Market Design Concepts to Prepare for Significant Renewable Generation

Ancillary Services Shortage Pricing: Market Design Concept Proposal

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- Ancillary Services Shortage Pricing
- NYISO Recommendation
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Background

Background

- The NYISO conducted a preliminary review of the market design concepts proposed in the Market Assessment with 50% Renewables Report (2017 Market Assessment).
- Concepts were evaluated according to the following criteria:
  - Whether the product or rule change would incentivize performance attributes such as availability, predictability, flexibility, and dispatchability.
  - Need demonstrated by the results of the NYISO's 2017 Market Assessment.
  - Anticipated future system need based on observations from other control areas or other NYISO studies.
- The NYISO recommends that concepts which may offer benefits but are not yet well defined be prioritized as future studies or longer-term market design efforts.

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Ancillary Services Shortage Pricing

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Project Overview

- Ancillary Services Shortage Pricing incents market participants to offer more flexibility and responsiveness in RT.
  - In response to the anticipated increased importance of ancillary services to support grid reliability as more weather dependent supply is added to the grid, as well as recent capacity market performance rules in other ISOs/RTOs, the NYISO and its stakeholders should consider:
    - A re-evaluation of shortage pricing values for each product relative to other products
    - The potential need to increase certain shortage pricing values
    - The potential implementation of more gradual steps in the demand curves for ancillary services

Re-evaluate Shortage Pricing between Ancillary Services Products

- **The NYISO will re-evaluate shortage pricing levels for each existing ancillary services product as part of this project.**
  - The market software will favor the procurement of a product with a higher shortage price above a product with a lower shortage price.
    - For example, under certain system conditions, the market software would procure Regulation Service at a $775/ MWh shortage price, rather than NYCA 30 minute reserve at a $750/MWh shortage price.

Increase to Shortage Pricing Values

- **Ancillary services shortage pricing is expected to become more important with the increases in weather dependent generation.**
  - Price signals should reflect the value of the flexibility that operating reserves, regulation, and any future market-based ancillary services provide.
  - Prices should support reliability and incent supply when conditions are tight across a broader region
  - Prices should signal investment by providing locational and temporal information about the NYCA conditions
  - The NYISO and its stakeholders should consider an overall increase to ancillary services shortage prices as part of this project.

More Gradual Demand Curve Steps

- **Increased pricing volatility was observed in the 2017 Market Assessment.***
  - Including more gradual steps within the reserve demand curves could help to smooth unnecessary pricing volatility associated with increased renewable generation, while prices continue to appropriately reflect system conditions.

*See Integrating Public Policy: A Wholesale Market Assessment of the impact of 50% Renewable Generation, page 84, Figure 64: http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_miwg/meeting_materials/2017-12-20/2017%20Market%20Assessment%20with%2050%20percent%20Renewables,%20Report.pdf

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Considerations for the Market Design Complete Phase of this Project

- **If the Market Design Complete phase of this project is prioritized, then the NYISO will collaborate with stakeholders on a number of market design considerations:**
  - Revise existing ancillary service shortage pricing levels to:
    - Promote strong operational and investment signals
    - Support regional coordination under tight operating conditions
    - Minimize unnecessary price volatility due to existing ancillary shortage pricing curve "cliffs"

NYISO Recommendation

NYISO Recommendation

- **The NYISO recommends that stakeholders evaluate the benefits of increasing ancillary services shortage pricing values after 2019.**
  - The NYISO believes that work on this effort would be more effective once the market designs for Reserve Procurement for Resilience and More Granular Operating Reserves projects are complete.

NYISO Recommendation

- **Robust Ancillary Services pricing to support reliable grid operations will become more important with increases in weather dependent generation and large changes to neighboring market incentives.**
  - Potomac Economics is supportive of the NYISO evaluating ancillary services shortage pricing due to ISONE and PJM's capacity market performance incentives.

Timeline

Timeline

- **June 12, 2018**
  - Present Master Plan at MC.
- **June 13, 2018**
  - Present Master Plan at MIWG.
- **June 15, 2018**
  - Stakeholders receive final project prioritization survey.
- **June 26, 2018**
  - Deadline for stakeholders to submit project prioritization survey.

