to obligations of the Interconnection Customer under this Agreement. Any applicable obligation imposed by this Agreement upon the hiring Party shall be equally binding upon, and shall be construed as having application to, any subcontractor of such Party.

12.11.3 The obligations under this article will not be limited in any way by any limitation of subcontractor's insurance.

#### 12.12 Reservation of Rights

The Utility shall have the right to make a unilateral filing with the Commission to modify this Agreement with respect to any rates, terms and conditions, charges, or classifications of service, and the Interconnection Customer shall have the right to make a unilateral filing with the Commission to modify this Agreement; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before the Commission in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties except to the extent that the Parties otherwise agree as provided herein.

**Article 13. Notices****13.1 General**

Unless otherwise provided in this Agreement, any written notice, demand, or request required or authorized in connection with this Agreement (Notice) shall be deemed properly given if delivered in person, delivered by recognized national courier service, sent by first class mail, postage prepaid, or sent electronically to the person specified below:

If to the Interconnection Customer:

Interconnection Customer: \_\_\_\_\_

Attention: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

If to the Utility:

Utility: \_\_\_\_\_

Attention: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

**13.2 Billing and Payment**

Billings and payments shall be sent to the addresses set out below: If to the Interconnection Customer:

Interconnection Customer: \_\_\_\_\_

Attention: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

If to the Utility:

Utility: \_\_\_\_\_

Attention: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

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**13.3 Alternative Forms of Notice**

Any notice or request required or permitted to be given by either Party to the other and not required by this Agreement to be given in writing may be so given by telephone, facsimile or e-mail to the telephone numbers and e-mail addresses set out below:

If to the Interconnection Customer:

Interconnection Customer: \_\_\_\_\_

Attention: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

If to the Utility:

Utility: \_\_\_\_\_

Attention: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

**13.4 Designated Operating Representative**

The Parties may also designate operating representatives to conduct the communications which may be necessary or convenient for the administration of this Agreement. This person will also serve as the point of contact with respect to operations and maintenance of the Party's facilities.

**Interconnection Customer's Operating Representative:**

Interconnection Customer: \_\_\_\_\_

Attention: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

**Utility's Operating Representative:**

Utility: \_\_\_\_\_

Attention: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

**13.5 Changes to the Notice Information**

Either Party may change this information by giving five Business Days written notice prior to the effective date of the change.

**IN WITNESS WHEREOF**, the Parties have caused this Agreement to be executed by their respective duly authorized representatives.

For the Utility

Name: \_\_\_\_\_

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

For the Interconnection Customer

Name: \_\_\_\_\_

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

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## Glossary of Terms

See Glossary of Terms, Attachment 1 to the North Carolina Interconnection Procedures.

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**Description and Costs of the Generating Facility,  
Interconnection Facilities, and Metering Equipment**

Equipment, including the Generating Facility, Interconnection Facilities, and metering equipment shall be itemized and identified as being owned by the Interconnection Customer, or the Utility. The Utility will provide a best estimate itemized cost, including overheads, of its Interconnection Facilities and metering equipment, and a best estimate itemized cost of the annual operation and maintenance expenses associated with its Interconnection Facilities and metering equipment.

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**One-line Diagram Depicting the Generating Facility,  
Interconnection Facilities, Metering Equipment, and Upgrades**

This agreement will incorporate by reference the one-line diagram submitted by the Customer on \_\_\_\_\_, dated \_\_\_\_\_, with file name "\_\_\_\_\_" as part of the Interconnection Request, or as subsequently updated and provided to the Company.

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### Milestones

Requested Upgrade In-Service Date: \_\_\_\_\_

Requested Interconnection Facilities In-Service Date \_\_\_\_\_

~~For an Interim Interconnection Agreement, this Appendix 4 is null and void.~~

Critical milestones and responsibility as agreed to by the Parties:

The build-out schedule does not include contingencies for deployment of Utility personnel to assist in outage restoration efforts on the Utility's system or the systems of other utilities with whom the Utility has a mutual assistance agreement. Consequently, the Requested In-service date may be delayed to the extent outage restoration work interrupts the design, procurement and construction of the requested facilities.

	Milestone	Completion Date	Responsible Party
1)			
2)			
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)	Expand as needed		

Signatures on next page

Interconnection Agreement  
Appendix 4

Agreed to for the Utility

Name: \_\_\_\_\_

Print Name: \_\_\_\_\_

Date: \_\_\_\_\_

Agreed to for the Interconnection Customer

Name: \_\_\_\_\_

Print Name: \_\_\_\_\_

Date: \_\_\_\_\_

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Interconnection Agreement  
Appendix 5

**Additional Operating Requirements for the Utility's  
System and Affected Systems Needed to Support  
the Interconnection Customer's Needs**

The Utility shall also provide requirements that must be met by the Interconnection Customer prior to initiating parallel operation with the Utility's System.

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Interconnection Agreement  
Appendix 6

**Utility's Description of its Upgrades  
and Best Estimate of Upgrade Costs**

The Utility shall describe Upgrades and provide an itemized best estimate of the cost, including overheads, of the Upgrades and annual operation and maintenance expenses associated with such Upgrades. The Utility shall functionalize Upgrade costs and annual expenses as either transmission or distribution related.

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**CERTIFICATE OF SERVICE**

I hereby certify that copies of the foregoing Direct Testimony of Michael J. Nester, filed in Docket No. E-100 Sub 101, were served electronically or via U.S. mail, first-class postage prepaid, upon all parties of record.

This the 19<sup>th</sup> day of November, 2018.

/s/Andrea R. Kells

Andrea R. Kells

McGuireWoods LLP

434 Fayetteville Street, Suite 2600

Raleigh, North Carolina 27601

(919) 755-6614

akells@mcguirewoods.com

*Attorney for Dominion Energy North  
Carolina*

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I/A

Virginia Administrative Code  
Title 20. Public Utilities and Telecommunications  
Agency 5. State Corporation Commission

## Chapter 314. Regulations Governing Interconnection of Small Electrical Generators

[Read Chapter >](#)

### Section 10

Applicability and scope; waiver

### Section 20

Definitions

### Section 30

Siting of distributed generation facilities

### Section 40

Level 1 interconnection process

### Section 50

Levels 2 and 3 interconnection request general requirements

### Section 60

Level 2 Interconnection Process

### Section 70

Level 3 interconnection process

### Section 80

Interconnection metering

### Section 90

Commissioning tests

### Section 100

Disputes

### Section 110

Confidential information

### Section 120

Equal treatment

### Section 130

Record retention

### Section 140

Coordination with affected systems

### Section 150

Capacity of the small generating facility

### Section 160

Insurance

### Section 170

Schedules for Chapter 314

### DIBR

DOCUMENTS INCORPORATED BY REFERENCE (20VAC5-314)



Virginia Administrative Code  
Title 20. Public Utilities and Telecommunications  
Agency 5. State Corporation Commission  
Chapter 314. Regulations Governing Interconnection of Small Electrical Generators

## 20VAC5-314-10. Applicability and Scope; Waiver.

A. These regulations are promulgated pursuant to § 56-578 of the Virginia Electric Utility Regulation Act (§ 56-576 et seq. of the Code of Virginia). They establish standardized interconnection and operating requirements for the safe operation of electric generating facilities with a rated capacity of 20 megawatts (MW) or less connected to electric utility distribution (and in certain cases transmission) systems in Virginia. These regulations apply to utilities providing interconnections to retail electric customers, independently owned generators and any other parties operating, or intending to operate, a distributed generation facility in parallel with utility systems. These regulations do not apply to customer generators operating pursuant to the Virginia State Corporation Commission's Regulations Governing Net Energy Metering (20VAC5-315) or those that fall under the jurisdiction of the Federal Energy Regulatory Commission (FERC).

If the utility has turned over control of its transmission system to a Regional Transmission Entity (RTE), and if the small generator interconnection process identifies upgrades to the transmission system as necessary to interconnect the small generating facility, then the utility will coordinate with the RTE, and the procedures herein will be adjusted as necessary to satisfy the RTE's requirements with respect to such upgrades.

There are three review paths for the interconnection of generation in Virginia having an output of not more than 20 MW:

Level 1 - A request to interconnect a small generating facility (SGF) no larger than 500 kilowatts (kW) shall be evaluated under the Level 1 process.

Level 2 - A request to interconnect a certified SGF no larger than 2 MW and not qualifying for the Level 1 process shall be evaluated under the Level 2 process.

Level 3 - A request to interconnect an SGF no larger than 20 MW and not qualifying for the Level 1 process or Level 2 process, shall be evaluated under the Level 3 process.

The utility may limit the interconnection of an SGF to a distribution feeder to a capacity substantially less than 20 MW, depending upon the characteristics of that feeder and the potential for upgrading it, as well as the nature of the loads and other generation on the feeder relative to the proposed point of interconnection. If the SGF cannot be safely and reliably interconnected to the utility's distribution feeder, the utility shall work with the IC to interconnect the SGF to the utility's transmission system. In such cases, the interconnection of the SGF may be governed by the regulations promulgated by FERC rather than the regulation of the State Corporation Commission.

The utility shall designate an employee or office from which the interconnection customer (IC) may informally request information concerning the application process. The name, telephone number, and email address of such contact employee or office shall be made available on the utility's Internet website. Electric system information relevant to the location of the proposed SGF shall be provided to the IC upon request and may include interconnection studies and any other relevant materials, to the extent such provision does not violate confidentiality provisions of prior agreements or release critical infrastructure information. The utility shall comply with reasonable requests for such information unless the information is proprietary or confidential and cannot be provided pursuant to a confidentiality agreement.

The utility shall make reasonable efforts to meet all time frames provided in these regulations unless the utility and the IC agree to a different schedule. If the utility cannot meet a deadline provided herein, it shall notify the IC, explain the reason for the failure to meet the deadline, and provide an estimated time by which it will complete the applicable interconnection procedure in the process.

Each utility shall have on file with the commission terms and conditions applicable to the interconnection of SGFs. Such terms and conditions shall, at a minimum, incorporate this chapter by reference, shall set forth terms and conditions applicable to SGFs for which no Small Generator Interconnection Agreement (SGIA) is executed, and shall not conflict with the provisions of this

chapter. The terms and conditions applicable to SGFs for which no SGIA is executed shall be reasonably consistent with the terms and conditions of the SGIA.

B. The commission may waive any or all parts of the provisions of this chapter for good cause shown.

**Statutory Authority**

§ 12.1-13 of the Code of Virginia.

**Historical Notes**

Derived from Volume 25, Issue 20, eff. May 21, 2009; amended, Virginia Register Volume 29, Issue 25, eff. July 1, 2013.

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As a service to the public, the Virginia Administrative Code is provided online by the Virginia General Assembly. We are unable to answer legal questions or respond to requests for legal advice, including application of law to specific fact. To understand and protect your legal rights, you should consult an attorney.

1/28/2019

## 20VAC5-314-100. Disputes.

A. The parties agree to attempt to resolve all disputes arising out of the interconnection process according to the provisions of this section.

B. In the event of a dispute, either party shall provide the other party with a written notice of dispute. The notice shall describe in detail the nature of the dispute. The parties shall make a good faith effort to resolve the dispute informally within 10 business days.

C. If the dispute has not been resolved within 10 business days after receipt of the notice, either party may seek resolution assistance from the commission's Division of Energy Regulation where the matter will be handled as an informal complaint.

