



**NORTH CAROLINA
PUBLIC STAFF
UTILITIES COMMISSION**

September 18, 2020

Ms. Kimberley A. Campbell, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

Re: Docket No. EMP-111, Sub 0 – Application for Certificate of Public Convenience and Necessity to Construct a 94-MW Solar Facility in Halifax County, North Carolina

Dear Ms. Campbell:

In connection with the above-referenced docket, I transmit herewith for filing on behalf of the Public Staff the confidential testimony and exhibits of Jay B. Lucas, Manager, Electric Section – Operations and Planning, Energy Division.

By copy of this letter, I am forwarding a copy of the redacted version to all parties of record by electronic delivery. The confidential version will be provided to those parties that have entered into a confidentiality agreement.

Sincerely,

Electronically submitted
/s/ Megan Jost
Staff Attorney
megan.jost@psncuc.nc.gov

Attachments

Executive Director
(919) 733-2435

Communications
(919) 733-5610

Economic Research
(919) 733-2267

Legal
(919) 733-6110

Transportation
(919) 733-7766

Accounting
(919) 733-4279

Consumer Services
(919) 733-9277

Electric
(919) 733-2267

Natural Gas
(919) 733-4326

Water
(919) 733-5610

4326 Mail Service Center • Raleigh, North Carolina 27699-4300
An Equal Opportunity / Affirmative Action Employer

OFFICIAL COPY

Sep 18 2020

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. EMP-111, SUB 0

In the Matter of)	TESTIMONY OF
Application of Sweetleaf Solar LLC for)	JAY B. LUCAS
a Certificate of Public Convenience and)	PUBLIC STAFF – NORTH
Necessity to Construct an 94-MW Solar)	CAROLINA UTILITIES
Facility in Halifax County, North)	COMMISSION
Carolina)	

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. EMP-111, SUB 0

Testimony of Jay B. Lucas

On Behalf of the Public Staff

North Carolina Utilities Commission

September 18, 2020

1 **Q. PLEASE STATE YOUR NAME AND ADDRESS FOR THE**
2 **RECORD.**

3 A. My name is Jay B. Lucas. My business address is 430 North
4 Salisbury Street, Raleigh, North Carolina.

5 **Q. BRIEFLY STATE YOUR QUALIFICATIONS AND DUTIES.**

6 A. My qualifications and duties are included in Appendix A.

7 **Q. WHAT IS YOUR POSITION WITH THE PUBLIC STAFF?**

8 A. I am the manager of the Electric Section – Operations and Planning
9 in the Public Staff's Energy Division.

10 **Q. WHAT IS THE PURPOSE OF YOUR SUPPLEMENTAL**
11 **TESTIMONY IN THIS PROCEEDING?**

12 A. The purpose of my testimony is to make recommendations to the
13 Commission on the request filed on June 2, 2020, for a certificate of

1 public convenience and necessity (CPCN) filed by Sweetleaf Solar
2 LLC (Sweetleaf or Applicant), to construct a 94-megawatt AC
3 (MW_{AC}) solar photovoltaic electric generating facility near Enfield in
4 Halifax County, North Carolina (the Facility).

5 On July 8, 2020, the Commission issued its *Order Requiring Filing of*
6 *Testimony, Establishing Procedural Guidelines, and Requiring*
7 *Public Notice* (July 8 Order). The July 8 Order called for a remote
8 public witness hearing on the application to be held on August 24,
9 2020, and an expert witness hearing to be held on October 5, 2020.
10 In addition, the July 8 Order required the Applicant to file
11 supplemental testimony, which was filed by the Applicant's witness
12 Donna Robichaud on August 11, 2020.

13 My testimony also responds to the supplemental testimony and
14 addresses other matters raised in the July 8 Order.

15 I. BACKGROUND AND COMPLIANCE WITH N.C. GEN. STAT. § 62-
16 110.1 AND COMMISSION RULE R8-63

17 **Q. PLEASE PROVIDE A BRIEF HISTORY OF THE APPLICATION.**

18 A. The application filed on June 2, 2020, included the direct testimony
19 of witnesses Donna Robichaud and Kara Price. The Facility will
20 interconnect to the Hornertown-Hathaway 230 kilovolt (kV)
21 transmission line owned by Virginia Electric and Power Company,

1 d/b/a Dominion Energy North Carolina (DENC). Since DENC is part
2 of PJM Interconnection (PJM), the Applicant is required to enter into
3 an interconnection service agreement with both entities. The Facility
4 has PJM queue number AD1-056/AD1-057. AD1-056 represents 60
5 MW of capacity, and AD1-057 represents 34 MW of capacity.

6 **Q. PLEASE DESCRIBE THE STATEMENT OF NEED PROVIDED BY**
7 **THE APPLICANT FOR ITS PROPOSED FACILITY.**

8 A. Exhibit 3 of the Application provided a description of the need for the
9 facility in North Carolina and the broader region. As a result of the
10 facility's interconnection with DENC, the facility has access to PJM,
11 providing it with the opportunity to take advantage of several offtake
12 opportunities in the PJM market, including: (1) the PJM
13 Interconnection wholesale market, (2) ancillary services sales
14 (reactive power and voltage control services) under the PJM tariffs;
15 and (3) corporate off-take agreements. The Applicant states that it
16 anticipates contracting the sale of energy, capacity, and renewable
17 energy credits (RECs) through PJM, and that the summer peak load
18 in PJM is expected to grow by 0.6% per year over the next ten years,
19 and by 0.5% over the next 15 years. In the Dominion Virginia Power
20 (DOM) Zone, summer peak load growth is expected to grow by 1.2%
21 per year over the next ten years, and 1.0% per year over the next 15
22 years.

1 The Applicant also noted that:

2 In addition, on May 1, 2020, Dominion Energy Virginia
3 filed a 15-year Integrated Resource Plan (“IRP”) almost
4 quadrupling the amount of solar in its planned
5 generation portfolio, from 4400 MW in its 2019 IRP to
6 15,900 MW. Dominion has also issued a request for
7 proposal soliciting bids for up to 1,000 megawatts
8 (MW) of solar and onshore wind generation.
9 Dominion’s commitment is consistent with state-level
10 policy set by the Virginia General Assembly, which
11 affirmed the growing importance of renewable energy
12 generation in passing the Grid Transformation and
13 Security Act of 2018 (the “GTSA”), signed into law by
14 Governor Ralph Northam on March 9, 2018. The GTSA
15 finds that up to an additional 5,000 MW of utility-scale
16 electric generating facilities powered by solar and wind
17 energy is in the public interest, along with up to an
18 additional 500 MW of non-utility scale solar or wind
19 generating facilities, including rooftop solar
20 installations. In addition, on March 6, 2020, the Virginia
21 General Assembly passed Virginia SB 851, which
22 dramatically accelerates and increases the need for
23 solar power facilities in that state. The law calls for
24 Dominion Energy Virginia and the smaller Appalachian
25 Power Co. to supply 30 percent of their power from
26 renewables by 2030, and to close all carbon-emitting
27 power plants by 2045 for Dominion and by 2050 for
28 Appalachian. These laws will ensure a robust market
29 for renewable resources in PJM territory over the
30 lifetime of the Project.¹

31 **Q. HAS THE STATE CLEARINGHOUSE COMPLETED ITS**
32 **APPLICATION REVIEW?**

33 A. No. In response to the Commission’s July 8 Order, the State
34 Clearinghouse on August 31, 2020, filed initial comments requesting
35 that the Applicant file additional information. The Department of

¹ Application at 14.

1 Cultural Resources has recommended that a comprehensive
2 archaeological survey of the project area be conducted by an
3 experienced archaeologist.

4 **Q. PLEASE DESCRIBE THE PUBLIC TESTIMONY IN THE AUGUST**
5 **24, 2020, HEARING.**

6 A. One public witness, Mr. Lawrence Watts, testified at the hearing. Mr.
7 Watts presented general information on the electric grid and solar
8 energy. His comments were not specific to the Facility or the
9 application filed by Sweetleaf.

10 II. COMPLIANCE WITH THE JULY 8 ORDER AND LEVELIZED COST
11 OF TRANSMISSION (LCOT) ANALYSIS

12 **Q. PLEASE DESCRIBE THE TRANSMISSION-RELATED**
13 **QUESTIONS THE COMMISSION INCLUDED IN ITS JULY 8**
14 **ORDER.**

15 A. In its July 8 Order, the Commission noted the increase in non-utility
16 generation on the North Carolina system and recognized its statutory
17 duty to examine the long-range needs for the generation of electricity
18 in North Carolina. It directed the Applicant to file additional testimony
19 and exhibits addressing the following questions:

20 1. Provide the amount of network upgrades on
21 DENC's or any affected system's transmission
22 system, if any, required to accommodate the
23 operation of the Applicant's proposed facility.

- 1 2. Provide the Levelized Cost of Transmission
2 (LCOT) information for any required
3 transmission system upgrades or modifications.
- 4 3. Provide any interconnection study received for
5 the proposed facility. If you have not received a
6 study, provide a date by when the study is
7 expected to be completed.
- 8 4. Are you aware of any system other than the
9 studied system that is or will be affected by the
10 interconnection? If yes, explain the impact and
11 basis.
- 12 5. If the Applicant proposes to sell energy and
13 capacity from the facility to a distribution utility
14 regulated by the Commission, provide a
15 discussion of how the facility's output conforms
16 to or varies from the regulated utility's most
17 recent IRP.
- 18 6. If the Applicant proposes to sell energy and
19 capacity from the facility to a distribution utility
20 not regulated by the Commission but serving
21 retail customers in North Carolina (e.g., a co-op
22 or muni), provide a discussion of how the
23 facility's output conforms to or varies from the
24 purchasing distribution utility's long-range
25 resource plan.
- 26 7. If the Applicant proposes to sell energy and
27 capacity from the facility to a purchaser who is
28 subject to a statutory or regulatory mandate with
29 respect to its energy sourcing (e.g., a REPS
30 requirement or Virginia's new statutory mandate
31 for renewables), explain how, if at all, the facility
32 will assist or enable compliance with that
33 mandate. Provide any contracts that support
34 that compliance.
- 35 8. Provide any PPA agreements, REC sale
36 contracts, or contracts for compensation for
37 environmental attributes for the output of the
38 facility.²

² July 8 Order at 2.

