IMM Revised ORDC Proposal

EPFSTF

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Joe Bowring

Catherine Tyler

Monitoring Analytics

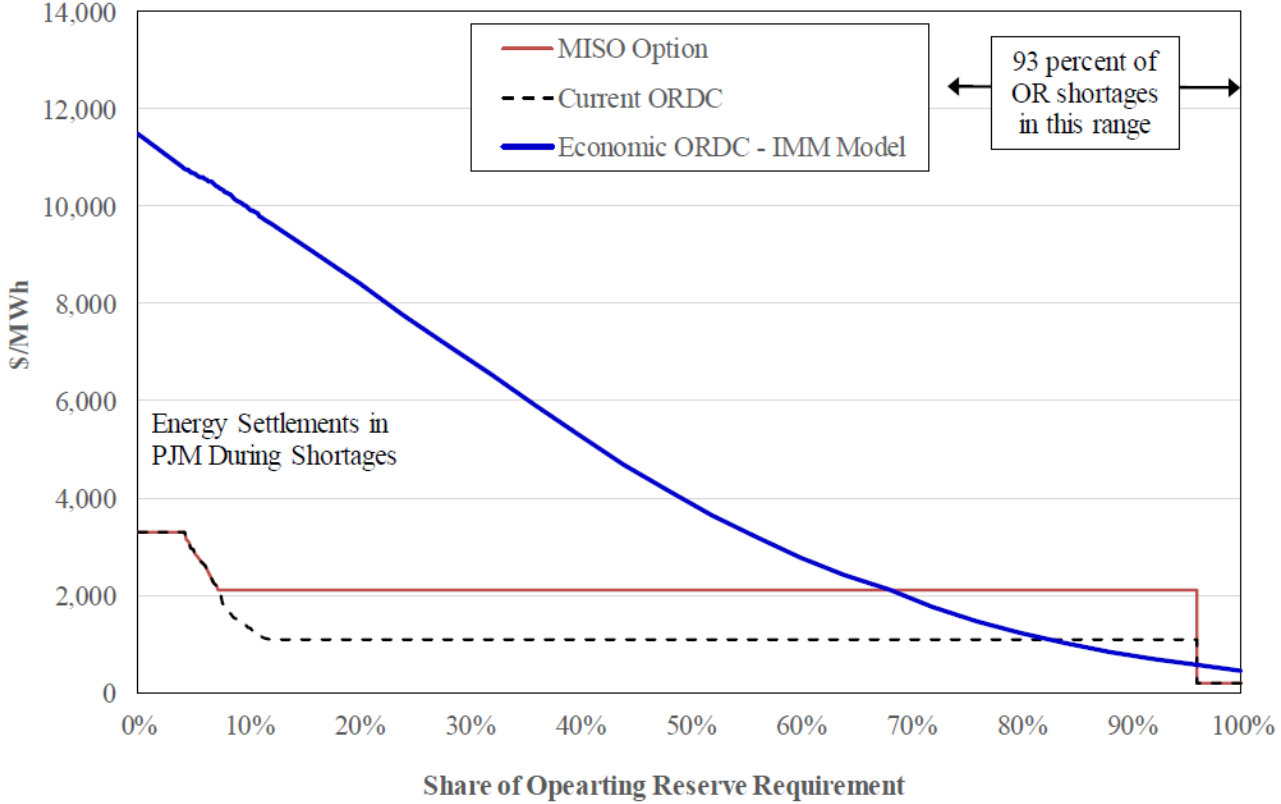
PJM ORDC Proposal

- **PJM's ORDC procures too many reserves and pays the reserves too much.**
- **The PJM approach is not similar to those used by other FERC jurisdictional RTOs**
- **With nesting of products and zones, PJM's ORDC includes higher prices than ERCOT's ORDC that is meant to substitute for a capacity market.**
- **The IMM proposes a more conservative ORDC than PJM's approach.**