Alternatively, the parties may, upon mutual agreement, seek resolution through the assistance of a dispute resolution service. The dispute resolution service will assist the parties in either resolving the dispute or in selecting an appropriate dispute resolution venue (e.g., mediation, settlement judge, early neutral evaluation, or technical expert) to assist the parties in resolving their dispute. Each party shall conduct all negotiations in good faith and shall be responsible for one-half of any costs paid to neutral third parties.

D. If the dispute remains unresolved either party may petition the commission to handle the dispute as a formal complaint or may exercise whatever rights and remedies it may have in equity or law.

### Statutory Authority

§§ 12.1-13 and 56-578 of the Code of Virginia.

### Historical Notes

Derived from Volume 25, Issue 20, eff. May 21, 2009.

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Exhibit BL-Direct-1

**BRIAN M. LYDIC**

1108 Wright St.  
Ann Arbor, MI 48105

734-548-8664  
brian@irecusa.org

**PROFESSIONAL EXPERIENCE****Interstate Renewable Energy Council, Inc.**

Ann Arbor, MI

**Regulatory Engineer**

Aug 2017 – Present

- Provide expert analysis of proposed technical standards for the interconnection of distributed energy resources.
- Participate in regulatory meetings, workshops and/or other forums to represent IREC's mission.
- Support IREC's communications efforts to convey relevant and timely information regarding regulatory issues and proceedings to identified target audiences.

**Forum on Inverter Grid Integration Issues**

Ann Arbor, MI

**Chair**

Feb 2013 – Present

- Lead ad-hoc group of manufacturers, national labs, utilities and other experts to technically address transient overvoltage, anti-islanding and other anticipated high-penetration distributed generation issues.
- Develop roadmap, research and standards development initiatives to resolve issues that hinder or potentially hinder grid integration of inverter-based generation.

**Fronius USA, LLC**

Ann Arbor, MI

**Sr. Standards & Technology Integration Engineer**

Aug 2012 – Aug 2017

- Participated in the development of standards and codes affecting the industry, including working groups such as UL 1741, IEEE 1547 and the NEC.
- Participated at trade fairs and conferences regarding the state of technology and the industry.
- Reviewed new products and offered product suggestions or engineering change requests to R&D.
- Wrote or assisted in the creation of white papers.
- Acted as the technical expert for special projects.
- Identified key challenges to product integration and worked with internal and external partners to overcome them.

**Fronius USA, LLC**

Brighton, MI

**Application Engineer**

June 2007 – Aug. 2012

- Supported installers in the field by troubleshooting inverter, data communications and system issues.
- Worked independently with clients and prospective clients, providing product guidance and support and addressing installation and product usability issues.
- Provided application and system design advice for colleagues, end customers, distributors and dealers.
- Initiated modifications and further development of new and existing Fronius products.
- Reviewed documentation and made needed changes.

**S.U.R. Energy Systems, LC**

Ann Arbor, MI

**Renewable Energy Specialist**

Feb. 2005 – June 2007

- Designed and installed solar energy systems for commercial and residential installations.
- Competently analyzed financial aspects and produced parts lists before installation.

**EDUCATION**

Bachelor of Science, Electrical Engineering  
University of Michigan, Ann Arbor, MI

May 2004

**MEMBERSHIPS**

IEEE Standards Working Group Member: 1547-2018, p1547.1, p1547.2, 1547.7-2013

IEEE Standards Association

UL 1741 Standards Technical Panel

UL 1699B Standards Technical Panel

## SELECTED SPEAKING ENGAGEMENTS

- Fall Distributed Generation Users Group Meeting, Utility Variable-Generation Integration Group (now Energy Systems Integration Group), Portland, OR, 2013
- Short Course: Microgrids and Distributed Generation Integration, Electric Power Research Center, Iowa State University, Ames, IA, November 2015 (CE credited)
- Building a Smarter Grid, Intersolar North America, San Francisco, CA, July 2016
- Microgrids and Advanced Inverter Functionality, North American Board of Certified Energy Practitioners Continuing Education Conference, San Diego, CA, April 2016 (CE credited)
- Case Studies – Energy Storage and Rule 21 Advanced Inverter Functions, North American Board of Certified Energy Practitioners Continuing Education Conference, Dallas, TX, March 2017 (CE credited)
- Performance of Smart Inverters in Residential Solar PV Applications, Solar Power International, Las Vegas, NV, September 2017
- Standards Driving Smart Inverter Development and Deployment, EUCI Smart Inverter Summit, Denver, CO, September 2017
- Deployment of Smart Inverter Functionality, IEEE PES Innovative Smart Grid Technologies Conference, Washington, DC, February 2018
- Interconnection Workshop, Solar Power Southeast, Atlanta, GA, May 2018
- State of Smart Inverters: Adoption and Considerations for Implementation, Intersolar North America, San Francisco, CA, July 2018
- What's New in Inverters, Solar Power International, Anaheim, CA, September 2018

## TECHNICAL WORKING GROUP PARTICIPATION

- IEEE P1547 Working Group, member and balloting committee
- IEEE P1547a Working Group, member and balloting committee
- IEEE P1547.1 Working Group, member and facilitator
- IEEE P1547.1a Working Group, member, facilitator, and balloting committee
- IEEE P1547.2 Working Group, member
- IEEE P1547.7 Working Group, member
- PV Industry Forum, writing group lead for NEC 690 part III "Disconnecting Means" public inputs to NEC 2020
- PV Industry Forum, writing group lead for NEC 690.12 "Rapid Shutdown of PV Systems on Buildings" and 690.56 "Identification of Power Sources" (initiation and indication) public inputs to NEC 2017
- UL 1741 Standards Technical Panel, member and writing group member for Supplement SA
- Manufacturing Alliance of Inverters Technical Assessment of Integration Issues, lead/chair – worked with Hawaiian Electric and stakeholders on updates to Rule 14 and Rule 22, and gave input on inverter function research by NREL
- Forum on Inverter Grid Integration Issues, lead/chair – contributed to research projects at NREL and engaged with utilities and commission staff on various matters

## RULEMAKING DOCKET PARTICIPATION AND WORKING GROUP MEMBERSHIP

- California PUC, Docket No. R11-09-011, Order Instituting Rulemaking on the Commission's Own Motion to Improve Distribution Level Interconnection Rules and Regulations for Certain Classes of Electric Generators and Electric Storage Resources
- California PUC, Docket No. R-17-07-007, Order Instituting Rulemaking to Consider Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21
- California PUC and California Energy Commission, Smart Inverter Working Group
- Hawaii PUC, Advanced Inverter Technical Working Group
- Minnesota PUC, Docket No. E-999/CI-16-521, Updating the Generic Standards for the Interconnection and Operation of Distributed Generation Facilities Established under Minn. Stat. §216B.1611
- Maryland PSC, Docket No. RM61, Revisions To COMAR 20.50.02 and 20.50.09 - Small Generator Facility Interconnection Standards
- Massachusetts DPU, Technical Standards Review Group, Energy Storage Subgroup
- Nevada PUC, Dockets Nos. 17-06014 & 17-06015, Revisions to Tariff Rule No. 15

- North Carolina Utilities Commission, Docket No. E-100 Sub 101, In the Matter of Joint Petition for Approval of Model Small Generation Interconnection Standards & Associated Application to Interconnect & Interconnection Contract Forms

## PUBLICATIONS

- Forthcoming: Brian Lydic and Sara Baldwin Auck, Interstate Renewable Energy Council, Inc. *Making the Grid Smarter, State Primer on Adopting the New IEEE 1547-2018 Standard for Distributed Energy Resources*
- Brian Lydic, Home Power Magazine, *Get Smart: Advanced Inverters* (issue #185 May/June 2018)
- Brian Lydic, Solar Builder, *How California's Rule 21 inverter requirements expand grid capacity, limit energy (revenue) generation* (June 18, 2016), <https://solarbuildermag.com/featured/california-rule-21-inverters-explained/>
- Brian Lydic, Fronius USA, Inc., *Things to Expect with NEC 2017* (2016), [https://www.fronius.com/~/downloads/Solar%20Energy/Technical%20Articles/SE\\_TEA\\_Expectations\\_NEC\\_2017\\_EN\\_US.pdf](https://www.fronius.com/~/downloads/Solar%20Energy/Technical%20Articles/SE_TEA_Expectations_NEC_2017_EN_US.pdf)

I/A

Exhibit BL-Direct-2



## Fast Track and Supplemental Review Statistics as of 8/2/17

DEP.NC

NC Size (kW)	Screens Failed	Total # Failed	Supplemental Available	Only Offered SIS	Supplemental Results
0-100	3.2.1.2	20	19/20	1	17 Passed
	3.2.1.3	1			1 Withdrawn
	3.2.1.8	3			1 In Progress
	3.2.1.9	1			
100-500	3.2.1.2	25	23/25	2	21 Passed
	3.2.1.3	4			1 Withdrawn
	3.2.1.6	2			1 Failed
	3.2.1.7	2			
	3.2.1.9	1			
500-1000	3.2.1.2	5	6/6	0	5 Passed
	3.2.1.3	1			1 Withdrawn
	3.2.1.7	1			
	3.2.1.8	1			
>1000	3.2.1.2	13	2/13	11	2 Passed
	3.2.1.3	10			
	3.2.1.4	1			
	3.2.1.7	1			
	3.2.1.8	1			
	3.2.1.9	1			
		99 of 100 Failed Screens; 98.46%	50/64		44 Passed
					3 Withdrawn
					1 failed
					1 In Progress

# DEP SC

SC Size (kW)	Screens Failed	Total # Failed	Supplemental Available	Only Offered SIS	Supplemental Results
0-100	3.2.1.2	9	7/9	2	4 Passed
	3.2.1.6	1			2 Withdrawn
	3.2.1.7	3			1 Downsized
100-500	3.2.1.2	9	10/10	0	7 Passed
	3.2.1.5	2			2 Withdrawn
	3.2.1.7	2			1 Downsized
500-1000	3.2.1.2	14	11/14	3	9 Passed
	3.2.1.6	1			2 Withdrawn
	3.2.1.7	1			
>1000	3.2.1.2	1	0/2	2	
	3.2.1.3	1			
		35 of 35 Failed Screens; 100%	28/35		20 Passed
					6 Withdrawn
					2 Downsized

### DEP NC & SC Summary

Fast Track Screen Results Per State & Size Category			
	Fail	Pass	Fail %
<b>NC</b>	64	1	98.46%
0-100	20	1	95.24%
100-500	25	0	100%
500-1000	6	0	100%
>1000	13	0	100%
<b>SC</b>	35	0	100%
0-100	9	0	100%
100-500	10	0	100%
500-1000	14	0	100%
>1000	2	0	100%
<b>Total</b>	99	1	99%

### The overall breakdown for supplemental reviews:

- 78 projects were offered a supplemental review
- 65 passed at the full requested size
- 9 withdrew without going into the supplemental review
- 1 failed and had to go to a system impact study
- 2 were required to downsize in order to pass
- 1 is still in progress

### Number of screens failed:

- 67 failed 1 screen (65 of which failed screen 3.2.1.2 across both North and South Carolina)
- 26 failed 2 screens
- 5 failed 3 screens
- 1 failed 4 screens

### Overall percentages:

- 66% Passed the Fast Track process
- 22% Failed the Fast Track process
- 2% Required to downsize to remain in the Fast Track process
- 9% Did not complete the Fast Track process
- 1% In Progress