1 **Q. DID WITNESS ROBICHAUD PROVIDE LCOT CALCULATIONS**
2 **FOR PJM NETWORK UPGRADES IN HER SUPPLEMENTAL**
3 **TESTIMONY?**

4 A. Yes, in testimony filed on August 11, 2020, witness Robichaud
5 provided an LCOT analysis for the network upgrades based on the
6 project's December 2019 System Impact Study (SIS), as well as
7 alternative LCOT analyses based on updated information provided
8 in interconnection reports for other facilities, and taking into
9 consideration projects that have withdrawn from the PJM queue.
10 Witness Robichaud noted that it is not possible to prepare a definitive
11 LCOT analysis at this time because a project's SIS might not reveal
12 the final network upgrade costs for that project. The final costs will
13 not be known until PJM executes the Interconnection Services
14 Agreement (ISA), which is scheduled for release for the Facility on
15 April 30, 2021. Witness Robichaud did state, however, that under
16 either of her evaluated scenarios, the final network upgrade costs
17 would not be reimbursed by ratepayers.

18 Using cost information from other related projects in the PJM queue,
19 witness Robichaud determined an LCOT of **[BEGIN**
20 **CONFIDENTIAL]** [REDACTED] **[END CONFIDENTIAL]** if Sweetleaf
21 had to pay for the full cost of network upgrades on the Hornertown –
22 Hathaway line. However, if other projects that require upgrade of this
23 line proceed, the LCOT is reduced to **[BEGIN CONFIDENTIAL]**

1 [REDACTED] [END CONFIDENTIAL]. These amounts are in
2 response to a Public Staff data request and differ from the amounts
3 listed in her supplemental testimony. See **Confidential Lucas**
4 **Exhibit 1.**

5 **Q. DID WITNESS ROBICHAUD PROVIDE AN LCOT ANALYSIS FOR**
6 **ANY AFFECTED SYSTEM UPGRADES IN HER SUPPLEMENTAL**
7 **TESTIMONY?**

8 A. Yes, to a limited extent and based on the current information
9 available. PJM has determined that generation by the Facility has the
10 potential to affect three transmission lines owned by Duke Energy
11 Progress, LLC (DEP): the Rocky Mount-Battleboro 115 kV line, the
12 Everetts-Greenville 230 kV line, and the Rocky Mount-Hathaway 230
13 kV line. DEP completed an affected system study for its Rocky
14 Mount-Battleboro line in May 2020 for PJM cluster AC1 (DEP AC1
15 Report), but this report does not include upgrades needed for PJM
16 cluster AD1. Witness Robichaud indicated that DEP expects to
17 release an affected system study report on its portion of the Everetts-
18 Greenville 230 kV line in September or October 2020. She stated,
19 however, the potential effects on the three transmission lines might
20 not materialize because some projects will most likely withdraw from
21 the queue. Also, DEP began independent modeling of the
22 transmission system in the spring of 2020, which could provide

1 different results. Previously, DEP relied on PJM's planning
2 assumptions.

3 The only affected system study report currently available for the
4 PJM/DEP interface is the DEP AC1 Report. The total projected cost
5 for upgrade of the Rocky Mount-Battleboro line is \$23,204,593. Most
6 of the cost is required to re-conductor and rebuild 8.5 miles of the
7 line. Witness Robichaud calculated an LCOT of \$0.57/MWh for the
8 Rocky Mount-Battleboro upgrade assuming that several projects in
9 the AC1, AC2, and AD1 clusters are completed. For the Everetts-
10 Greenville 230 kV line, she calculated an LCOT of [BEGIN

11 **CONFIDENTIAL]** [REDACTED]
12 [REDACTED]
13 [REDACTED]
14 [REDACTED]
15 [REDACTED]. [END

16 **CONFIDENTIAL]** However, she cautioned that these two LCOTs
17 were based on a cost estimate from a PJM SIS, not from any DEP
18 studies.

19 **Q. DID THE PUBLIC STAFF REQUEST ADDITIONAL INFORMATION**
20 **FROM DEP REGARDING THE AFFECTED SYSTEM STUDY**
21 **TIMELINE FOR PJM CLUSTER AD1 OR OTHER LATER**
22 **CLUSTERS?**

1 A. Yes. **Lucas Exhibit 2** is a data request submitted by the Public Staff
2 to DEP requesting information on the number and timeline for all
3 affected system studies currently being conducted by DEP, and it
4 includes DEP's response. The response shows that DEP is currently
5 conducting 22 affected system studies for projects in PJM. The only
6 completed study is the DEP AC1 Report. As indicated in the table
7 provided, DEP anticipates completing affected system studies for
8 Clusters AC2, AD1, and AD2, on October 1, 2020, with a total of
9 approximately 677 MW of capacity being evaluated in those three
10 clusters. DEP also indicated that it is currently conducting affected
11 system studies on approximately 2 gigawatts (GW) of existing
12 capacity in Clusters AE1 and AE2, but the timeline for completing
13 those affected system studies is not known at this time.

14 **Q. HOW ARE THE UPGRADES TO THE DEP SYSTEM DIFFERENT**
15 **THAN THE UPGRADES REQUIRED WITHIN PJM?**

16 A. The upgrade costs in the PJM system must generally be paid for by
17 the Facility and are not reimbursable. With respect to the affected
18 systems, such as DEP, one or more of the generators will be
19 responsible for these network upgrade costs, consistent with the
20 Joint Open Access Transmission Tariff of Duke Energy Carolinas,
21 LLC (DEC), Duke Energy Florida, LLC, and DEP (Duke OATT).
22 However, pursuant to the Duke OATT, upon commercial operation,
23 the interconnection customer(s) that paid for the network upgrades

1 would be entitled to receive repayment from DEP of the entire
2 balance of the network upgrades cost plus interest at the monthly
3 interest rates posted by the Federal Energy Regulatory Commission
4 (FERC). Following repayment, DEP would seek to recover those
5 costs from its wholesale and retail customers.

6 **Q. DO YOU HAVE ANY CONCERNS ABOUT USE OF THE LCOT?**

7 A. Yes. The Public Staff does not disagree with witness Robichaud's
8 LCOT calculations, but still has some concerns regarding application
9 of the LCOT to network upgrade costs identified in an affected
10 system study that results in costs being borne by another utility's
11 ratepayers who do not see a direct benefit.

12 In her supplemental testimony, witness Robichaud fully explains the
13 tentative nature of her LCOT calculations because many necessary
14 cost estimates for upgrades are not available.

15 On June 11, 2020, the Commission issued an *Order Denying*
16 *Application for a Certificate of Public Convenience and Necessity for*
17 *a Merchant Generating Facility* requested by Friesian Holdings, LLC
18 (Friesian), in Docket No. EMP-105, Sub 0. In that Order, the
19 Commission found that, "The use of the levelized cost of
20 transmission (LCOT) provides a benchmark as to the
21 reasonableness of the transmission network upgrade cost
22 associated with interconnecting a proposed new generating facility."

1 The Public Staff agrees with the Commission; however, an LCOT
2 calculation that only includes the network upgrades required by an
3 affected system to which a generating facility is not directly
4 interconnected would be distorted by the fact that: (1) energy flows
5 occur that provide no direct benefit to DEP customers, (2) network
6 upgrades on the DENC system, whose costs may be borne by the
7 interconnection customer or DENC's customers, may also be
8 required, and (3) the projected need for the Facility and any network
9 upgrades is not driven by DEP.

10 As noted in the concurring opinion by Chair Mitchell to the
11 Commission's September 2, 2020, *Order on Reconsideration* in
12 Docket No. EMP-107, Sub 0, (Halifax Order on Reconsideration), a
13 properly calculated LCOT may be used as a benchmark to consider
14 the overall costs of transmission needed to interconnect a solar
15 facility, but it is just one factor to be considered in determining
16 whether to grant a CPCN to a merchant generating facility:

17 Prior to the Federal Energy Regulatory Commission's
18 open access transmission rule, Order No. 888, and the
19 formation of regional transmission organizations, the
20 Commission would not approve siting of a true
21 merchant plant. When the Commission adopted Rule
22 R8-63 and opened the door for the construction of
23 merchant generating facilities, it was assumed that the
24 developer of a facility would bear all of the financial risk
25 and that no costs would be imposed upon retail
26 ratepayers other than those costs that would flow from
27 the purchase of power from the facility by a utility under
28 least cost principles. When that is still the case, the

1 LCOT analysis is less important. Whatever costs are
2 caused are borne by the developer and recovered
3 through the sale of power, which is bounded either by
4 such least costs principles if in a traditional bilateral
5 wholesale power market such as most of this State or
6 by the market clearing price in a restructured market,
7 such as PJM. When that is not the case, it is the
8 Commission's role and obligation to protect retail
9 ratepayers from unreasonable costs.³

10 **Q. HAVE CLUSTER STUDIES AFFECTED THE PUBLIC STAFF'S**
11 **REVIEW OF CPCN APPLICATIONS?**

12 A. Yes. On pages 13 and 14 of my direct testimony filed on November
13 19, 2018, in Docket No. E-100, Sub 101, I discussed the use of
14 grouping studies or cluster studies by DEP and DEC as one method
15 to increase the efficiency of interconnecting multiple generators. PJM
16 is currently evaluating multiple cluster studies with increased
17 complexity, which are affecting individual transmission lines that
18 interconnect to adjoining systems not under the control of PJM.

19 Determining the total cost to the using and consuming public of
20 multiple generator projects in multiple cluster studies is difficult
21 because of the fluid nature of generator projects. For example,
22 facilities can and do withdraw from a cluster, and the revised total
23 capacity or project location may no longer trigger the need for some
24 or all of the network upgrades identified in an affected system study.

³ Order on Reconsideration, *Application of Halifax County Solar, LLC, for a Certificate of Public Convenience and Necessity to Construct an 80-MW Solar Facility in Halifax County, North Carolina*, No. EMP-107, Sub 0, at 2 (Mitchell, C., concurring) (N.C.U.C. September 2, 2020).

1 However, it is possible that the next cluster study may retrigger those
2 costs and/or cause additional costs and additional upgrades.