Appendix I: Ancillary Services Shortage Pricing at Neighboring ISOs/RTOs

ISONE – Reserve Shortage Pricing

- **If all four reserve constraints were violating in the system and reserve zone, then the maximum reserve price would be $2,800/MWh**
  - Local 30-Minute Operating Reserve (TMOR)
    - $250/MWh
  - System 30-Minute Operating Reserve (TMOR)
    - Minimum TMOR $1,000/MWh
    - Replacement Reserve $250/MWh (does not cascade with other reserve shortage prices)
  - System 10-Minute Nonsynchronized Reserve (TMNSR)
    - $1,500/MWh
  - System 10-Minute Spinning Reserve (TMSR)
    - $50/MWh

PJM- Reserve Shortage Pricing

- **If short of both Synchronous and Primary Reserve, the maximum reserve price would be $1,700/MWh**
  - Primary Reserve (10 minute synchronized and 10 minute non-synchronized reserve)
    - $850/MWh
  - Synchronous Reserve (10 minute spinning)
    - $850/MWh
  - 190 MW (plus optional additional reserves for reliability) at $300/MWh applies to both synchronized reserve and primary reserve

NYISO – Reserve Shortage Pricing

- NYISO's highest reserve demand curve values

Reserve Product	NYCA	EAST	SENY	LI
Spin	S.P. 3 = $775	S.P. 6 = $25	S.P. 9 = $25	S.P. 12 = $25
10-Minute Total	S.P. 2 = $750	S.P. 5 = $775	S.P. 8 = $25	S.P. 11 = $25
30-Minute	S.P.* 1 = $750	S.P. 4 = $25	S.P. 7 = $500	S.P. 10 = $25

- NYISO's highest cascaded reserve clearing prices

Reserve Product	NYCA	EAST	SENY	LI
Spin	$2,275	$3,100	$3,650	$3,725
10-Minute Total	$1,500	$2,300	$2,825	$2,875
30-Minute	$750	$775	$1,275	$1,300

*S.P. stands for "Shadow Price" in this table

Regulation Service

- ISONE Regulation $100/MWh
- PJM Regulation $100/MWh
- NYISO Regulation
  - 25 MW at $25/MWh
  - 80 MW at $525/MWh
  - Remainder at $775/MWh

Appendix II: Capacity Market Performance Incentives at Neighboring ISOs/RTOs

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Capacity Market Performance Incentives

- Neighboring ISOs/RTOs have introduced capacity market performance incentives that are expected to financially reward resource performance during critical operating periods
  - Shortage pricing for ancillary services performs a similar function in the NYISO markets

Capacity Market Performance Incentives - Summary

	Capacity Market Performance Incentives	
	ISONE	PJM
Start Date	June 2018	June 2016
Effective	During operating reserve shortages	During emergency conditions
Price incorporated into LMP?	No	No
Load directly charged?	No	No
Who pays?	Under-performing capacity market resources	Under-performing capacity market resources
Who is paid?	Any over-performing resource	Any over-performing resource*
2017/2018 performance $/MWh rates	$2,000/MWh	$2,420.23/MWh

