

Demand Resources Participation in 30 Minute Reserves (1/17/2019 Presentation)

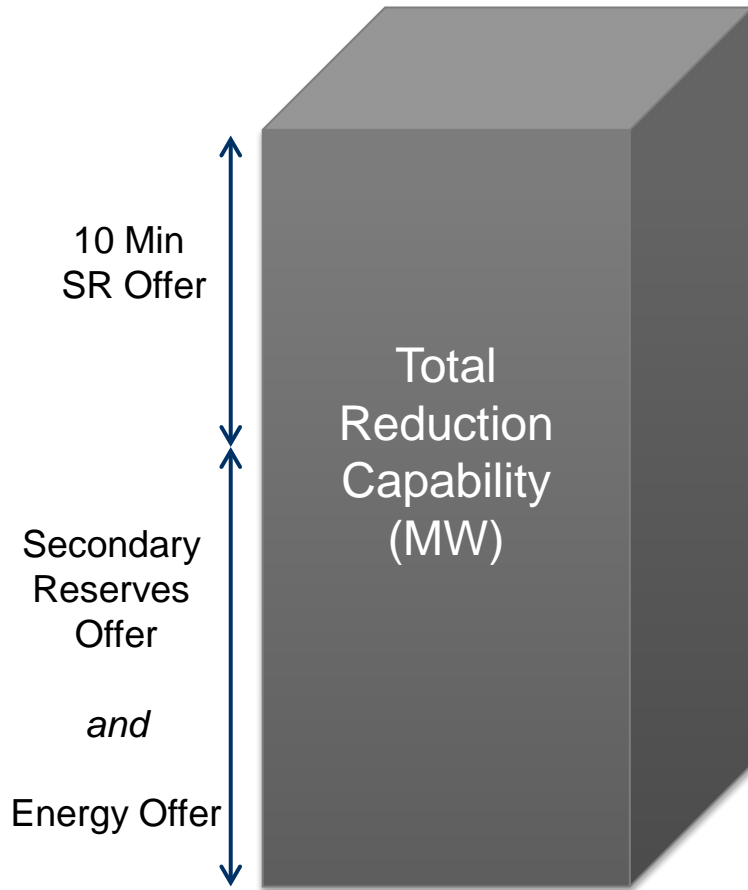
**Slides 3 and 10-15:
Edited and New for 1/23/2019 Meeting**

- 10 minute Synch Reserves adder will change from \$7.50 to the expected value of the penalty
 - Estimated to be \$0.02 for 2018
- DASR offer price will no longer be submitted
- DASR assignment is balanced out with Real Time Secondary Reserve assignment in Settlements
- In order to provide Secondary Reserves, a valid Real Time energy offer must be submitted for the same MW amount

- Secondary Reserves for Demand Resources are the amount of MW that can be reduced within 30 minutes minus the amount of MW that can be reduced in 10 minutes
- Must have an approved economic DR registration
- Need to have one minute meter data available for measurement & verification
- Must be available for Real Time energy in order to be eligible for Secondary Reserves in Real Time
 - Cannot clear total reduction capability in DA energy market
- Must have a lead time less than or equal to 30 minutes
- **(New as of 1/23/2019) Energy min downtime must be less than or equal to 2 hours**
 - This ensures that resources can be dispatched for energy in Real Time if needed

Availability	Offer MW	Offer Price
<ul style="list-style-type: none"> • Must be available for energy in order to be eligible to clear for Secondary Reserves • Reflect availability for Secondary Reserves in Secondary Reserve Offer MW value 	<ul style="list-style-type: none"> • Consistent with treatment for Synchronized Reserves, Demand Resources will have the ability to specify an offer MW • Secondary reserves offer MW must be equal to the energy offer MW • Cannot be greater than the total load reduction capability • Offer MW = 0 indicates that resource is unavailable for Secondary Reserves • No must offer requirement 	<ul style="list-style-type: none"> • Secondary Reserve is a cost-based market • No offer margin allowed • Each resource's cost to provide Secondary Reserves is based solely on lost opportunity cost, which for Demand Resources is zero

- Max of 33% of total 30 Min Reserves can be met with Demand Resources
 - Today, DR cap is 33% for SR and 25% for DASR
- Secondary Reserves Market Clearing:
 - Inflexible DR will be cleared in ASO
 - But may be dispatched for energy by ITSCED
 - Flexible DR will be cleared in RTSCED
- Energy dispatch:
 - Will be evaluated in ITSCED (same as today)
- Any Inflexible Synch Reserve MW cleared in ASO will be honored in any downstream clearing engines