### DEC NC

NC Size (kW)	Screens Failed	Total # Failed	Supplemental Available	Only Offered SIS	Supplemental Results
0-100	3.2.1.2	45	41/45		41 Passed
	3.2.1.3	1			4 Withdrawn
	3.2.1.7	21			
	3.2.1.9	2			
100-500	3.2.1.2	21	22/22		22 Passed
	3.2.1.3	1			
	3.2.1.7	13			
500-1000	3.2.1.1	1	9/10		5 Passed
	3.2.1.2	10		1	4 Withdrawn
	3.2.1.3	2			
	3.2.1.7	3			
>1000	3.2.1.2	10	3/20		1 Passed
	3.2.1.3	8			1 Withdrawn
	3.2.1.6	1			1 Fail
	3.2.1.7	4		17	
		87 of 89 Failed Screens; 97.75%	74/97		69 Passed
					9 Withdrawn

DEC SC

SC Size (kW)	Screens Failed	Total # Failed	Supplemental Available	Only Offered SIS	Supplemental Results
0-100	3.2.1.2	92	68/94		68 Passed
	3.2.1.3	1			26 Withdrawn
	3.2.1.5	30			
	3.2.1.6	1			
100-500	3.2.1.2	47	45/47		42 Passed
	3.2.1.3	1			3 Withdrawn
	3.2.1.5	24		2	
500-1000	3.2.1.2	34	28/34		24 Passed
	3.2.1.3	4		6	4 Withdrawn
	3.2.1.5	10			
>1000	3.2.1.2	10	0/2		
	3.2.1.3	2			
	3.2.1.4	1			
				2	
			144/177		134 Passed
		177 of 179 Failed Screens; 98.87%			33 Withdrawn

### DEC NC & SC Summary

Fast Track Results Per State & Size Category			
	Fail	Pass	Fail %
<b>NC</b>	97	2	97.94%
0-100	45	0	100.00%
100-500	22	0	100.00%
500-1000	10	2	80.00%
>1000	20	0	100.00%
<b>SC</b>	177	2	98.87%
0-100	94	2	97.87%
100-500	47	0	100.00%
500-1000	34	0	100.00%
>1000	2	0	100.00%
<b>Total</b>	274	4	98.50%

### The overall breakdown for supplemental reviews:

- 274 Total Fast Track for DEC
- 218 projects were offered a supplemental review
- 217 passed at the full requested size
- 16 withdrew without going into the supplemental review
- 28 failed and had to go to a system impact study
- 1 were required to downsize in order to pass
- 43 is still in progress

### Number of screens failed:

- 144 failed 1 screen (142 of which failed screen 3.2.1.2 across both North and South Carolina)
- 109 failed 2 screens
- 10 failed 3 screens

**Overall percentages:**

- 98.5% Passed the Fast Track/Supplemental process
- 10.2% Failed the Fast Track/Supplemental process
- 0.4% Required to downsize to remain in the Fast Track process
- 5.9% Did not complete the Fast Track process
- 15.7% In Progress

I/A

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Feb 13 2019

Exhibit BL-Direct-3



**DUKE ENERGY CAROLINAS, LLC and DUKE ENERGY PROGRESS, LLC**

**Request:**

Please provide additional clarity to the following statement found on page 17 (Section II.C): "IREC similarly acknowledges that the 15% screen. . . ." Please provide an illustration of the items/topics mentioned in this paragraph in the following format(s) as appropriate:

- a. A circuit or one line diagram;
- b. Identification of the transformer zone boundary;
- c. Location or area of the 15% peak load applied to the circuit;
- d. Customers or load connection points;
- e. Location of the single transformer;
- f. Location of transformer fuse(s);
- g. DER interconnection point(s);
- h. Aggregate DER generation "point" (node) on the circuit; and
- i. Visual identification of the "Line Section", as defined by the Company.

**Response:**

See REDACTED attachment (PSDR4-8 question\_and\_answer.pdf).



DEC and DEP  
Response to PS DR 4

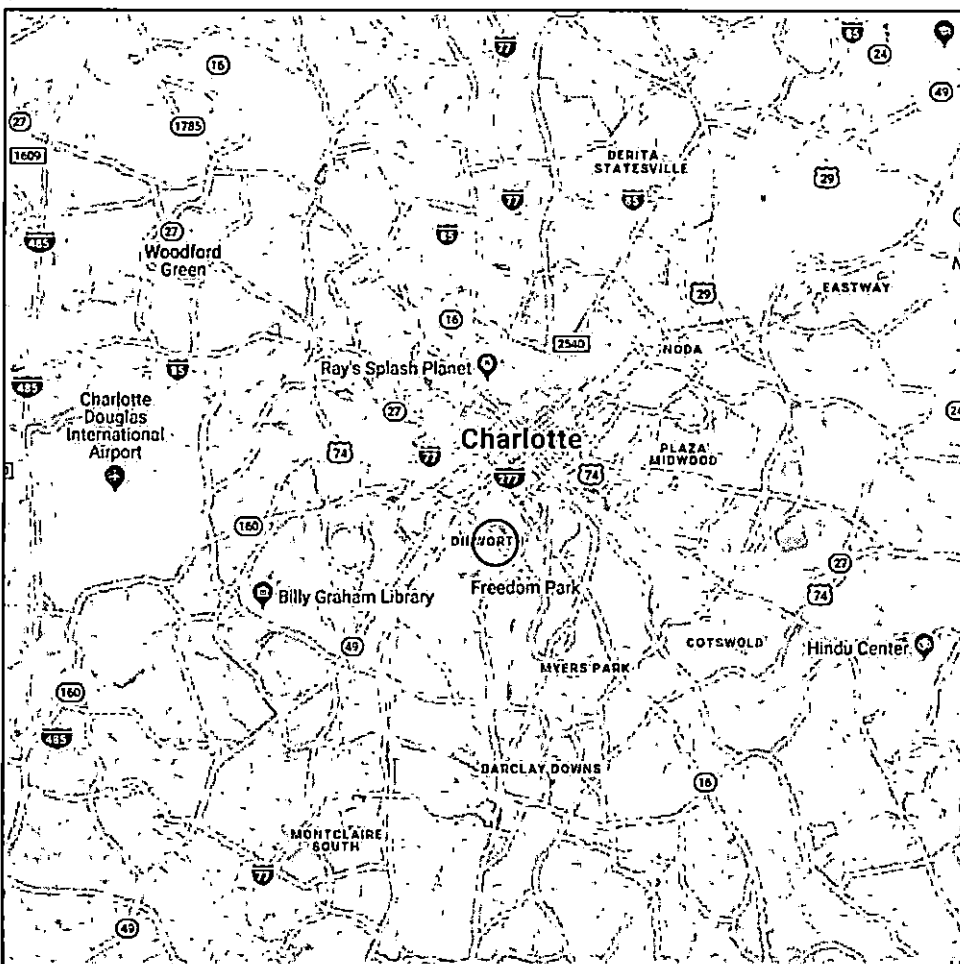
Question #: PSDR4-8

Question Detail:

8. Please provide additional clarity to the following statement found on page 17 (Section II.C): "IREC similarly acknowledges that the 15% screen. . . ." Please provide an illustration of the items/topics mentioned in this paragraph in the following format(s) as appropriate:

- a. A circuit or one line diagram;
- b. Identification of the transformer zone boundary;
- c. Location or area of the 15% peak load applied to the circuit;
- d. Customers or load connection points;
- e. Location of the single transformer;
- f. Location of transformer fuse(s);
- g. DER interconnection point(s);
- h. Aggregate DER generation "point": (node) on the circuit; and
- i. Visual identification of the "Line Section", as defined by the Company.

(a) General area, substation one-line, and circuit one-line



CONFIDENTIAL

Substation one-line, Kenilworth Retail (note circuit 12-8),

[BEGIN CONFIDENTIAL]

PROPRIETARY COMPANY INFORMATION

Duke  
Energy

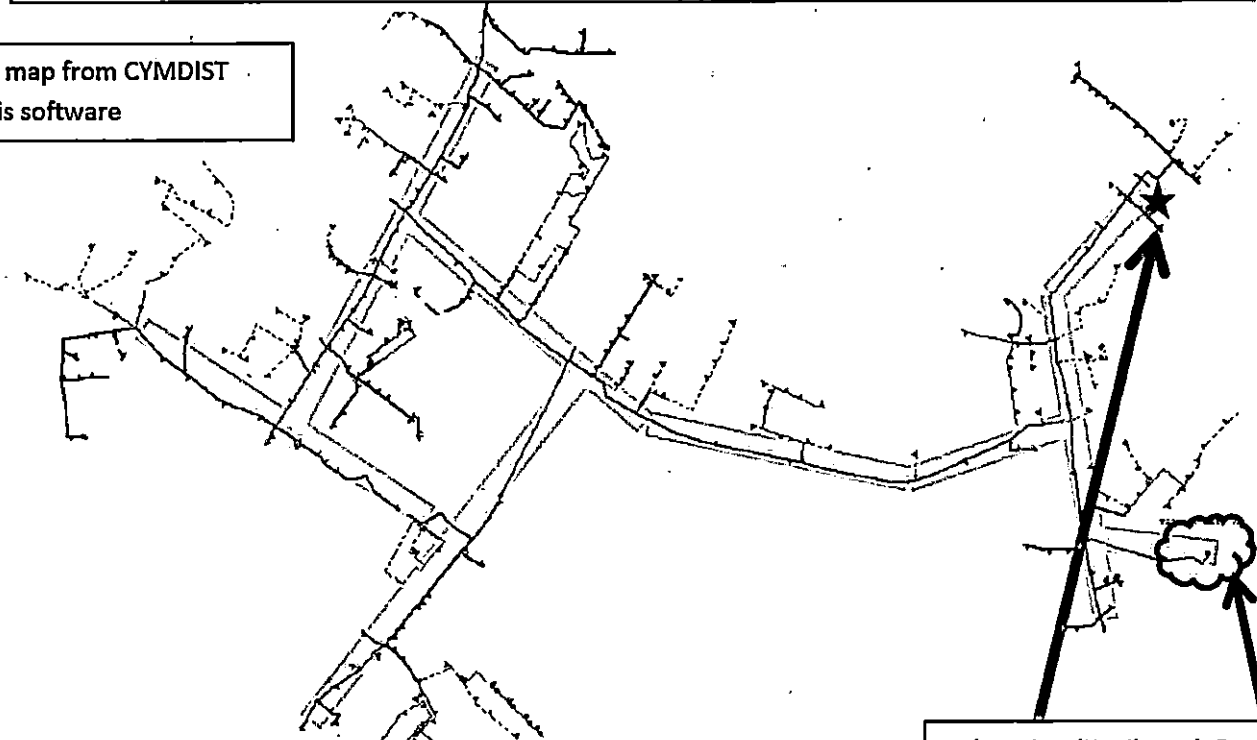
[END CONFIDENTIAL]