*Effective 2018/2019

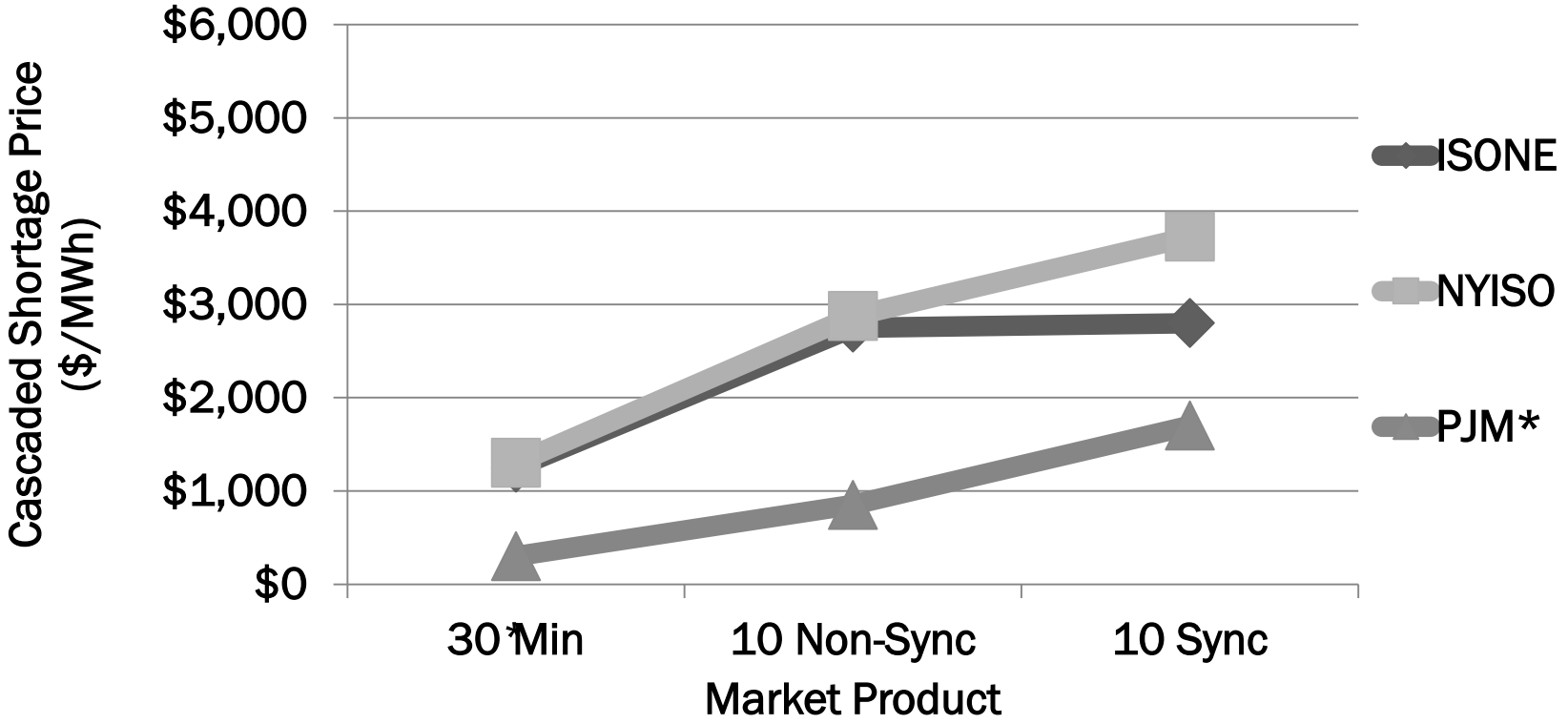
PJM Capacity Market Performance Incentives

- **Winter generator performance in 2014 highlighted a potentially significant reliability issue for PJM.**
  - Resource retirements expected in PJM were cause for concern.
- **PJM created the Capacity Performance product to ensure resources are available during emergency conditions.**
  - Resources are compensated or charged for their performance during these conditions.
  - Performance Shortfall MW are assessed when emergencies are declared by PJM.
  - Performance charge and payment rules were effective June 2016.
- **PJM Non-Performance Charges are assessed for the amount of Performance Shortfall MW.**
  - Non-Performance Charges in PJM are allocated to resources that have over-performed (pro-rata share of the total over-performance).
    - For the 2018/2019 years and beyond, all resources are eligible for payment (even if not a Capacity supplier).
  - Load is not charged or credited directly.

ISONE Capacity Market Performance Incentives

- **ISO-NE will also implement resource incentives during stressed system conditions through their Pay for Performance mechanism.**
  - Mechanism will be effective during operating reserve shortages.
  - Pay for Performance will be effective June 2018.
- **During a reserve shortage:**
  - A resource's capacity performance score will be calculated.
    - Score could be positive or negative.
  - This score and the Performance Payment Rate in effect will be used to compensate or charge resources.
    - Charges and credits are determined using the same Performance Payment Rate.
- **Capacity suppliers receive performance payments and pay performance charges separate from their energy market settlements.**
  - Suppliers not providing Capacity are only eligible to receive payments, and will not be obligated to pay performance charges.
  - Charges are collected from under-performers and used to pay over-performers.
  - Load is not charged or credited directly.

