



PJM's RCSTF Proposal Summary

Emily Barrett

Principal Market Design Specialist

Reserve Certainty Senior Task Force

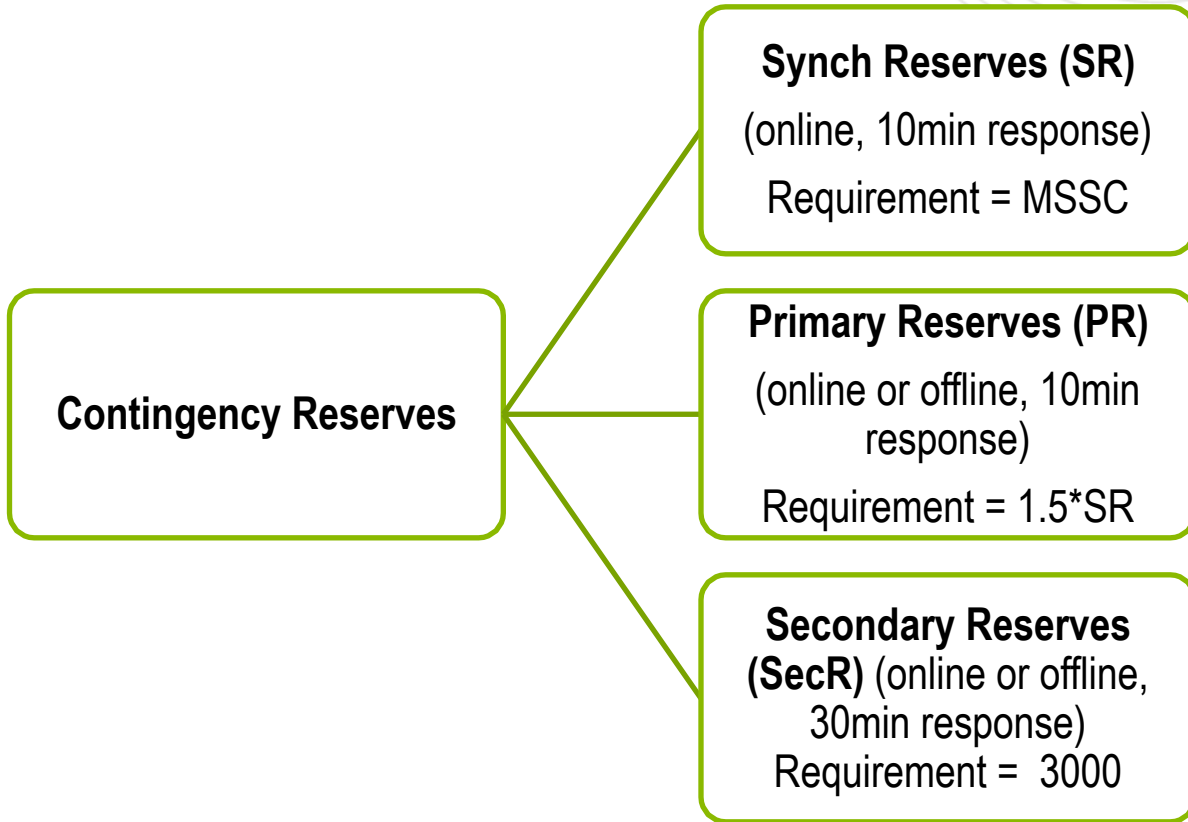
June 25, 2027

Disclaimer: While materials are current at the time of publishing, applicable requirements may change. PJM Governing Documents control.