Review of Other RTO ORDCs

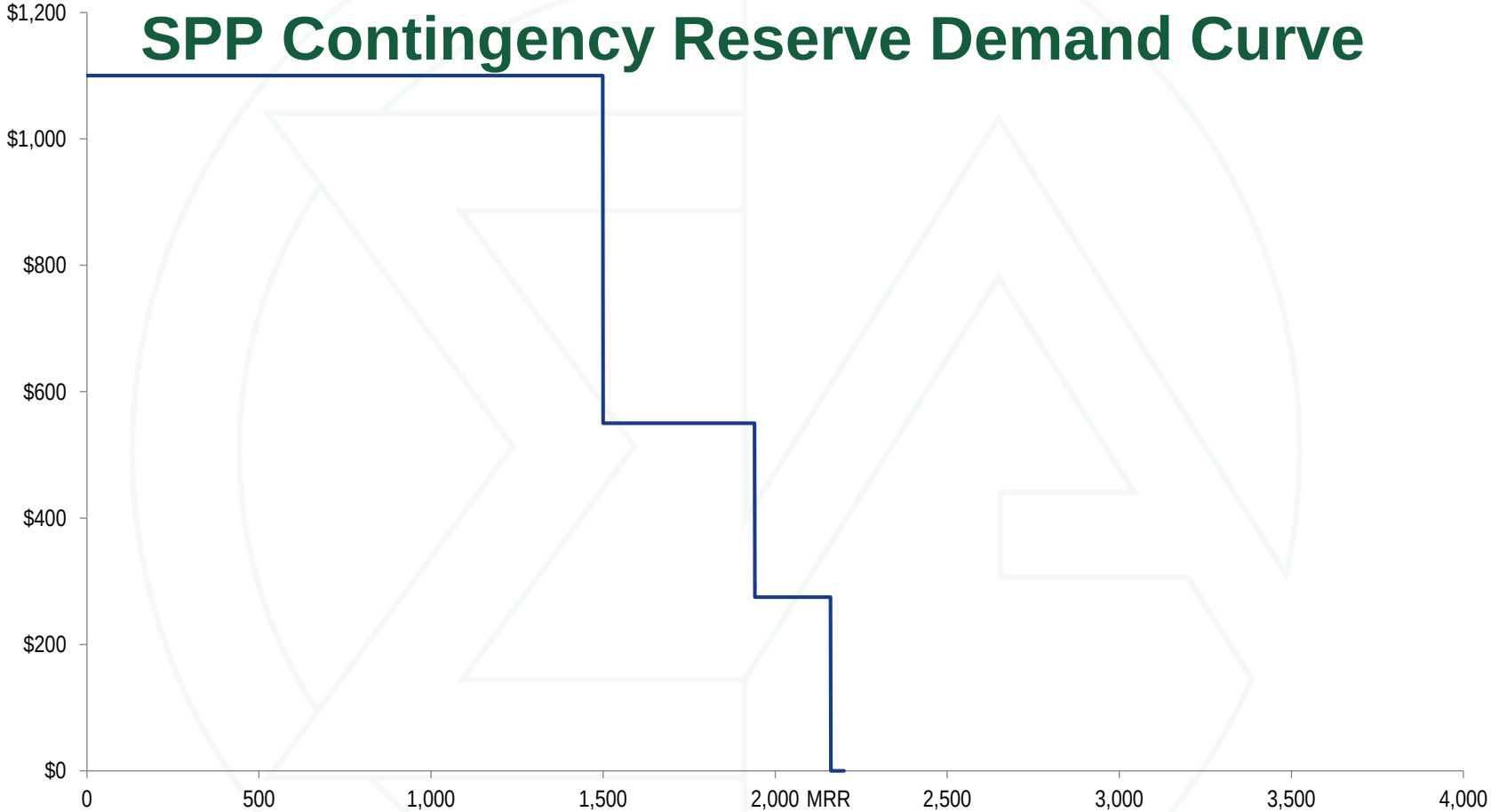
- **ISO New England**
  - **Vertical demand up to penalty factor, no sloped curve**
    - 30 Minute Reserves $2,000 per MWh
    - 10 Min. Not Synchronized $3,500 per MWh
    - 10 Min. Synchronized $3,550 per MWh
  - **Escalating penalty factors for reserve subzones**
- **New York ISO, California ISO, Southwest Power Pool**
  - **Stepped demand curves for shortages only**
- **Midcontinent ISO**
  - **Sloped and stepped curve for shortages only**

MISO and MISO IMM Proposed ORDCs



Source: Potomac Economics, 2016 State of the Market Report for MISO, Analytical Appendix, Section V.F.

SPP Contingency Reserve Demand Curve



Source: SPP Integrated Marketplace Protocols, v.65.a, Section 4.1.5.2 and https://marketplace.spp.org/groups/scarcity-demand-curve.

