

## Winter Storm Elliott Recommendations – Progress Summary

### Overview

Coming out of Winter Storm Elliott in December 2022, PJM analyzed the challenges the storm presented and identified opportunities for improvement across PJM's Operations, Markets and Planning. In July 2023, PJM published its [Winter Storm Elliott Event Analysis and Recommendation Report](#) (WSE Report) (PDF). In December 2023, PJM published its [Winter Storm Elliott Recommendations – Progress Summary](#) (PDF). The December 2023 progress summary documented the current status of completed and in-progress actions based on defined work areas.

Included below is a status update on these work areas as of March 2024, as well as mapping of related work areas to the October 2023 FERC, NERC and Regional Entity Staff Report, [Inquiry into Bulk-Power System Operations During December 2022 Winter Storm Elliott](#). Please note, the work areas that are marked as “Complete” indicate the initial recommendation criteria has been completed; however, additional work may continue based on PJM and stakeholder input.

Based on the FERC, NERC and Regional Entity Staff Report's grouping of the recommendations into four categories, PJM has listed the related report recommendations in the work areas below. The report recommendation groups are:

- Generator Cold Weather Reliability (Recommendations: 1a, 1b, 1c, 1d, 1e, 1f, 1g, 2 & 3)
- Natural Gas Infrastructure Cold Weather Reliability (Recommendations: 4, 4a, 4b & 4c)
- Natural Gas-Electric Coordination for Cold Weather Reliability (Recommendations: 5, 6 & 7)
- Electric Grid Operations Cold Weather Reliability (Recommendations: 8, 9, 10 & 11)

Additional action items for PJM stemming from the Inquiry into Bulk-Power System Operations During December 2022 Winter Storm Elliott-FERC report will be tracked and managed as part of PJM's Human Performance and Operating Experience program.

PJM will continue to provide status updates throughout the year. A progress summary of Winter Storm Elliott recommendations as of March 11, 2024, follows on the proceeding pages.

## Winter Storm Elliott Recommendation Status as of March 11, 2024

Legend for Status Complete In Progress

		STATUS
Work Area	Summary of Improvements	
<b>Resource Performance</b>	Enhance the generator cold weather checklist and cold weather operating limit reporting.	<b>Complete</b>
<p><b>ACTIONS:</b></p> <ul style="list-style-type: none"> <li>• Cold weather preparedness checklist updated with additional NERC and industry best practices reflected in PJM Manual 14D: Generator Operational Requirements.</li> <li>• Expanded cold weather preparations presentations for stakeholders to include more resources on training, using PJM's online tools and cold weather emergency procedures.</li> <li>• Participated with ReliabilityFirst in visits to generators to assess winter readiness status, plans and best practices.</li> <li>• Analyzed cold weather data requests.</li> </ul> <p>FERC, NERC and Regional Entity Staff Winter Storm Elliott Report Mapping:</p> <p><b>Generator Cold Weather Reliability – Recommendations: 1b, 1c, 1d 1g</b></p>		
<b>Resource Performance</b>	Improve Curtailment Service Provider (CSP) load reduction estimates.	<b>Complete</b>
<p><b>ACTIONS:</b></p> <ul style="list-style-type: none"> <li>• Reviewed load reduction estimates and provided updates at the Distributed Resources Subcommittee.</li> <li>• Provided notice to CSPs that they must improve their estimation processes or be in violation of PJM manual requirements.</li> <li>• Reached out individually to CSPs to emphasize their obligation to provide reasonably accurate estimates.</li> </ul>		
<b>Resource Performance</b>	Review opportunities to improve synchronized reserve response.	<b>Complete</b>
<p><b>ACTIONS:</b></p> <ul style="list-style-type: none"> <li>• Reserve Certainty Senior Task Force Issue Charge approved.</li> <li>• Provided required just-in-time training for Market Operations Centers.</li> <li>• Provided “Synchronized Reserve Event Performance Generator Outreach” to PJM's Operating Committee.</li> </ul>		
<b>Unit Status and Unit Parameters</b>	Conduct training for staff involved in updating parameter limited schedules and price schedules, focusing on time-to-start parameters.	<b>Complete</b>
<p><b>ACTIONS:</b></p> <ul style="list-style-type: none"> <li>• Education provided by IMM on reflecting <a href="#">fuel supply limitations</a> in parameters at Electric Gas Coordination Senior Task Force.</li> <li>• Internal training completed for PJM dispatchers.</li> </ul>		
<b>Unit Status and Unit Parameters</b>	Review and update the Temporary Exception and Real-Time Value processes for cold weather advisories, alerts, conservative operations and pipeline operational flow order to ensure accurate offer information from generation resources.	<b>Complete</b>

Legend for Status	Complete	In Progress
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STATUS

Work Area	Summary of Improvements
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**ACTIONS :**

- Daily reports sent to internal SMEs, Gas-Electric Coordination Team and Dispatch leadership on temporary and real-time exceptions to confirm pipeline restrictions are reflected in parameters.
- FERC compliance filing made Dec. 11, 2023, allowing market sellers to submit temporary exceptions during operating day.
- Markets Gateway enhanced to allow temporary exceptions to be provided in real time.

