



CURRENT MARKET INITIATIVES RELEVANT TO RELIABILITY

December 10, 2021

The guiding principle for development of market rules at the NYISO is that Markets are consistent with and reinforce Reliability rules. The following current market design activities provide opportunities for application of this principle and may be of interest to the NYSRC.

Preparing the Capacity Market for the Grid in Transition

Capacity markets exist to provide efficient incentives for attracting resources needed to satisfy the resource adequacy requirements of the system. In New York, the Installed Capacity Market has performed this role well and has provided strong signals for developers to make investment or retirement decisions while maintaining a reliable resource fleet.

As the resource mix transitions to one more dependent on resources that rely on the sun or wind to produce energy or resources with energy limitations, each resources' contribution to reliability also evolves. Historically, for each MW of installed capacity, that MW could also be depended upon to provide grid operators with dispatch control to manage transmission constraints. With intermittent and energy limited resources, this one-to-one relationship no longer exists.

The resource adequacy contribution of resources that has limited energy and/or dispatch capabilities, such as being intermittent or having limited energy/fuel storage capabilities, is also very dependent on the diversity and performance of the resource mix. For example, as more solar generation is added to the grid the peak load shift to non-daylight hours therefore making it less valuable to resource adequacy.

To address these emerging concerns, the NYISO has completed the following:

- **Established a Partial Capacity Value for Limited Duration Resources** - Established a process for determining the resource adequacy contribution of limited duration and limited energy resources with its Expanding Capacity Eligibility construct; and
- **Improved Alignment of Resources' UCAP measures with Reliability Contribution** - Improved methodology and calculations of determining availability factors of intermittent and conventional resources

The NYISO believes that improving the robustness of Capacity Requirements to support Reliability, evolving the Methods for Measuring Reliability, and enhancing Capacity Accreditation Measures are key to the future success of the Installed Capacity Market as we navigate the transition of resource mix.

- **Methods for Measuring Reliability** - Improve the resource adequacy tools and models to account for the evolving critical reliability time periods, changing load shapes and load variability, new technology

operation such as energy storage, and consideration of regional conditions that may inhibit shared assistance;

- **Reform Capacity Accreditation Rules** - Expand on the principles established with Expanding Capacity Eligibility and Tailored Availability Metric to all resources; and
- **Capacity Requirements support Reliability** - Improve handling of the assumptions between the IRM and LCR setting processes and consider *Transmission Security in the ICAP Market* which will explore capacity requirements based on the resource mix's impact on transmission security considerations.

These improvements are part of a larger effort, the NYISO's Grid in Transition, which is a multi-faceted approach that focuses on i) aligning competitive markets and New York State clean energy objectives, ii) valuing resource and grid flexibility, and iii) improving capacity market valuation. By addressing the improvements above, the NYISO believes its Installed Capacity Market will continue to provide robust market signals that promote efficient decision making by developers in support of maintaining a reliable grid.

On August 5, 2021 and August 9, 2021, the NYISO discussed its existing capacity accreditation rules and guiding principles and proposed framework for improvement capacity accreditation practices with the NYISO's ICAP market. On August 30, 2021, the NYISO and its consultants discussed methods for determining ELCC and some examples that illustrate the differences between marginal and average methods for determining a resource's capacity accreditation. The NYISO also described the filing that PJM made regarding changes to its minimum offer pricing rules (MOPR). The NYISO continued to discuss its proposal for capacity accreditation and buyer-side mitigation measures throughout September and October 2021. **The proposal was approved by stakeholders in November. (Updated)**

Market Assessment for Accommodating Public Policy

The NYISO will assess the impacts of de-carbonization goals on the current NYISO energy and capacity markets from the high penetration of low carbon or carbon-free resources and consider whether new market products or changes to the existing market structure will be necessary to meet the anticipated reliability needs.

Key areas for consideration:

- a) Understanding the additional resource flexibility that will be necessary to balance the intermittent nature of weather dependent resources;
- b) Modeling intermittent resources in IRM and long term planning studies; and
- c) Ensuring resources are responsive to operational instructions.

The NYISO is considering a broad spectrum of market product and structural enhancements that may be necessary to incent market participants to meet the reliability needs anticipated with the Climate Leadership and Community Protection Act (CLCPA). The CLCPA includes 70% renewable generation by 2030 and carbon neutral electricity by 2040, 6,000 MWs of solar by 2025, 3,000 MWs of energy storage by 2030, 9,000 MWs of offshore wind by 2035, and 185 trillion BTU electricity reduction through energy efficiency. The NYISO has completed its simulation of potential market conditions and

initiated discussions on possible reforms with stakeholders. Based upon these discussions, and input from the stakeholders, the NYISO has identified a series of initiatives to prepare for balancing intermittency and variability, and managing energy limited resources. The NYISO produced a whitepaper on “Reliability and Market Considerations for a Grid in Transition,” which identifies the needs for additional resource flexibility and responsiveness to balance the output from large penetrations of weather dependent resources. The paper provides a starting point for the discussions over how competitive markets must evolve in order to continue to provide reliable, economically efficient electricity to all New Yorkers as the resource fleet transitions to new cleaner energy technologies. The NYISO released the updated paper on December 20, 2019, incorporating feedback received from stakeholders, and additional thinking and analysis on reliability considerations and the need for market advancements. The NYISO continues to discuss the Grid in Transition initiatives with stakeholders. Additionally, the NYISO consulted with the Brattle Group to provide stakeholders with more information about the potential transition the power system will undergo over the next 20 years. On June 22, 2020, results from a capacity expansion study performed by the Brattle Group that simulates the NYISO’s energy market structure was released. (Current)

Specific efforts underway in this area are included in the NYISO Project Plan.

