

ORDC Shape Options

EPFSTF

June 25, 2018

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Monitoring Analytics

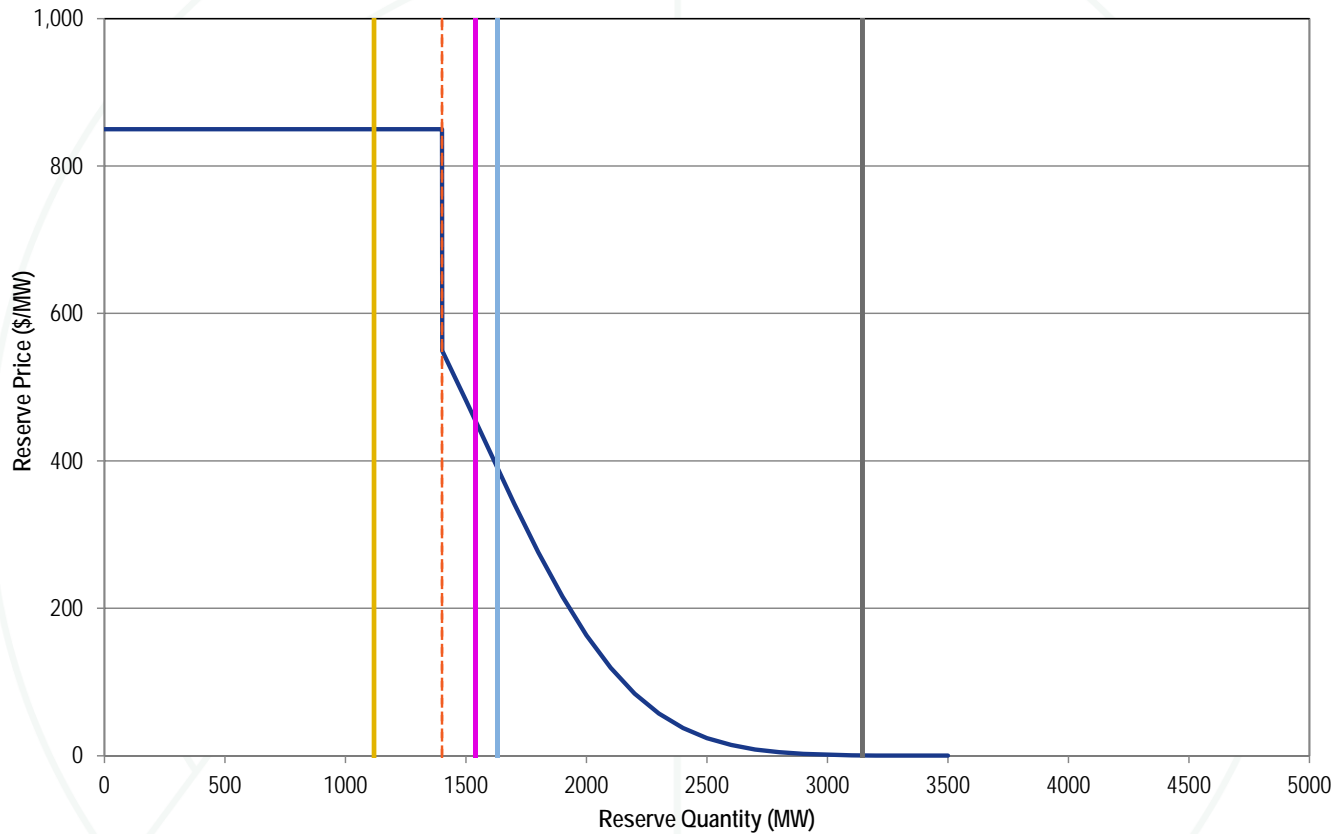
PJM Estimated ORDCs

- **The ORDC estimation method presented by PJM in May was a straightforward adaptation of the method used by ERCOT.**
- **The ORDC means that PJM will buy more than current synchronized reserve levels and pay higher prices for synchronized reserves.**
- **Used within the energy and reserve joint optimization, the MMU expects the estimated ORDCs would lead PJM to carry more online capacity than it has historically.**
- **The implication is not only a change to price formation, but also a change to operations.**