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IMM Revised ORDC Proposal

- **Simple ORDC: vertical demand with penalty factor**
  - **Consistent with precedent of other RTOs**
  - **Used for both synchronized and primary reserve**
- **No sloped curve, no extension beyond MRR**
- **Identical curves in day ahead market**
- **Max price equal to energy offer cap**
  - **$1,000 per MWh, unless PJM has approved a higher cost-based offer, per FERC rules**
  - **Increases at $250 per MWh increments with higher approved cost-based offers, up to $2,000 per MWh**
- **Note: Further development needed for consideration of IMM's previous proposal, Intertemporal ORDC based on operator actions.**

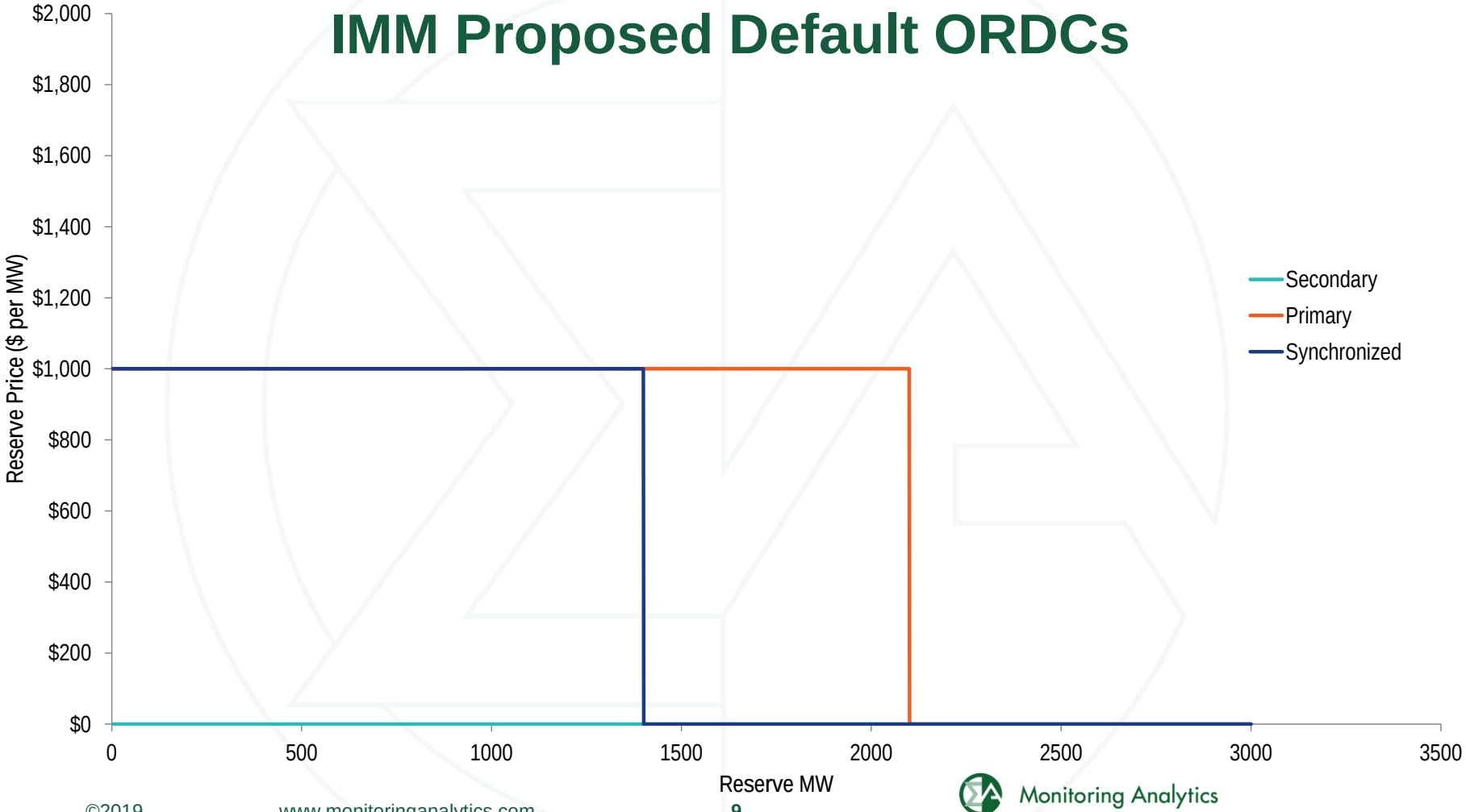
Operator Actions

- **Operators may increase the minimum reserve requirements under predefined conditions.**
  - **Change in the largest contingency (Synch., Primary)**
  - **Extreme weather (Synchronized, Primary)**
  - **Gas contingencies (Secondary)**
- **The increased requirements will have defined start and end times.**
- **PJM will post on its website:**
  - **The active minimum reserve requirements**
  - **The reason for any increased reserve requirements**
  - **The beginning and end times for the increased reserve requirements**

Secondary (30 Minute) Reserves

- Eliminate Day Ahead Schedule Reserves
- Default requirement is zero
  - Consistent with no NERC requirement
- Secondary reserves may be created with an ORDC based on a PJM defined contingency
  - such as a gas contingency
  - defined under the operator actions provisions for increasing a minimum reserve requirement
- Penalty factor is $1,000 to $2,000 per MWh, as with synchronized and primary reserves.
- Demand Response should participate under the same rules as generators.