3 **Q. DO YOU HAVE CONCERNS ABOUT THE COSTS OF AFFECTED**
4 **SYSTEM UPGRADES?**

5 A. Yes.

6 (1) As shown in Slide 10 in **Lucas Exhibit 3**, the North Carolina
7 PJM queue had 4,503 MW of solar capacity as of December
8 31, 2019. Even if the total capacity and energy that is
9 ultimately constructed has a low LCOT for the utility for which
10 the generation will be directly interconnected, it could still
11 trigger many millions of dollars of affected system upgrades
12 that DEP's customers would have to pay for but may not need
13 for reliable electric service. **Lucas Exhibit 3** is a PJM
14 infrastructure report for North Carolina completed in May 2020
15 and updated in July 2020.

16 (2) As previously discussed in the Applicant's statement of need,
17 the Virginia Clean Economy Act⁴ could lead to more
18 renewable energy facilities in DENC above those facilities in
19 the PJM's North Carolina queue. Many factors make
20 northeastern North Carolina appealing to locate solar

⁴ The Virginia Clean Economy Act, signed in to law on April 11, 2020, set clean energy and carbon emissions standards, and included numerous other requirements to encourage the adoption and construction of clean energy in Virginia. The full bill summary is at <https://lis.virginia.gov/cgi-bin/legp604.exe?201+sum+HB1526>.

1 facilities, including inexpensive, flat land, and the fact that
2 DENC is the southernmost point in PJM, thus receiving the
3 most direct sunlight.

4 (3) An affected system could build network upgrades that go
5 unused for extended periods of time because some
6 interconnection projects withdraw from the queue late in the
7 review process. For example, even after signing the final
8 agreement, 793 MW of capacity withdrew from PJM's North
9 Carolina queue as shown in **Lucas Exhibit 3**, Slide 13.

10 (4) Network upgrades on the Rocky Mount-Battleboro line
11 necessitated by PJM's cluster AC1 could soon be inadequate
12 due to the needs of future facilities in PJM's North Carolina
13 queue. Witness Robichaud states, "For example, if the DEP
14 Rocky Mount-Battleboro 115 kV line is constructed because
15 of impacts from the AC1 cluster, projects in the AC2, AD1, and
16 later clusters will benefit from that Upgrade."

17 Because of future clusters, upgrades to accommodate the
18 AC1 cluster could soon need to be replaced with even greater
19 transmission assets long before the end of their normal
20 service life (40 to 60 years). As such, a large part of the
21 approximately \$23 million spent to upgrade the Rocky Mount-
22 Battleboro line, costs which would ultimately be borne by DEP
23 customers, could be wasted.

1 **Q. DOES THE CLUSTER STUDY REVIEW PERIOD AFFECT THE**
2 **PUBLIC STAFF’S REVIEW OF CPCN APPLICATIONS?**

3 A. Yes. The development of cluster studies and accurate cost estimates
4 for network upgrades can take years, but the CPCN application
5 review by the Public Staff must be completed in just a few months.
6 As noted in Finding of Fact No. 11 in the Friesian Order:

7 It is appropriate for the Commission to consider the
8 total construction costs of a facility, including the cost
9 to interconnect and to construct any necessary
10 transmission network upgrades, when determining the
11 public convenience and necessity of a proposed new
12 generating facility.

13 The Public Staff finds itself increasingly being asked to provide a
14 recommendation to the Commission on approval of a CPCN
15 application without knowing the potential costs to be borne by the
16 using and consuming public for network upgrades. As such, the
17 Public Staff believes it may be appropriate for the Commission to
18 require additional certainty from CPCN applicants as to
19 interconnection costs, transmission network upgrades, and any
20 potential affected system costs, before making any decision on
21 whether to grant a CPCN to a proposed new generating facility.

22 III. CONCLUSIONS AND RECOMMENDATIONS

23 **Q. DOES THE PUBLIC STAFF HAVE ANY OTHER COMMENTS?**

1 A. Yes. The continued increase in non-utility generation seeking to be
2 constructed and interconnected in North Carolina raises questions
3 about the costs and long-range needs for the generation. The
4 amount of capacity in PJM's interconnection queue for North
5 Carolina (over 4,500 MW) is large compared to the 1,129 MW of
6 solar capacity that has been recently reviewed by the Commission.
7 **Lucas Exhibit 4** provides a summary of these recent proceedings.
8 The Public Staff expects more CPCN applications for electric
9 merchant power facilities in DENC territory in the near future. In
10 evaluating options for this Application, the Pubic Staff has relied upon
11 its prior recommendations in Docket No. EMP-107, Sub 0, Docket
12 No. EMP-108, Sub 0, and the Commission's Halifax Order on
13 Reconsideration. In the Halifax Order on Reconsideration, the
14 Commission affirmed the granting of the CPCN to Halifax while
15 considering the limited information available for potential affected
16 system upgrade costs to ratepayers. Following that decision, the
17 Commission on September 16, 2020, issued its *Order Requiring*
18 *Comments and Reply Comments Regarding Affected System Study*
19 *Process and Cost Allocation* in Docket No. E-100, Sub 170 (Sub 170
20 Proceeding), to address some of the concerns being raised by the
21 increasing amounts of non-utility generation being proposed to be
22 constructed in North Carolina. The Public Staff appreciates the
23 Commission's recognition of the challenges in evaluating potential

1 network upgrades on affected systems and their respective cost
2 impact on retail and wholesale customers. The information and
3 conclusions provided in that proceeding will help to clarify the review
4 of whether proposed merchant generating facilities triggering
5 significant network upgrade costs or affected system costs are in the
6 public convenience and necessity, and help to protect retail
7 ratepayers from unreasonable costs.

8 **Q. WHAT IS THE PUBLIC STAFF'S RECOMMENDATION ON**
9 **SWEETLEAF'S APPLICATION FOR A CPCN?**

10 A. After reviewing the application, the direct testimony of witnesses
11 Robichaud and Price, the supplemental testimony of witness
12 Robichaud, and the other evidence in the record and obtained
13 through discovery, the Public Staff remains concerned that
14 insufficient information regarding the total costs to construct the
15 facility, including the costs to interconnect and to construct any
16 necessary transmission network upgrades, is available at this time
17 to recommend approval of the CPCN for the Facility. The Public Staff
18 notes that the affected system studies being conducted by DEP for
19 Cluster AD1 are anticipated to be completed on October 1, 2020, and
20 can then be evaluated to provide better information on all costs
21 associated with the Facility. In addition, the Public Staff notes that
22 the Commission's Sub 170 Proceeding calls for the utilities to file
23 comments regarding the affected system study process and cost

1 allocation on October 7, 2020, and for all parties to file reply
2 comments on October 14, 2020. The topics raised in the Sub 170
3 Proceeding are directly applicable to this merchant application and
4 other applications currently pending before the Commission.
5 Therefore, the Public Staff recommends that the Commission hold
6 the Application in abeyance until such time as the affected system
7 study costs for Cluster AD1 can be reviewed and the additional
8 information submitted in the Sub 170 Proceeding can be evaluated
9 by the Public Staff and the Commission before proceeding with a
10 determination of whether the CPCN for the facility should be granted.

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

12 **A.** Yes, it does

QUALIFICATIONS AND EXPERIENCE

JAY B. LUCAS

I graduated from the Virginia Military Institute in 1985, earning a Bachelor of Science Degree in Civil Engineering. Afterwards, I served for four years as an engineer in the Air Force performing many civil and environmental engineering tasks. I left the Air Force in 1989 and attended the Virginia Polytechnic Institute and State University (Virginia Tech), earning a Master of Science degree in Environmental Engineering. After completing my graduate degree, I worked for an engineering consulting firm and worked for the North Carolina Department of Environmental Quality in its water quality programs. Since joining the Public Staff in January 2000, I have worked on utility cost recovery, renewable energy program management, customer complaints, and other aspects of utility regulation. I am a licensed Professional Engineer in North Carolina.

Docket No. EMP-111, Sub 0

Confidential Exhibit 1

Public Staff's Testimony of Jay B. Lucas,
Manager, Electric Section – Operations and
Planning, Energy Division

Lucas Exhibit 2

Sweetleaf Solar LLC

Docket No. EMP-111, Sub 0

Public Staff Data Request No. 3 to Duke Energy Progress, LLC (DEP)

Date Sent: September 2, 2020

Requested Due Date: September 14, 2020

Public Staff Technical Contact: Jay Lucas

Phone #: (919) 733-0882

Email: jay.lucas@psncuc.nc.gov

Public Staff Legal Contact: Megan Jost

Phone #: (919) 733-0978

Email: megan.jost@psncuc.nc.gov

Please provide any available responses electronically. If in Excel format, include all working formulas.

Please include (1) the name and title of the individual who has the responsibility for the subject matter addressed therein, and (2) the identity of the person making the response by name, occupation, and job title.

Topic: Affected System Studies

1. Please provide a description of any affected system studies DEP is currently developing to include the following information:

- a. Name and voltage of the transmission line;
- b. Name and cluster number of each facility in each affected system study;
- c. MW capacity of each facility in each affected system study; and
- d. Estimated completion date of the affected system study.

DEP's Response:

Name and Voltage of Transmission Line	Queue Number	MW Capacity	Estimated Date of Study Completion
Dawson-South Justice 115kV	AC2-084	60	10/1/2020
Cashie-Trowbridge 230 kV	AD1-023	40	10/1/2020
Hornertown-Hathaway 230 kV	AD1-057	34	10/1/2020
Trowbridge 230 kV	AD1-076	109	10/1/2020
Chase City-Lunenburg 115 kV	AD2-033	130	10/1/2020
Boynton DP-Kerr Dam 115 kV	AD2-046	80	10/1/2020
Earleys – Northampton 230kV	AD2-051	74.9	10/1/2020
Central-Chase City 115kV	AD2-063	149.5	10/1/2020
Cashie 230 kV	AE1-026	80	TBD
Red House-South Creek 115 kV	AE1-056	60	TBD
Shawboro-Sligo 230 kV	AE1-072	150	TBD
Kerr Dam-Ridge Rd 115 kV	AE1-148	90	TBD
Carson-Rawlings 500 kV	AE2-031	290	TBD
Clubhouse-Sappony 230 kV	AE2-033	149	TBD
Mackeys 230 kV	AE2-034	140	TBD
Anaconda-Dunbar 115 kV	AE2-044	120	TBD
Carson-Septa 500 kV	AE2-051	150	TBD
Kerr Dam-Ridge Road 115 kV	AE2-053	20	TBD
Carson-Rogers Road 500 kV	AE2-094	300	TBD
Swamp 230 kV	AE2-147	150	TBD
Curdsville-Willis Mtn 115 kV	AE2-259	100	TBD
Clubhouse 230 kV	AE2-260	200	TBD

2019 North Carolina State Infrastructure Report

(January 1, 2019 – December 31, 2019)

May 2020
(updated July 2020)

Lucas Exhibit 3

This report reflects information for the portion of North Carolina within the PJM service territory.

