PJM's RCSTF Proposal Summary

Last Updated: April 13, 2026

PJM Proposal

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

Reserve Services included in PJM's Proposal

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

Current and Proposed Future Reserve Constructs

CURRENT

Contingency Reserves

- **Synch Reserves (SR)** (online, 10min response) Requirement = MSSC
- **Primary Reserves (PR)** (online or offline, 10min response) Requirement = 1.5*SR
- **Secondary Reserves (SecR)** (online or offline, 30min response) Requirement = 3000

MSSC = Most Severe Single Contingency

FUTURE

Contingency Reserves

- **Synch Reserves (SR)** (online, 10min response) Requirement = MSSC
- **Secondary Reserves (SecR)** (online or offline, 30min response) Requirement = MSSC

Ramp and Uncertainty Reserves

- **Day Ahead Reserves** (online or offline, 60min response) Requirement = DA Uncertainty
  Energy Gap Reserves (online 60min response)
- **10 Min Ramp and Uncertainty (RUR)** (online, 10min response) Requirement = max(Net Load Ramp + Uncertainty, 0)
- **30 Min Ramp and Uncertainty (RUR)** (online, 10min response) Requirement = max(Net Load Ramp + Uncertainty, 0)

Introduction of new reserve products for uncertainty and ramping

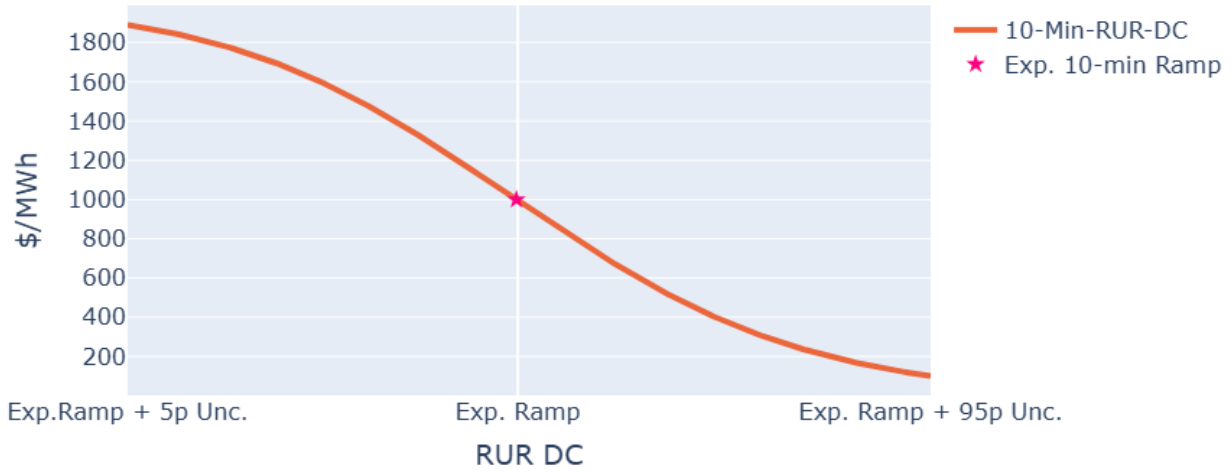
10 Minute Ramp and Uncertainty

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 1.25 times the 10-Min RUR clearing price	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$_{T+10}$ – Net-Load Forecast$_T$ 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*
10 Minute	0.4%	1.9%	3.1%

