2020 Delaware State Infrastructure Report
(January 1, 2020 – December 31, 2020)

April 2021
1. Planning
   - Generation Portfolio Analysis
   - Transmission Analysis
   - Load Forecast

2. Markets
   - Market Analysis
   - Net Energy Import/Export Trend

3. Operations
   - Emissions Data
• **Existing Capacity:** Natural gas represents approximately 63.1 percent of the total installed capacity in the Delaware service territory while oil represents approximately 24.2 percent and coal 12.7 percent. Comparatively across PJM, natural gas and oil are at 43.4 and 4.7 percent of total installed capacity, while coal represents 27.5 percent.

• **Interconnection Requests:** Wind represents 35.5 percent of new interconnection requests in Delaware, while natural gas represents approximately 31.6 percent of new requests and solar 30.1 percent. Wind generation listed in the queue for Delaware includes offshore wind projects that are Maryland public policy projects but are physically located in Delaware.

• **Deactivations:** No generation in Delaware gave a notice of deactivation in 2020.
• **RTEP 2020:** Delaware’s 2020 RTEP project total represents $5.5 million in investment from one baseline upgrade. Project totals include only RTEP projects that cost at least $5 million.

• **Load Forecast:** Delaware’s summer peak load is projected to increase by 0.2 percent annually over the next ten years.

• **2022/23 Capacity Market:** No Base Residual Auction was conducted in 2020. For the most recent auction results, please see the 2018 Delaware State Infrastructure Report.

• **1/1/20 – 12/31/20 Market Performance:** Delaware’s average hourly LMPs were generally lower than the PJM average hourly LMP, except during peak hours.

• **Emissions:** Carbon dioxide emissions are slightly up from 2019 levels. Sulfur dioxide and nitrogen oxide emissions remain flat from 2019 levels.
PJM Service Area – Delaware
Planning
Generation Portfolio Analysis
PJM – Existing Installed Capacity
(CIRs – as of Dec. 31, 2020)

- Coal, 50,689 MW
- Natural Gas, 80,115 MW
- PJM 184,396 MW

- Nameplate Capacity, 10,367 MW
- Wind, 2,184 MW
- Hydro, 8,275 MW
- Solar, 1,015 MW
- Oil, 8,629 MW
- Nuclear, 32,640 MW
- Waste, 849 MW

*Note: Nameplate capacity represents a generator's rated full power output capability.
Delaware – Existing Installed Capacity
(CIRs – as of Dec. 31, 2020)

DE
3,228 MW

Coal, 410 MW

Natural Gas, 2,038 MW

Oil, 780 MW
PJM – Queued Capacity (MW) by Fuel Type
(Requested CIRs – as of Dec. 31, 2020)

Solar, **58,845 MW**

Storage, **10,877 MW**

Wind, **6,560 MW**

Coal, **76 MW**

Hydro, **559 MW**

Diesel, **4 MW**

Natural Gas, **27,804 MW**

Nuclear, **81 MW**

Oil, **31 MW**

PJM

104,837 MW
The wind generation listed in the queue for Delaware includes offshore wind projects that are Maryland public policy projects but are physically located in Delaware.

*Note: Nameplate capacity represents a generator's rated full power output capability.*
## Delaware – Interconnection Requests by Fuel Type
(Unforced Capacity – as of Dec. 31, 2020)

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>In Queue</th>
<th>Complete</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Active</td>
<td>Suspended</td>
<td>Under Construction</td>
</tr>
<tr>
<td></td>
<td>Projects</td>
<td>Capacity (MW)</td>
<td>Projects</td>
</tr>
<tr>
<td>Non-Renewable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coal</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>0</td>
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<tr>
<td>Oil</td>
<td>0</td>
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<td>Other</td>
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<tr>
<td>Storage</td>
<td>3</td>
<td>40.4</td>
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<tr>
<td>Renewable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biomass</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Methane</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Solar</td>
<td>17</td>
<td>391.4</td>
<td>0</td>
</tr>
<tr>
<td>Wind</td>
<td>7</td>
<td>442.4</td>
<td>0</td>
</tr>
<tr>
<td>Grand Total</td>
<td>27</td>
<td>874.2</td>
<td>1</td>
</tr>
</tbody>
</table>

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

Applications Received by PJM

<table>
<thead>
<tr>
<th>Projects withdrawn after final agreement</th>
<th>Nameplate Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interconnection Service Agreements</td>
<td>420 MW 780 MW</td>
</tr>
<tr>
<td>Wholesale Market Participation Agreements</td>
<td>18 MW 53 MW</td>
</tr>
</tbody>
</table>

Projects:
- 3 Interconnection Service Agreements
- 5 Wholesale Market Participation Agreements

Percentage of planned capacity and projects that have reached commercial operation:
- 15% Requested capacity megawatts
- 34% Requested projects

This graphic shows the final state of generation submitted to the PJM queue that completed the study phase as of Dec. 31, 2020, meaning the generation reached in-service operation, began construction, or was suspended or withdrawn. It does not include projects considered active in the queue as of Dec. 31, 2020.
Delaware had no generation deactivation notifications in 2020.
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/planning/project-construction
### Delaware – RTEP Baseline Projects

(Greater than $5 million)