1. Planning

- Generation Portfolio Analysis
- Transmission Analysis
- Load Forecast

2. Markets

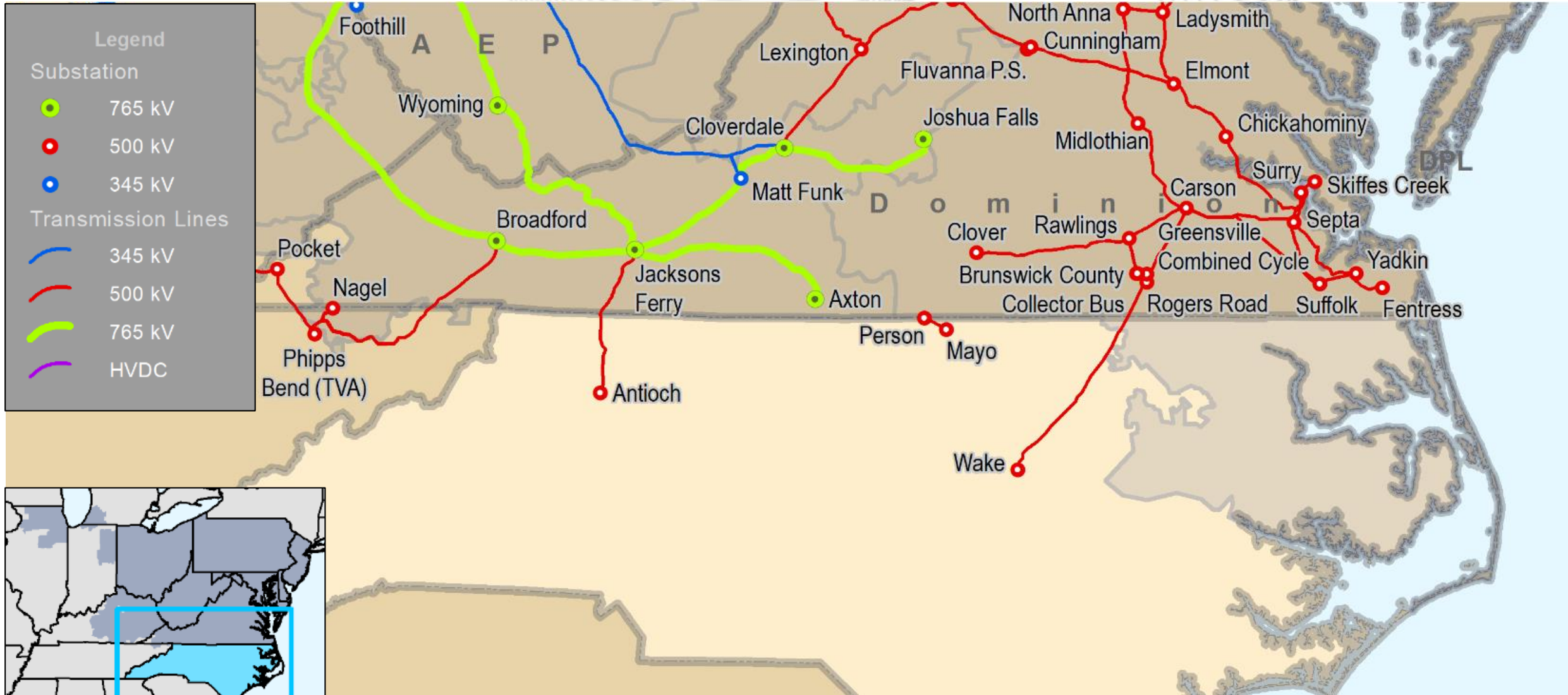
- Market Analysis

3. Operations

- Emissions Data

- **Existing Capacity:** Solar represents approximately 39.1 percent of the total installed capacity in the North Carolina service territory while hydro represents approximately 36.3 percent.
- **Interconnection Requests:** Solar represents 95.2 percent of new interconnection requests in North Carolina.
- **Deactivations:** No generation in North Carolina gave notification of deactivation in 2019.
- **RTEP 2019:** North Carolina's 2019 RTEP projects total approximately \$13 million in investment. This total captures only RTEP projects that cost at least \$5 million.

- **Load Forecast:** North Carolina's load within the PJM footprint is projected to grow between 1.2 and 1.4 percent annually over the next ten years. Comparatively, the overall PJM RTO projected load growth rate is 0.6 percent.
- **2022/23 Capacity Market:** No Base Residual Auction was conducted in 2019. For the most recent auction results, please see the 2018 North Carolina State Infrastructure Report.
- **1/1/19 – 12/31/19 Market Performance:** North Carolina's average hourly LMPs were slightly above PJM average hourly LMPs.

