System Operations Report

Hong Chen
Principal Engineer, Markets Coordination
MC Webinar
January 22, 2024
Average Load Forecast Error

December 2023
Hourly Error: 1.36%  Peak Error: 1.38%

- All Hours
- Peak Hours Only
- Winter
- Summer
- 25-month Average
- 25-month Average

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Daily Peak Forecast Error (December)

18:00 Day Ahead Forecast Error

-7% -6% -5% -4% -3% -2% -1% 0% 1% 2% 3% 4% 5% 6% 7%

Error at Peak Hour
Weekend / Holiday

Over-forecasting
Under-forecasting

Error at Peak Hour
Weekend / Holiday
PJM's BAAL performance has exceeded the goal of 99% for each month in 2022 and 2023.
• 1 Shared Reserve event

• 2 Spin Events

• The following Emergency Procedures occurred:
  – 1 Geomagnetic Disturbance Warning
  – 2 High System Voltage Actions
  – 14 Post Contingency Local Load Relief Warnings (PCLLRWs)
• 1 Shortage Case Approved

• The approved Shortage Case occurred on:
  – 12/01/2023:
    – 1 Shortage Case for 14:15 interval
    – Factors: Mainly due to load, interchange, and drop off of wind and solar
The 13-month average forced outage rate is 4.32% or 8,608 MW. The 13-month average total outage rate is 15.33% or 30,750 MW.
2022-2023 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
<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>Duration</th>
<th>Region</th>
<th>Assigned (MW)</th>
<th>Response (MW)</th>
<th>Penalty (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12/14/24</td>
<td>19:41:33</td>
<td>19:53:48</td>
<td>00:12:15</td>
<td>RTO</td>
<td>2712.0</td>
<td>1436.2</td>
<td>1275.8</td>
</tr>
<tr>
<td>2</td>
<td>12/19/24</td>
<td>09:51:31</td>
<td>09:58:01</td>
<td>00:06:30</td>
<td>RTO</td>
<td>2687.2</td>
<td>2687.2</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Presenter:
Hong Chen,
Hong.Chen@pjm.com

SME:
Ross Kelly,
Ross.Kelly@pjm.com

System Operations Report

Member Hotline
(610) 666 – 8980
(866) 400 – 8980
custsvc@pjm.com
Appendix
Balancing Authority ACE Limit - Performance Measure

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 4.32% or 8,608 MW. The 13-month average total outage rate is 15.33% or 30,750 MW.
PCLLRW Count Vs. Peak Load – Daily Values For 13 Months
PROTECT THE POWER GRID
THINK BEFORE YOU CLICK!

Report suspicious email activity to PJM.
(610) 666-2244 / it_ops_ctr_shift@pjm.com