

# Methodology for Consumer Impact Analysis: Energy Storage Integration

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# Agenda

- **Project Description**
- **Background**
- **Consumer Impact Methodology**
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# Project Description

- Although certain types of ESRs can participate in the NYISO-administered wholesale markets today, existing market products offer limited opportunities to provide Energy and Ancillary Services, which is inconsistent with the NYISO's goal to integrate the full range of storage resources into the wholesale markets. Existing programs also do not account for operating constraints that have important performance implications for ESRs, such as Upper Storage Limit, Minimum Load level, and Transition Time<sup>1</sup>
- To address these shortcomings, the NYISO, as part of its *Energy Storage Integration* project, is developing a participation model that will better enable the NYISO to economically schedule eligible ESRs for Energy, Capacity, and Ancillary Services in NYISO-administered wholesale markets<sup>2</sup>
- This presentation addresses the consumer impact of ESRs. However, we expect this analysis to be the basis of the DER impact analysis also since both ESRs and DERs will have a similar effect on energy and capacity markets

1. Energy Storage Integration: Market Design Concept Proposal, pg. 4 12/2017 @ [http://www.nyiso.com/public/webdocs/markets\\_operations/committees/bic\\_miwg/meeting\\_materials/2017-12-20/2017%20ESR%20Market%20Design%20Concept%20Proposal.pdf](http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_miwg/meeting_materials/2017-12-20/2017%20ESR%20Market%20Design%20Concept%20Proposal.pdf)
2. Energy Storage Integration: Market Design Concept Proposal, pg. 4 12/2017 @ [http://www.nyiso.com/public/webdocs/markets\\_operations/committees/bic\\_miwg/meeting\\_materials/2017-12-20/2017%20ESR%20Market%20Design%20Concept%20Proposal.pdf](http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_miwg/meeting_materials/2017-12-20/2017%20ESR%20Market%20Design%20Concept%20Proposal.pdf)

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# Background

- In 2017, the NYISO developed a market design concept for a participation model that will enable ESRs to offer their full capabilities into the NYISO's wholesale Energy, Capacity, and Ancillary Services markets<sup>3</sup>
  - The ESR Participation Model was prioritized as a Key Project with a deliverable of Market Design Complete in Q3 of 2018.
- On February 15, 2018, FERC issued Order No. 841, directing “each RTO/ISO to revise its tariff to establish a participation model consisting of market rules that, recognizing the physical and operational characteristics of electric storage resources, facilitates their participation in the RTO/ISO markets”<sup>4</sup>
  - The compliance filing deadline for Order No. 841 is December 3, 2018, with an implementation deadline of December 3, 2019

3. See NYISO, *Energy Storage Integration: Market Design Concept Proposal* (Dec. 20, 2017) at [http://www.nyiso.com/public/webdocs/markets\\_operations/committees/bic\\_miwg/meeting\\_materials/2017-12-20/2017%20ESR%20Market%20Design%20Concept%20Proposal.pdf](http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_miwg/meeting_materials/2017-12-20/2017%20ESR%20Market%20Design%20Concept%20Proposal.pdf)

4. Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, Order No. 841, 162 FERC ¶ 61,127, at P3 (Feb. 15, 2018) (“Order No. 841”) as amended by the Feb. 28, 2018 Errata Notice (“Order No. 841 Errata”).

# Consumer Impact Analysis (IA) Evaluation Areas

- Present the potential impact on all four evaluation areas

RELIABILITY	COST IMPACT/ MARKET EFFICIENCIES
ENVIRONMENT/ NEW TECHNOLOGY	TRANSPARENCY

# Energy Market Impact

- Since we don't know how much storage will be available, we will provide estimates over a range of expected values
- To approximate the short run energy market impact of storage, upstate and downstate historic energy prices will be used
  - Include all price intervals during 2017 for a location upstate and downstate
  - Consider how various quantities of energy storage would impact the real-time price spikes based on duration, efficiency and capacity factor
  - Use the change in hourly integrated real-time prices to approximate changes (up or down) to hourly day ahead market prices
  - Determine the consumer impact using the historic day ahead load and the hourly changes to day ahead market prices

# Energy Market Impact

## Assumptions:

- Consider impacts of 500, 1,000, 1,500, and 2,500 MW of storage on peak pricing both upstate and downstate.
- Upstate node: Generator bus in West or North zone that has little congestion
- Downstate node: Generator bus in NYC or LI load pocket
- 4 hour duration ESRs
- Constant capacity factor (~10-30%)
- Charge time is equivalent to discharge time, and impact on peak shaving is symmetrical to price impacts when charging.

# Capacity Market Impact

- Since we don't know how much storage will be available, we will provide estimates over a range of expected values
- The cost impact of storage on capacity prices will depend on the amount of MW available to the wholesale market
- We assume that most of the storage resources will participate in the wholesale market as capacity providers

# Analysis Assumptions

- To illustrate the cost impact, we will assume a range of storage resources 500MW, 1,000MW, 1,500MW and 2,500MW entering the wholesale market
- Since the impact of storage MW on the IRM and LCRs has not been determined, we will assume a range of impacts on LCRs for the different levels of storage resources we are looking at in our analysis
  - Assume that the storage resource is either 50%, 75%, or 100% comparable to a traditional generator
- We will assume that two-thirds of storage is located in Zone J and one-third in Zone K
  - For example, in the 1,500 MW case at 75%, we will add 1,000 MW of storage resources to the supply stack in NYC, and increase requirements for NYC by 250 MW ( $(100\% - 75\%) * 1,000 \text{ MW}$ ), and we will add 500 MW of storage resources to the supply stack in LI, and increase the requirements for LI by 125 MW ( $(100\% - 75\%) * 500 \text{ MW}$ )

# Short term Cost Impact Methodology

- For the short-run, we will model the 2018 Capability Year
  - For the winter supply stack, we will use the winter 2017/18 actual data
- The short-run impact analysis will assume no additional changes to generation

# Long Term Cost Impact Methodology

- For the long-run, we will use the 2021/22 Capability Year base case, and utilize the requirement percentages developed in the short term impact analysis
- For the supply level, we will use the historic excess defined as a percentage of excess above the requirement observed within the last 3 Capability Years in each of the different Localities

# Other Impacts

- Evaluate other impacts:
  - Reliability Impact
  - Environmental Impact
  - Impact on Transparency

# Feedback?

- Email additional feedback to:
- [deckels@nyiso.com](mailto:deckels@nyiso.com)

# Next Steps

- Communicate any changes to the consumer impact analysis methodology in response to stakeholder feedback
- Present the results of the consumer impact analysis in August 2018

# Questions?

We are here to help. Let us know if we can add anything.

# The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefits to consumers by:

- 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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