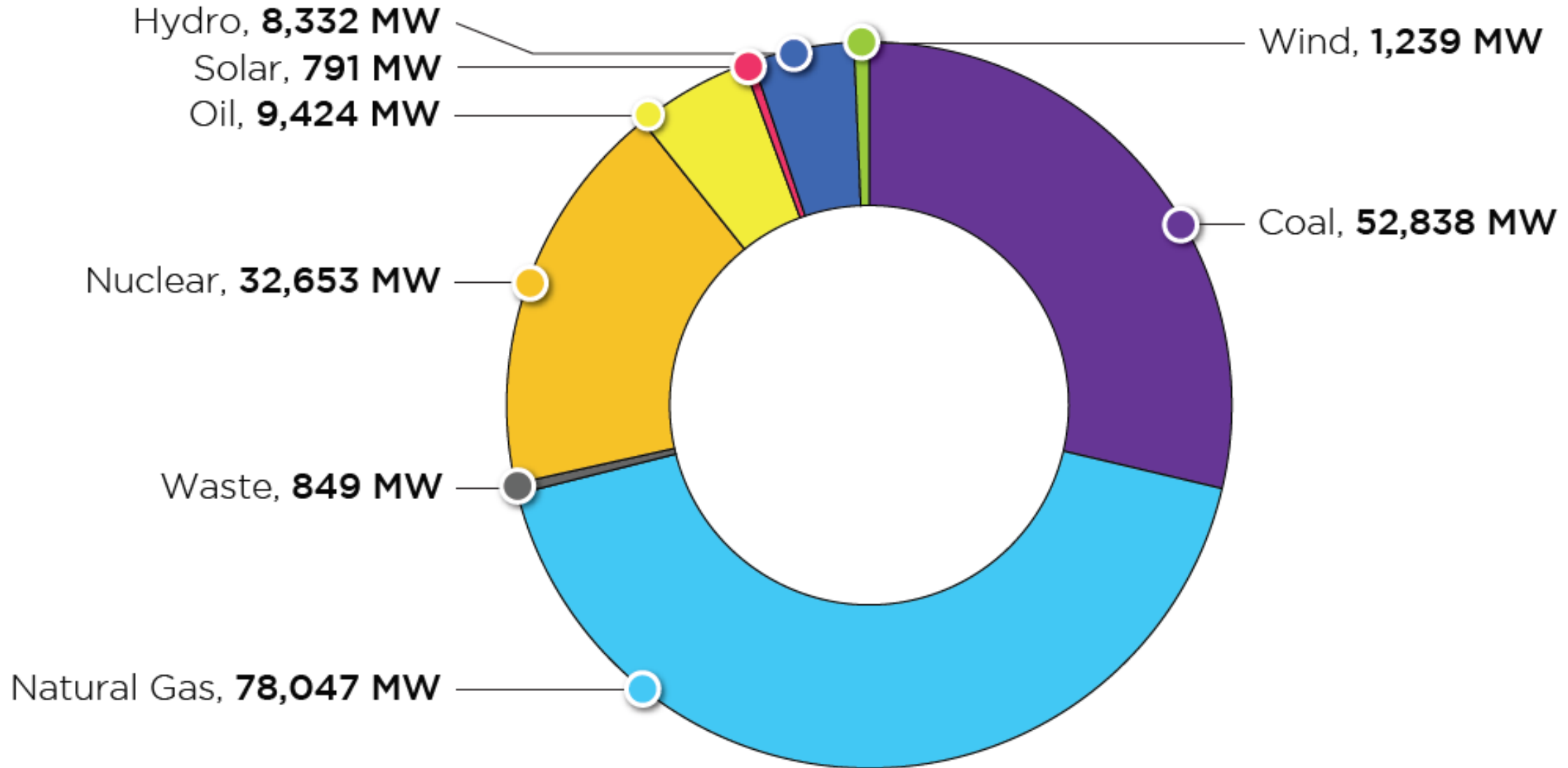


Planning

Generation Portfolio Analysis

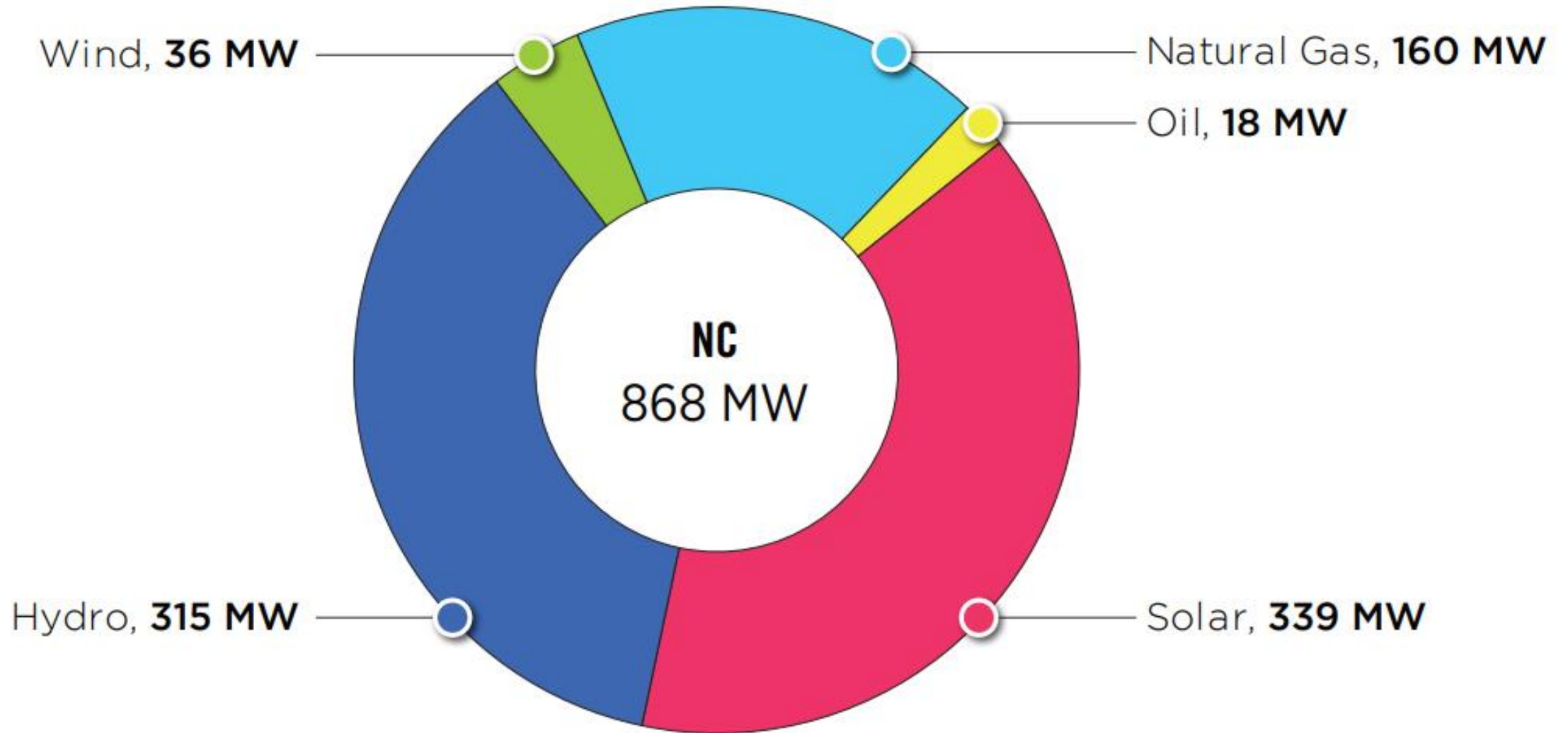
PJM – Existing Installed Capacity

(CIRs – as of Dec. 31, 2019)



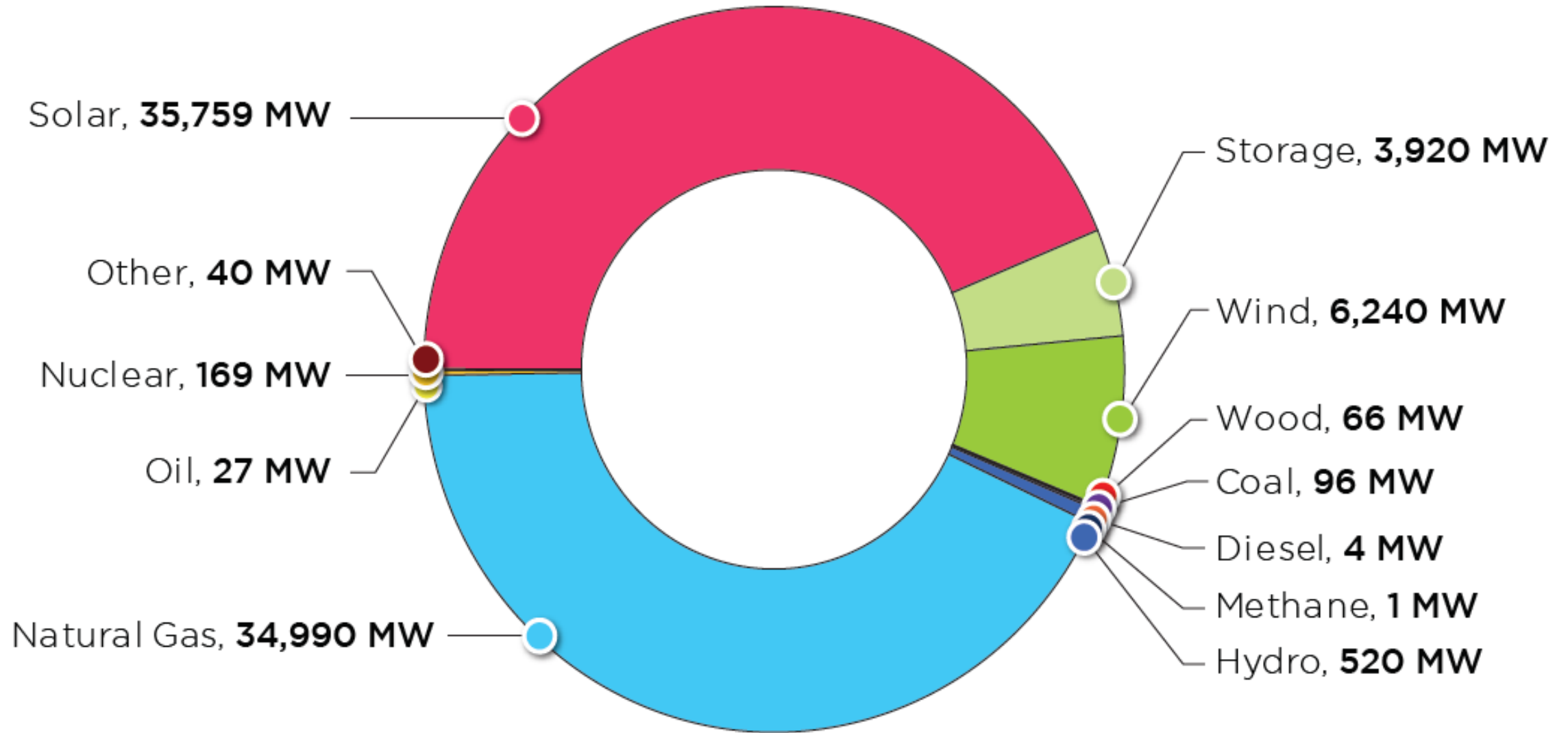
North Carolina – Existing Installed Capacity

(CIRs – as of Dec. 31, 2019)



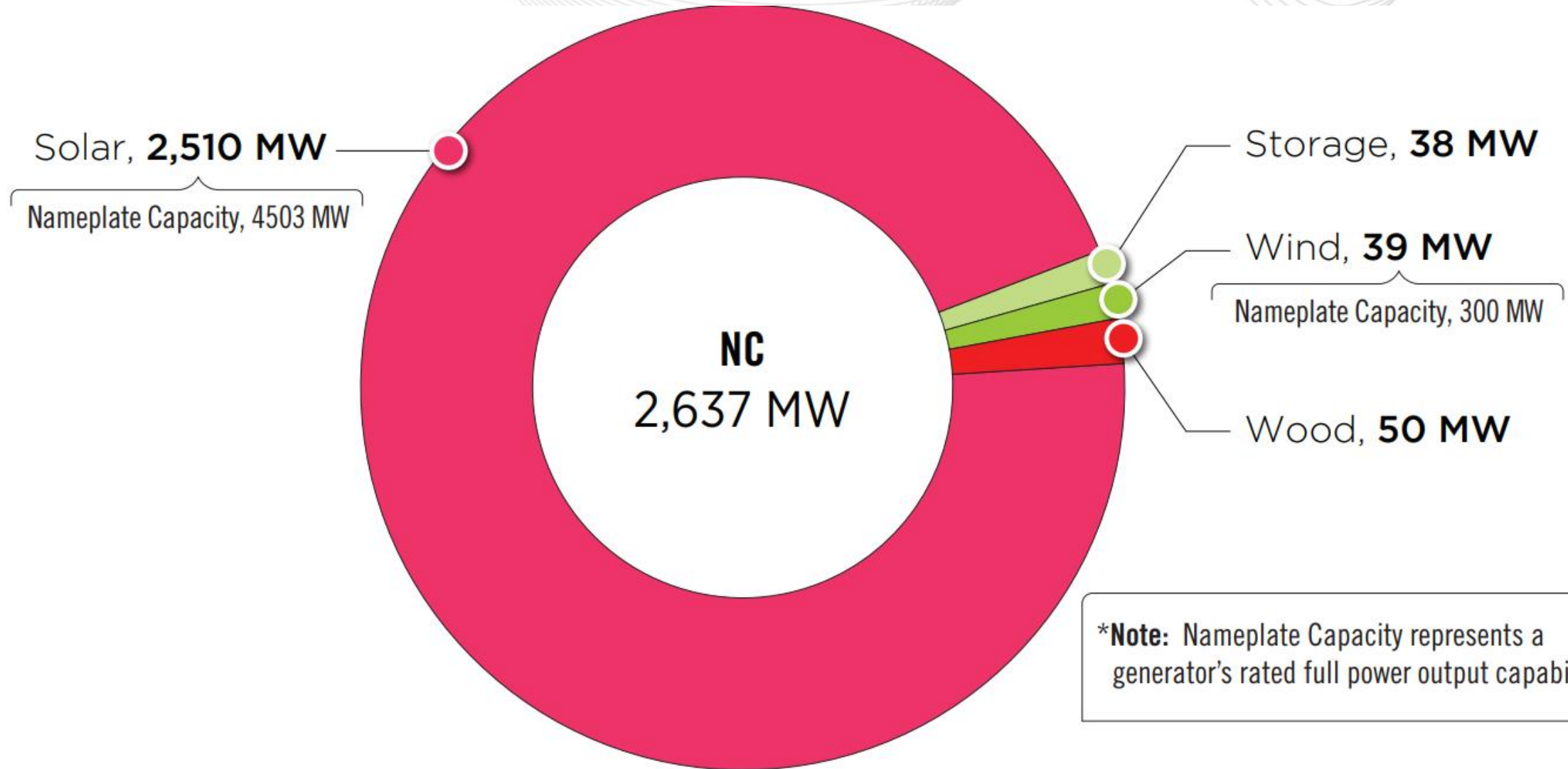
PJM – Queued Capacity (MW) by Fuel Type

(Requested CIRs – as of Dec. 31, 2019)