Ground Rules for Offers:

- MWs offered for 10 min Synchronized Reserves cannot overlap MWs offered for Energy or Secondary Reserves
- Secondary Reserves Offer MW = Energy Offer MW
 - Secondary Reserves Offer is voluntary
 - Same MW are considered between Secondary Reserves and Energy
- Notification time for energy offer must be ≤ 30 minutes
- Energy offer schedule must have Market Type = “Both” or “Balancing”
 - Cannot be set to “DayAhead”
 - Indicates that the energy schedule is available for Real Time dispatch

- Cleared Secondary Reserve MW will be paid at the Secondary Reserve MCP
- Any MW dispatched for energy will be paid at the LMP
- Balancing reserve settlements will apply as described at 1/11/2019 meeting
 - Resources can be made whole for net negative buy back that results from PJM's dispatch directions

- Change name to Day-Ahead Secondary Reserves
- No DASR price offer submitted
- Increase cap to 33% from 25%
- Balancing settlements for changes to Secondary Reserve assignment between Day-Ahead and Real Time

- From M-11, Section 2.3.3:
 - Emergency and Pre-Emergency Demand Resource emergency or pre-emergency offer price may not exceed the following:
 - o 30 minute lead time: \$1,000/MWh, plus the applicable Primary Reserve Penalty Factor from the first step of the demand curve, minus \$1.00
 - o approved 60 minute lead time: \$1,000/MWh, plus [the applicable Primary Reserve Penalty Factor from the first step of the demand curve divided by 2]; and
 - o approved 120 minute lead time: \$1,100/MWh.

- PJM proposal:
 - Change to a static number that is not dependent on the penalty factor value
 - Emergency and Pre-Emergency max offer price set to:
 - \$1,849/MWh for 30 minute lead time resources
 - \$1,425/MWh for 60 minute lead time resources
 - \$1,100/MWh for 120 minute lead time resources



New Slides for 1/23/2019 Meeting

- Currently, DASR that is called on for energy in RT:
 - Highest output at minute $T-1$, T , $T+1$ where T = notify time of dispatch
 - Lowest output at minute $T+29$, $T+30$, $T+31$
 - The delta between the highest and lowest output must be greater than or equal to the RT energy dispatched MW to receive credits
- PJM Proposal, Secondary Reserves called on for energy in RT:
 - Same performance measurement
 - T = notify time of dispatch (same as today)

Balancing Settlements Example for DR

Scenario: Resource clears Secondary Reserves in DA and energy in Real Time

	Secondary Reserves	Credits for Reserves	Energy	Credits for Energy
Day-Ahead	4 MW \$1/MWh	\$4	0 MW \$10/MWh	\$0
Real Time	0 MW \$3/MWh	\$0	4 MW \$15/MWh	\$60
Balancing (RT – DA)*RT price	$0-4 = -4 \text{ MW} * \$3$	-\$12	$4-0 = 4 \text{ MW} * \$15$	\$60
Payment		-\$8 *Eligible for make-whole up to \$0		\$60

How is this different from today?
 Today, resource would not have to buy back 4 MW of Secondary Reserves.
 The total credit would be $\$4 + \$60 = \$64$ instead of just \$60
 *based on actual performance

Balancing Settlements Example for DR

Scenario: Resource clears Secondary Reserves in DA and RT and does not clear for energy

	Secondary Reserves	Credits for Reserves	Energy	Credits for Energy
Day-Ahead	4 MW \$1/MWh	\$4	0 MW \$10/MWh	\$0
Real Time	4 MW \$3/MWh	\$0	0 MW \$15/MWh	\$0
Balancing (RT – DA)*RT price	$4-4 = 0 \text{ MW} * \$3$	\$0	$0-0 = 0 \text{ MW} * \$15$	\$0
Payment		\$4		\$0

Same payment as today

Scenario: Resource clears for energy in DA and reduces in Real Time

	Secondary Reserves	Credits for Reserves	Energy	Credits for Energy
Day-Ahead	0 MW \$1/MWh	\$0	4 MW \$10/MWh	\$40
Real Time	0 MW \$3/MWh	\$0	4 MW \$15/MWh	\$0
Balancing (RT – DA)*RT price	$0-0 = 0 * \$3$	\$0	$4-4 = 0 * \$15$	\$0
Payment		\$0		\$40

Resources that clear for DA energy are expected to reduce in Real Time.
 If total load reduction capability clears in DA energy, no MW are available for RT Secondary Reserves or RT energy dispatch.