New York ISO
Independent System Operator

Grid Services from Renewable Generators: Consumer Impact Analysis Methodology

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Background

- **Some recent industry studies have indicated the ability of renewable generators to potentially provide additional services such as fast frequency response, inertial response, and ramping services[1,2]**
  - Based on the findings of those studies, stakeholders (NYSERDA) requested the NYISO to study the potential of renewable generators to provide grid services in New York by including Grid Services from Renewable Generators as a 2021 project
- **The NYISO investigated the ability of renewable generators to provide the Ancillary Services that it currently procures, and also other services renewable generators could potentially provide in the future**

1. Demonstration of Essential Reliability Services by a 300-MW Solar Photovoltaic Power Plant. https://www.nrel.gov/docs/fy17osti/67799.pdf.
2. *AvangridRenewables Tule Wind Farm: Demonstration of Capability to Provide Essential Grid Services*. 11 March 2020. https://www.caiso.com/Documents/WindPowerPlantTestResults.pdf

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Background (cont'd)

- **The study results presented at the May 19th ICAP/MIWG meeting indicate that the only additional service that renewable generators can potentially provide is regulation "down" service**
  - The creation of a separate regulation "up" and "down" products would increase accessibility to renewable generators, since it would be easier to qualify and provide regulation "down" than it would be for the current bi-directional product
- **Based on the study results, we will conduct the consumer impact of renewable generators providing regulation "down" service in the future**
  - Currently, regulation "up" and "down" is a single service
  - Consider bifurcating regulation into two separate services

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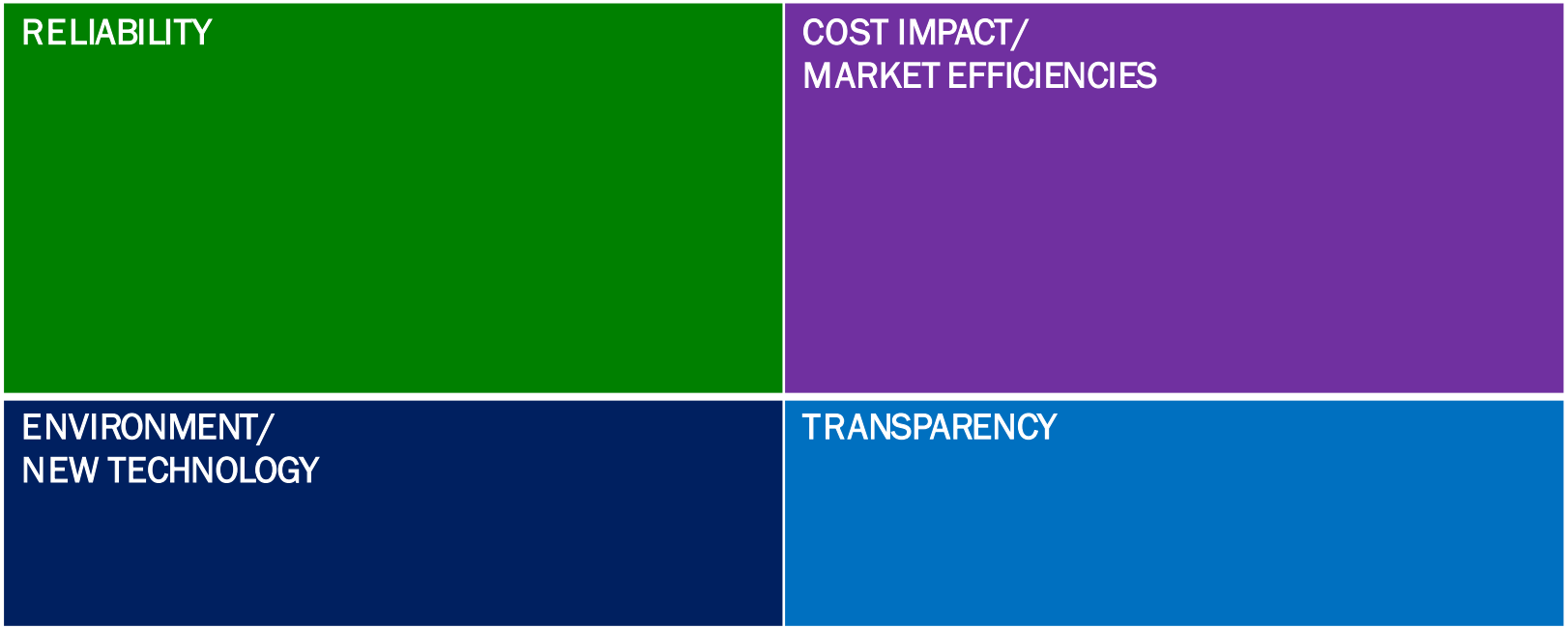
Consumer Impact Analysis (IA) Evaluation Areas