Feb 13 2019

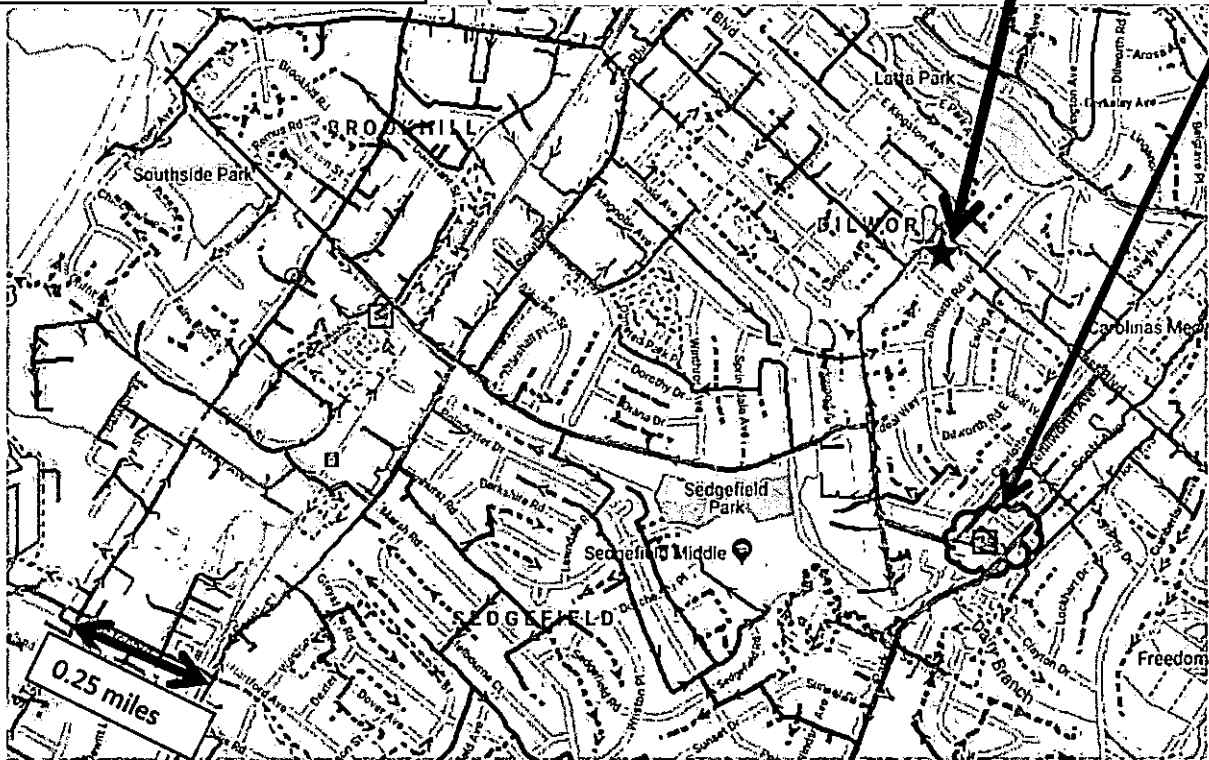
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Circuit diagram, Kenilworth 1208 (interconnection customer's address: 900 East Boulevard, Charlotte, NC

Circuit map from CYMDIST analysis software

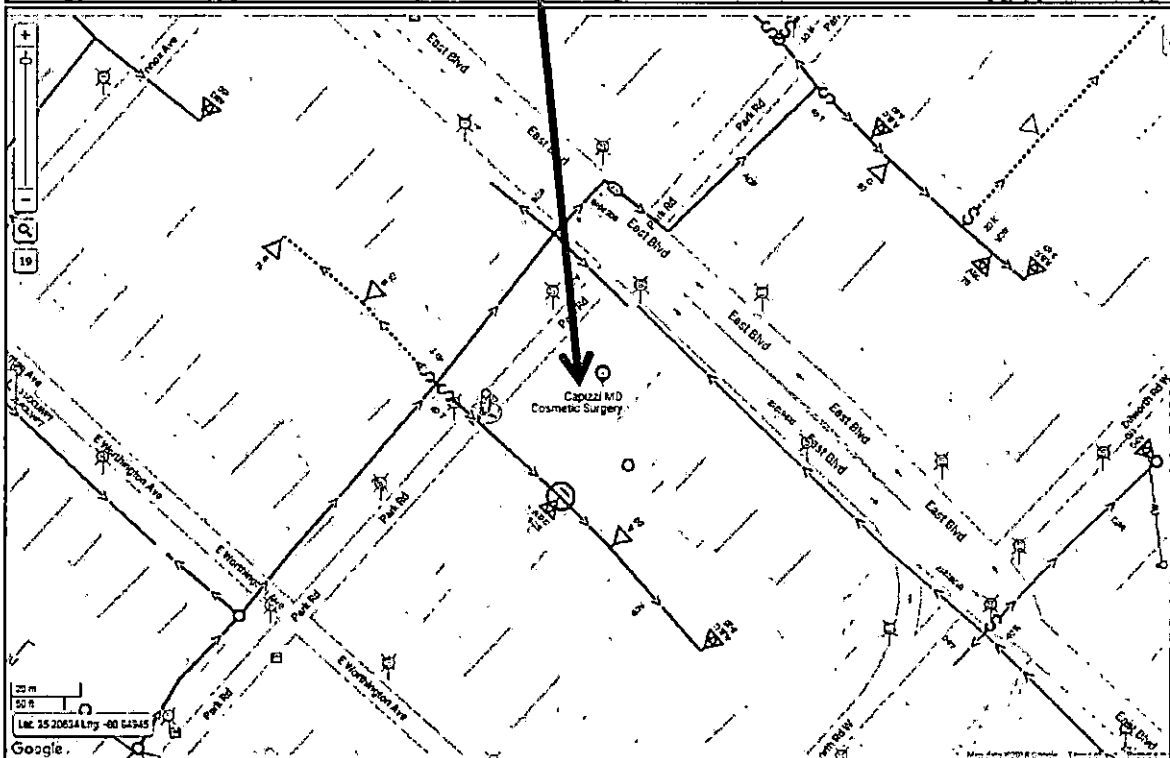
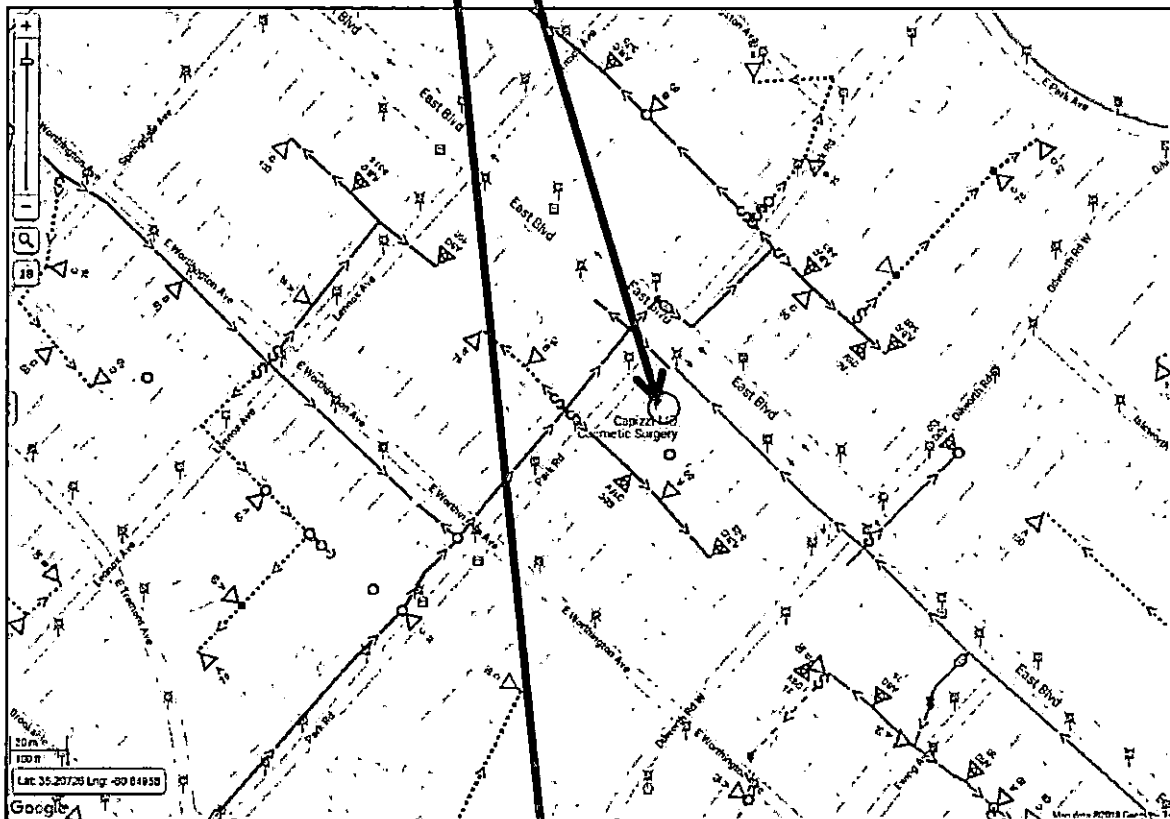


Circuit map from GIS system "MyWorld"



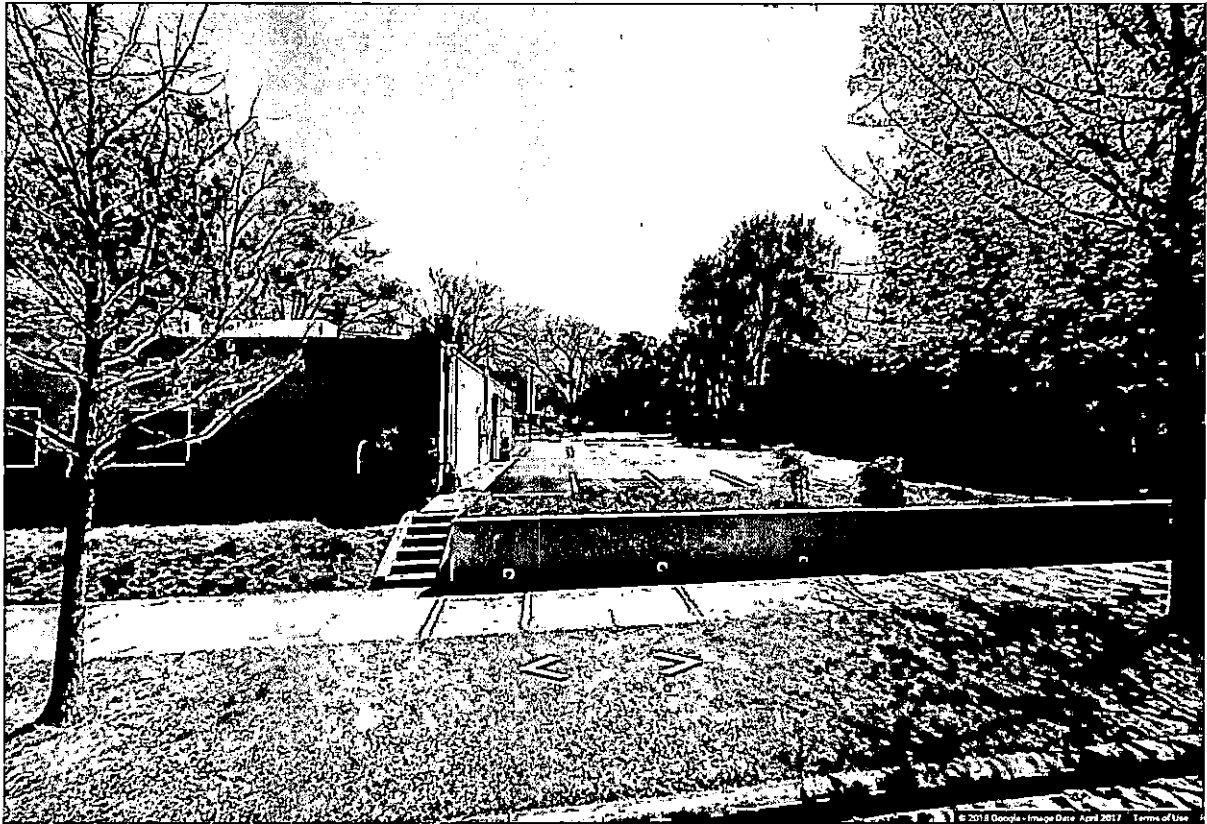
Substation (Kenilworth Retail)

