

RESERVE CERTAINTY

PROBLEM / OPPORTUNITY STATEMENT

As outlined in PJM's mission statement, its primary task is to ensure the safety, reliability and security of the bulk electric system. As such, PJM is always evaluating its reliability posture and identifying opportunities for improvement or learning from recent experience. At the May 1, 2023 Members Committee, PJM and Monitoring Analytics participated on a panel, [The Reliability Landscape: A Forward Look](#), to discuss the challenges and opportunities with the energy transition. PJM identified three time horizons for Reliability concerns – Immediate, Near-term, and Upcoming. The Immediate concern supports the need for excellence in resource performance based on the experience during Winter Storm Elliott. The Near-term concern looks to ensure resource adequacy based on findings from the recent [Energy Transition in PJM: Resource Retirements, Replacements, and Risks](#) report. The Upcoming concern seeks to maintain and attract essential Reliability Services as recommended in the [Energy Transition in PJM: Frameworks for Analysis](#) paper.

PJM and stakeholders are currently working the bulk of the Near-term concern in the [Critical Issue Fast Path - Resource Adequacy](#) stakeholder process. Action needs to be taken to address concerns in both the Immediate and Upcoming time horizons in the following areas:

- 1 | Reserve Certainty
- 2 | Fuel procurement and compensation lessons learned from Winter Storm Elliott
- 3 | Energy Assurance
- 4 | Load Following/Dispatchability

Immediate Concern

Reserve Market Performance and Fuel Procurement Incentives

PJM believes “reserve certainty” comes from having the appropriate suite of ancillary service products procured at the necessary level coupled with the confidence in resources with an assignment to provide reserves to perform when called upon. Since the implementation of Reserve Price Formation, PJM has observed poor performance when deploying synchronized reserves coincident with low-to-zero clearing prices and correspondingly low penalty rates for non-performance. Event recovery back to October 1, 2022 has taken more than the PJM internal requirement of 10 minutes for the majority of Synchronized Reserve Events but less than the NERC Standard requirement of 15 minutes. Additionally, PJM is observing a non-performance factor of approximately 47%¹ on average for resources with a Synchronized Reserve commitment during events.

¹ <https://www.pjm.com/-/media/markets-ops/ancillary/synchronized-reserve-offer-cap-penalty.ashx>

In addition to the low clearing prices, which may not appropriately compensate for the commitment or penalize for nonperformance, PJM has observed instances where certain resources that could provide energy or reserves are unavailable to PJM due to fuel availability. Currently, resources that take on a reserve commitment with no energy dispatch are not compensated for fuel procured that would be needed to meet that commitment. Lack of timely fuel procurement when it may not be available on demand, specifically for gas-fired generators, has the potential to lead to inaccurate reserve calculations when resources are later called on to generate and are unable to get fuel.

PJM's [Electric Gas Coordination Senior Task Force](#) is currently exploring solutions that will improve the situational awareness of PJM System Operators by:

- 1 | Including requirements on generation owners to notify PJM in real-time, whether or not their operating parameters are impacted by gas availability.
- 2 | Exploring opportunities to require gas resources to communicate their gas nominations and the relevant hours of availability and energy.
- 3 | Ensuring accurate reserve quantity estimation during certain operating conditions by restricting when gas resources can provide Non-Synchronized Reserves and making additional and earlier commitments so gas resources can arrange fuel as early as possible.

In addition to these potential reforms that will improve coordination and transparency, opportunities exist to find solutions that accomplish these objectives:

- 1 | Ensure reserve prices reflect the value of the service being provided.
- 2 | Encourage resource performance of all reserve products and appropriately penalize for non-performance.
- 3 | Confirm the appropriate level of reserves is procured under different operating conditions.

Upcoming Concern

Energy Market Incentives for an Evolving Generation Fleet

There is a long record available within the Industry, and in PJM, on the importance of maintaining and attracting Essential Reliability Services, including voltage control, frequency support and ramping capability, amidst the energy transition. Specifically, in *Modernizing Wholesale Electricity Market Design, FERC Docket No. AD21-10*, PJM, other ISO/RTOs, and various commenters detail how the shifting electricity system resource mix and the growing quantity of distributed energy resources are causing a rise in uncertainty and volatility in markets and operations. Several themes emerge from the technical conferences, filed remarks, and submitted comments:

- 1 | Products, with defined and quantified requirements, are needed to secure and compensate for services to ensure resources are appropriately compensated for their services and prices are accurate.
 - (a) These products are primarily needed to address uncertainty with the load forecast and future ramping needs.
- 2 | Prices need to accurately reflect the value of flexible capacity to the system.