- The potential impact on all four evaluation areas



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Potential Energy Market Impact

Regulation Market

- **The NYISO regulation market is relatively small**
  - Requirements are static for the year and vary both hourly and seasonally, ranging from 150MW to 300MW with roughly 1,000MW of suppliers offering in the current market
- **Over the proposed analysis period (March 2019-February 2020), regulation capacity clearing prices averaged $7.44, while regulation movement clearing prices averaged $0.19**
  - Regulation capacity reached as high as $775 in some intervals, but clearing prices were $30 or less in 98.6% of intervals across the sample year
  - Regulation movement prices never exceeded $0.74

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Consumer Impact Proposed Approach and Assumptions

- **Separating the NYISO's regulation market into "up" and "down" products would have much broader impacts on consumer costs than those considered in this analysis, however, understanding the benefits of renewables providing such a service could still be useful for stakeholders**
  - The NYISO proposes to focus on the impacts driven by possible changes in renewable generator behavior in order to align with the scope of this project
  - A potential future project, if prioritized by stakeholders, could evaluate the comprehensive estimated consumer impact of modifying the regulation market

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Consumer Impact Proposed Approach and Assumptions (cont'd)

- **The NYISO proposes to compare historic real time regulation prices from March 2019 through February 2020 against average historic real time wind resource energy bids**
  - The analysis will include three scenarios; the observed historic average bid, historic average bid + 20%, and historic average bid – 20%
  - It is expected that prices for the separate regulation "up" and "down" prices would be different than historic regulation prices
    - Thus, the analysis results may over- or understate the amount of intervals where renewable resources would clear in the regulation market, but still provide valuable insights into potential consumer cost impacts
  - This approach can be used to estimate the changes in consumer costs associated with possible changes in renewable resource behavior resulting from the creation of a "regulation down" product

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Consumer Impact Proposed Approach and Assumptions (cont'd)

- **The amount of estimated cleared MW from wind generators in the regulation market will demonstrate various potential impacts on consumer cost**
  - The analysis will assume that a shift in renewable resources from providing energy to providing reserves will not impact energy prices
    - This assumption recognizes that the locations where wind resources are located have significant energy supply that could substitute for the redispatch of wind from energy to regulation down without any material impact to energy LBMPs
    - The quantity of consumer savings is highly dependent on current market conditions, participating resources, and load
- **There are no expected capacity market consumer impacts for this project**

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Energy Market Methodology

- The NYISO proposes to compare historic real time regulation prices from March 2019 through February 2020 against average historic real-time wind resource energy bids
- Assume several possible levels of bids to provide multiple estimates of consumer impact rather than focus on a single estimate (observed historic real time bids, +20%, and -20%)
- Determine price deltas for intervals where the wind resource bids are lower than the historic regulation prices
- Multiply the price deltas by the actual corresponding demand during the historic one-year period where wind resource bids were lower than the historic regulation prices to estimate an annual consumer impact

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Additional Impacts

Other Impacts

- **Evaluate other Impacts:**
  - Reliability Impacts
  - Environmental Impacts
  - Impact on Transparency

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Feedback?

- Email additional feedback to: deckels@nyiso.com

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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