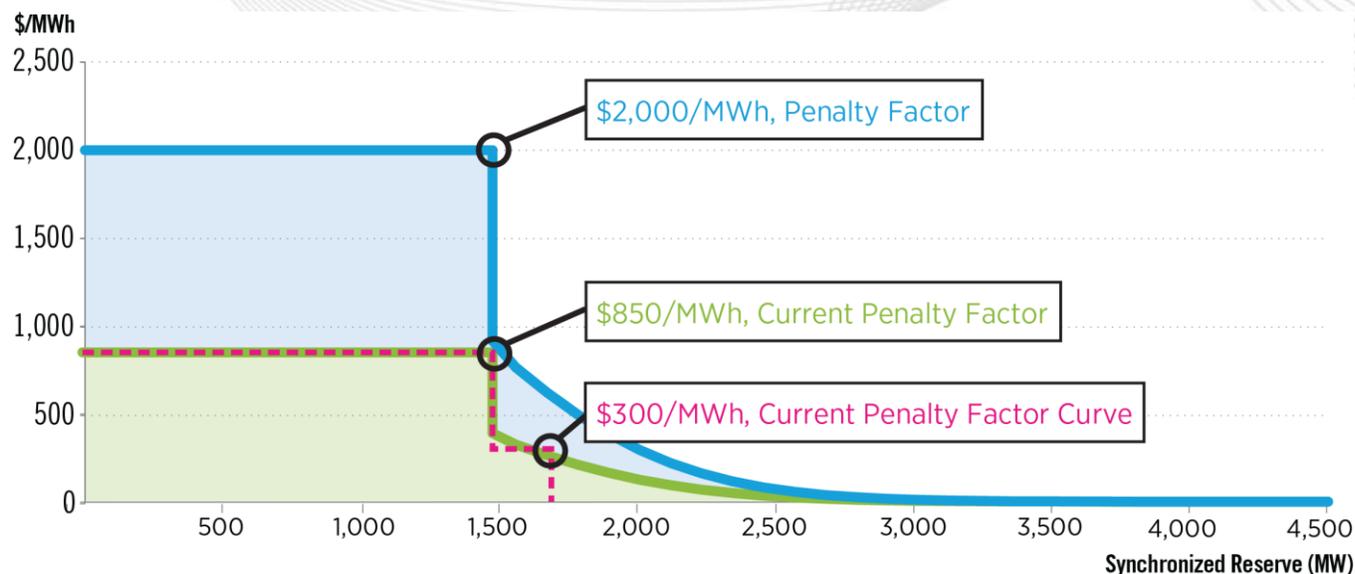




Reserve Market Price Formation Effects

Synchronous Reserve Deployment
Task Force
April 30, 2021



For illustrative purposes only.

The Operating Reserve Demand Curves:

- Will affect the amount of MWs cleared for Reserves
 - And therefore, the amount available to be deployed during a reserve event
- Will affect the clearing price for Reserves
 - In general, not just during reserve events
- Will not affect the methodology for calculating LMPs
 - When Reserve Requirements can be met at a price less than or equal to the defined penalty factors, the penalty factors do not impact the calculation of LMPs.
 - When any Reserve Requirement cannot be met at a price less than or equal to the defined penalty factor, the applicable penalty factor(s) is used in the determination of LMPs



Tier 1/Tier 2 Consolidation will affect

- **SR Offers**
 - Availability for Reserves is controlled by availability for Energy (with the exception of Hydro/ESR/Load Response resources)
 - MW capability will be calculated by PJM based on Eco Limits and Ramp Rates (with the exception of Hydro/ESR/Load Response resources)
 - The \$7.50/MWh offer margin will be reduced to the expected value of the penalty (approximately \$0.02 for the first month of implementation).
 - VOM is not allowed in the offer price
- **SR Event Response Obligation**
 - All cleared SR has an obligation to respond when SR is deployed
- **Payment during SR Deployment**
 - All cleared SR is paid the Market Clearing Price regardless of deployment
- **Penalties for Non-Performance**
 - All cleared SR is penalized for non-performance



Effect on SR Event Response in RTO

Date	Start	End	Duration	Region	Tier 1 Estimate (MW)	Tier 1 Response (MW)	Tier 1 % Response	Tier 2 Assigned (MW)	Tier 2 Response (MW)	Tier 2 % Response
3/9/2021	07:50:52	08:01:48	00:10:56	RTO	1354.9	635.4	46.9%	884.0	540.8	61.2%

Assuming total SR response will be comparable to current Tier 2 response:

With no increase to SR requirement and MWs cleared

- 3/9/2021 - Event Response changes from 1,176.2 MW to 1,370 MW (increase of 193.8 MW)

With SR requirement and MWs cleared assumed to be 2,500 MW

- Event Response estimated to be 2,500 MW x 61.2% = 1,530 MW

Date	Start	End	Duration	Region	Tier 1 Estimate (MW)	Tier 1 Response (MW)	Tier 1 % Response	Tier 2 Assigned (MW)	Tier 2 Response (MW)	Tier 2 % Response
12/16/2020	11:38:17	11:48:39	00:10:22	MAD	286.4	196.9	68.8%	527.6	413.2	78.3%

Assuming total SR response will be comparable to current Tier 2 response:

With no increase to SR requirement and MWs cleared

- 12/16/2021 - Event Response changes from 610.1 MW to 637.4 MW (increase of 27.3 MW)

With SR requirement and MWs cleared assumed to be 2,500 MW (and 50% of the cleared MWs in MAD)

- Event Response estimated to be $2,500 \text{ MW} \times 50\% \times 78.3\% = 978.8 \text{ MW}$

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