FERC, NERC and Regional Entity Staff Winter Storm Elliott Report Mapping:

**Electric Grid Operations Cold Weather Reliability: Recommendation: 8**

<b>CIFP</b>	Evaluate opportunities to align the incentives from the capacity market via Performance Assessment Intervals (PAIs) with real-time operating conditions, particularly with regard to PAI triggers.	<b>Complete</b>
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**ACTIONS :**

- PAI trigger changes approved by FERC with an effective date of July 30, 2023, focusing performance assessments on times of greatest reliability risk.
- Changes reviewed with the MIC and OC.
- Transparency/visibility education for potential future PAIs provided at a special MRC session on Dec. 11, 2023.

FERC, NERC and Regional Entity Staff Winter Storm Elliott Report Mapping:

**Electric Grid Operations Cold Weather Reliability: Recommendation: 8**

<b>CIFP</b>	Evaluate if and how exports should be accounted for in the balancing ratio.	<b>Complete</b>
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**ACTIONS :**

Considered and discussed as part of Resource Adequacy Senior Task Force and Critical Issue Fast Path (CIFP) stakeholder processes. Ultimately, PJM did not propose to change how exports are accounted for in the balancing ratio.

<b>CIFP</b>	Explore opportunities to refine and simplify excusal rules to reduce manual and case-by-case review processes.	<b>Complete</b>
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**ACTIONS :**

Proposed and filed clarifications and adjustments with FERC to excusal rules, which, in combination with tightened PAI triggers, are expected to reduce the need for manual reviews and/or clarify determination of such reviews. This filing was rejected by FERC on Feb. 6, 2024.

<b>CIFP</b>	Review the measurement and verification calculations of Energy Efficiency and Demand Resources for PAIs to assess if the determination of actual performance and bonus accurately reflects the reliability benefit provided.	
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**ACTIONS :**

- Filed changes with FERC to limit the pool of resources assessed during PAIs to only committed capacity, which would effectively remove the ability for Energy Efficiency and Demand Resources to receive bonus payments during PAIs. This filing was rejected by FERC on Feb. 6, 2024.

**Complete**

- PJM and stakeholders currently evaluating reforms to the measurement and verification calculations of Energy Efficiency Resources at the MIC (Working Item: Evaluation of Energy Efficiency Resources).

**In Progress**

Legend for Status	Complete	In Progress
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Work Area	Summary of Improvements	STATUS
<b>CIFP</b>	Explore opportunities for further education on PAIs, such as providing periodic training sessions.	Complete

**ACTIONS :**

First education session for stakeholders on new PAI triggers held Dec. 11, 2023, with the training scheduled to be updated and provided annually ahead of winter operations.

<b>Call for Conservation</b>	Evaluate opportunities to enhance Public Notification Language in Attachment A of Manual 13 regarding a Call for Conservation.	Complete
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**ACTIONS :**

- Updated language in PJM Manual 13: Emergency Operations, Attachment A: Public Notification Statements, which was endorsed by the OC.
- Updated State Emergency Procedure manual.
- Developed email templates, graphics and explanations related to emergency procedures to communicate with and educate key state stakeholders.

<b>Outreach</b>	Seek ways to enhance communications, specifically looking at timeliness, relevance and clarity of information, along with curating and updating appropriate contacts for each audience.	Complete
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**ACTIONS :**

- Developed materials and graphics to communicate emergency procedures to external audiences, including an extensive definitions and simple explanations document and a new guide posted on PJM.com, [PJM's Emergency Procedures and Messages](#)
- State contact lists updated for 2023–2024 and process to maintain list documented in the internal State Emergency Procedure manual.

<b>Drills and Exercise</b>	Strengthen stakeholder participation in periodic Operations drills as well as Corporate Communications and State Government Policy drilling with states, Transmission Owners and other members.	Complete
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**ACTIONS :**

- Expanded state participation in GridEx VII to include activity roles and in-person participation.
- PJM State & Government Policy Team executed first annual team tabletop drill including states.
- Held first annual state agency emergency procedures training session.
- Provided education on PJM Emergency Procedures to Transmission Owner communications departments as part of summer and winter operations drills.

