ORDC Shape Options

EPFSTF
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Catherine Tyler
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
- MRR (MW)
- Average RTO Sync Reserves (2015-2017)
Illustration of Supply and Demand
ORDC Spring T Block 3 (0700-1000)

- Reserve Price ($/MW)
- Reserve Quantity (MW)

- Rampable Capacity with Zero Opportunity Cost (Tier 1)
- Synchronized Reserve Supply Curve

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

PJM will bring additional capacity online to equate supply and demand.

Rampable Capacity with Zero Opportunity Cost (Tier 1)

Synchronized Reserve Supply Curve

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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?
Penalty Factor = $850/MWh

PBMRR x $850/MWh

Synchronized Reserve Supply Curve
Penalty Factor = $850/MWh

PBMRR x $850/MWh

PBMRR x Excess Value Intercept

Synchronized Reserve Supply Curve
Penalty Factor = $850/MWh

PBMRR x $850/MWh

PBMRR x Excess Value Intercept

Synchronized Reserve Supply Curve

Excess Value Intercept

Clearing Price

Reserve Price ($MM)

Reserve Quantity (MW)

ORDC MRR (MW)

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ORDC Shape Alternatives

• PJM seeks to prices 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.