* Illustrative Uncertainty % based on 24/25 Data



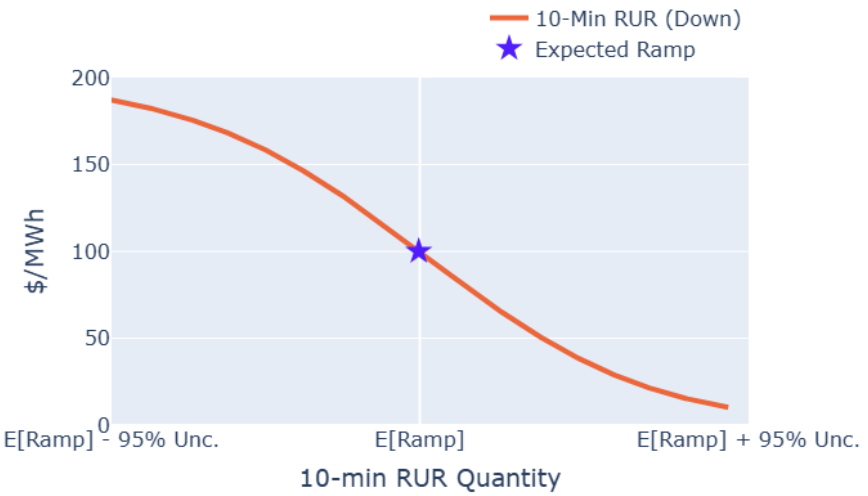
10 Minute Ramp and Uncertainty Down

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 1.25 times the 10-Min RUR clearing price	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
Expected Ramp = Net-Load Forecast$_T$ – 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*
10 Minute	0.4%	1.9%	3.1%

* Uncertainty % based on 24/25 Data



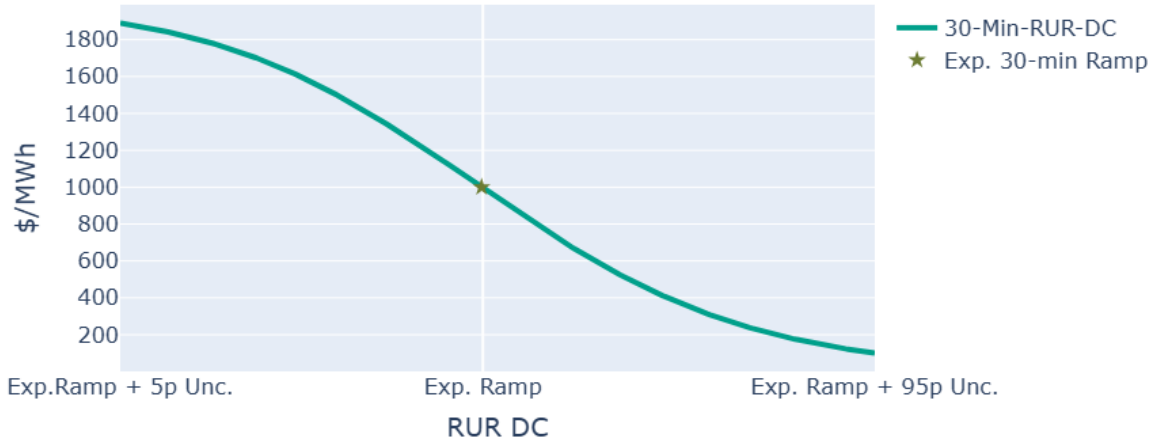
30 Minute Ramp and Uncertainty

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 1.25 times the 30-Min RUR clearing price	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$_{T+10}$ 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*
30 Minute	0.6%	2.7%	4.0%

* Uncertainty % based on 24/25 Data



Day Ahead Scheduling Reserves

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

Risk Percentiles

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

$DASR_T$ = load $forecast_T$* load error + load $forecast_T$* gen performance + solar $forecast_T$ * solar error + wind $forecast_T$ * wind error

20251015-item-03---proposed-error-percentiles-for-day-ahead-scheduling-reserve-quantities.pdf
20250827-item-02---uncertainty-and-risk-framework.pdf

