



# ***Price Formation Enhancements in Competitive Electric Markets***

Presented by Vitol Inc.

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Development Working Group

# Background: Price Formation Principals

## FERC Order 719 shortage pricing criteria

- Improve reliability by reducing demand and increasing generation during periods of operating reserve shortage;
- Make it more worthwhile for customers to invest in demand response technologies;
- Encourage existing generation and demand resources to continue to be relied upon during an operating reserve shortage;
- Encourage entry of new generation and demand resources;
- Ensure that the principle of comparability in treatment of and compensation to all resources is not discarded during periods of operating reserve shortage; and
- Ensure market power is mitigated and gaming behavior is deterred during periods of operating reserve shortages including, but not limited to, showing how demand resources discipline bidding behavior to competitive levels.

*Wholesale Competition in Regions with Organized Electric Markets*, Order No. 719, at P 137-138



## Vitol is seeking to address the following issue highlighted in CAISO's Discussion Paper

*“The current market design fails to consistently project the increased risk of a shortage into higher prices as the system nears scarcity conditions, reflecting scarcity only after a shortage hits. Developing mechanisms for prices to rise earlier and more gradually as shortage risks increase could produce more actionable and effective scarcity price signals. This approach could encourage market-based solutions to resolve shortages and reduce the need for disruptive emergency actions, particularly if these signals can be provided sufficiently in advance of real-time operations.” – emphasis added*

CAISO Discussion Paper and Stakeholder Recommendations, 9/5/2024 at P. 11



# Scarcity pricing mechanism vary across organized market regions

Most organized market regions employ stepwise reserve demand curves, however the reserve amounts and price levels vary