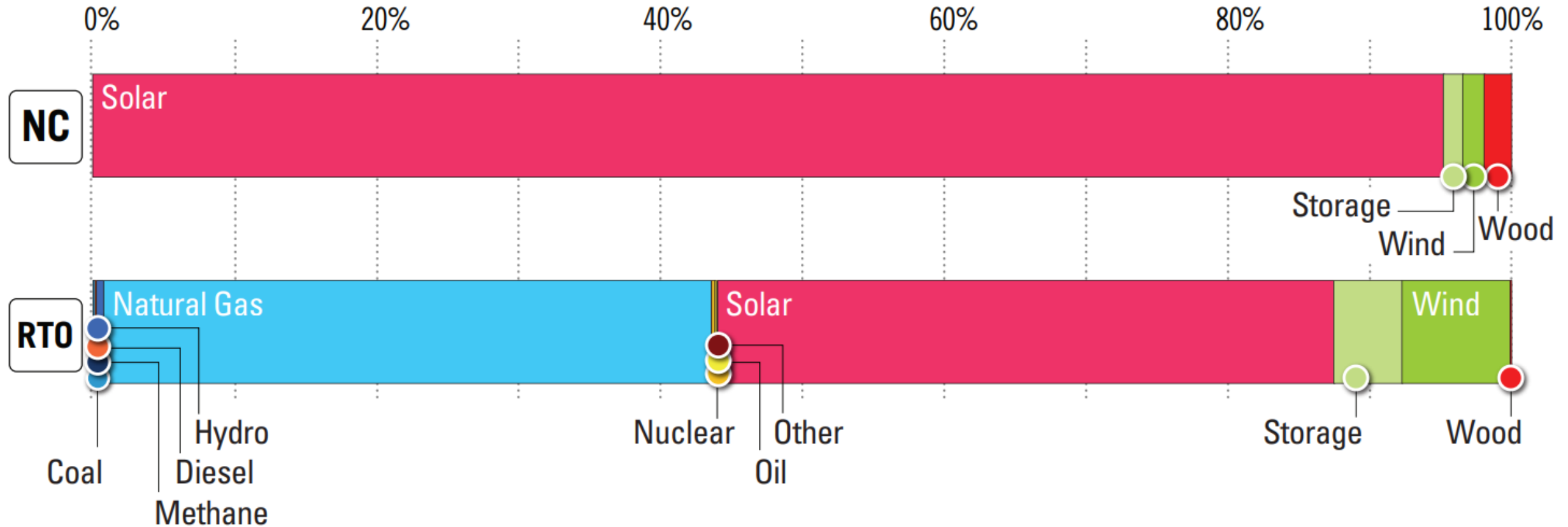
North Carolina – Queued Capacity (MW) by Fuel Type

(Requested CIRs – as of Dec. 31, 2019)



North Carolina – Percentage of MW in Queue by Fuel Type

(Dec. 31, 2019)



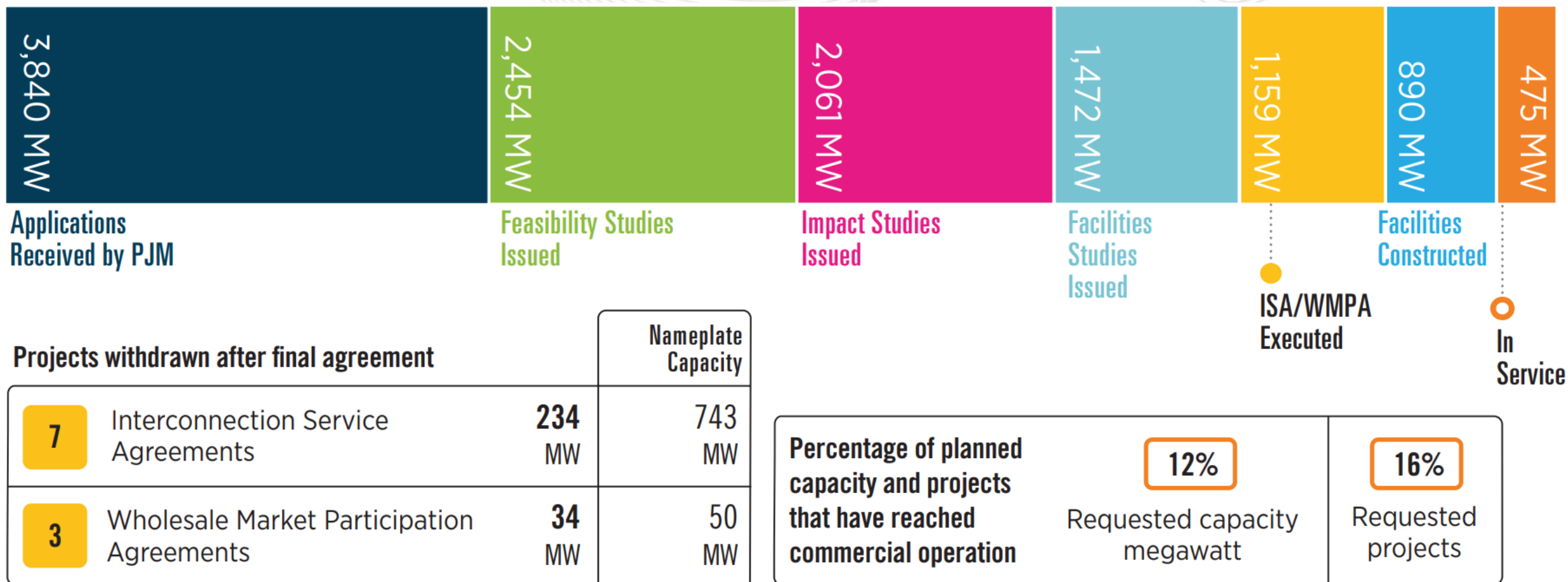
North Carolina – Interconnection Requests

(Unforced Capacity – as of Dec. 31, 2019)

		In Queue						Complete				Grand Total	
		Active		Suspended		Under Construction		In Service		Withdrawn			
		No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)
Non-Renewable	Storage	2	38.0	0	0.0	0	0.0	0	0.0	3	50.0	5	88.0
Renewable	Methane	0	0.0	0	0.0	0	0.0	0	0.0	1	12.0	1	12.0
	Solar	32	2,094.8	1	84.0	10	331.3	14	359.1	69	2,612.1	126	5,481.3
	Wind	0	0.0	0	0.0	1	39.0	1	27.0	9	195.3	11	261.3
	Wood	0	0.0	0	0.0	1	50.0	0	0.0	1	80.0	2	130.0
	Grand Total	34	2,132.8	1	84.0	12	420.3	15	386.1	83	2,949.4	145	5,972.6

Note: The "Under Construction" column includes both "Engineering and Procurement" and "Under Construction" project statuses.

North Carolina – Progression History of Interconnection Requests



This graphic shows the final state of generation submitted in all PJM queues that reached in-service operation, began construction, or was suspended or withdrawn as of Dec. 31, 2019.

North Carolina – Generation Deactivation Notifications Received in 2019

North Carolina had no generation deactivation notifications in 2019.

Planning

Transmission Infrastructure Analysis

Please note that PJM historically used \$5 million as the threshold for listing projects in the RTEP report. Beginning in 2018, it was decided to increase this cutoff to \$10 million. All RTEP projects with costs totaling at least \$5 million are included in this state report. However, only projects that are \$10 million and above are displayed on the project maps.

For a complete list of all RTEP projects, please visit the “RTEP Upgrades & Status – Transmission Construction Status” page on [pjm.com](https://www.pjm.com).

<https://www.pjm.com/planning/rtep-upgrades-status/construct-status.aspx>

North Carolina – RTEP Baseline Projects

(Greater than \$10 million)



Note: Baseline upgrades are those that resolve a system reliability criteria violation.



North Carolina – RTEP Baseline Projects

(Greater than \$5 million)

Map ID	Project	Description	Projected In-Service Date	Project Cost (\$M)	TO Zone	TEAC Date
1	b3122	Rebuild Hathaway-Rocky Mount (Duke Energy Progress) 230 kV Line No. 2181 and Line No. 2058 with double-circuit steel structures using double-circuit conductor at current 230 kV standards with a minimum rating of 1047 MVA.	6/1/2019	\$13.0	Dominion	6/13/2019

North Carolina – RTEP Network Projects

(Greater than \$5 million)

North Carolina had no network project upgrades in 2019.

Note: Network upgrades are new or upgraded facilities required primarily to eliminate reliability criteria violations caused by proposed generation, merchant transmission or long term firm transmission service requests, as well as certain direct connection facilities required to interconnect proposed generation projects.