Zoomed in view of distribution system at interconnection



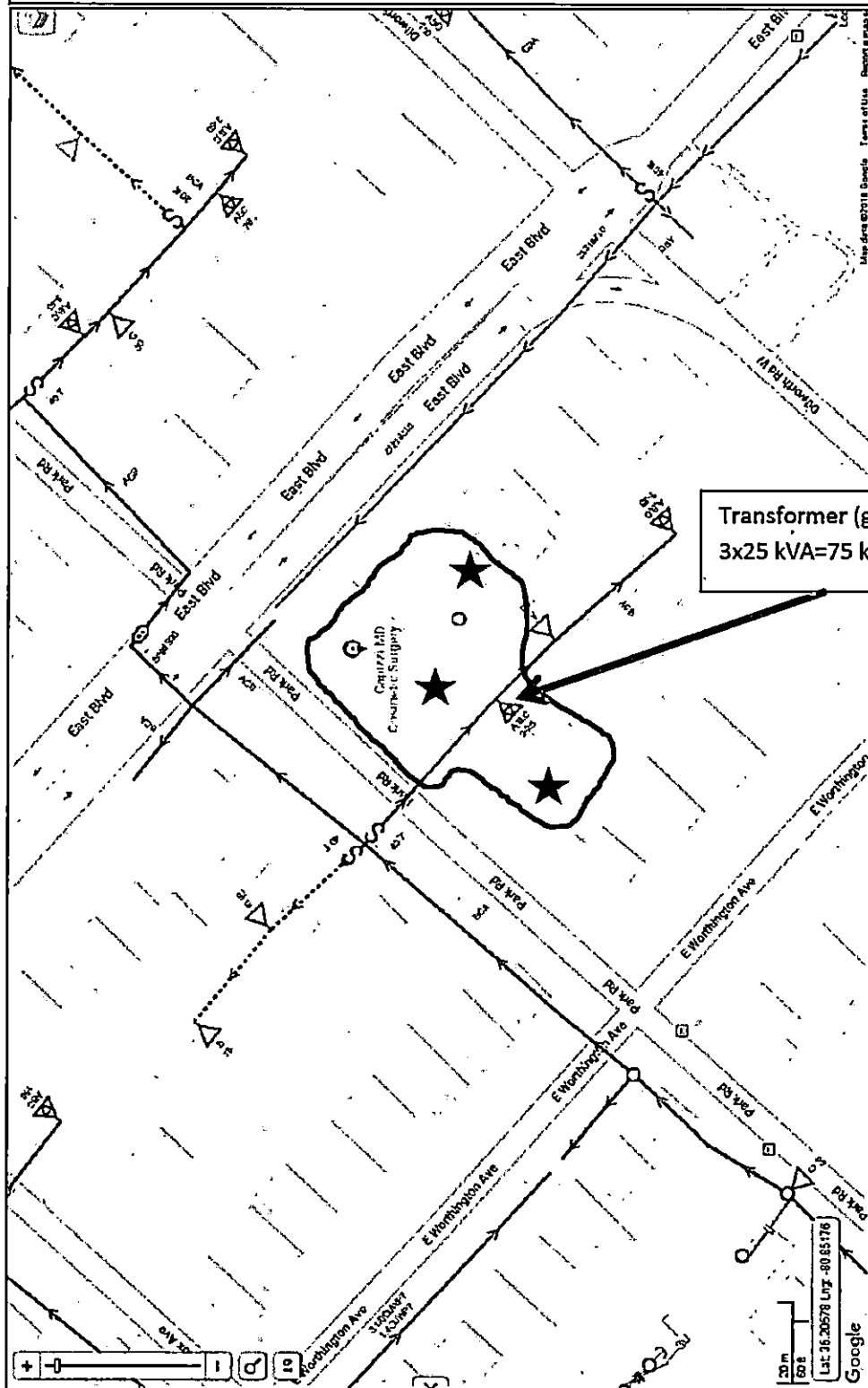
Details	Layers
<b>OH Transformer 01281208 (NC)</b> ABC 75	
<b>▼ Overview</b>	
Smallworld ID 40090436 Number <i>no value</i> Status Existing Owner Type Company Owned Phasing ABC Total kVA 75 kVA OH Transformer Units 3 Items Customer ServPt Items Upstream Devices 5 Items	
<b>▼ Details</b>	
Owner Name Duke Energy Carolinas Circuit ID 01281208 Bank Configuration <i>no value</i> Banked? Yes Parallel? No Current Limiting Fuse? No Mounting Pole Primary Voltage 12.47/7.2 kV Secondary Voltage <i>no value</i> Special Loading <i>no value</i> Customer Count 3 Percent Loaded 56 Coincident Summer Peak 40 kW Coincident Winter Peak 42.3734 kW Load Details Items Customer Load Details Items Customer Load History (Progress) Items Location Description <i>no value</i> Remarks <i>no value</i> City Name CHARLOTTE County Name MECKLENBURG State Name NORTH CAROLINA Source Data ATLAS Source ID 35294850	

Transformer attributes from GIS system



Google Streetview from Park Road (back parking lot has transformer pole at rear of lots (right hand side in this photo))

(B) Transformer Zone boundary (includes three customers, noted with red stars)





(C) The transformer zone indicated in part (B) is the area of the "15% peak load applied to the circuit"

(D) There are three customers; one customer has a metered account and a lighting account:

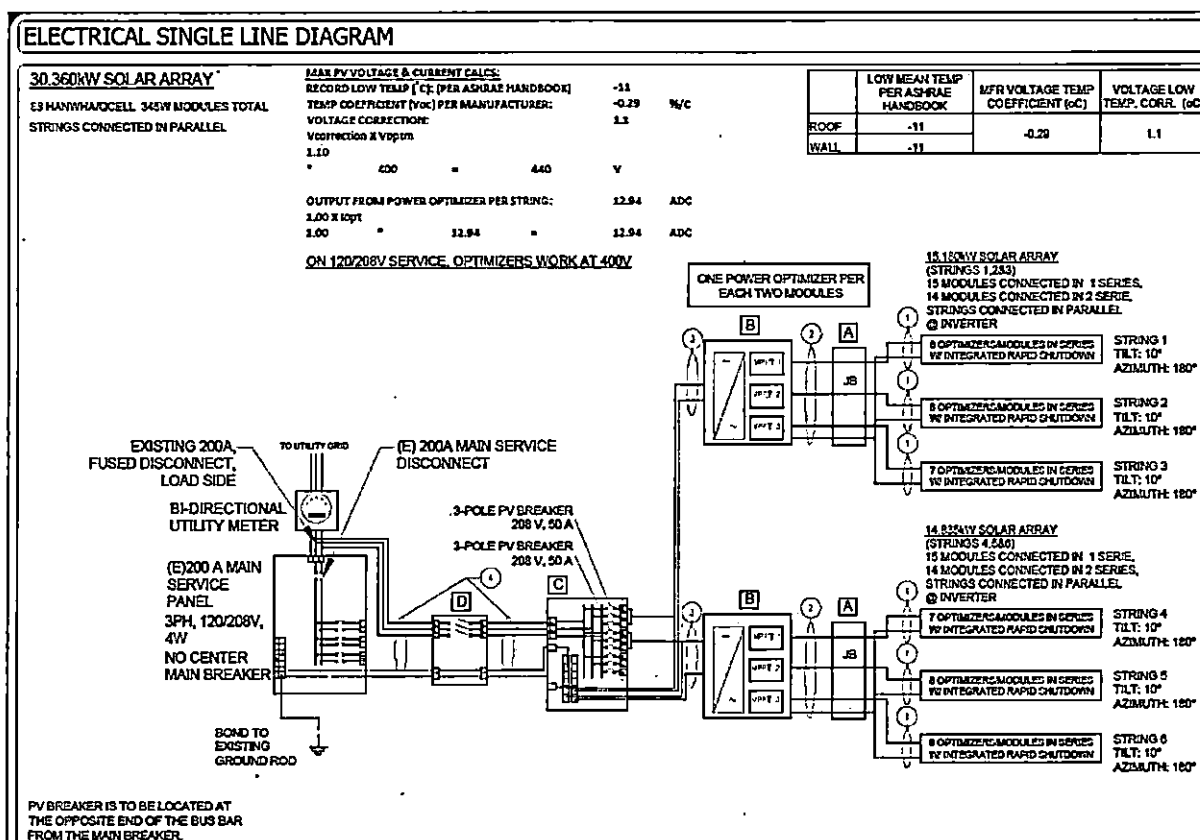
Customer 1527872254 Active Electric-Metered STILLWATER PLASTIC SURGERY PA 900 EAST BLVD
Customer 3577441 Active Electric-Metered MILLS, DAVID JAMES 1817 PARK RD
Customer 1801092667 Active Electric-Metered CLEVELAND PLACE LLC 910 EAST BLVD
Customer 1527872254 Active Lighting STILLWATER PLASTIC SURGERY PA 900 EAST BLVD

(E) See transformer location noted in section "B"

(F) Transformer fuses are mounted on the cross arm above the transformer bank:



(G) The DER interconnection point is inside the customer premises, for the first customer listed in section "D". See portion of customer one-line diagram:



(H) The point at which the aggregate generation is being evaluated is the transformer zone, as defined by the automatic sectionalizing device (transformer fuses).

(I) The "Line Section" as defined by the Company is the transformer zone, as defined by the automatic sectionalizing device (transformer fuses).

7/A

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Feb 13 2019

Exhibit BL-Direct-4

**Mike Burton**

**From:** Whitaker, Jessica L. <Jessica.Whitaker@duke-energy.com>  
**Sent:** Monday, August 28, 2017 10:43 AM  
**To:** Laura D. Beaton  
**Cc:** Sky C. Stanfield; Brian Lydic (brian@irecusa.org); Breitschwerdt, Brett -mcguirewoods; Riggins, Jeff; Gajda, John W  
**Subject:** RE: Follow Up Questions re Fast Track / Supp Review  
**Attachments:** Fast Track Data.docx

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Laura,

The Duke responses are provided in the attachment for the questions below.

Thank you,  
 Jessica Whitaker



*Distribution Protection Automation and Controls &  
 Distributed Generation (DPAC&DG)*

---

**From:** Laura D. Beaton [<mailto:Beaton@smwlaw.com>]  
**Sent:** Thursday, August 17, 2017 12:59 PM  
**To:** Riggins, Jeff ([Jeff.Riggins@duke-energy.com](mailto:Jeff.Riggins@duke-energy.com)) <[Jeff.Riggins@duke-energy.com](mailto:Jeff.Riggins@duke-energy.com)>; Gajda, John W ([John.Gajda@duke-energy.com](mailto:John.Gajda@duke-energy.com)) <[John.Gajda@duke-energy.com](mailto:John.Gajda@duke-energy.com)>; Whitaker, Jessica L. ([Jessica.Whitaker@duke-energy.com](mailto:Jessica.Whitaker@duke-energy.com)) <[Jessica.Whitaker@duke-energy.com](mailto:Jessica.Whitaker@duke-energy.com)>; Breitschwerdt, E. Brett <[bbreitschwerdt@mcguirewoods.com](mailto:bbreitschwerdt@mcguirewoods.com)>  
**Cc:** Sky C. Stanfield <[stanfield@smwlaw.com](mailto:stanfield@smwlaw.com)>; Brian Lydic ([brian@irecusa.org](mailto:brian@irecusa.org)) <[brian@irecusa.org](mailto:brian@irecusa.org)>  
**Subject:** Follow Up Questions re Fast Track / Supp Review

All,

Thanks for your participation in the call yesterday. We really appreciate Duke's helpfulness in sharing information so we can understand what's working and what's not with interconnection in North Carolina. There were a few questions we didn't get a chance to ask on the call, and I was hoping you'd be able to answer them for us via email.

