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)

- **Hydro**, 8,332 MW
- **Solar**, 791 MW
- **Oil**, 9,424 MW
- **Nuclear**, 32,653 MW
- **Waste**, 849 MW
- **Wind**, 1,239 MW
- **Coal**, 52,838 MW
- **Natural Gas**, 78,047 MW
North Carolina – Existing Installed Capacity
(CIRs – as of Dec. 31, 2019)

- Wind, 36 MW
- Natural Gas, 160 MW
- Oil, 18 MW
- Hydro, 315 MW
- Solar, 339 MW

NC 868 MW
PJM – Queued Capacity (MW) by Fuel Type
(Requested CIRs – as of Dec. 31, 2019)

- Solar, 35,759 MW
- Other, 40 MW
- Nuclear, 169 MW
- Oil, 27 MW
- Natural Gas, 34,990 MW
- Storage, 3,920 MW
- Wind, 6,240 MW
- Wood, 66 MW
- Coal, 96 MW
- Diesel, 4 MW
- Methane, 1 MW
- Hydro, 520 MW
North Carolina – Queued Capacity (MW) by Fuel Type

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

Solar, 2,510 MW

Nameplate Capacity, 4503 MW

Storage, 38 MW

Wind, 39 MW

Nameplate Capacity, 300 MW

Wood, 50 MW

NC
2,637 MW

*Note: Nameplate Capacity represents a generator’s rated full power output capability.
North Carolina – Percentage of MW in Queue by Fuel Type

(Dec. 31, 2019)
# North Carolina – Interconnection Requests

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

<table>
<thead>
<tr>
<th></th>
<th>In Queue</th>
<th></th>
<th>Complete</th>
<th></th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Active</td>
<td>Suspended</td>
<td>Under Construction</td>
<td>In Service</td>
<td>Withdrawn</td>
</tr>
<tr>
<td></td>
<td>No. of Projects</td>
<td>Capacity (MW)</td>
<td>No. of Projects</td>
<td>Capacity (MW)</td>
<td>No. of Projects</td>
</tr>
<tr>
<td>Non-Renewable</td>
<td>Storage</td>
<td>2</td>
<td>38.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Renewable</td>
<td>Methane</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Solar</td>
<td>32</td>
<td>2,094.8</td>
<td>1</td>
<td>84.0</td>
</tr>
<tr>
<td></td>
<td>Wind</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td>Wood</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>34</td>
<td>1</td>
<td>84.0</td>
<td>12</td>
<td>420.3</td>
</tr>
</tbody>
</table>

**Note:** The "Under Construction" column includes both “Engineering and Procurement” and “Under Construction” project statuses.
North Carolina – Progression History of Interconnection Requests

Applications Received by PJM

- 3,840 MW
- 2,454 MW
- 2,061 MW
- 1,472 MW
- 1,159 MW
- 890 MW
- 475 MW

Feasibility Studies Issued
Impact Studies Issued
Facilities Studies Issued
ISA/WMPA Executed
In Service

Projects withdrawn after final agreement

<table>
<thead>
<tr>
<th>Category</th>
<th>Nameplate Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interconnection Service Agreements</td>
<td>234 MW</td>
</tr>
<tr>
<td>Wholesale Market Participation Agreements</td>
<td>34 MW</td>
</tr>
</tbody>
</table>

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 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.

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)

<table>
<thead>
<tr>
<th>Map ID</th>
<th>Project</th>
<th>Description</th>
<th>Projected In-Service Date</th>
<th>Project Cost ($M)</th>
<th>TO Zone</th>
<th>TEAC Date</th>
</tr>
</thead>
</table>
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)

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.

North Carolina had no supplemental project upgrades in 2019.
Planning
Load Forecast
North Carolina – 2020 Load Forecast Report

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

(Dec. 31, 2019)

Load (MW)

LMP ($/MWh)

Jan 1 Mar 1 May 1 Jul 1 Sep 1 Nov 1 Jan 1

Note: The price spike in October reflects the Performance Assessment Interval event that occurred on October 2nd.
North Carolina’s average hourly LMPs were slightly above the PJM average hourly LMP.
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

**CO₂ (lbs/MWh)**
- 1,300
- 1,250
- 1,200
- 1,150
- 1,100
- 1,050
- 1,000
- 950
- 900
- 850
- 800

**SO₂ and NOₓ (lbs/MWh)**
- 10
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1
- 0

- **Carbon Dioxide**
- **Nitrogen Oxides**
- **Sulfur Dioxides**