North Carolina – TO Supplemental Projects

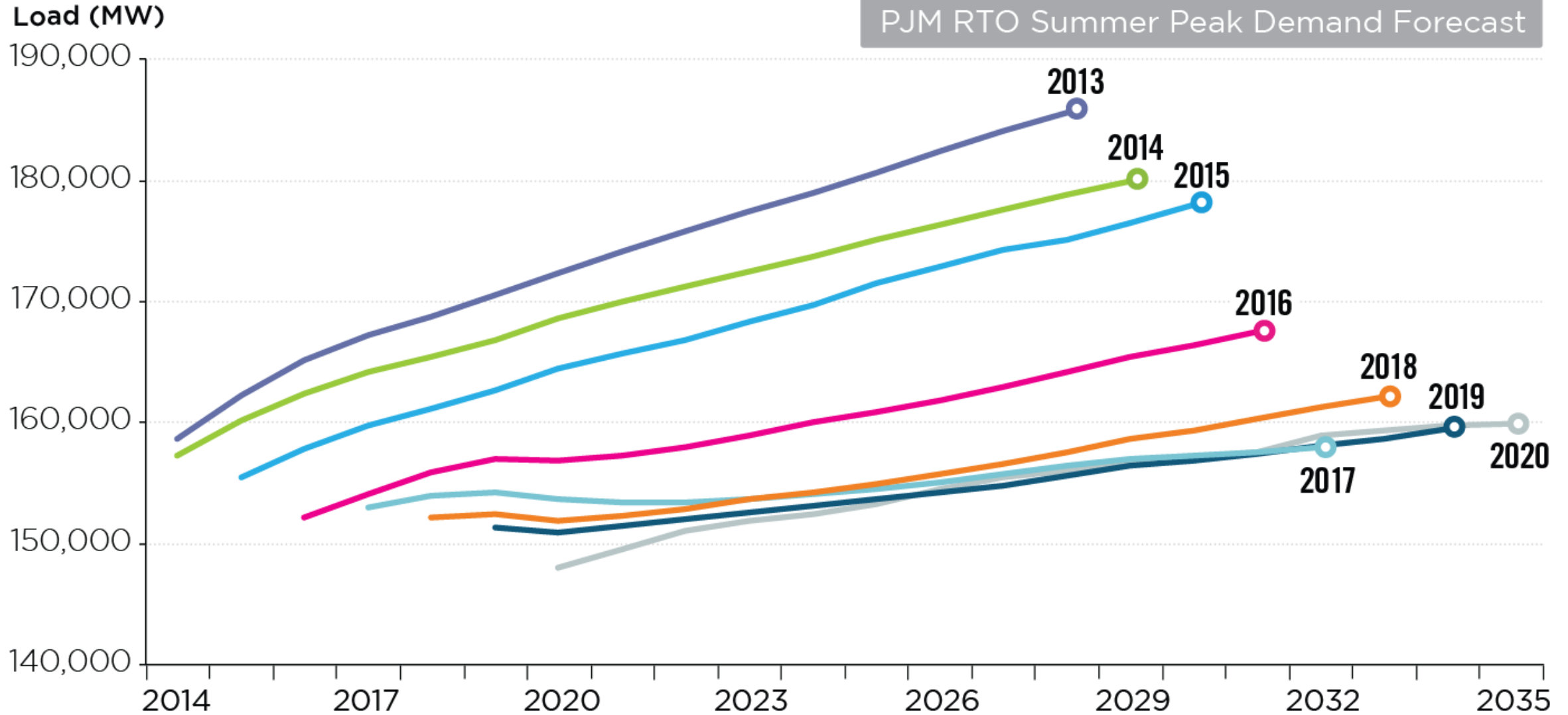
(Greater than \$5 million)

North Carolina had no supplemental project upgrades in 2019.

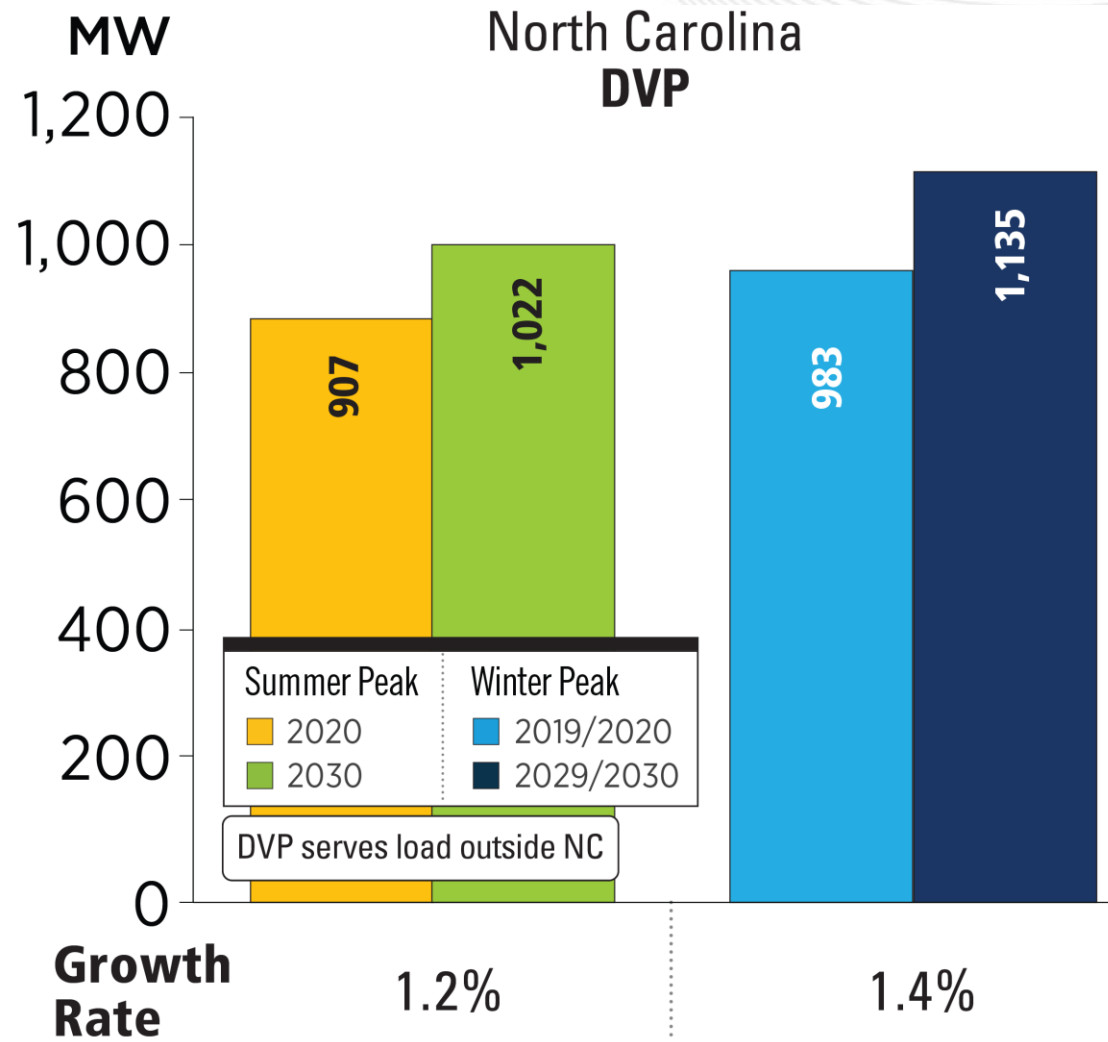
Note: Supplemental projects are transmission expansions or enhancements that are not required for compliance with PJM criteria and are not state public policy projects according to the PJM Operating Agreement. These projects are used as inputs to RTEP models, but are not required for reliability, economic efficiency or operational performance criteria, as determined by PJM.

Planning Load Forecast

PJM RTO Summer Peak Demand Forecast



North Carolina – 2020 Load Forecast Report



PJM RTO Summer Peak

2020

148,092
MW

2030

157,132
MW

Growth Rate 0.6%

PJM RTO Winter Peak

2019/2020

131,287
MW

2029/2030

139,970
MW

Growth Rate 0.6%

The summer and winter peak megawatt values reflect the estimated amount of forecasted load to be served by each transmission owner in the noted state. Estimated amounts were calculated based on the average share of each transmission owner's real-time summer and winter peak load in those areas over the past five years.

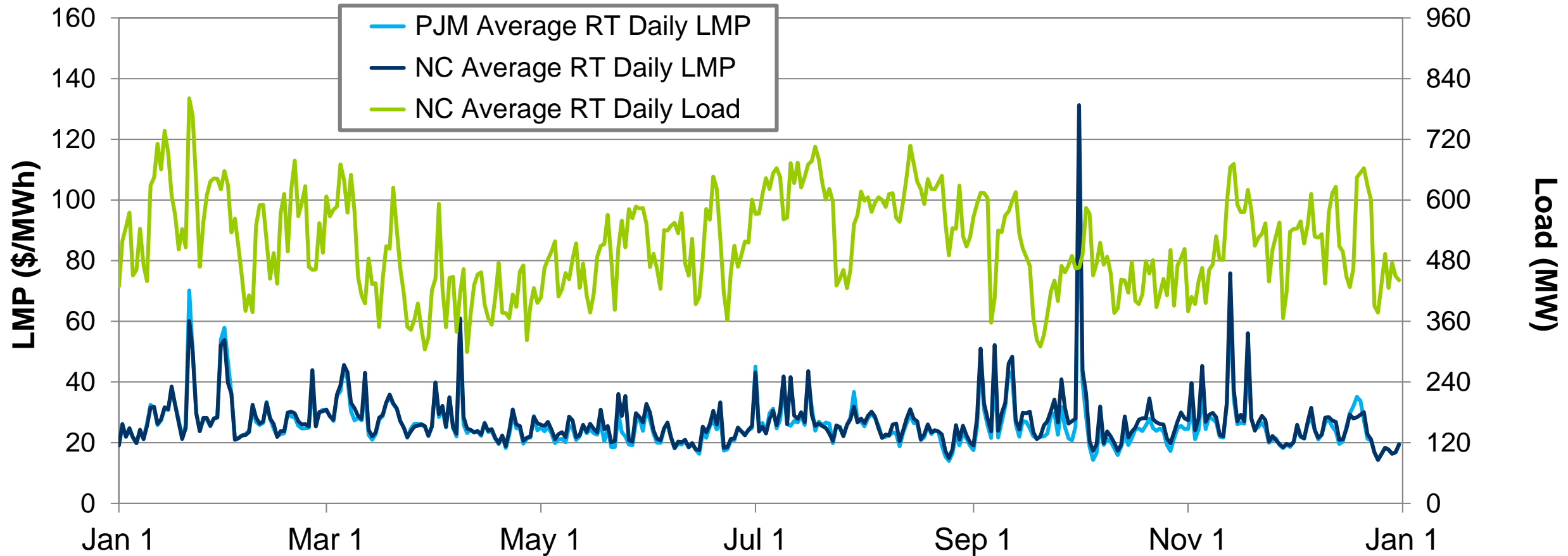
The Load Forecast was produced prior to COVID-19 and will be updated before the next Base Residual Auction to reflect changes in load patterns.