Estimated ORDCs and Historic Reserves

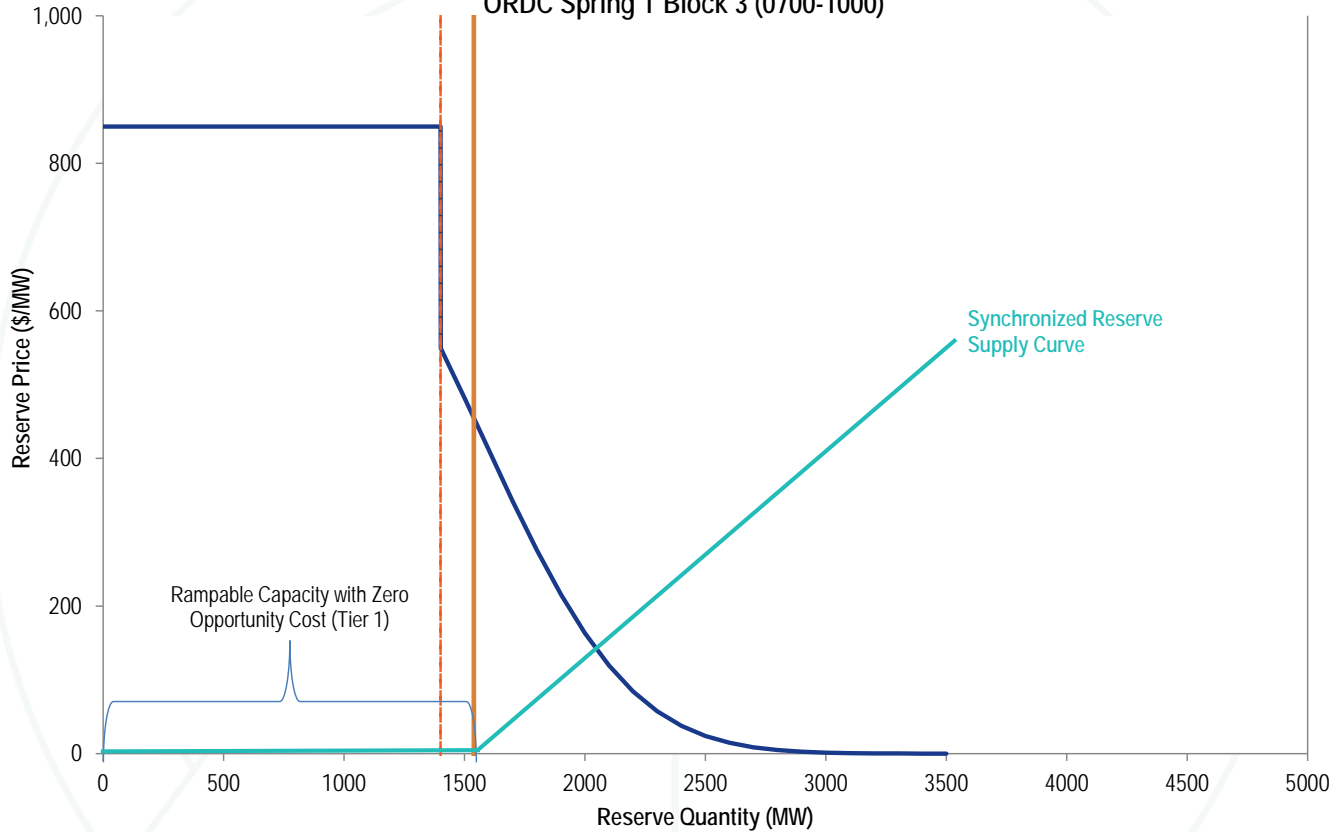
- **The following graphs plot the PJM ORDC estimates provided at the May EPFSTF meeting.**
- **The MMU added historic synchronized reserve levels:**
 - **2015 through 2017**
 - **By season and time block**
 - **Five minute pricing solution synchronized reserve levels**
 - **Minimum, Maximum**
 - **Mean, Median**
- **The actual historic reserve requirement may vary from the MRR (minimum reserve requirement) in the plotted curve.**