First, regarding the recloser requirement—is this ever applied to projects under 1MW? If so, how do you decide which projects require a recloser?

Second, regarding the 15% peak load screen—I was wondering if you could help illustrate how you apply the 15% peak loads screen and subsequent supplemental review for a smaller (<500kW) project. We think it would be helpful if you could provide the following information for one or two projects:



1. Select a smaller (<500kW) project that failed 3.2.1.2 and 3.2.1.7
2. Show a circuit diagram of where the system is located, including other loads, DER and sectionalizing devices upstream and downstream the feeder from the associated distribution transformer.

3. Include gen:load and overcurrent device calculations to show how the respective screens were failed, utilizing the utility practice of considering the distribution transformer fuse.
4. Describe what supplemental review criteria were then satisfied to allow the system to pass.
5. Move relevant sectionalizing devices to be considered up from the distribution transformer, and re-do calculations to compare if it would pass screens.

Let me know if you'll be able to provide us with this info, and if you have any questions.

Thank you!

Laura

Laura D. Beaton  
Shute, Mihaly & Weinberger LLP  
396 Hayes Street  
San Francisco, CA 94102  
415.552.7272   
415.552.5816  (fax)  
[www.smwlaw.com](http://www.smwlaw.com)



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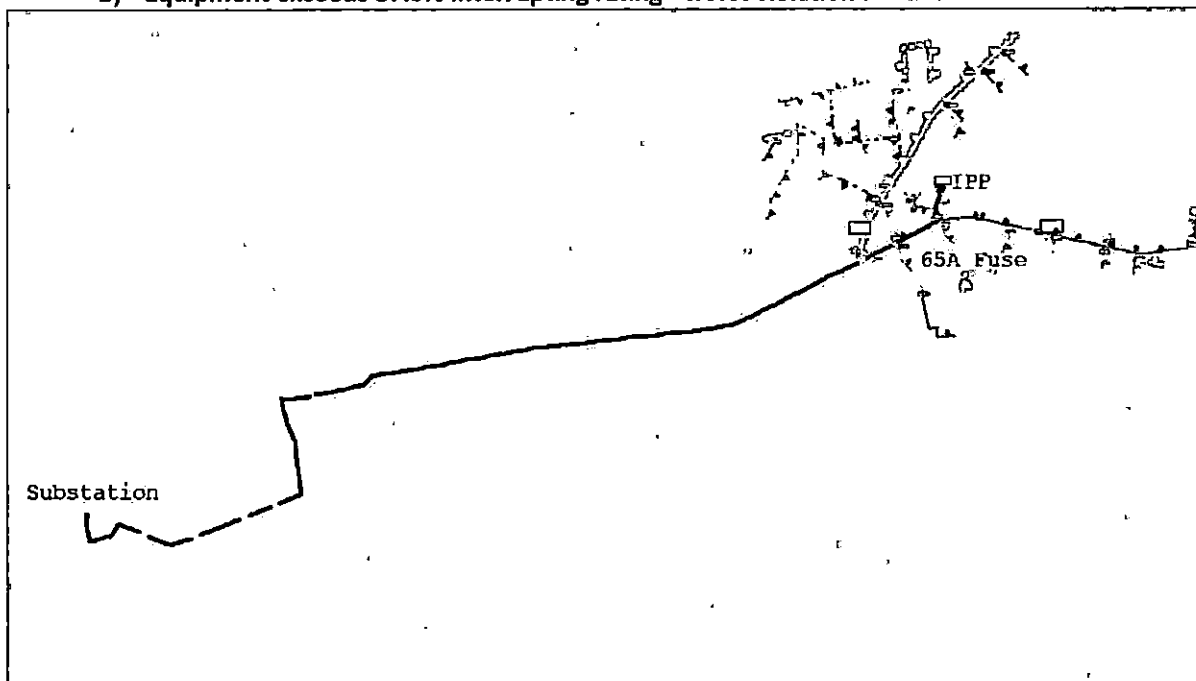
Regarding the recloser requirement—is this ever applied to projects under 1MW? If so, how do you decide which projects require a recloser?

Projects under 1MW with rotating machines require a recloser due to the increased risk of inadvertent islanding. Rotating machines typically do not comply with UL 1741 or IEEE 1547.1.

1. Select a smaller (<500kW) project that failed 3.2.1.2 and 3.2.1.7.
  - a) One NC project that entered the queue in 2017 was selected.
2. Show a circuit diagram of where the system is located, including other loads, DER and sectionalizing devices upstream and downstream the feeder from the associated distribution transformer.



3. Include gen:load and overcurrent device calculations to show how the respective screens were failed, utilizing the utility practice of considering the distribution transformer fuse.
  - a) 90kW project is 205% of annual line section peak load
  - b) Equipment exceeds 87.5% interrupting rating - worst violation is 94.3%



4. Describe what supplemental review criteria were then satisfied to allow the system to pass.

a) Does not back feed any line or substation regulator

Voltage Drop Box													
	V	V(LN)	I	I bal	kVA	kW	kVAR	PF	cKVA	MinVolt	DwLoss	Cust	DwTxUtil
A	124.1	7.46	88.4	-1.47	660.2	625.0	212.7	94.67	5242.6	121.7	12.20	364	33.46
B	125.0	7.52	102.6	-15.67	770.9	723.9	265.2	93.89	7027.6	121.7	11.08	422	28.73
C	121.7	7.32	69.8	17.13	511.2	488.7	149.9	95.60	6655.1	120.6	5.25	316	0.00
N			28.3	Total>	1942	1838	628	94.61	18925	120.6	28.53	1102	27.36
Dist >	0.00	Miles		CBAL %>	0.00		CapVR >	0.000	<V %>	0.000	DwTotLoad%	95.79	
124.1   125.0   121.7   88.4   102.6   69.8   7343   7496													
○ S ⊗ C ○ L													

b) The project does not cause any voltage rise problems

c) All voltages on the circuit are within acceptable limits

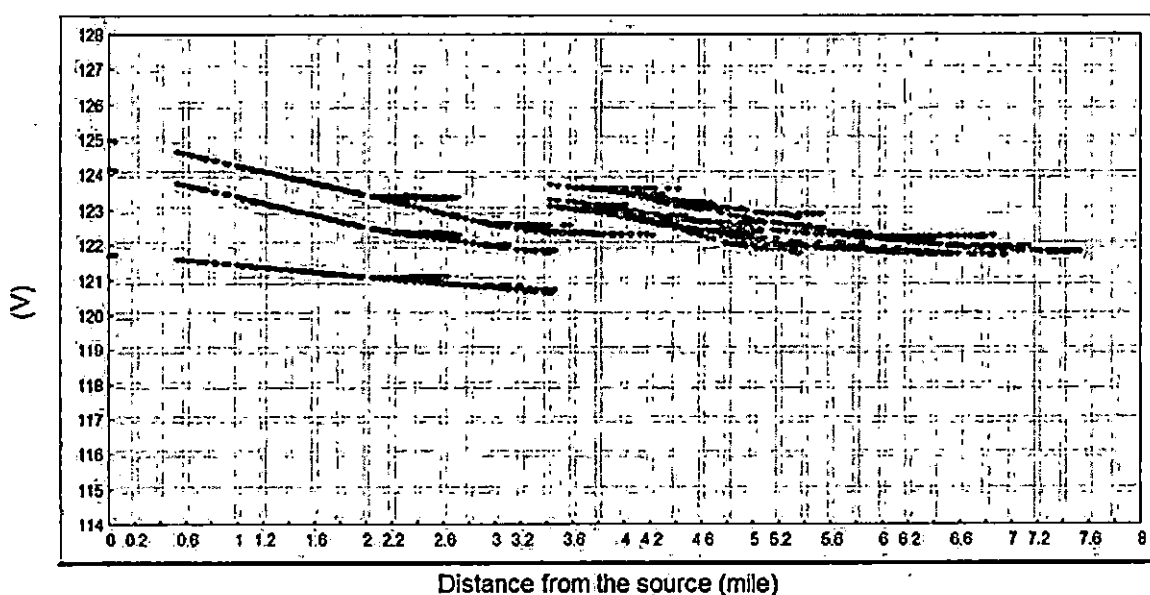
d) Voltage at project injection point shown in result box below

e) Voltage profile of feeder shown in graph below

f) No existing projects on the feeder

Voltage Drop Box													
	V	V(LN)	I	I bal	kVA	kW	kVAR	PF	cKVA	MinVolt	DwLoss	Cust	DwTxUtil
A	122.3498	7.35	2.8	0.03	20.8	-20.1	5.4	-96.56	300.0	122.4	0.00	10	9.33
B	123.2221	7.41	2.7	0.13	19.8	-18.9	6.2	-95.00	325.0	123.2	0.00	1	9.54
C	121.0074	7.28	3.0	-0.17	21.5	-21.0	4.7	-97.61	325.0	121.0	0.00	1	0.00
N			0.3	Total>	62	-60	16	-96.42	950	121.0	0.00	12	8.84
Dist >	2.24	Miles		CBAL %>	0.00		CapVR >	0.000	<V %>	0.000	DwTotLoad%	3.07	
122.3498   123.2221   121.0074   2.8   2.7   3.0   2872   2070													
○ S ⊗ C ○ L													

### Voltage Profile



- Base voltage on phase A
- Base voltage on phase B
- Base voltage on phase C



- g) Flicker Limitations =  $0.26\% < 3\%$
  - h) Distribution Protection
    - Transformer protected by a 20 amp fuse
    - Project will contribute 5 amps of fault current
    - Is not at risk of operation in the event of a fault
  - i) Substation Capacity
    - Total net metering/secondary sell all on the substation: 90 kW
    - Substation rating: 37.33 kVA
    - Total does not exceed 10% of substation rating
  - j) Transformer Winding Configurations
    - Service transformer does have a delta winding on either side
    - An interposing transformer without a delta winding is being utilized
  - k) Inverters
    - Three phase inverters on a three phase service
5. Move relevant sectionalizing devices to be considered up from the distribution transformer, and re-do calculations to compare if it would pass screens.
- a) 90kW project is 121.6% of annual line section peak load

**Mike Burton**

---

**From:** Whitaker, Jessica L. <Jessica.Whitaker@duke-energy.com>  
**Sent:** Thursday, September 7, 2017 4:43 AM  
**To:** brian@irecusa.org  
**Cc:** Sky C. Stanfield; Breitschwerdt, Brett -mcguirewoods; Riggins, Jeff; Gajda, John W; Laura D. Beaton  
**Subject:** RE: Follow Up Questions re Fast Track / Supp Review

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Brian,

The answers to your questions are detailed below.