<b>Procedures</b>	Reinforce and clarify expectations for Cold Weather Advisories and Cold Weather Alerts.	Complete
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**ACTIONS :**

- Expanded audience of SOS calls to include generation and enhanced expectations of generators in these calls.
- Enhanced proactive reach out ahead of implementing emergency procedures.
- Evaluate improvements to all-call scripts to emphasize required member actions.

Legend for Status	Complete	In Progress
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		STATUS
Work Area	Summary of Improvements	
Procedures	Evaluate triggers for increasing operating reserves based on risks imposed by extreme or unusual weather, renewable resource uncertainty and resource performance uncertainty.	Complete

ACTIONS:

- Operating reserve triggers have been reviewed and adjusted to help mitigate risks.
- Reviewed risks associated with load profiles and temperature impact on generation stations that would require more reserves due to increased probability of units not performing. Factors such as gas pipeline restrictions and OFOs have been considered to determine additional reserves.
- Updated internal Operating Memo to reflect the updated guidance and procedure.

FERC, NERC and Regional Entity Staff Winter Storm Elliott Report Mapping:

**Electric Grid Operations Cold Weather Reliability: Recommendation: 8**

Load Forecasting	Evaluate opportunities to improve extreme weather load forecast processes and methodology.	
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ACTIONS:

- Evaluated and enhanced load forecast staffing.
- Developed internal processes for identifying and adjusting for risk of load forecast error driven by extreme weather.
- Developed partnership with PJM System Planning to leverage Planning model (longer history and different methodology) in parallel with the Operations model as an additional source/input.
- Extended weather forecast from seven days out to 15 days out and integrated data into existing visualization.

Complete

- Conducted an independent evaluation of PJM's short-term forecast processes with recommendations in progress.

In Progress

FERC, NERC and Regional Entity Staff Winter Storm Elliott Report Mapping:

**Electric Grid Operations Cold Weather Reliability: Recommendation: 9**

Gas-Electric Coordination	Evaluate multiday commitment processes to provide greater certainty of fuel supply during critical operating periods with a focus on weekends.	In Progress
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ACTIONS:

- Multiple-day RAC tool under development (long-term deliverable)

FERC, NERC and Regional Entity Staff Winter Storm Elliott Report Mapping:

**Electric Grid Operations Cold Weather Reliability: Recommendation: 8**

Legend for Status	Complete	In Progress
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		STATUS
Work Area	Summary of Improvements	
<b>Gas-Electric Coordination</b>	Work with states to discuss opportunities to increase prioritization of gas for usage in electric power production.	In Progress

**ACTIONS:**

- Initiated conversations with OPSI in tandem with the release of the Winter Storm Elliott Event Analysis and Recommendations Report in July and at the OPSI Annual Meeting in October. Mike Bryson, Sr. Vice President – Operations, will discuss this in 2024 with regulators on a national platform with his recent appointment to NARUC’s new Gas-Electric Alignment for Reliability initiative (GEAR).
- Follow up with OPSI (Organization of PJM States, Inc.) is planned to provide an overview of this effort in conjunction with the recently released white paper.
- Continued outreach to individual states to address this topic among other state-centered gas-electric issues.

FERC, NERC and Regional Entity Staff Winter Storm Elliott Report Mapping:

**Natural Gas Infrastructure Cold Weather Reliability: Recommendations: 4, 4a, 4b, 4c**

<b>Gas-Electric Coordination</b>	Evaluate including fuel-specific information in the capacity accreditation model (dual fuel, firm/non-firm gas, on-site fuel requirements etc.).	Complete
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**ACTIONS:**

Proposed capacity market enhancements to increase reliability of capacity resources filed with FERC on Oct. 13, 2023. This filing was approved by FERC.

<b>Reserve Performance</b>	In conjunction with stakeholders, evaluate Synchronized Reserve commitment and performance.	Complete
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**ACTIONS:**

- [Issue Charge](#) approved for the Reserve Certainty Senior Task Force.
- Just In Time training completed (required for Market Operations Centers (MOCs)).
- Synchronized Reserve Event Performance Generator Outreach completed at the Operating Committee meeting presentation [Synchronized Reserve Event Performance Generator Outreach \(PPT\)](#).

<b>CIFP</b>	Evaluate and discuss alignment of market incentives with operational decisions.	In Progress
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**ACTIONS:**

Efforts underway in the RCSTF as part of its immediate work plan. Stakeholder approval of packages for immediate Key Work Activities under the Issue Charge are targeted for 2024.

<b>CIFP</b>	Reevaluate what happens in the scenario that a resource has not submitted a valid offer.	Complete
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**ACTIONS:**

Proposed and filed with FERC changes that included an update to the PJM Manuals allowing resources that do not submit price/MW offers into the market to still be eligible for bonus payments for their actual performance during an event. This update was planned for M-11. This filing was rejected by FERC on Feb. 6, 2024.