ORDC Spring T Block 3 (0700-1000)



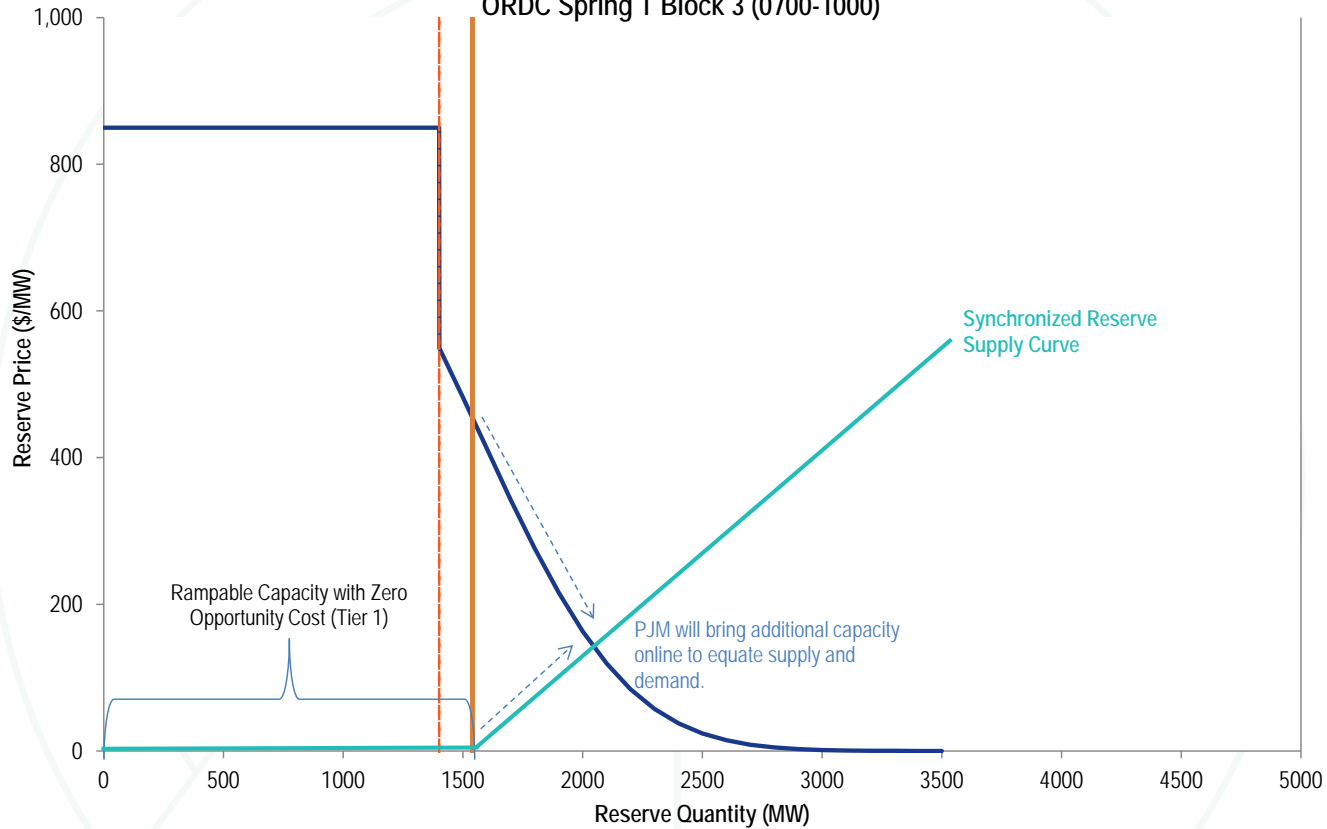
- ORDC
- Minimum RTO Sync Reserves (2015-2017)
- MRR (MW)
- Maximum RTO Sync Reserves (2015-2017)
- Average RTO Sync Reserves (2015-2017)
- Median RTO Sync Reserves (2015-2017)