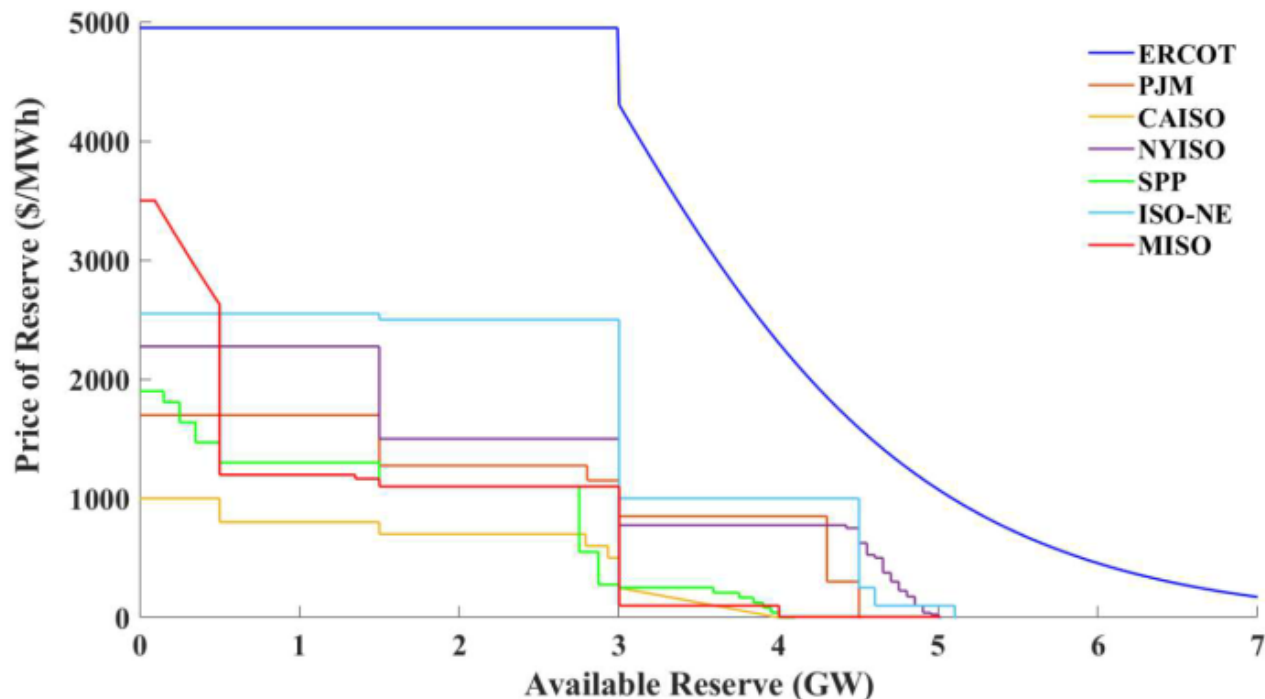


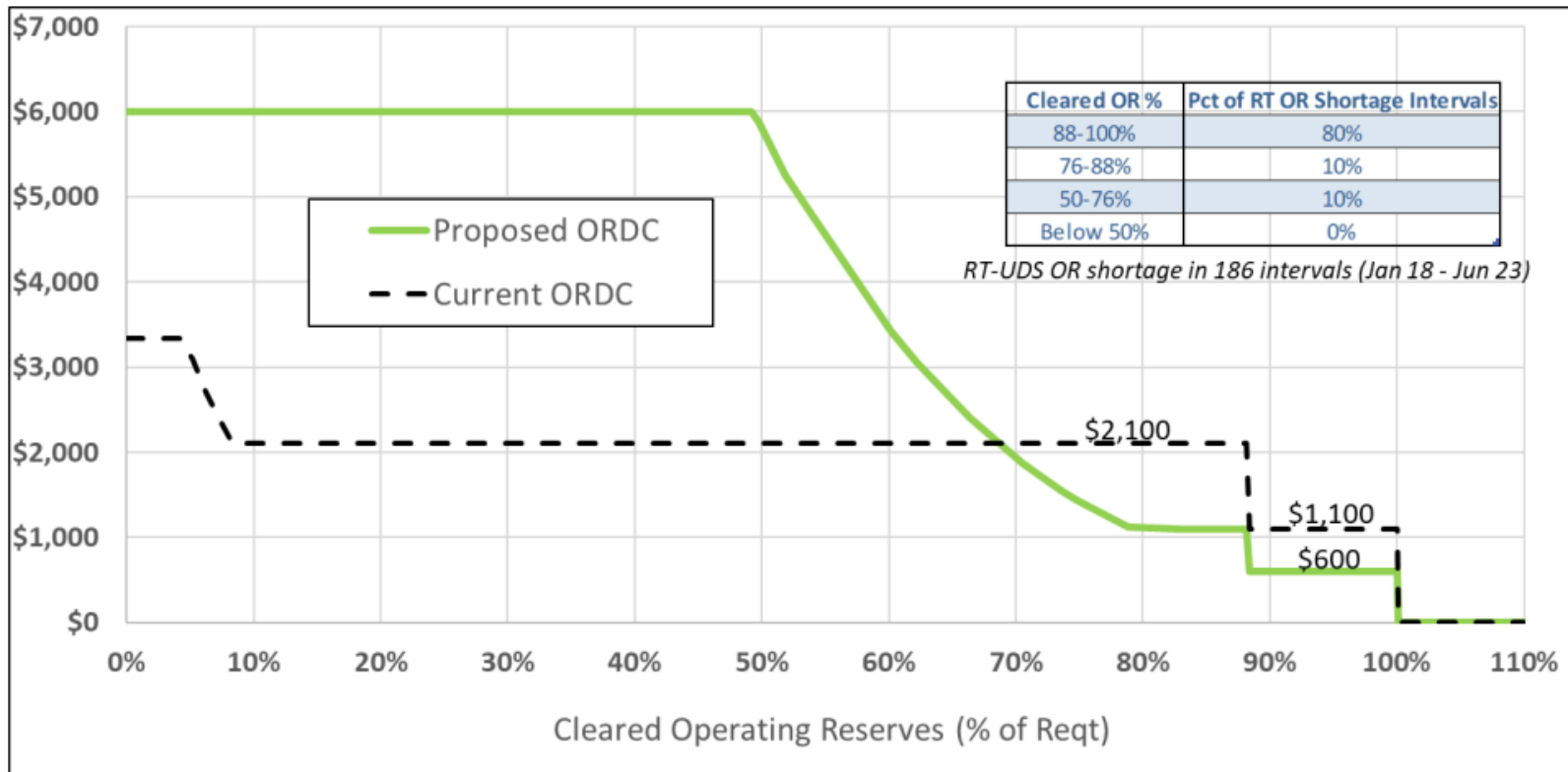
Fig. 11. Results of the comparative numerical example for scarcity premiums across seven U.S. ISOs.

