

Methodology for Consumer Impact Analysis: Hybrid Storage Participation Model

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- **Proposed Options**
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Project Description

- The NYISO's rules do not currently allow two Generators of different types to be treated as a single facility in the interconnection process
- This project seeks to develop market participation rules for front-of-the-meter renewable generators co-located with Energy Storage Resources by developing market rules that integrate large-scale weather dependent and energy storage resources co-located behind a single interconnection point.
- This presentation addresses the methodology to be employed to measure the consumer impact of Hybrid Storage Resources.

Proposed Options for Hybrid Storage Resources (HSR) Participation

- **Option 1 (Co-located Hybrid Storage Resource or CSR) :** Each resource component within the CSR will have a distinct PTID/bid/schedule/settlement. The injection limit for the CSR can be less than the combined capability of the component resources.¹
 - The NYISO is pursuing this option with stakeholders for Market Design Complete in 2020
- **Option 2 (Aggregated Hybrid Storage Resource (HSR)):** HSR will have a single PTID/bid/schedule/settlement.¹ The injection limit for the HSR can be less than the combined capability of the component resources. The NYISO is evaluating the feasibility of allowing HSRs that include a combination of Intermittent Power Resources (IPR) and Energy Storage Resources (ESR) to provide ancillary services.
 - The NYISO is pursuing this option with stakeholders for Market Design Concept Proposal in 2021

1. For more details on the options, please refer to 4.14.20 ICAPWG/MIWG discussions on "Hybrid Storage Model – Initial Market Design Concept Overview"
<https://www.nyiso.com/documents/20142/11904936/Hybrid%20Storage%20Model%20MIWG%2004142020%20Final.pdf/08841944-5251-4497-c52b-105154f150a9>

Potential Benefits

- Developing a market participation model for front-of-the-meter generators plus storage will better align the NYISO's market procurement with State and Federal efforts to integrate more clean energy into the grid.
- Hybrid resources have the potential to reduce output volatility and improve the availability of intermittent resources.
- Developers may avail themselves of State and Federal initiatives/incentives such as Federal Investment Tax Credit (ITC), REC procurements, to couple storage and intermittent renewable assets.

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 Assumptions

- Since we don't know how much CSR/HSR capability will be available, we will provide estimates over a range of expected values
 - Assume a range of CSR/HSR penetration of 100MW, 250 MW and 500MW added to the fleet
- The impact to representative upstate and downstate historical energy prices for all intervals in 2019 will be calculated using the assumptions outlined on this and the next slide.
 - The short run energy market impact of CSRs/HSRs will be approximated using:
 - Day-ahead NYISO reference bus prices
 - Real time actual time weighted integrated load
- The consumer impact of CSR/HSR resources for both upstate (Zones A-F) and downstate (Zones G-K) will be estimated for multiple scenarios as shown in the table below. A diminishing impact for additional MWs is considered, as outlined in the table below:

MW	Impact	Percent impact calculation
100	1.0%	$1\% \times 100 = 1.0\%$
250	1.75 %	$0.5\% \times 150 + 1.0\% = 1.75\%$
500	2.375%	$0.25\% \times 250 + 1.75\% = 2.375\%$



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Energy Market Impact Methodology

- The study will consider a 4 hour duration for CSRs/HSRs.
 - Injections will be assumed to take place during two sets of seasonal hours:
 - Summer (May through October) from HB12:00 to HB19:00
 - Winter (November through April) from HB14:00 to HB21:00
 - The consecutive hours of production with the highest revenue will be used in the analysis for the 4 hour duration calculations.
- The hourly average price impact will be multiplied by its respective hourly average load for both upstate and downstate.
 - A constant resource availability factor of 20%, 50%, or 80% will then be applied to provide the estimated consumer impact range.

Capacity Market Impact Assumptions

- Consistent with the energy market impact analysis, the capacity market impact scenarios will use 100 MW, 250 MW and 500 MW of CSRs/HSRs
- Assume 90% of CSRs/HSRs Upstate (Zones A-F) and 10% Downstate (Zone J)
 - We will assume 80% intermittent and 20% storage in all scenarios and zones
 - 75% of the upstate intermittent components will be wind and 25% will be solar
 - 100% of the downstate intermittent components will be solar
- Production factors for intermittent units within CSRs/HSRs will be the default values from the ICAP Manual
 - Wind: 10%(summer), 30%(winter)
 - Solar: 46%(summer), 2%(winter)
- Derating factors for storage units within CSRs/HSRs will be the five-year average NERC EFORD for pumped storage of 6.02%, which is consistent with the ESR consumer impact analysis
- Derates on CSR/HSR injection limits are expected to be infrequent and therefore will not be included in the analysis

Capacity Market Impact Assumptions (cont'd)

- Sensitivities will model CSRs/HSRs having a 50%, 75%, and 100% impact on capacity requirements
- CSRs/HSRs will be modeled consistent with the capacity supplier payment structure proposed in the CSR/HSR project and ultimately adopted as part of the stakeholder process
- We assume that most of the CSRs/HSRs will participate in the wholesale market as capacity providers
- Impacts of the Tailored Availability Metric project will not be included in this analysis

Short Term Cost Impact Methodology

- **Use the 2020 as-found system as a base case, for both short term and long term consumer impact analyses**
 - 2020 as-found system with additions of 100MW, 250MW and 500MW of HSR penetration (MWs additions consistent with earlier discussion)
- **The short-run impact analysis will assume no additional changes to generation**
- **The impacts shown in the short run may not be sustainable, as retirements and other changes will result from the influx of large amounts of capacity additions**
 - We address this in the long run analysis, that assumes a supply level based on the historic level of excess

Long Term Cost Impact Methodology

- **Use the 2020 as-found system as a base case**
 - Use the same MW additions and requirement percentages developed in the short term impact analysis
 - Use the 2020 Demand Curve values
- **For the supply level, we will use the historic excess defined as a percentage of excess above the requirement observed within the last three 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

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/September 2020
- Requesting a waiver of presenting to stakeholders the Consumer Impact Analysis at least 30 days prior to submission of a market design initiative to BIC that is scheduled for September 2020

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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