Illustration of Supply and Demand ORDC Spring T Block 3 (0700-1000)



— ORDC - - - MRR (MW) — Median RTO Sync Reserves (2015-2017)

Illustration of Supply and Demand ORDC Spring T Block 3 (0700-1000)

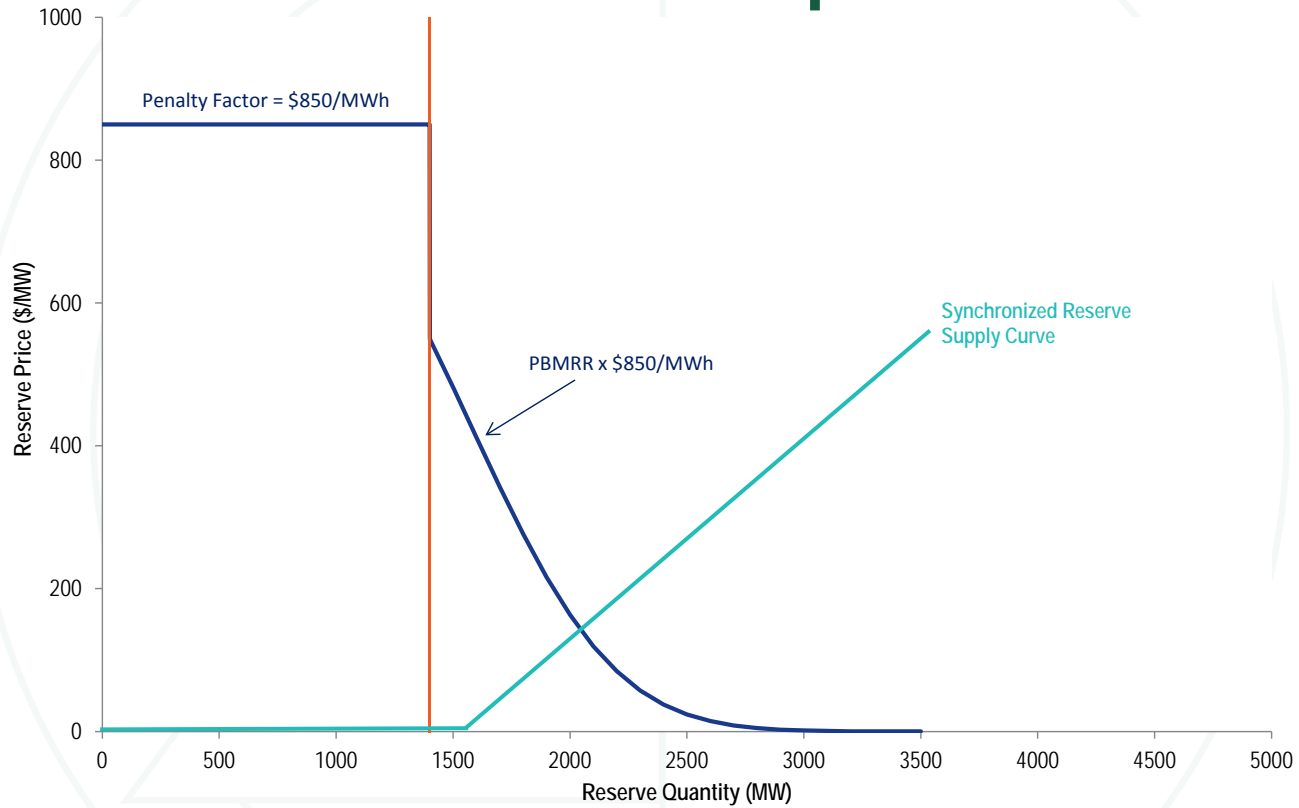


— ORDC - - - MRR (MW) — Median RTO Sync Reserves (2015-2017)

