System Operations Report

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Average Load Forecast Error

August 2021
Hourly Error: 1.59%  Peak Error: 1.86%
Daily Peak Forecast Error (August)

- Error at Peak Hour
- Weekend / Holiday

Over-forecasting

Under-forecasting
PJM's BAAL performance has exceeded the goal of 99% for each month in 2021.

<table>
<thead>
<tr>
<th>Month</th>
<th>BAAL Score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug</td>
<td>99.7</td>
</tr>
<tr>
<td>Sep</td>
<td>99.9</td>
</tr>
<tr>
<td>Oct</td>
<td>99.9</td>
</tr>
<tr>
<td>Nov</td>
<td>99.7</td>
</tr>
<tr>
<td>Dec</td>
<td>99.9</td>
</tr>
<tr>
<td>Jan</td>
<td>99.9</td>
</tr>
<tr>
<td>Feb</td>
<td>99.9</td>
</tr>
<tr>
<td>Mar</td>
<td>99.9</td>
</tr>
<tr>
<td>Apr</td>
<td>99.8</td>
</tr>
<tr>
<td>May</td>
<td>99.8</td>
</tr>
<tr>
<td>Jun</td>
<td>99.8</td>
</tr>
<tr>
<td>Jul</td>
<td>99.8</td>
</tr>
<tr>
<td>Aug</td>
<td>99.7</td>
</tr>
</tbody>
</table>

The monthly BAAL Performance Score chart illustrates the performance metrics for each month from August 2020 to August 2021. The chart shows the percentage of operations within the limits (blue bars) and the excursions outside limits (black line) and minutes outside limits (green line) for each month.
• Two spinning events
• Three reserve sharing events with the Northeast Power Coordinating Council (NPCC)
• The following Emergency Procedures occurred:
  – 20 Post-Contingency Local Load Relief Warnings (PCLLRW)
  – 9 Hot Weather Alerts
  – 6 Shortage Case Approved
• 6 Shortage Cases Approved

• The approved Shortage Case occurred on:
  – 08/20/21:
    – 1 Shortage Case for 16:15
    – 1 Shortage Case for 16:20
    – During peak load time, one large unit tripped, load came in higher suddenly, and a transformer constraint was binding
  – 08/20/21:
    – 1 Shortage Case for 18:00
    – One large unit tripped and case needed to provide ACE control
  – 08/23/21:
    – 1 Shortage Case for 16:50
    – 1 Shortage Case for 16:55
    – 1 Shortage Case for 17:00
    – During the peak load time, two large units tripped as load was increasing, and Actual Net Interchange increased 1,000+ MW in 10 minutes
The 13-month average forced outage rate is 4.16% or 8,274 MW.
The 13-month average total outage rate is 14.80% or 29,413 MW.
2020-2021 Planned Emergency, Unplanned, and Total Outages by Ticket

Note: “Unplanned Outages” include tripped facilities. One tripping event may involve multiple facilities.
PCLLRW Count Vs. Peak Load – Daily Values For 3 Months

- RTO Peak Load
- PCLLRW Count

MW (Thousands)

06/01/21 07/01/21 08/01/21
**Spin Response**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>Duration</th>
<th>Region</th>
<th>Tier 1 Estimate (MW)</th>
<th>Tier 1 Response (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>08/23/21</td>
<td>16:44:13</td>
<td>17:01:50</td>
<td>00:17:37</td>
<td>RTO</td>
<td>879.8</td>
<td>597.5</td>
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<tr>
<td>2</td>
<td>08/24/21</td>
<td>10:37:39</td>
<td>10:45:48</td>
<td>00:08:09</td>
<td>RTO</td>
<td>903.7</td>
<td>658.3</td>
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</table>

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>Duration</th>
<th>Region</th>
<th>Tier 2 Assigned (MW)</th>
<th>Tier 2 Response (MW)</th>
<th>Tier 2 Penalty (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>08/23/21</td>
<td>16:44:13</td>
<td>17:01:50</td>
<td>00:17:37</td>
<td>RTO</td>
<td>896.2</td>
<td>667.1</td>
<td>229.1</td>
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<tr>
<td>2</td>
<td>08/24/21</td>
<td>10:37:39</td>
<td>10:45:48</td>
<td>00:08:09</td>
<td>RTO</td>
<td>1119.9</td>
<td>1119.9</td>
<td>0.0</td>
</tr>
</tbody>
</table>

*Tier 2 Response is equal to Tier 2 Assigned for events with duration less than ten minutes*
Appendix
Goal Measurement: Balancing Authority ACE Limit (BAAL)

- The purpose of the new BAAL standard is to maintain interconnection frequency within a predefined frequency profile under all conditions (normal and abnormal), to prevent frequency-related instability, unplanned tripping of load or generation, or uncontrolled separation or cascading outages that adversely impact the reliability of the interconnection. NERC requires each balancing authority demonstrate real-time monitoring of ACE and interconnection frequency against associated limits and shall balance its resources and demands in real time so that its Reporting ACE does not exceed the BAAL (BAAL_{LOW} or BAAL_{HIGH}) for a continuous time period greater than 30 minutes for each event.

- PJM directly measures the total number of BAAL excursions in minutes compared to the total number of minutes within a month. PJM has set a target value for this performance goal at 99% on a daily and monthly basis. In addition, current NERC rules limit the recovery period to no more than 30 minutes for a single event.
The 13-month average forced outage rate is 4.16% or 8,274 MW. The 13-month average total outage rate is 14.80% or 29,413 MW.
PCLLRW Count Vs. Peak Load – Daily Values For 13 Months
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System Operations Report

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