<table>
<thead>
<tr>
<th>Map ID</th>
<th>Project Description</th>
<th>Required In-Service Date</th>
<th>Project Cost ($M)</th>
<th>TO Zone</th>
<th>TEAC Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>b3143</td>
<td><strong>Reconductor the Silverside – Darley 69 kV circuit</strong>&lt;br&gt;<strong>Reconductor the Darley – Naamans 69 kV circuit</strong>&lt;br&gt;Replace three (3) existing 1200 A disconnect switches with 2000 A disconnect switches and install three (3) new 2000 A disconnect switches at Silverside 69 kV station**&lt;br&gt;Replace two (2) 1200 A disconnect switches with 2000 A disconnect switches, replace existing 954 ACSR and 500 SDCU stranded bus with (2) 954 ACSR stranded bus. Reconfigure four (4) CTs from 1200 A to 2000 A and install two (2) new 2000 A disconnect switches, new (2) 954 ACSR stranded bus at Naamans 69 kV station**&lt;br&gt;Replace four (4) 1200 A disconnect switches with 2000 A disconnect switches. Replace existing 954 ACSR and 1272 MCM AL stranded bus with (2) 954 ACSR stranded bus. Reconfigure eight (8) CTs from 1200 A to 2000 A and install Four (4) new 2000 A (310 MVA SE / 351 MVA WE) disconnect switches, new (2) 954 ACSR (331 MVA SE / 369 MVA WE) stranded bus at Darley 69 kV station.</td>
<td>10/21/2019</td>
<td>$5.50</td>
<td>DPL</td>
<td>10/21/2019</td>
</tr>
</tbody>
</table>

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

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Map ID: b3143
Project: Reconductor the Silverside – Darley 69 kV circuit
Description: Reconductor the Darley – Naamans 69 kV circuit
Replace three (3) existing 1200 A disconnect switches with 2000 A disconnect switches and install three (3) new 2000 A disconnect switches at Silverside 69 kV station
Replace two (2) 1200 A disconnect switches with 2000 A disconnect switches, replace existing 954 ACSR and 500 SDCU stranded bus with (2) 954 ACSR stranded bus. Reconfigure four (4) CTs from 1200 A to 2000 A and install two (2) new 2000 A disconnect switches, new (2) 954 ACSR stranded bus at Naamans 69 kV station
Replace four (4) 1200 A disconnect switches with 2000 A disconnect switches. Replace existing 954 ACSR and 1272 MCM AL stranded bus with (2) 954 ACSR stranded bus. Reconfigure eight (8) CTs from 1200 A to 2000 A and install Four (4) new 2000 A (310 MVA SE / 351 MVA WE) disconnect switches, new (2) 954 ACSR (331 MVA SE / 369 MVA WE) stranded bus at Darley 69 kV station.
Delaware – RTEP Network Projects

(Greater than $5 million)

Delaware had no network project upgrades in 2020.

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.
Delaware had no supplemental project upgrades in 2020.

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
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/district. 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.
Markets
Market Analysis
Delaware – Average Daily LMP and Load


<table>
<thead>
<tr>
<th>Load (MW)</th>
<th>LMP ($/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
</tr>
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<td>40</td>
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</tr>
<tr>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>140</td>
<td>140</td>
</tr>
</tbody>
</table>

- **PJM Average RT Daily LMP**
- **DE Average RT Daily LMP**
- **DE Average RT Daily Load**
Delaware’s average hourly LMPs were generally lower than the PJM average hourly LMP, except during peak hours.
Delaware – Net Energy Import/Export Trend

Positive values represent exports and negative values represent imports.
Operations
Emissions Data
2005 – 2020 PJM Average Emissions

- **CO₂** (lbs/MWh)
- **SO₂ and NOₓ** (lbs/MWh)

**Graph Details:**
- **CO₂** (Carbon Dioxide)
- **SO₂** (Sulfur Dioxide)
- **NOₓ** (Nitrogen Oxides)

**Years:** 2005 to 2020

**Graph Description:**
- The graph shows the trend of emissions per year for Carbon Dioxide, Sulfur Dioxide, and Nitrogen Oxides from 2005 to 2020.
- Emissions for Carbon Dioxide have decreased significantly from 2005 to 2020, while emissions for Sulfur Dioxide and Nitrogen Oxides have also declined but not as significantly as CO₂.
Delaware – Average Emissions (lbs/MWh)
(Feb. 2021)

- **CO₂** (lbs/MWh)
- **SO₂ and NOₓ** (lbs/MWh)

- Carbon Dioxide
- Sulfur Dioxide
- Nitrogen Oxides

- 2005: 1900 lbs/MWh
- 2006: 1900 lbs/MWh
- 2007: 1900 lbs/MWh
- 2008: 1900 lbs/MWh
- 2009: 1900 lbs/MWh
- 2010: 1900 lbs/MWh
- 2011: 1900 lbs/MWh
- 2012: 1900 lbs/MWh
- 2013: 1900 lbs/MWh
- 2014: 1900 lbs/MWh
- 2015: 1900 lbs/MWh
- 2016: 1900 lbs/MWh
- 2017: 1900 lbs/MWh
- 2018: 1900 lbs/MWh
- 2019: 1900 lbs/MWh
- 2020: 1900 lbs/MWh