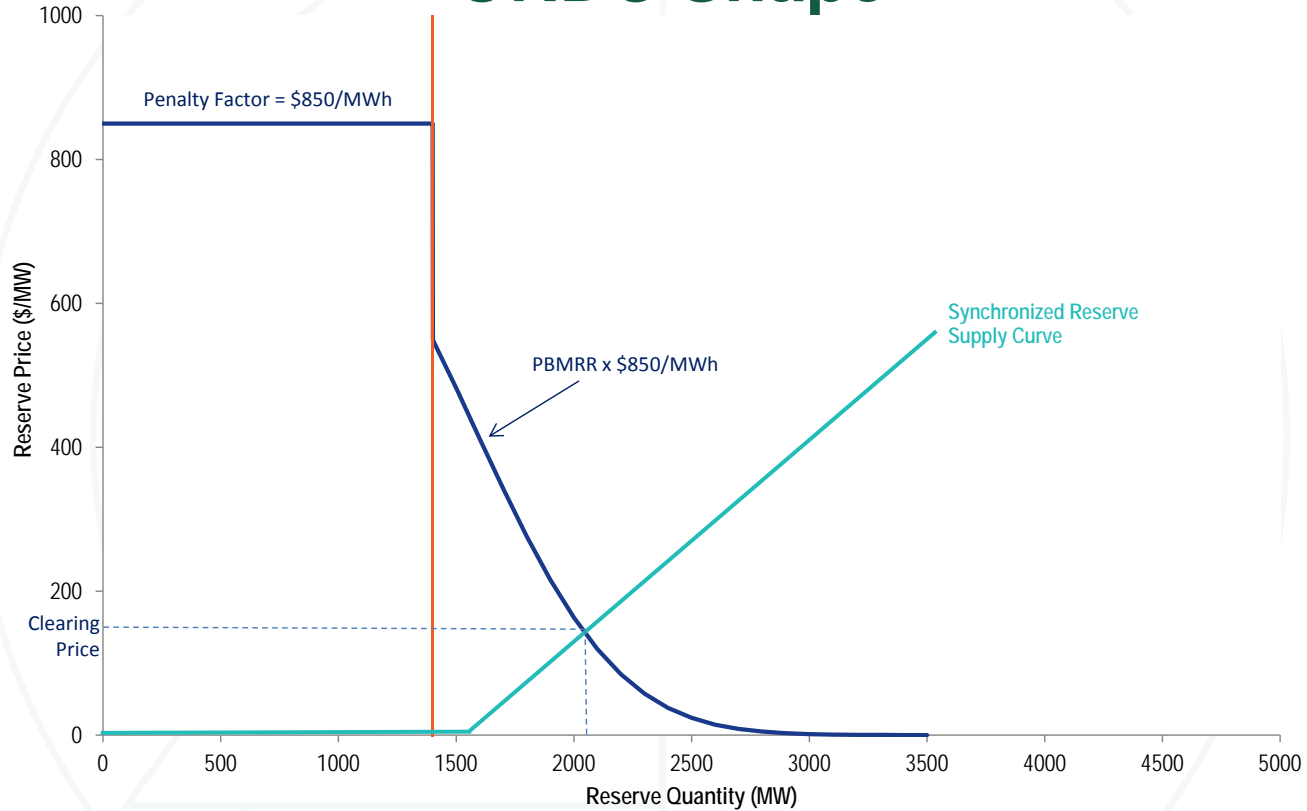
ORDC Shape Criteria

- **What is the marginal value of ten minute reserves?**
- **Is the thirty minute Probability Below the Minimum Reserve Requirement (PBMRR) the best metric?**
 - **Load forecast, wind forecast, solar forecast**
 - **Forced outage rates**
- **Does the penalty factor reflect the value of maintaining ten minute reserves?**
 - **\$850 per MWh x 1400 MW = \$1.19 million per hour**
- **Impact to the market**
 - **Can a less dramatic change to the ORDC produce the desired results at a lower cost?**

