

Resource Offers into PJM's Reserve Markets

Emily Barrett

Principal Market Design Specialist

Reserve Certainty Senior Task Force

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PJM's Concerns about Status Quo Market Rules



Today, resources are not permitted to submit >\$0 offers for providing reserve services.



PJM is the only ISO that does not allow resources to submit >\$0 reserve offers into the market.



PJM believes that this limitation leads to inefficient and uneconomic market outcomes and can create disincentives for resources to take actions that are needed to support reliability.

Reserve Offers > \$0

PJM

MISO

CAISO

ISO-NE

NYISO

SPP

ERCOT



PJM's current position is that there are costs that resources should be allowed to reflect in their reserve offers.

- 1 Resources should be able to reflect and recover any costs for maintaining availability to provide reserves through their reserve offers.
- 2 Resources should be able to reflect any performance risk they would incur by taking on a reserve assignment through their reserve offer.
- 3 Resources should be able to reflect any expectation or risk of revenue loss for reserve deployment in their reserve offer.

PJM's Current Working Assumptions: Availability Costs



Resources may be able to take actions *day-ahead* that allow them to maintain their availability to provide reserves in real-time, such as making fuel arrangements. These actions may entail some cost that resources should be able to recover through their reserve offers.



In real-time, there are no additional going forward avoidable costs that resources can take to maintain availability to provide reserves.



Therefore, to allow resources to bid in their costs for maintaining *availability* to provide reserves, resources should be able to bid those costs into the Day-Ahead Market, but not into the Real-Time Market.

- ☒ When resources have a more stringent performance obligation and higher consequences or penalties for non-performance due to a reserve assignment, this may entail additional risk and cost.
- ☒ This additional performance risk exists for resources that are deployed during an event and evaluated based on their performance during that event as is the case with SR.
- ☒ This additional performance risk would also exist for offline resources if they are evaluated differently when they fail to come online within the prescribed time than resources without a reserve assignment as is the case with offline 30-Minute Reserves.
- ☒ Resources providing SR and offline 30-Minute Reserves should therefore be able to reflect their performance risk in their reserve offers. If additional non-performance penalties are advanced for other reserve products, this should also be considered in reserve offer rules.

PJM's Current Working Assumptions: Revenue Loss During Deployment



In the case of reserves that are not deployed economically but during an event to meet a reliability need, resources providing these services may experience deployment costs that are not recovered through the energy market.



In the suite of reserve products being discussed, SR is the only reserve service that is deployed during an event.



Resources providing SR should therefore be able to reflect their expectations of lost revenue for deployment into their SR offers.

Examples of Lost Revenue:

- Demand Response resources that incur costs to curtail load
- Generation resources with marginal costs above energy prices during the event
- Limited energy storage resources that are instructed to either stop charging or to discharge uneconomically and therefore experience lost opportunity cost

Day Ahead Reserves

Addresses uncertainty DA that does not need to be carried into RT.
Inclusive of the need to have energy and reserve commitments to meet the next day load forecast (energy gap)

30-Min Reserves – Updated

Addresses net-load ramping, net-load forecast uncertainty and the need for replacement reserves for system recovery.

30-Min Spinning Reserves

Addresses net-load ramping and net-load forecast uncertainty

10-Min Ramp/Uncertainty Reserves – Up and Down Reserves

Addresses net-load ramping and net-load forecast uncertainty

Primary Reserves (PR) (10-minute reserves) – 150% SR

Contingency reserves and ACE recovery

Synchronized Reserves (SR) (10-minute reserves) – 100% MSSC*

Contingency reserves and ACE recovery

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Contingency reserves and ACE recovery

Synchronized Reserves (SR) (10-minute reserves) – 100% MSSC*

Contingency reserves and ACE recovery

Summary of PJM's Current Perspective on When Offers > \$0 for Reserve Services Should be Allowed

Reserve Service	Offers into the Day-Ahead Market			Offers into the Real-Time Market		
	Availability Costs	Performance Risk*	Deployment Revenue Loss	Availability Costs	Performance Risk*	Deployment Revenue Loss
DA Offline Reserves	✓	✓		N/A	N/A	N/A
DA Online Reserves	✓	✓		N/A	N/A	N/A
30-Min Offline Reserves	✓	✓			✓	
30-Min Online Reserves	✓	✓			✓	
10-Min RUR	✓	✓			✓	
Offline Primary Reserves	✓	✓			✓	
Synchronized Reserves	✓	✓	✓		✓	✓

*The light gray check marks reflect that there may be additional performance risk for providing these services depending on the performance obligation and consequences for non-performance.

Summary of PJM's Current Perspective on When Offers > \$0 for Reserve Services Should be Allowed

- Assuming no additional performance penalties for online 30-Min and 10-Min RUR reserves beyond deviation charges, the offer caps for these services would be \$0 in real-time. The cost of these services for online resources would therefore solely be based on lost opportunity costs calculated by the dispatch engine.
- The offer caps for reserve services in the Day-Ahead Market would be greater than \$0 across all products.
- The offer caps for offline resources would be greater than \$0 in both the Day-Ahead and Real-Time Markets.
- The offer cap for Synchronized Reserves would be greater than \$0 in both the Day-Ahead and Real-Time Markets.

Reserve Service	Day-Ahead Offer Cap	Real-Time Offer Cap
DA Offline Reserves	> \$0	N/A
DA Online Reserves	> \$0	N/A
30-Min Offline Reserves	> \$0	> \$0
30-Min Online Reserves	> \$0	\$0
10-Min RUR	> \$0	\$0
Offline Primary Reserves	> \$0	> \$0
Synchronized Reserves	> \$0	> \$0

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

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

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

Reserve Offers into PJM's Reserve Markets



Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com

Acronym	Term & Definition
SR	Synchronized Reserves are reserves provided by resources that are synchronized to the grid and can respond within 10 minutes.
PR	Primary Reserves are reserves provided by resources that are either synchronized or not synchronized to the grid and can respond within 10 minutes.
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).

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POWER GRID
THINK BEFORE
YOU CLICK!**



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