Day Ahead Scheduling Reserves

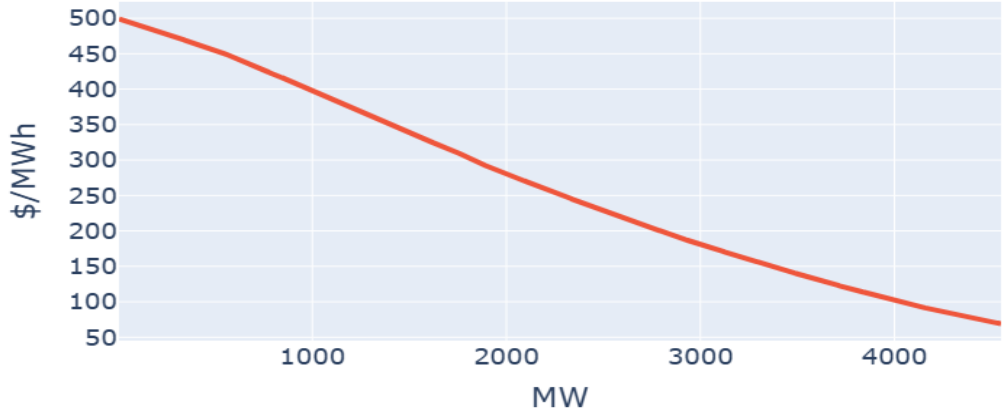
	Performance Expectations	Consequences for Non-Availability	Consequences for Non-Performance
Day-Ahead Scheduling Reserve	Maintain availability to provide energy and reserves consistent with day-ahead assignments Come online when called by PJM in real-time	Pay for the unprovided reserves at the greater 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
Based on Risk Day, $DASR_T$ = load $forecast_T$* load error + load $forecast_T$* gen performance + solar $forecast_T$ * solar error + wind $forecast_T$ * wind error Hourly DASR values would be capped at the DASR values for the peak load hour. This MW value will be procured *net* of RUR and Energy gap products (nested market design) ORDC will be single step demand curve at $50	DA Only	No

Energy Gap

Energy Gap	Performance Expectations	Consequences for Non-Availability	Consequences for Non-Performance
	Maintain availability to provide energy and reserves consistent with day-ahead assignments Follow PJM's energy dispatch instructions	Pay for the unprovided reserves at the greater of 1.25 the EG market clearing price or the RT 30-Min RUR clearing price	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

- 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

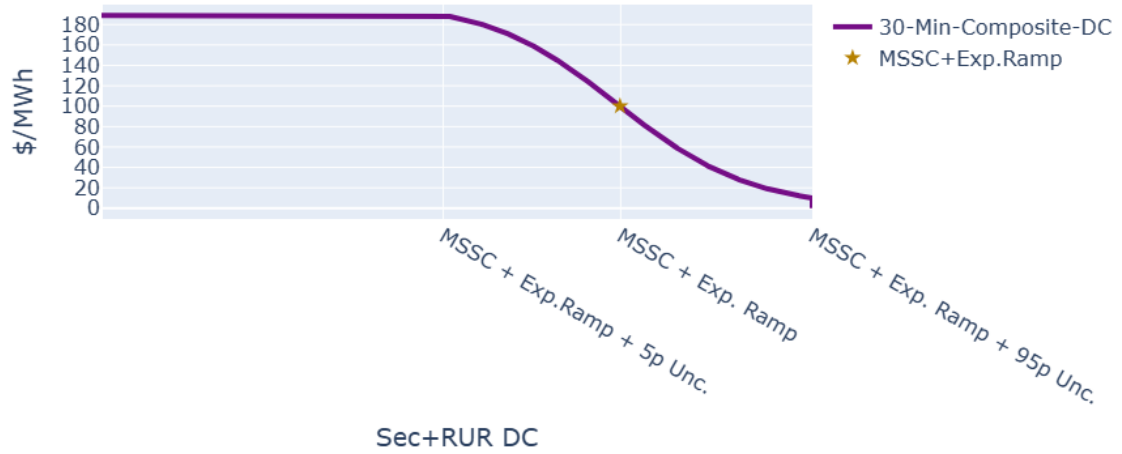
Synchronized Reserves

- Offer Structure Changes
  - Day-Ahead Soft Offer Cap: $10/MWh + Expected Penalty Rate
  - Real-Time Soft Offer Cap:$10/MWh + 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 or b) the highest system marginal energy price in the 6 intervals following the Synchronized Reserve Event
- 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