Thank you,  
Jessica Whitaker



*Distribution Protection Automation and Controls &  
Distributed Generation (DPAC&DG)*

---

**From:** brian@irecusa.org [mailto:brian@irecusa.org]  
**Sent:** Thursday, August 31, 2017 5:44 PM  
**To:** Whitaker, Jessica L.; 'Laura D. Beaton'  
**Cc:** 'Sky C. Stanfield'; Breitschwerdt, Brett -mcguirewoods; Riggins, Jeff; Gajda, John W  
**Subject:** RE: Follow Up Questions re Fast Track / Supp Review

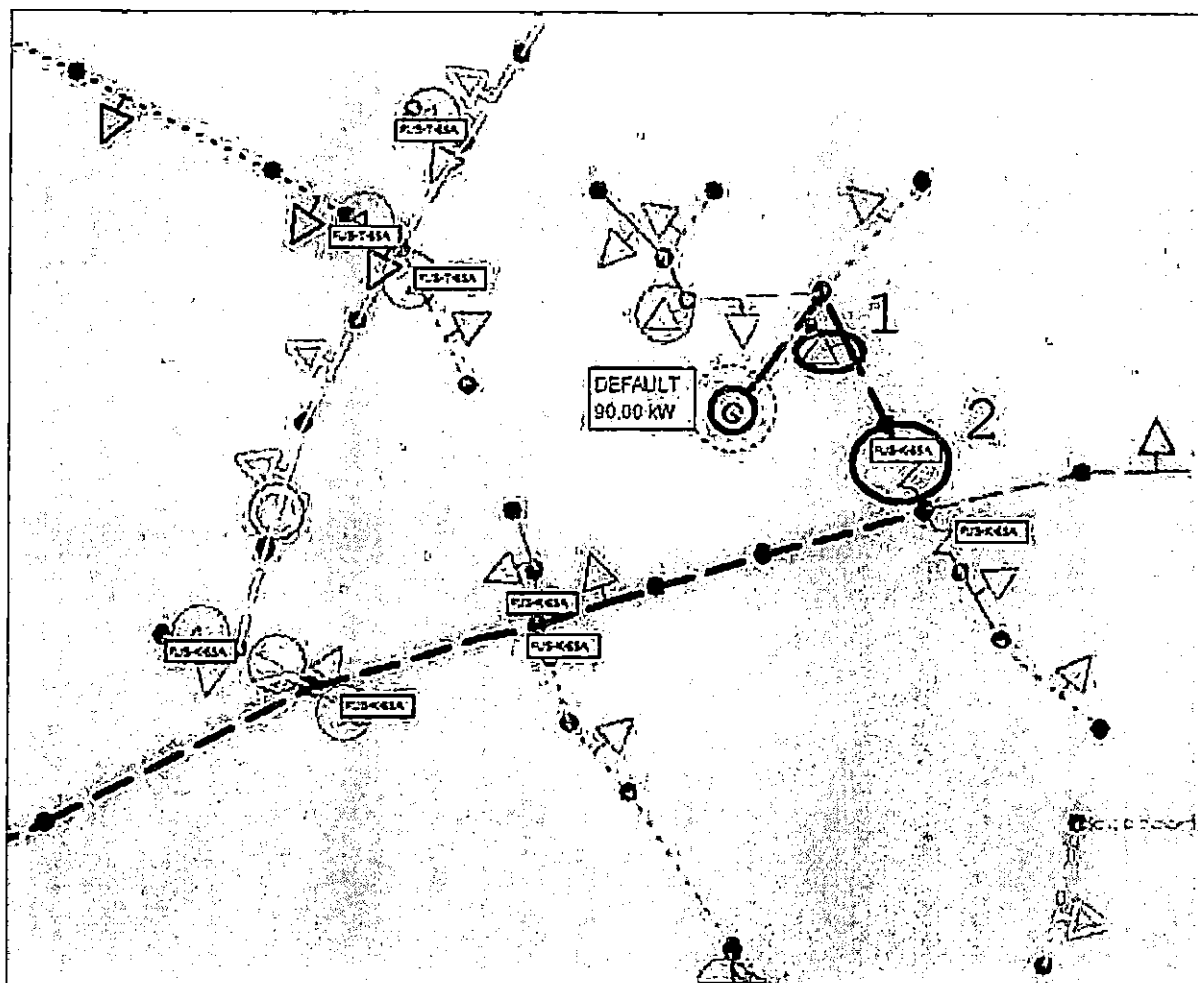
**\*\*\* Exercise caution. This is an EXTERNAL email. DO NOT open attachments or click links from unknown senders or unexpected email. \*\*\***

Hi Jessica,

I appreciate Duke gathering the info on this system. Since it's tough to discern exactly how the screen is addressed with this level of detail, I'm wondering if you might be able to follow up on the below points:

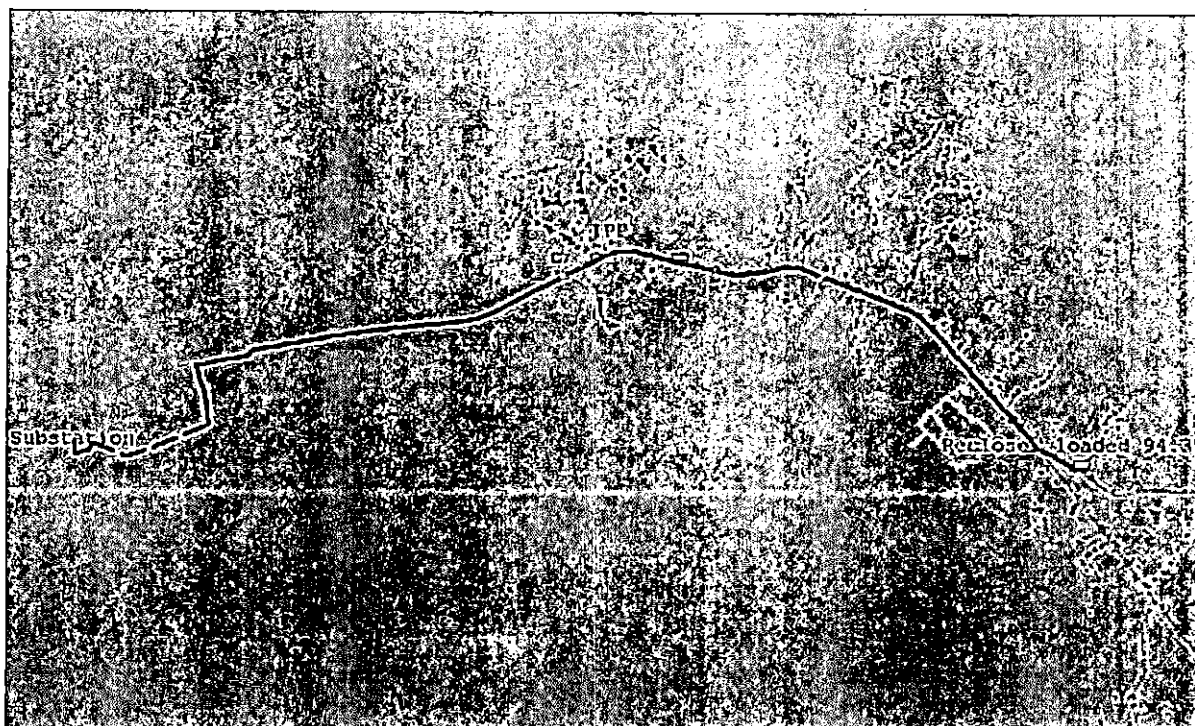
- a. Could you please show the feeder diagram in detail around the following area so we can see where the generator is located, distribution transformer(s), sectionalizing device used for 15% screen, and other loads in the line section, as well as the device used for the calculation in question #5, and associated ratings?





In the figure above, item 1 is the distribution transformer with the sectionalizing device (20A fuse) used for the 15% screen where the generator is located. Item 2 is the sectionalizing device (65A fuse) to be considered upstream from the distribution transformer.

- b. In your response to 4.h it is noted that a 20A fuse is used and project contributes 5A. What device becomes loaded to 94.3%? Is it loaded to that level in absence of the DER?



The figure above shows the location of the device. The device is a recloser with the worst violation of its interrupting rating of 94.3%. Yes, it is loaded without the DER.

- c. Is this example fairly representative of typical practice in application of the two screens, or can you share other notated feeder diagrams for a few other sites that also failed, but perhaps with dissimilar topologies?

Although every circuit has a unique topology, we apply the same concept and evaluate all the applications to the same standard. This example is fairly representative of typical practice.

- d. In 4.i, is it 37.33 kVA or MVA? MVA

Best regards,  
Brian

**Brian Lydic**  
Regulatory Engineer  
Interstate Renewable Energy Council  
734-548-8664 office



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From: Whitaker, Jessica L. [<mailto:Jessica.Whitaker@duke-energy.com>]

Sent: Monday, August 28, 2017 1:43 PM

To: Laura D. Beaton <[Beaton@smwlaw.com](mailto:Beaton@smwlaw.com)>

Cc: Sky C. Stanfield <[stanfield@smwlaw.com](mailto:stanfield@smwlaw.com)>; Brian Lydic ([brian@irecusa.org](mailto:brian@irecusa.org)) <[brian@irecusa.org](mailto:brian@irecusa.org)>; Breitschwerdt, Brett -mcguirewoods <[bbreitschwerdt@mcguirewoods.com](mailto:bbreitschwerdt@mcguirewoods.com)>; Riggins, Jeff <[Jeff.Riggins@duke-energy.com](mailto:Jeff.Riggins@duke-energy.com)>; Gajda, John W <[John.Gajda@duke-energy.com](mailto:John.Gajda@duke-energy.com)>

Subject: RE: Follow Up Questions re Fast Track / Supp Review

Laura,

The Duke responses are provided in the attachment for the questions below.

Thank you,

Jessica Whitaker



*Distribution Protection Automation and Controls &*

*Distributed Generation (DPAC&DG)*

---

**From:** Laura D. Beaton [<mailto:Beaton@smwlaw.com>]  
**Sent:** Thursday, August 17, 2017 12:59 PM  
**To:** Riggins, Jeff ([Jeff.Riggins@duke-energy.com](mailto:Jeff.Riggins@duke-energy.com)) <[Jeff.Riggins@duke-energy.com](mailto:Jeff.Riggins@duke-energy.com)>; Gajda, John W ([John.Gajda@duke-energy.com](mailto:John.Gajda@duke-energy.com)) <[John.Gajda@duke-energy.com](mailto:John.Gajda@duke-energy.com)>; Whitaker, Jessica L. ([Jessica.Whitaker@duke-energy.com](mailto:Jessica.Whitaker@duke-energy.com)) <[Jessica.Whitaker@duke-energy.com](mailto:Jessica.Whitaker@duke-energy.com)>; Breitschwerdt, E. Brett <[bbreitschwerdt@mcguirewoods.com](mailto:bbreitschwerdt@mcguirewoods.com)>  
**Cc:** Sky C. Stanfield <[stanfield@smwlaw.com](mailto:stanfield@smwlaw.com)>; Brian Lydic ([brian@irecusa.org](mailto:brian@irecusa.org)) <[brian@irecusa.org](mailto:brian@irecusa.org)>  
**Subject:** Follow Up Questions re Fast Track / Supp Review

All,

Thanks for your participation in the call yesterday. We really appreciate Duke's helpfulness in sharing information so we can understand what's working and what's not with interconnection in North Carolina. There were a few questions we didn't get a chance to ask on the call, and I was hoping you'd be able to answer them for us via email.

First, regarding the recloser requirement—is this ever applied to projects under 1MW? If so, how do you decide which projects require a recloser?