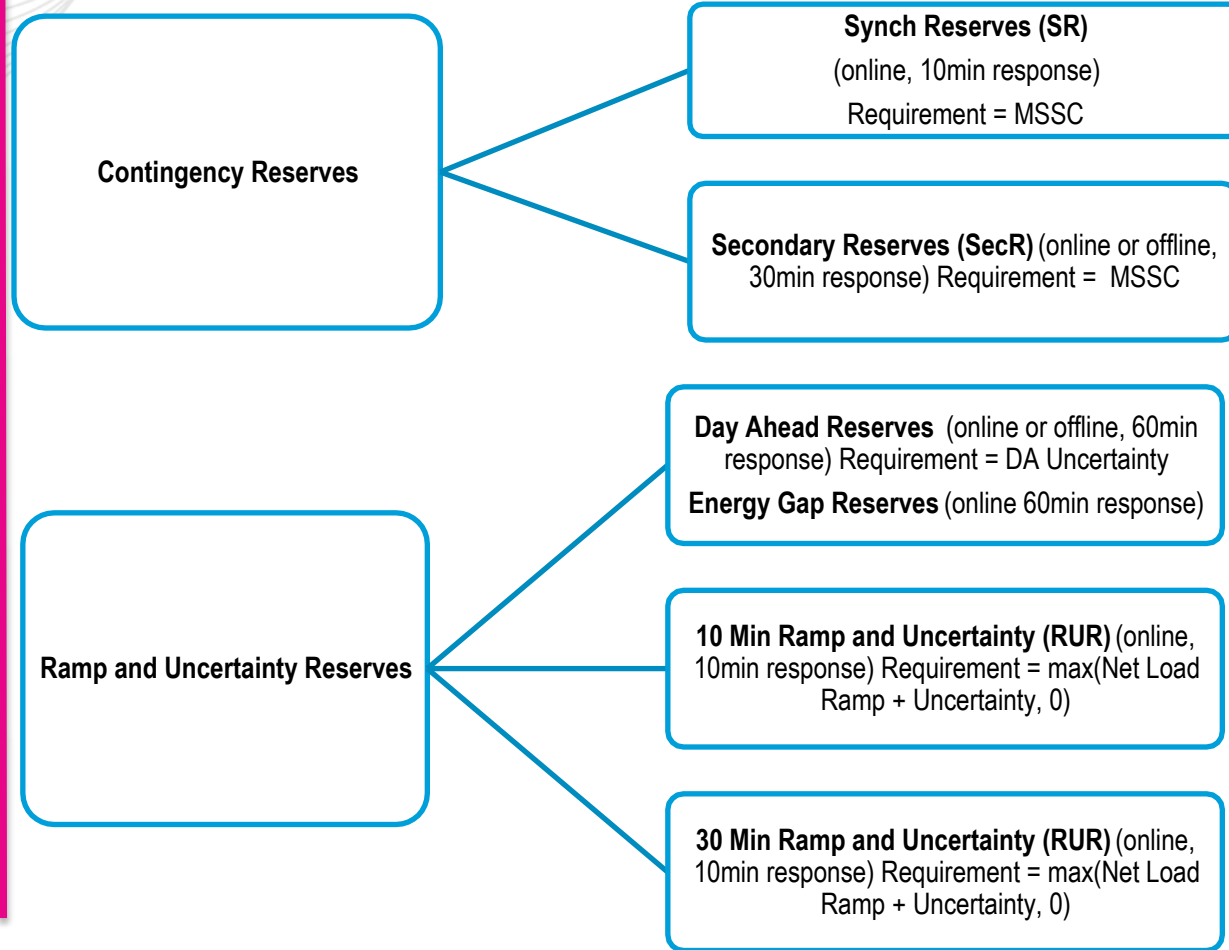
- 1) Reserve Requirements to align with operational needs
 - a) Align operational scheduling needs with the Day-Ahead Market
 - b) Address growing ramping and uncertainty system needs
- 2) Market Design Reserve Structure Changes
 - a) Define Eligibility and Incentive Performance of resources
 - b) Recognize the cost to provide reserves through offers
 - c) Value the flexibility to address the system reserve needs

	Purpose	RTM / DAM	Response Time	Online Only	Locational
Synchronized Reserve	Contingency recovery	Both	10 minutes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10-Min Ramp/Uncertainty Reserve	Real-time net-load ramp and uncertainty	Both	10 minutes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
30-Min Ramp/Uncertainty Reserve	Real-time net-load ramp and uncertainty	Both	30 minutes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
30-Min Reserves	Replacement for contingency reserves	Both	30 minutes	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Day-Ahead Scheduling Reserves	Day-ahead uncertainty	DAM-only	60 minutes	<input type="checkbox"/>	<input type="checkbox"/>
Energy Gap Reserves	Scheduling physical supply to meet the PJM load forecast	DAM-only	60 minutes	<input checked="" type="checkbox"/>	<input type="checkbox"/>