Source: Renewable and Sustainable Energy Reviews Volume 183, September 2023, 113465 Reserve and Energy Scarcity Pricing in United States Power Markets: A Comparative Review of Principles and Practices Mahdi Mehtash, Benjamin F. Hobbs, Erik Ela; September 2023



# Enhanced ORDC Proposal

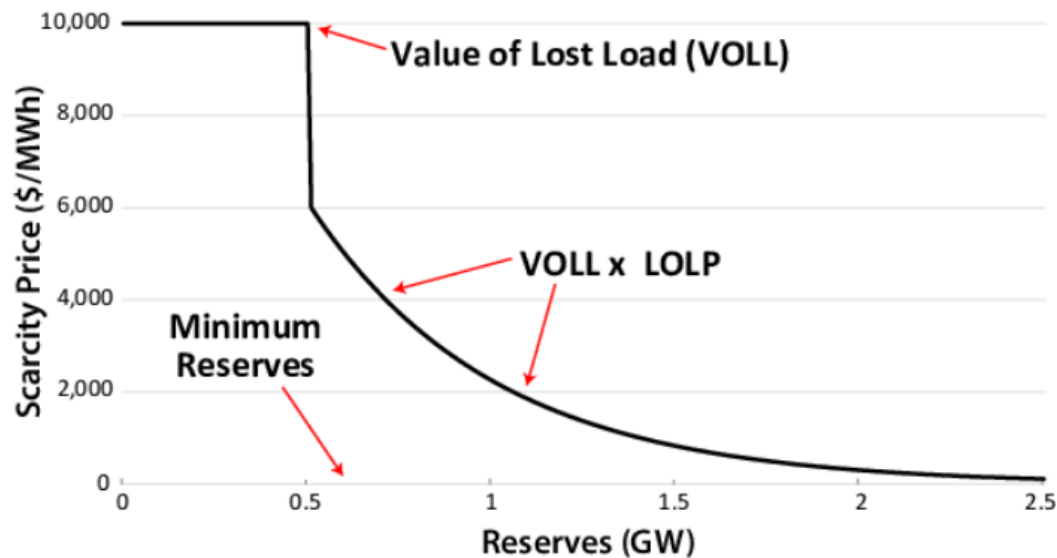
MISO proposed an enhanced ORDC for market-wide reserves that is a continuous function of LOLP\*VOLL. It was approved by the MISO Board and is currently pending at FERC (ER25-579)



Source: MISO filing to FERC (ER25-579) at p.39

# Vitol supports the implementation an enhanced operating reserve demand curve (ORDC) in the real-time and day-ahead market that reflects the reliability value of supply before reserve shortages occur

- The design can help prices rise more gradually and move away from binary and sporadic price movements
- Send valuable price signals ahead of shortages so the supply and demand can respond
- Proper scarcity provides financial incentives encouraging appropriate actions (e.g., fosters competition for DA load hedges and increase resource investment to ensure performance)
- An efficient ORDC should reflect the marginal reliability value of reserves at each shortage level, which is the  $VOLL \times$  the probability of losing load



Operating Reserve Demand Curve



# Key design parameters for CAISO and stakeholders to consider when developing an enhanced ORDC proposal

Scarcity detection: Loss of Load Probability	Scarcity Valuation: VOLL (\$/MWh)	Minimum contingency reserve value (MW)	Reserve types and MW levels to be include in reserve requirement
<ul style="list-style-type: none"> <li>• LOLP should be the short-run probability (e.g., over the next hour) that unanticipated increases in load or decreases in available generation would reduce operating reserves below the X level.<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>• The VOLL should approximate the average cost of involuntary load curtailments or other non-market actions that would actually be undertaken by the system operator when reserves become scarce.<sup>2</sup></li> <li>• Protections from prolonged extreme prices are critical to ensure a stable market design:               <ul style="list-style-type: none"> <li>• Cap prices with “pricing VOLL”</li> <li>• “Circuit breaker” mechanism</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Level of reserves that corresponds to upper bound for the ORDC price</li> <li>• Indicates severe scarcity conditions (e.g., undertaking or preparing for emergency actions)</li> </ul>	<ul style="list-style-type: none"> <li>• Expanding the reserve requirement would start pricing interactions earlier and establish a price on “economic shortages” and periods of actual reserve insufficiency</li> </ul>

<sup>1</sup> Electricity Market Design and Efficient Pricing: Applications for New England and Beyond William W. Hogan June 24, 2014 at P. 12

<sup>2</sup> Electricity Market Design and Efficient Pricing: Applications for New England and Beyond William W. Hogan June 24, 2014 at P12



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