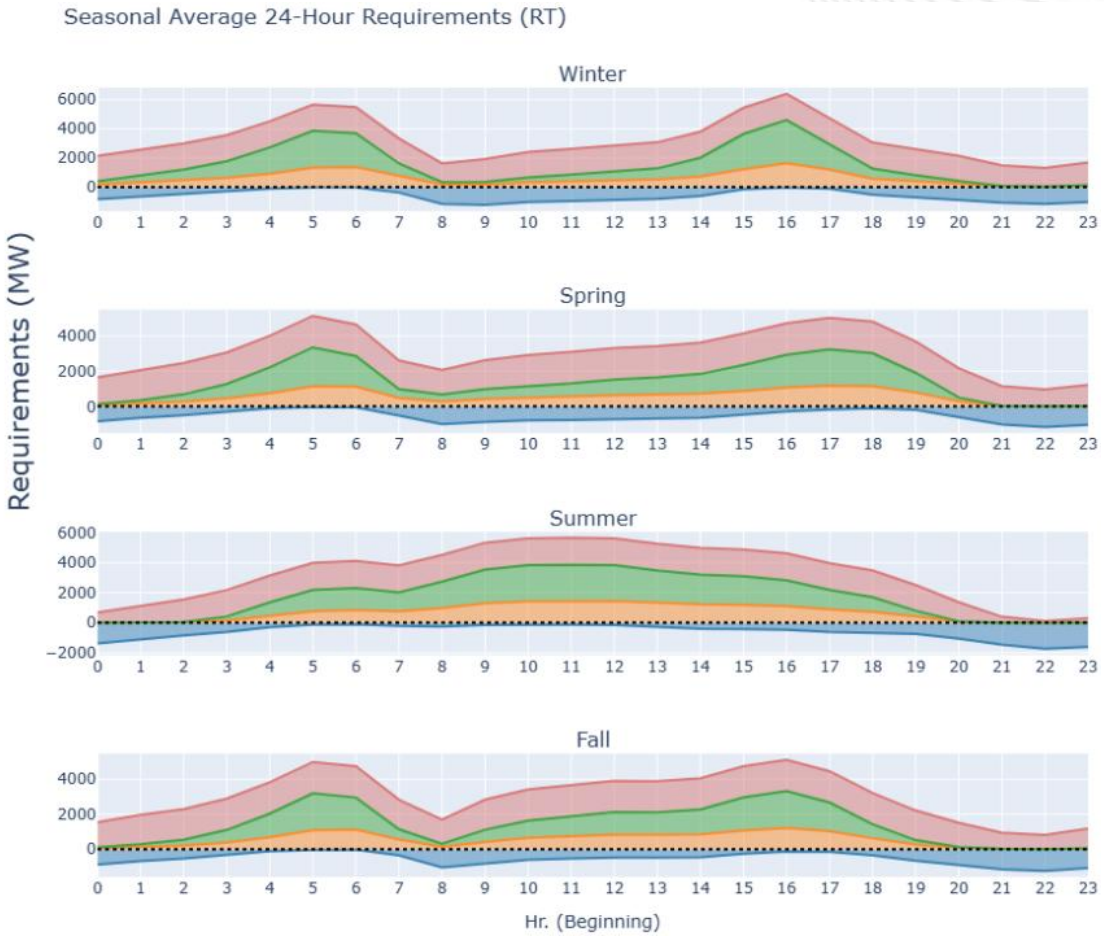
30 Minute Reserves

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 a rate of 1.5 times the real-time reserve market clearing price
	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

Sample Requirements



Acronyms

Acronym	Term & Definition
SR	**Synchronized Reserves** are reserves provided by resources that are synchronized to the grid and can respond within 10 minutes.
ORDC	An **Operating Reserve Demand Curve** is an administrative pricing curve that represents the markets willingness to pay for reserves at different reserve levels.
RUR	**Ramping/Uncertainty Reserves** are reserves that would be procured to manage forecasted ramp and uncertainty operational flexibility needs.
MW	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).