CURRENT



FUTURE



MSSC = Most Severe Single Contingency

Introduction of new reserve products for uncertainty and ramping



10 Minute Ramp and Uncertainty

10-Min Ramp/ Uncertainty Reserve	Performance Expectations	Consequences for Non-Availability	Consequences for Non-Performance
	Follow PJM's energy dispatch instructions	Pay for shortfall at the greater of a) 1.25 times the 10-Min RUR clearing price and b) the cost to provide reserves.	Energy deviation penalties
	Day-Ahead Soft Offer Cap	Real-Time Soft Offer Cap	Cost Allocation
	\$10/MWh	Capped at \$0	Allocated to real-time load and exports based on load ratio share across the entire RTO

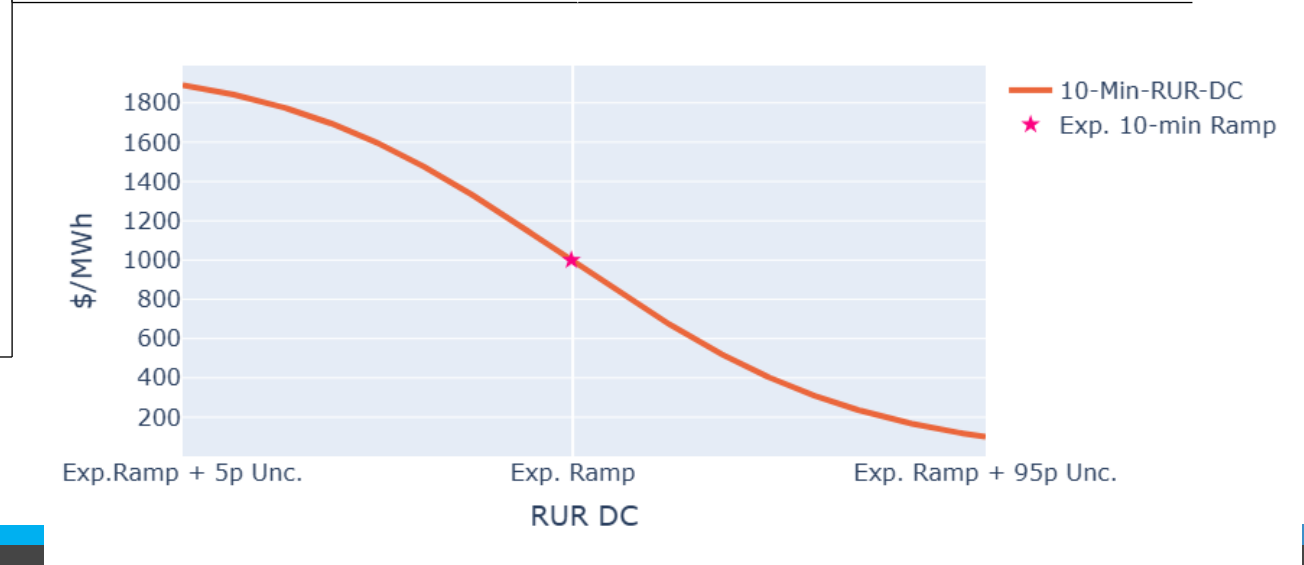
Requirement	Settlement	Locational Procurement
Expected Ramp = $\text{Net-Load Forecast}_{T+10} - \text{Net-Load Forecast}_T$	Balancing Settlement	Yes

Where, Net-Load Forecast = Load Forecast – Wind Forecast – Solar Forecast – Expected Energy from Resources Starting-Up

Uncertainty = % Load Forecast Uncertainty x Forecasted Load + % Wind Forecast Uncertainty x Forecasted Wind + % Solar Forecast Uncertainty x Forecasted Solar

	Uncertainty		
	Load*	Wind*	Solar*
10 Minute	0.4%	1.9%	3.1%

* Illustrative Uncertainty % based on 24/25 Data





10 Minute Ramp and Uncertainty Down

10-Min Ramp/ Uncertainty Reserve	Performance Expectations	Consequences for Non-Availability	Consequences for Non-Performance
	Follow PJM's energy dispatch instructions	Pay for shortfall at the greater of a) 1.25 times the 10-Min RUR clearing price and b) the cost to provide reserves.	Energy deviation penalties
	Day-Ahead Soft Offer Cap	Real-Time Soft Offer Cap	Cost Allocation
	\$10/MWh	Capped at \$0	Allocated to real-time load based and exports on load ratio share across the entire RTO