Markets

Market Analysis

North Carolina – Average Daily Load and LMP

(Jan. 1, 2019 – Dec. 31, 2019)

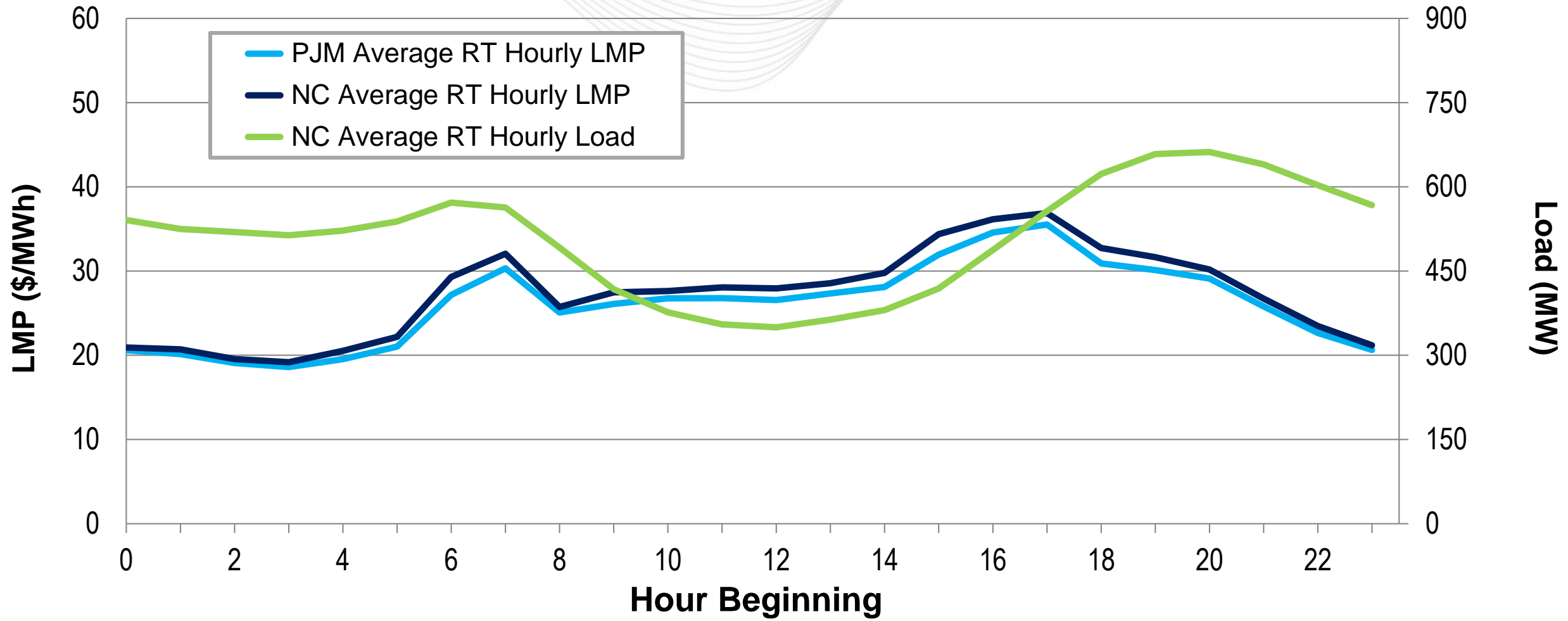


Note: The price spike in October reflects the Performance Assessment Interval event that occurred on October 2nd.

North Carolina – Average Hourly Load and LMP

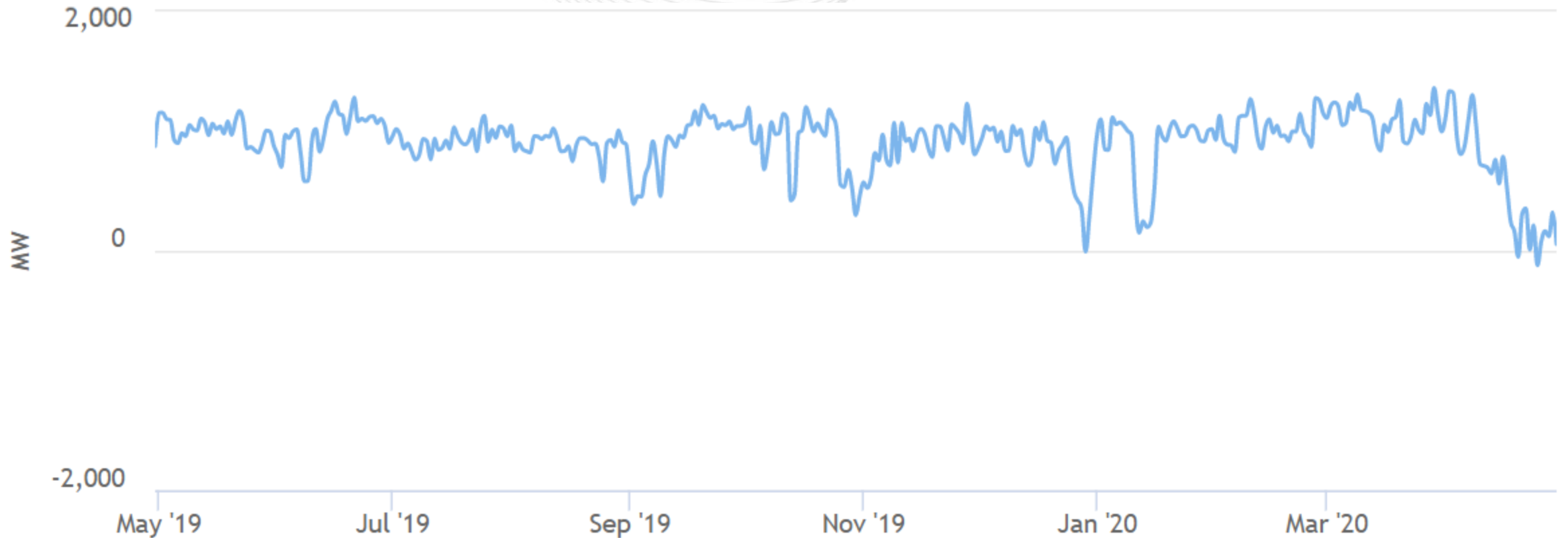
(Jan. 1, 2019 – Dec. 31, 2019)

North Carolina's average hourly LMPs were slightly above the PJM average hourly LMP.



North Carolina – Net Energy Import/Export Trend

(May 2019 – April 2020)

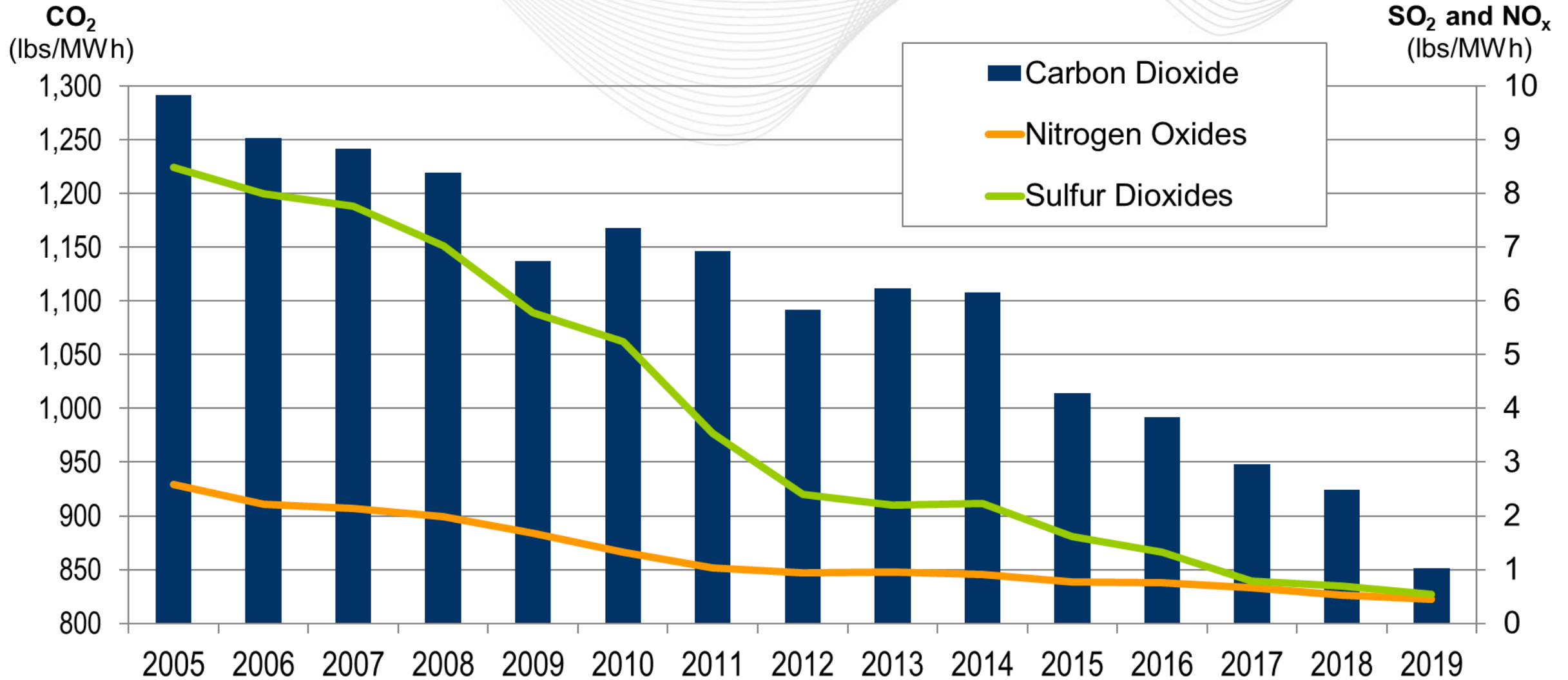


This chart reflects the portion of North Carolina that PJM operates. Positive values represent exports and negative values represent imports.

Operations

Emissions Data

2005 – 2019 PJM Average Emissions



Recent EMP proceedings before the Commission in PJM's queue for North Carolina						
EMP-	Sub	Applicant Name	Filing Date	Approval Date	Capacity, MW	County
101	0	Edgecombe Solar LLC	10-05-18		75	Edgecombe
103	0	Albemarle Beach Solar, LLC	09-21-15		80	Washington
104	0	Fern Solar LLC	11-27-18	03-16-20	100	Edgecombe
107	0	Halifax County Solar LLC	08-30-19	09-02-20	80	Halifax
108	0	American Beech Solar LLC	01-28-20		110	Halifax
109	0	Camden Solar LLC	04-01-20	09-14-20	20	Camden
110	0	Sumac Solar LLC	04-16-20		120	Bertie
111	0	Sweetleaf Solar LLC	06-02-20		94	Halifax
112	0	Gaston Green Acres Solar, LLC	07-15-20		300	Northampton
102	1	Bethel NC 11 Solar, LLC	08-10-20		150	Pitt

Total = 1129