Second, regarding the 15% peak load screen—I was wondering if you could help illustrate how you apply the 15% peak loads screen and subsequent supplemental review for a smaller (<500kW) project. We think it would be helpful if you could provide the following information for one or two projects:

1. Select a smaller (<500kW) project that failed 3.2.1.2 and 3.2.1.7
2. Show a circuit diagram of where the system is located, including other loads, DER and sectionalizing devices upstream and downstream the feeder from the associated distribution transformer.
3. Include gen:load and overcurrent device calculations to show how the respective screens were failed, utilizing the utility practice of considering the distribution transformer fuse.
4. Describe what supplemental review criteria were then satisfied to allow the system to pass.
5. Move relevant sectionalizing devices to be considered up from the distribution transformer, and re-do calculations to compare if it would pass screens.

Let me know if you'll be able to provide us with this info, and if you have any questions.

Thank you!

Laura

Laura D. Beaton

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Feb 13 2019

Exhibit BL-Rebuttal-1

# **Solar Energy Industries Association Survey of Members**

**December 2018**

27 Member Companies Operating in Top Solar States Responded

This survey was conducted as a courtesy for the Interstate Renewable Energy Council, Inc.

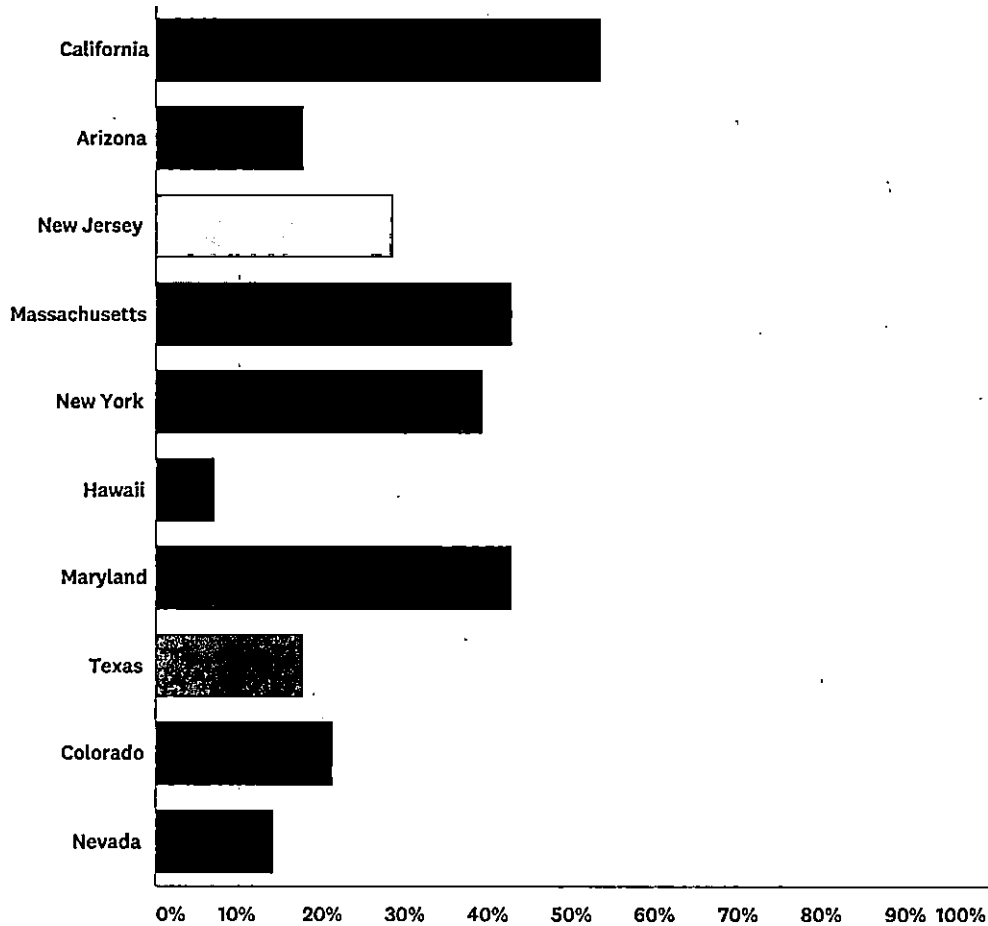


Q1 Company Name:

Answered: 28    Skipped: 0

Q2 Of the top 10 solar states for distributed generation, please check the states where you have or are installing DG PV systems:

Answered: 28 Skipped: 0

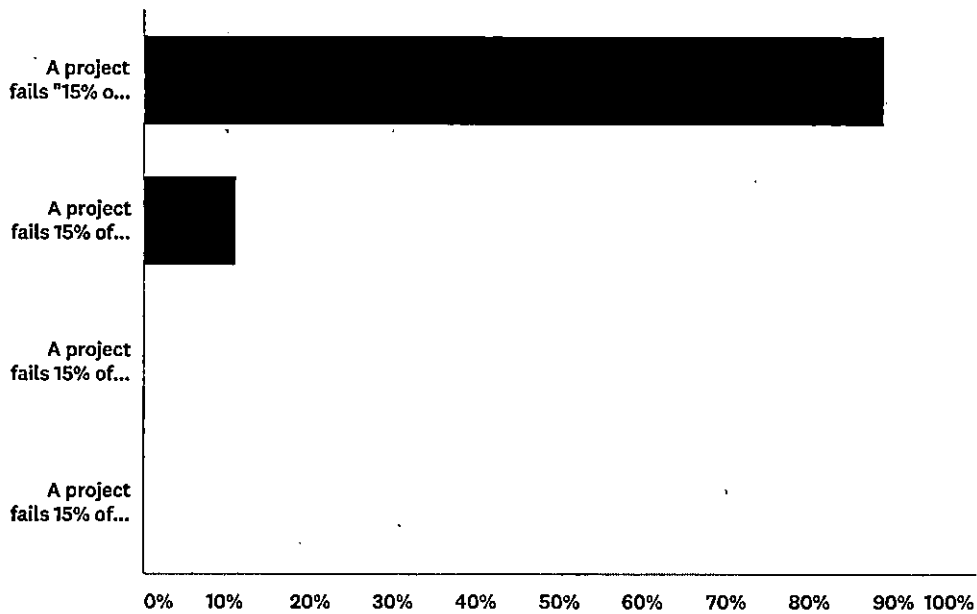


ANSWER CHOICES	RESPONSES	
California	53.57%	15
Arizona	17.86%	5
New Jersey	28.57%	8
Massachusetts	42.86%	12
New York	39.29%	11
Hawaii	7.14%	2
Maryland	42.86%	12
Texas	17.86%	5
Colorado	21.43%	6
Nevada	14.29%	4

Total Respondents: 28

## Q3 Interconnection for PV system sizes 1-20kW:

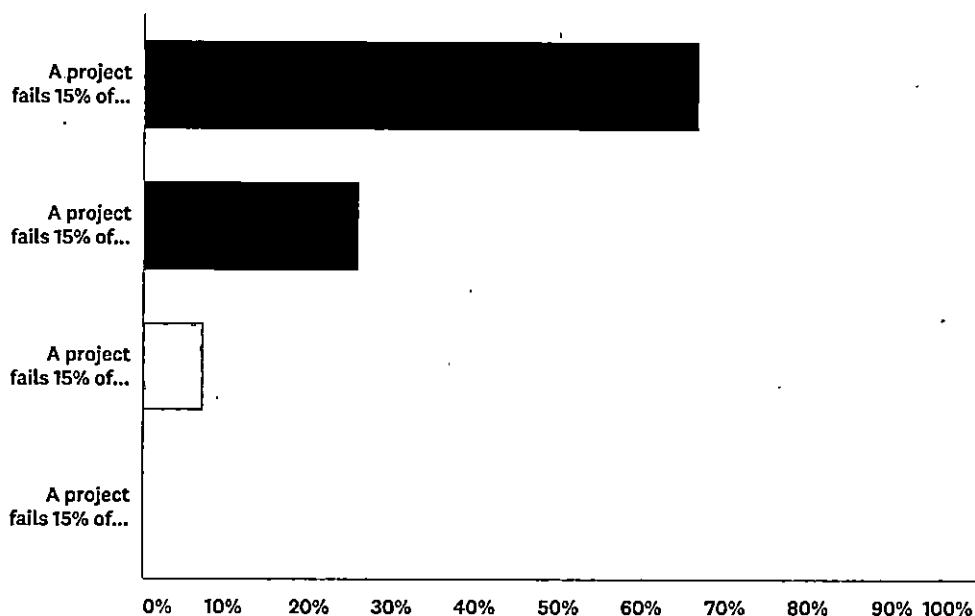
Answered: 27 Skipped: 1



ANSWER CHOICES	RESPONSES	
A project fails "15% of Peak Load screen" almost never (0-25% of the time)	88.89%	24
A project fails 15% of Peak Load screen approximately 25-50% of the time	11.11%	3
A project fails 15% of Peak Load screen approximately 50-75% of the time	0.00%	0
A project fails 15% of Peak Load screen almost every single time (>75% of the time)	0.00%	0
TOTAL		27

## Q4 Interconnection for PV system sizes 20kW-100kW:

Answered: 27 Skipped: 1



## ANSWER CHOICES

## RESPONSES

A project fails 15% of Peak Load screen almost never (0-25% of the time)	66.67%	18
A project fails 15% of Peak Load screen approximately 25-50% of the time	25.93%	7
A project fails 15% of Peak Load screen approximately 50-75% of the time	7.41%	2
A project fails 15% of Peak Load screen almost every single time (>75% of the time)	0.00%	0
TOTAL		27

Q5 Are you willing to be contacted about your answers to possibly include them in an interconnection proceeding? If so, please provide your name and email.

Answered: 14 Skipped: 14

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-100, SUB 101

In the Matter of	)	Agreement and Stipulation of Partial
Petition for Approval of	)	Settlement by and between Duke Energy
Generator Interconnection	)	Carolinas, LLC, Duke Energy Progress,
Standard	)	LLC, Dominion Energy North Carolina,
	)	North Carolina Pork Council and the Public
	)	Staff – North Carolina Utilities Commission

Duke Energy Carolinas, LLC (“DEC”), Duke Energy Progress, LLC (“DEP” and together with DEC, the “Companies”), Dominion Energy North Carolina (“DENC”), North Carolina Pork Council (“Pork Council”), and the Public Staff – North Carolina Utilities Commission (“Public Staff” and together with DEC, DEP, DENC, and Pork Council, the “Parties”) through counsel and pursuant to N.C. Gen. Stat. § 62-69 respectfully submit this Agreement and Stipulation of Partial Settlement (“Stipulation”) for consideration by the North Carolina Utilities Commission (“Commission”) in the above-captioned proceeding.

The Stipulating Parties agree and stipulate as follows:

1. **Background.**

- a. On January 29, 2018, DEC, DEP, and DENC filed their Initial Comments in this docket in response to the North Carolina Utilities Commission’s (“Commission”) December 20, 2017 Order Requesting Comments issued. Such Initial Comments also included a set of proposed modifications (“Initial Modifications”) to the North Carolina Interconnection Procedures (“NC Procedures”).
- b. Additional changes have been made to the Initial Modifications over the past several months resulting either from dialogue among the Parties or the Companies’ identification of additional needed changes. The Companies’ currently proposed modification (“Revised Modifications”) were attached to the rebuttal testimony of John W. Gajda filed in this docket on January 8, 2019.