Requirement	Settlement	Locational Procurement
--------------------	-------------------	-------------------------------

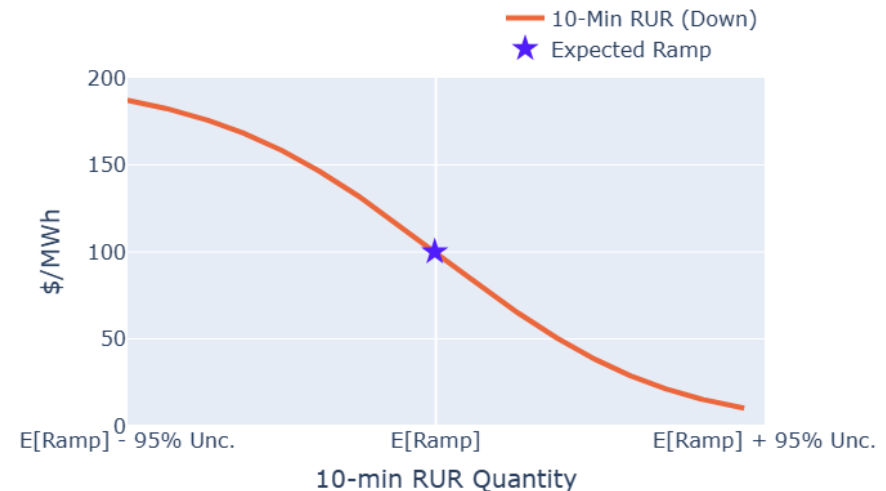
$$\text{Expected Ramp} = \text{Net-Load Forecast}_T - \text{Net-Load Forecast}_{T+10}$$

Where, Net-Load Forecast = Load Forecast – Wind Forecast – Solar Forecast – Expected Energy from Resources Starting-Up

Uncertainty = % Load Forecast Uncertainty x Forecasted Load + % Wind Forecast Uncertainty x Forecasted Wind + % Solar Forecast Uncertainty x Forecasted Solar

Balancing Settlement

Yes



Uncertainty

Load*	Wind*	Solar*
--------------	--------------	---------------

* Uncertainty % based on 24/25 Data

10 Minute	0.4%	1.9%	3.1%
------------------	-------------	-------------	-------------

30-Min Ramp/ Uncertainty Reserve	Performance Expectations	Consequences for Non-Availability	Consequences for Non-Performance
	Follow PJM's energy dispatch instructions	Pay for shortfall at the greater of a) 1.25 times the 30-Min RUR clearing price and b) the cost to provide reserves	Energy deviation penalties
	Day-Ahead Soft Offer Cap	Real-Time Soft Offer Cap	Cost Allocation
	\$10/MWh	Capped at \$0	Allocated to real-time load and exports based on load ratio share across the entire RTO

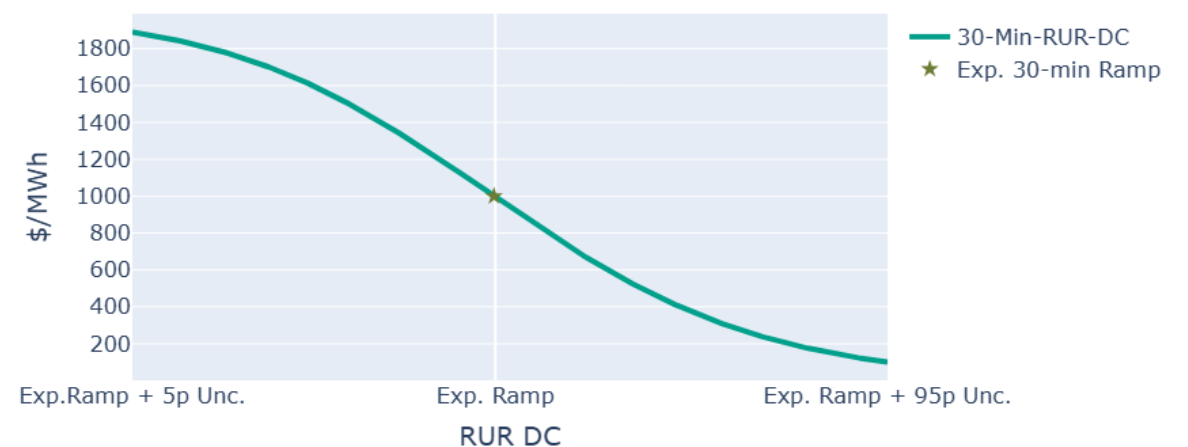
Requirement	Settlement	Locational Procurement
Expected Ramp = Net-Load Forecast _{T+30} - Net-Load Forecast _{T+10}	Balancing Settlement	Yes

