Summer 2018
PJM Reliability Assessment

Pennsylvania Public Utility Commission
June, 2018
PJM as Part of the Eastern Interconnection

**Key Statistics**

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member companies</td>
<td>1,040+</td>
</tr>
<tr>
<td>Millions of people served</td>
<td>65</td>
</tr>
<tr>
<td>Peak load in megawatts</td>
<td>165,492</td>
</tr>
<tr>
<td>MW of generating capacity</td>
<td>178,563</td>
</tr>
<tr>
<td>Miles of transmission lines</td>
<td>84,042</td>
</tr>
<tr>
<td>2017 GWh of annual energy</td>
<td>773,522</td>
</tr>
<tr>
<td>Generation sources</td>
<td>1,379</td>
</tr>
<tr>
<td>Square miles of territory</td>
<td>243,417</td>
</tr>
<tr>
<td>States served</td>
<td>13 + DC</td>
</tr>
</tbody>
</table>

- 28% of load in Eastern Interconnection
- 20% of transmission assets in Eastern Interconnection

As of 2/2018
Current forecast suggests a higher probability of above average temperatures for the entire RTO.

There is a greater chance of above average temperatures in the eastern half of the RTO than in the west.
2017 vs. 2018 PJM Load Forecast

2018 load forecast is lower than 2017 load forecast in the near term largely due to continued slow economic growth and increased penetration of energy efficiency and distributed solar generation.
### 2017

<table>
<thead>
<tr>
<th>Forecast Load (MW) Total</th>
<th>Demand Response (MW)</th>
<th>Forecast Load Less Demand Response (MW)</th>
<th>Installed Generation Capacity (MW)</th>
<th>Reserve Margin (MW)</th>
<th>Reserve Margin</th>
<th>Required Reserve Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>152,999</td>
<td>9,120</td>
<td>143,879</td>
<td>185,804</td>
<td>41,925</td>
<td>29.1%</td>
<td>16.6%</td>
</tr>
</tbody>
</table>

### 2018

<table>
<thead>
<tr>
<th>Forecast Load (MW) Total</th>
<th>Demand Response (MW)</th>
<th>Forecast Load Less Demand Response (MW)</th>
<th>Installed Generation Capacity (MW)</th>
<th>Reserve Margin (MW)</th>
<th>Reserve Margin</th>
<th>Required Reserve Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>152,108</td>
<td>9,095(^1) (est.)</td>
<td>143,013</td>
<td>184,010</td>
<td>40,997</td>
<td>28.7%</td>
<td>16.1%</td>
</tr>
</tbody>
</table>

\(^1\)DR estimate is based on methodology used in RTEP and described in PJM Manual 19

2017 (Metered Peak Load: 145,331 MW on 7/19/17 at HE 18)
**Forecast Load** – Expected peak demand, based on normal peak day weather (Total Internal Demand-TID)

**Demand Response** – Contractually interruptible load and other customer load willing to be interrupted at the direction of PJM. Compliance check is performed at end of summer.

**Forecast Load Less Load Management** – Expected peak demand after demand response has been implemented (Net Internal Demand-NID)

**Installed Generation Capacity** – The MW sum of two groups of generators: All generators in PJM that have capacity interconnection rights and are not committed to serve external load plus all external generators that cleared in RPM and are committed to serve PJM load

**Reserve (MW)** – Installed Generation Capacity minus Net Internal Demand

**Reserve Margin (%)** – Reserve expressed as a percent of Net Internal Demand

**Required Reserve Margin (%)** – PJM required planning reserve, as determined by the RPM process (Installed Reserve Margin-IRM)

The **Reserve Margin (%)** must exceed the **Required Reserve Margin (%)** to satisfy the reliability requirement.
• Historically about 7% of PJM capacity is “forced out” of service during the peak summer period
• Scheduled generator maintenance is coordinated to minimize peak period impacts
• Water levels are expected to be normal for hydro units
8,000 MW of wind generation in the PJM markets
  • 1,367 MW in Pennsylvania

1,528 MW of solar-powered generation in the PJM markets
  • 20 MW in Pennsylvania

4,055 MW of solar-powered distributed generation in the PJM territory
  • 309 MW in Pennsylvania

Change in Pennsylvania generation since June 1, 2017
  • 33 MW of generator deactivations
  • 1,247 MW of generator additions
Summer Preparedness

- Summer Seasonal Assessment
- Conduct emergency drills to ensure readiness
- System Operator Training
- Assess the weather outlook daily
- Review projected load and capacity
- Coordinate with neighboring systems to discuss the upcoming season conditions
50/50 Non-diversified Peak Load Base Case

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Forecast (sum of zonal peaks)</td>
<td>158,010 MW</td>
</tr>
<tr>
<td>Preliminary RTO Net Interchange</td>
<td>4,150 MW** (Importing)</td>
</tr>
<tr>
<td>PJM RTO Installed Capacity</td>
<td>184,010 MW</td>
</tr>
<tr>
<td>Discrete Generator Outages</td>
<td>12,285 MW</td>
</tr>
</tbody>
</table>

** 4,150 MW of net interchange is modeled in the Operations base case and accounts for external pseudo tied capacity resources.

**Study Conclusions**
- No reliability issues identified for base case and N-1 analyses
- Some off-cost generation re-dispatch required to control local thermal issues
- All voltage issues were resolved with capacitors
- Sensitivity studies – no concerns identified
• PJM expects to be able to reliably serve expected peak loads—peak loads are expected to be higher this summer than in summer 2017 which had very mild peak day weather.

• PJM generation (including firm external purchases) saw a net decrease of 1,800 MW between 2017 and 2018. The projected summer 2018 reserve margin of 28.7% exceeds the required reserve margin of 16.1%.

• The transmission system is expected to perform adequately based on applicable reliability criteria.