ORDC Shape



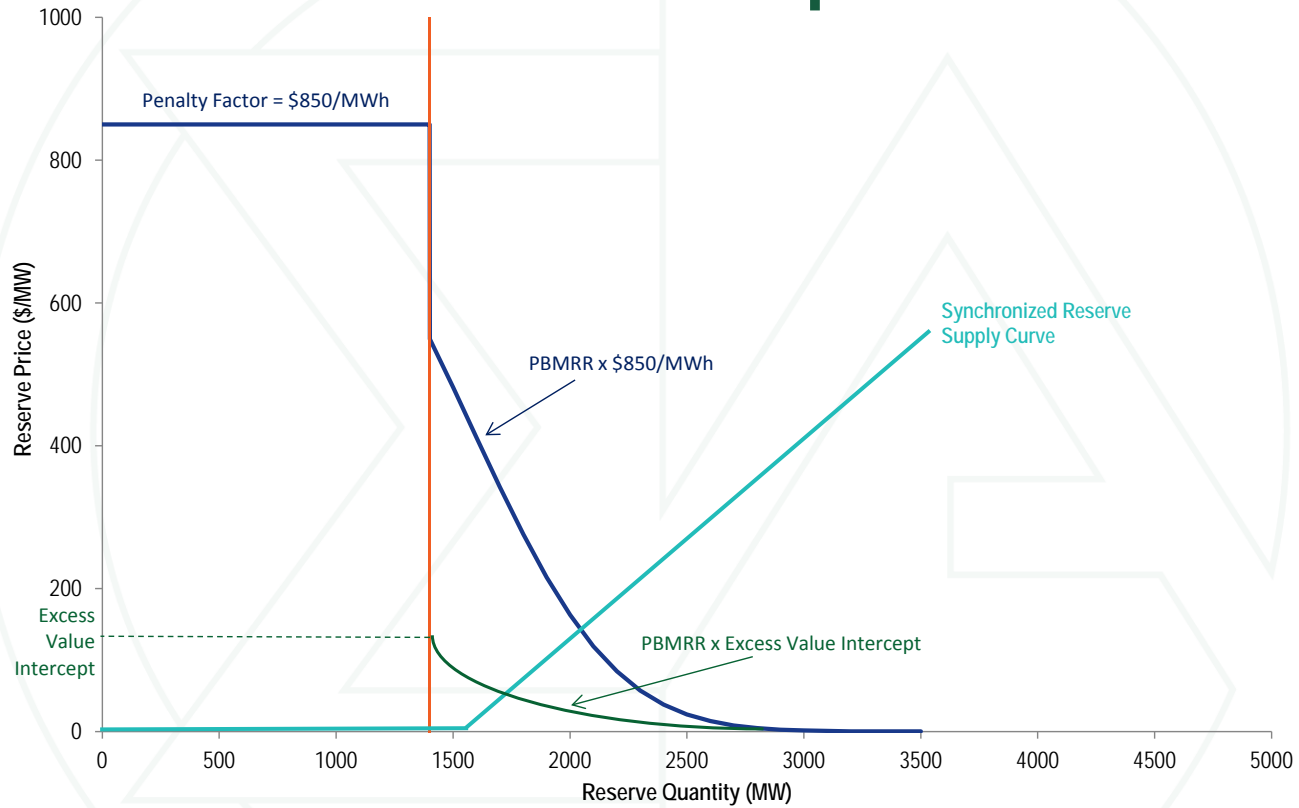
ORDC Shape



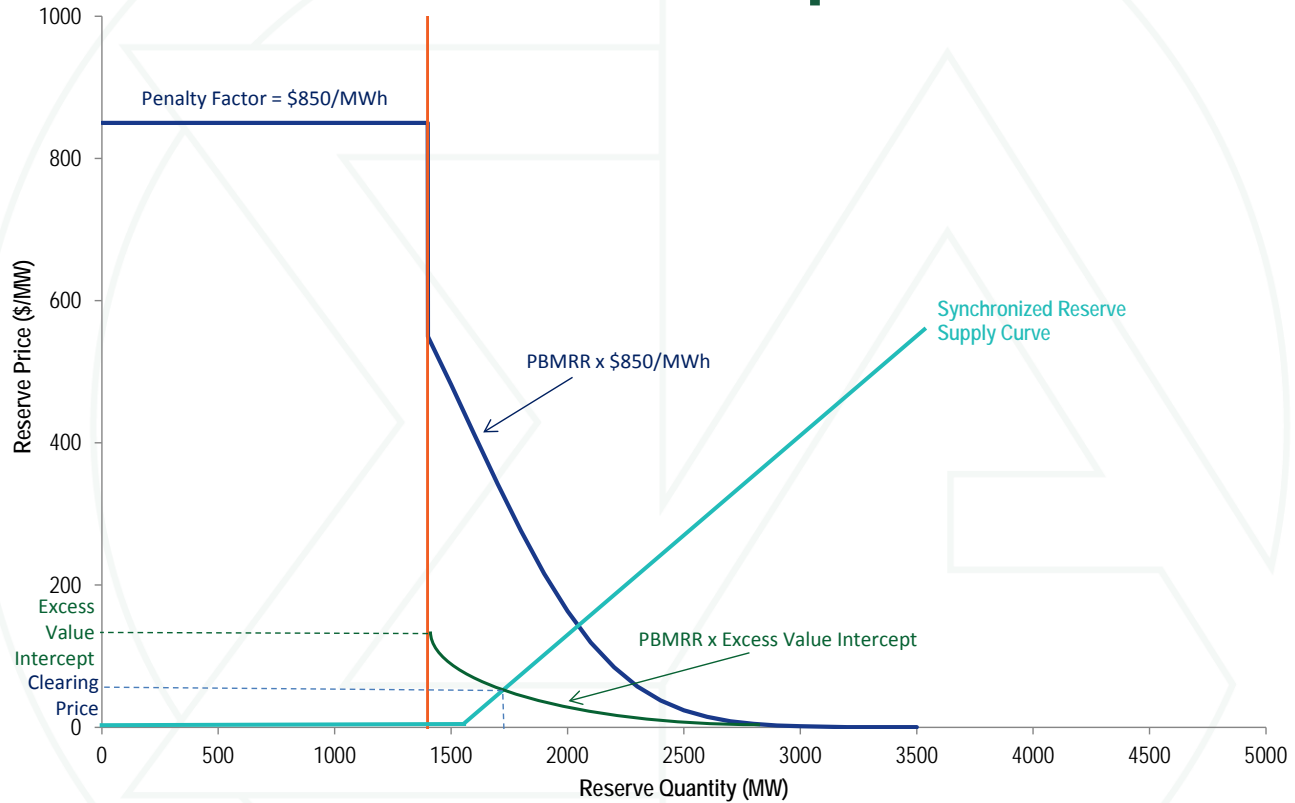
— ORDC — MRR (MW)



ORDC Shape



ORDC Shape



ORDC Shape Alternatives

- **PJM seeks to price reserves on the system when reserves exceed the Minimum Reserve Requirement.**
- **The identified market design gap does not require pricing at \$850 per MWh x the Probability Below the Minimum Reserve Requirement (PBMRR).**
- **The IMM suggests considering a different intersection point for the MRR and the downward sloping segment of the ORDC.**
 - **We call the different intercept point the Excess Value Intercept.**
- **A lower PBMRR is a similar option.**

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