Where, Net-Load Forecast = Load Forecast - Wind Forecast - Solar Forecast - Expected Energy from Resources Starting-Up

Uncertainty = % Load Forecast Uncertainty x Forecasted Load + % Wind Forecast Uncertainty x Forecasted Wind + % Solar Forecast Uncertainty x Forecasted Solar

30 Minute	Uncertainty		
	Load*	Wind*	Solar*
	0.6%	2.7%	4.0%

* Uncertainty % based on 24/25 Data



CURRENT

Day-Ahead Scheduling Reserve is calculated in RAC after the Day-Ahead market

Calculated As:

Load forecast at peak * (Under-forecasted Load Forecast Error (LFE) + (FOR) Generator Forced Outage Rates)

DASR is currently = Load forecast at peak *4.51%

FUTURE

Reflect the Day-Ahead Scheduling Reserve needs in the Day-Ahead market

Move to an uncertainty and risk framework that dynamically sets the reserve needs based on the expected operating conditions and accounts for variable resource uncertainty

Operating Days will be classified as high, medium or low risk which will drive the DASR requirement

Proposed Risk Values	Percentile	Load	Generator Performance	Solar	Wind
Low	80 th Load / 50 th Others	2.19%	2.03%	11.28%	9.68%
	80 th All	2.19%	3.12%	19.71%	21.48%
Medium	85 th All	2.42%	3.49%	22.50%	24.19%
	90 th All	2.79%	3.88%	25.51%	26.54%
High	95 th All	3.55%	4.68%	31.33%	32.43%

$$DASR_T = \text{load forecast}_T * \text{load error} + \text{load forecast}_T * \text{gen performance} + \text{solar forecast}_T * \text{solar error} + \text{wind forecast}_T * \text{wind error}$$