Reserve Shortage Pricing Comparison



*Price shown at 30 Minute for PJM is the first step of the Primary Reserve product

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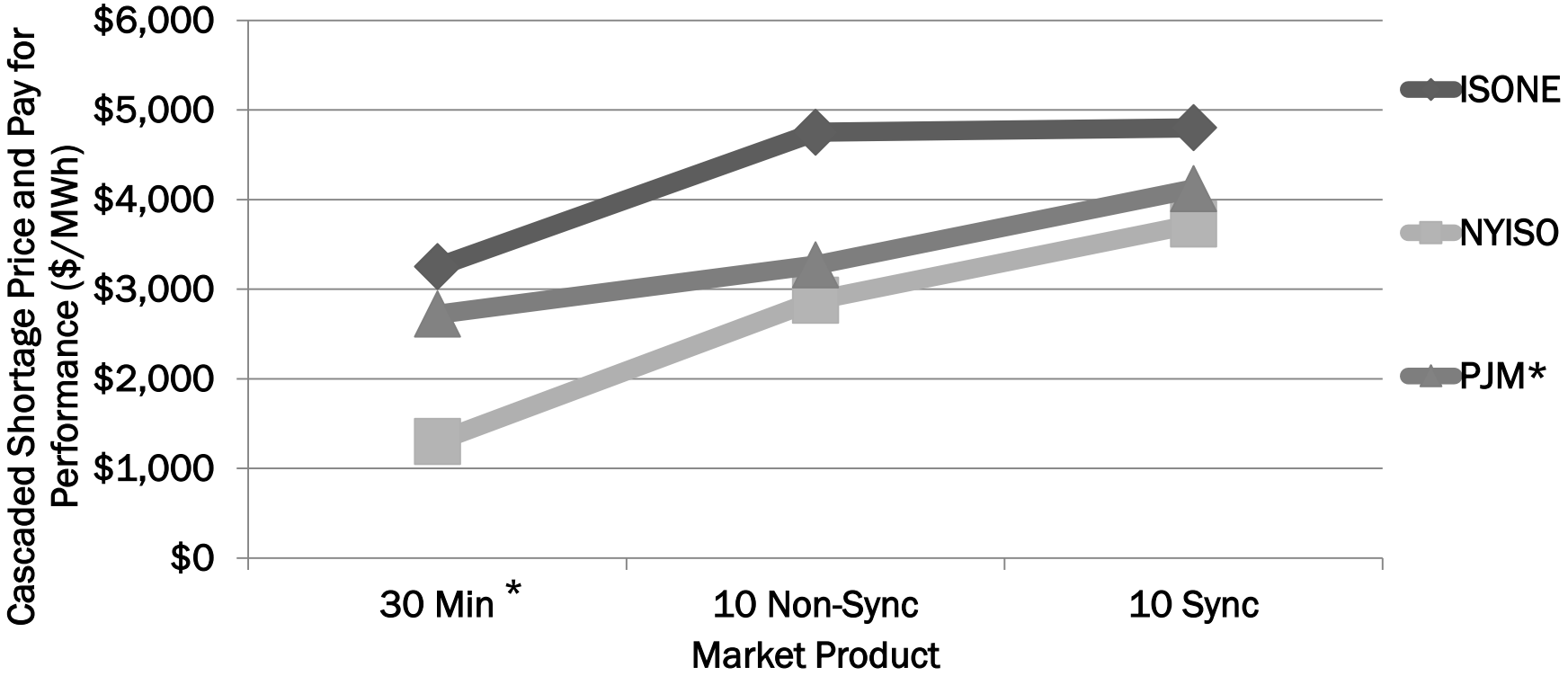
Reserve Shortage Pricing and Pay for Performance Comparison (2017/2018)



*Price shown at 30 Minute for PJM is the first step of the Primary Reserve product

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Pay for Performance at Other ISOs/RTOs

- **ISO-NE will use a Performance Payment Rate that is gradually raised until 2024:**
  - 2018-2021: $2,000/MWh
  - 2021-2024: $3,500/MWh
  - 2024 onward: $5,455/MWh
- **PJM will use a calculation to determine a Non-Performance Charge Rate (NPCR) that is distributed from non-performers to performers.**
  - For 2017/2018, the NPCR is $2,420.23/MWh

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- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policy makers, stakeholders and investors in the power system

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