IMM Proposed Default ORDCs



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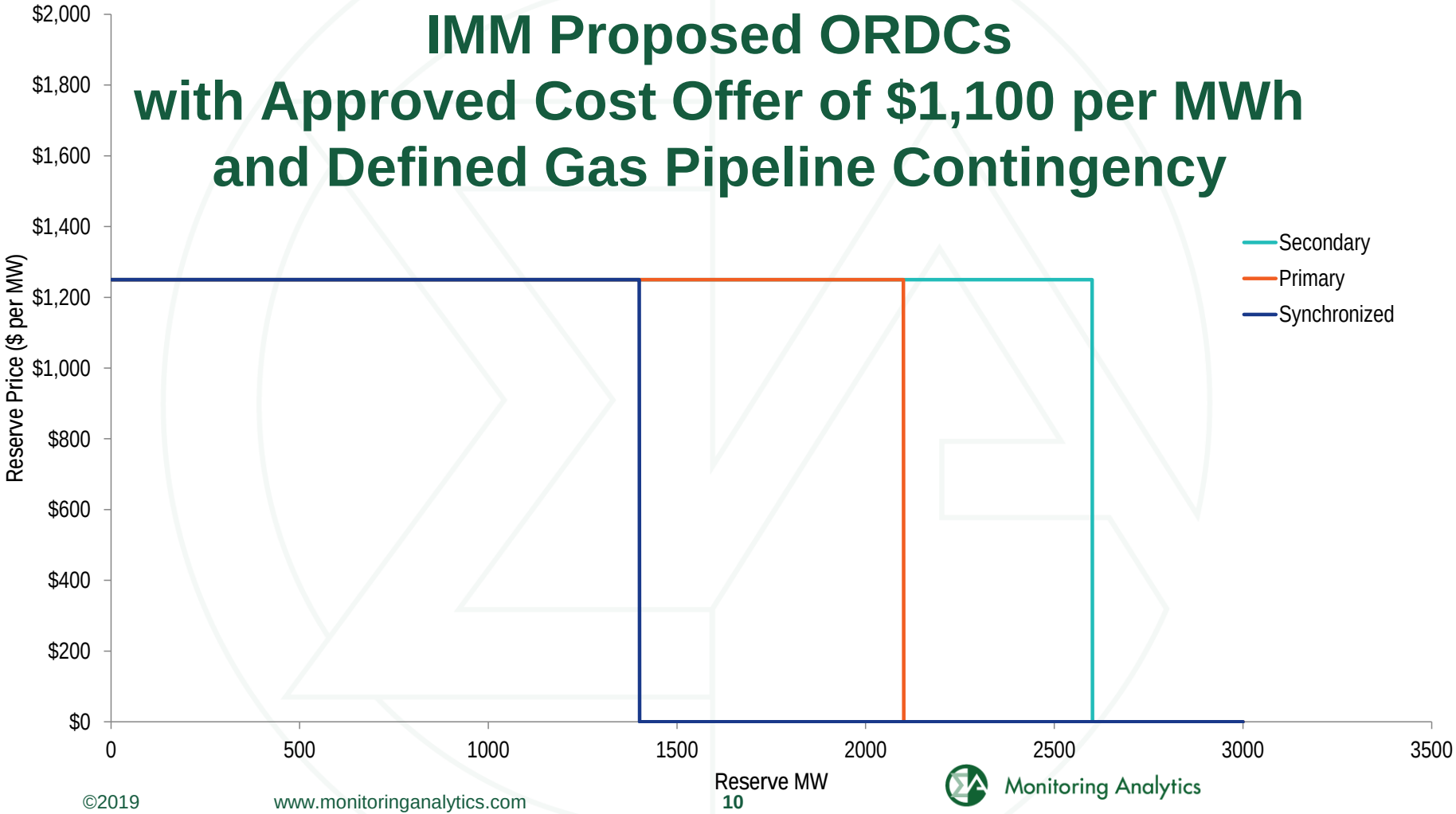
IMM Proposed ORDCs with Approved Cost Offer of $1,100 per MWh and Defined Gas Pipeline Contingency



Monitoring Analytics

Monitoring Analytics, LLC
2621 Van Buren Avenue
Suite 160
Eagleville, PA
19403
(610) 271-8050

MA@monitoringanalytics.com
www.MonitoringAnalytics.com