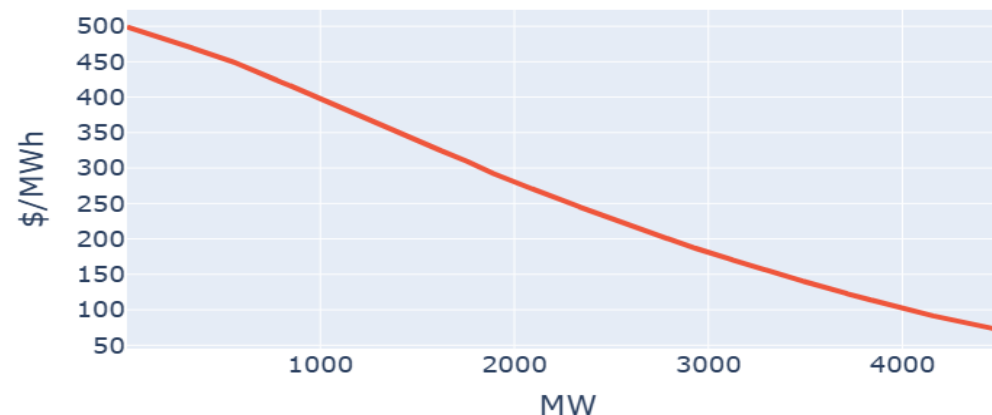


Day Ahead Scheduling Reserves

	Performance Expectations	Consequences for Non-Availability	Consequences for Non-Performance
Day-Ahead Scheduling Reserve	Maintain availability to provide energy and reserves consistent with day-ahead assignments Come online when called by PJM in real-time	Pay for the unprovided reserves at the greater of 1.25 the DASR market clearing price or the RT 30-Min clearing price	Pay for the shortfall at the greater of 1.5 the DASR market clearing price or 1.5 times the RT 30-Min res. price
	Day-Ahead Soft Offer Cap	Real-Time Soft Offer Cap	Cost Allocation
	\$10/MWh	N/A	allocated to real-time load and exports based on load ratio share across the entire RTO
	Requirement / ORDC	Settlement	Locational Procurement
	<p>Based on Risk Day, $DASR_T = \text{load forecast}_T * \text{load error} + \text{load forecast}_T * \text{gen performance} + \text{solar forecast}_T * \text{solar error} + \text{wind forecast}_T * \text{wind error}$</p> <p>Hourly DASR values would be capped at the DASR values for the peak load hour.</p> <p>This MW value will be procured <i>net</i> of RUR and Energy gap products (nested market design)</p> <p>ORDC will be single step demand curve at \$50</p>	DA Only	No

Energy Gap	Performance Expectations	Consequences for Non-Availability	Consequences for Non-Performance
	<p>Maintain availability to provide energy and reserves consistent with day-ahead assignments</p> <p>Follow PJM's energy dispatch instructions</p>	<p>Pay for the unprovided reserves at the greater of 1.25 the EG market clearing price or the RT 30-Min RUR clearing price</p>	<p>Energy deviation penalties</p>
	Day-Ahead Soft Offer Cap	Real-Time Soft Offer Cap	Cost Allocation
	\$10/MWh	Capped at \$0	Allocated to real-time load and exports based on load ratio share across the entire RTO

- Energy Gap Reserves are procured to mitigate the reliability risk of having insufficient physical supply cleared through the Day-Ahead Market to meet PJM's load forecast.
- Energy Gap is only procured on medium- and high-risk days that fall within the "winter" season (November – March).

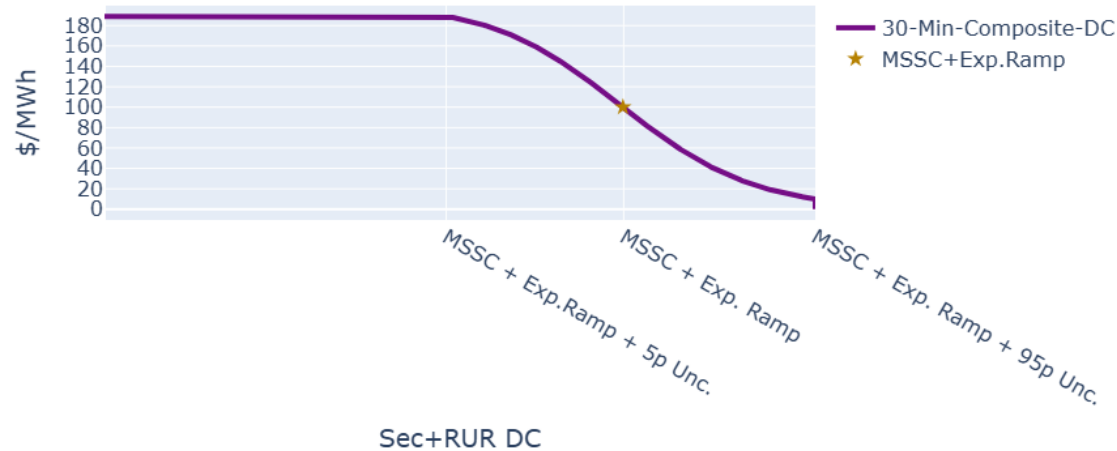


Updates to Contingency Reserves

- Offer Structure Changes
 - Day-Ahead Soft Offer Cap: $\$10/\text{MWh} + \text{Expected Penalty Rate}$
 - Real-Time Soft Offer Cap: $\$10/\text{MWh} + \text{Expected Penalty Rate}$
- Penalty Structure Changes
 - Consequences for Non-Availability: Pay for shortfall at 1.25 times the SR clearing price
 - Consequences for Non-Performance: Pay for the greater of a) the shortfall at the average cost of Synchronized Reserves and b) the highest system marginal energy price in the 6 intervals following the Synchronized Reserve Event, capped at the highest point on the SR Demand Curve.
- ORDC Update to a single step demand curve at $\$2,100$ at the reliability requirement (MSSC)
- Locational Procurement- same interface modeling with nodal pricing

The PJM Proposal Removes Primary Reserves → PAI Triggers will be set on SR shortages