3 | Properly setting the requirements for products on the operating reserve demand curve(s) is important to reflect the true value and needs of the system.

(a) Market requirements need to be consistent with Operator actions so the correct incentives are included in the Market and not priced out-of-the-market.

The rise in uncertainty and volatility is compounded by the growing concern over the amount of thermal generation retirements that are anticipated, particularly given that the Intermittent Resources that are replacing thermal resources are not comparable in terms of flexibility and dispatchability as identified in the [Energy Transition in PJM: Resource Retirements, Replacements, and Risks](#) report. This report further identifies the ancillary service markets may not be used to their full potential and therefore enhancements to these markets may be appropriate. Such reforms could help ensure the markets to better reflect the demand for and value of ancillary services needed to maintain reliability in a transparent manner both now and through the energy transition.

PJM is conducting analysis on system flexibility needs by establishing a set of metrics that will be published and utilized to identify future system needs. There is an opportunity to be proactive and begin discussions to address system needs for when these metrics indicate changing system requirements and evaluate the need for PJM's procurement of additional reliability-based services, with a particular focus on reliability needs in the face of the changing resource portfolio and increased penetration of intermittent resource technologies. PJM must maintain Essential Reliability Services for grid reliability now and in the future.

Background Materials

Reports/Memos

[Reliability in PJM: Today and Tomorrow](#)

[Energy Transition in PJM: Frameworks for Analysis](#)

[Energy Transition in PJM: Emerging Characteristics of a Decarbonizing Grid](#)

[Energy Transition in PJM: Resource Retirements, Replacements, and Risks](#)

[May 2023 - PJM Synchronized Reserve Requirement Reliability Update Memo](#)

[Winter Storm Elliott Event Analysis and Recommendation Report](#)

Testimonies

[Statement of Walter Graf for the FERC Technical Conference on Modernizing Electricity Market Design](#)

[Statement of Adam Keech for the FERC Technical Conference on Modernizing Electricity Market Design](#)

Related Stakeholder Issues

[PJM - Issue Details - Synchronized Reserve Event Actions and Expectations \(SRDTF\)](#)



Problem/Opportunity Statement

[PJM - Issue Details - Natural Gas and Electric Market Coordination \(EGCSTF\)](#)

[PJM - Energy Price Formation Senior Task Force \(2018-2019\)](#)

Stakeholder Presentations

[Feb 2022- OC- Reliability Products and Services Assessment](#)

[Dec 2022 - SOS - Synchronized Reserve Events Performance Review Post Reserve Price Formation](#)

[Feb 2023 - MIC - Synchronized Reserve Event Performance](#)

[April 2023 - MIC - Synchronous Reserve Response during Event Deployment Presentation](#)

[April 2023 - MIC - Synchronous Reserve Response during Event Deployment Problem Statement](#)

[April 2023 - MIC - Synchronous Reserve Response during Event Deployment Issue Charge](#)

[May 2023 - OC - Synchronized Reserve Requirement for Reliability Presentation](#)

[May 2023 - MRC - PJM Reserve Response Update Presentation](#)

[May 2023 - MRC - IMM Reserve Market Changes Presentation](#)

FERC Filings

[FERC Staff Report on Energy and Ancillary Services Markets Reforms to Address Changing System Needs, Docket No. AD21-10-000](#)

[Post-Technical Conference Comments on Modernizing Electricity Market Design, Docket No. AD21-10-000](#)

[Order Directing Reports AD21-10-000 | Federal Energy Regulatory Commission \(ferc.gov\)](#)

[PJM Response to Order Directing Reports on Modernizing Wholesale Electricity Market Design, Docket No. AD21-10-000](#)

Education

[Reserve Price Formation Education \(Recorded\), June 27, 2022](#)