30 Minute Reserves	Performance Expectations	Consequences for Non-Availability	Consequences for Non-Performance
	Come online when called by PJM	N/A	Pay for the shortfall at the greater of a) 1.5 times the real-time reserve market clearing price and b) the cost to provide reserves.
	Day-Ahead Soft Offer Cap	Real-Time Soft Offer Cap	Cost Allocation
	\$10/MWh	\$10/MWh	Allocated to real-time load and exports based on load ratio share across the entire RTO



The 30-Min Reserve service is nested with the 30-Min RUR service

- PJM has posted several documents and data sets to support understanding of its RCSTF proposal
- These documents are posted on the RCSTF page on [pjm.com](https://www.pjm.com) alongside the Issue Charge and Problem Statement:

<https://www.pjm.com/committees-and-groups/task-forces/rcstf>

Reserve Certainty Senior Task Force

The Reserve Certainty Senior Task Force (RCSTF) will investigate enhancements to PJM's reserve markets. Immediate-term topics to be explored include the quantity of reserves procured, how reserves are deployed, event performance and penalty structure, and alignment of offer structure with fuel procurement practices. Additionally, the group will explore long-term system needs due to an evolving generation fleet, including reserve product participation requirements and incentives for resource flexibility. The RCSTF reports to the Markets and Reliability Committee (MRC).

[View issues](#) the RCSTF is currently tracking.

Chair/Facilitator: [Lisa Morelli](#)

Secretary: [Amanda Egan](#)

During the meeting, if you are experiencing issues with connectivity or teleconference, please contact [Meeting Support](#). For registration issues, contact [PJM](#).

[Roster](#) [PDF](#) | [Updates](#)

	Date
PJM's RCSTF Package and Rationale PDF	4.7.2026
PJM's RCSTF Proposal Summary PDF	4.7.2026
Incentive Compatibility via Interactions between Reserve and Energy Prices PDF	4.7.2026
Reserve Service Nesting, Unnesting and Price Formation PDF	4.7.2026
2025 Reserve Requirements XLS	4.7.2026
RCSTF Product Explainer PDF	4.7.2026
Supplement Product Nesting and Resource Level Constraints PDF	4.7.2026
Visualizations of 2025 RCSTF Reserve Requirements PDF	4.7.2026
Operation Uncertainty Quantification PDF	3.12.2026
Real-Time Net-Load Uncertainty Quantification PDF	3.12.2026
Supplement Locational Constraints for Reserve Services PDF	3.13.2026
Day-Ahead Uncertainty and Risk Framework WEB	10.29.2025
Issue Charge PDF	10.3.2023
Problem Statement PDF	9.25.2023

- [PJM's RCSTF Package and Rationale](#)
- [Summary Presentation on PJM's RCSTF Proposal](#)
- [Operation Uncertainty Quantification](#)
- [Real-Time Net-Load Uncertainty Quantification](#)
- [Locational Constraints for Reserve Services](#)
- [Product Nesting and Resource-Level Constraints](#)
- [Reserve Service Explainer Table](#)
- [2025 Day-Ahead and Real-Time Reserve Requirements](#)
- [Graphical Visualizations of the 2025 Requirement Values](#)
- [Reserve Service Nesting, Unnesting and Price Formation Examples](#)
- [Incentive Compatibility via Interactions between Reserve and Energy Prices](#)

Facilitator:
Lisa Morelli, Lisa.Morelli@pjm.com

Secretary:
Amanda Egan, Amanda.Egan@pjm.com

SME/Presenter:
Emily Barrett, Emily.Barrett@pjm.com

PJM's RCSTF Proposal Summary



Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com

Acronym	Term & Definition
SR	<p>Synchronized Reserves are reserves provided by resources that are synchronized to the grid and can respond within 10 minutes.</p>
ORDC	<p>An Operating Reserve Demand Curve is an administrative pricing curve that represents the markets willingness to pay for reserves at different reserve levels.</p>
RUR	<p>Ramping/Uncertainty Reserves are reserves that would be procured to manage forecasted ramp and uncertainty operational flexibility needs.</p>
MW	<p>A Megawatt is a unit of power equaling one million watts (1 MW = 1,000,000 watts) or one thousand kilowatts (1 MW = 1,000 KW).</p>

**PROTECT THE
POWER GRID
THINK BEFORE
YOU CLICK!**



Be alert to
malicious
phishing emails.

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