Dynamic Reserves: The NYISO procures fixed quantities of reserves in specified regions across the state. For example, the NYCA-wide reserve requirement is based on the largest single source contingency, which today is statically defined as 1,310 MW. Operationally, the largest contingency could change based on the current commitment of generation. Additionally, the static modeling of reserves, specifically locational requirements, does not optimally account for the real-time transmission flows and available transmission capability that could be used to deliver reserves from a more cost-effective reserve region. Dynamic Reserves is a novel approach that will explore more efficient scheduling of operating reserves based on system conditions and transmission system capability. This will not only allow for appropriate reserves to be procured to cover the largest source contingency that could potentially occur under the current system conditions but will also allow for more reserves to be scheduled in cost-effective regions. **The NYISO is planning to issue a report on its findings regarding the feasibility of incorporating a dynamic reserves approach into its energy market software and recommended next steps in December 2021. (Updated)**

Grid Services for Renewables: The NYISO has examined relevant reliability rules, as well as the necessary upgrades to typical inverters and controls to allow renewable generators to provide grid services and released its study in August 2021. Additionally, the study has considered potential enhancements to current market designs to allow renewable generators to provide the grid services they are capable of providing. Specifically, the study identified an opportunity to expand the provision of Regulation Service from generators (both renewable and non-renewable) by separating regulation “up” and “down” products. Bifurcating the regulation market could increase resource participation and competition to provide the services, which could reduce the overall costs of procuring regulation service. Currently, Regulation Service providers are required to be able to move both up and down at the instruction of the NYISO in order to balance system frequency needs. In addition to potential impacts on renewable participation, separation of Regulation Service into “up” and “down” products

would lead to a variety of impacts on markets, grid operations, and consumers. The transformation of the current regulation product into two products would potentially expand participation from renewable generators, but it would also have implications for other resource types that currently provide Regulation Service. Current Regulation Service providers sometimes encounter limitations in scheduling capability due to an inability to regulate up or down. The change to a two-product design would enable resources that are scheduled at their minimum generation (“min gen”) to regulate up, while resources scheduled at their Upper Operating Limit (“UOL”) would become eligible to regulate down. The NYISO will consider this enhancement in the future. (Current)

Distributed Energy Resources

To ensure NYISO markets are capable of integrating Distributed Energy Resources (DERs) in greater numbers and to provide clarity as to how they can realize value for their services, NYISO staff has engaged Market Participants in the development of a DER program.

Key areas for consideration:

- a) Managing the volume of resources interacting with the NYISO;
- b) Modeling distributed resources in IRM and long-term planning studies;
- c) Evaluating limited duration resources ability to satisfy resource adequacy needs;
- d) Capturing the impact of behind the meter resources in Load Forecasting and other system models;
- e) Ensuring resources are responsive to operational instructions; and
- f) Establishing requirements and expectations in the NYISO wholesale markets for resources that wish to simultaneously participate in retail market programs.

The NYISO and stakeholders are engaged in the development of a DER Participation Model to support resource integration into the wholesale markets. NYISO and GE have developed an analytical assessment, based on the 2018 IRM base case, of the capacity value of resources with energy limitations. The model design is guided by the objective to encourage aggregation of smaller assets into qualified wholesale market participants, to manage the volume of resources scheduled and managed by the NYISO, and the development of requirements for sufficient measurement and verification protocols to enforce resource performance obligations. Stakeholders approved the market design in April and NYISO submitted its filing to FERC at the end of June. FERC accepted the filing on January 23, 2020, the NYISO plans to implement the DER participation model by the end of 2022. Consistent with the FERC approved DER market design, the NYISO filed its compliance with FERC Order 2222 on July 19, 2021. **The NYISO responded to an additional FERC data request regarding its Order 2222 filing on November 19, 2021. (Updated)**

Hybrid Storage Resources

Interest in opportunities for hybrid resources to participate in wholesale markets is growing. The NYISO is engaging stakeholders on market rules to support hybrid storage integration, and has developed two options, referred to as the Hybrid Co-located Model and the Hybrid Aggregation Model.

Key areas for consideration:

- a. Evaluating the ability of Hybrid Resources to satisfy resource adequacy needs;
- b. Modeling Hybrid resources in IRM and long-term planning studies;
- c. Understanding the resource flexibility contribution of Hybrid Resources;
- d. Consideration of Hybrid Resources capabilities to meet operating reserve requirements; and
- e. Ensuring resources are responsive to operational instructions.

The Hybrid Co-located Model will allow energy storage resources (ESRs) and intermittent renewable power resources (IPRs) behind the same point of interconnection participate in the wholesale market as an individual ESR and IPR while respecting any point of interconnection injection or withdrawal limitation. The Hybrid Aggregation Model will focus on a model where the ESR is aggregated with other resources behind the same point of interconnection where the resources will participate in the wholesale market as a single generic dispatchable resource. The market design for the Hybrid Co-located Model was approved by stakeholders and filed with the FERC on January 28, 2021. FERC approved the Hybrid Co-located Model on March 30, 2021. Implementation of the Hybrid Co-located Model is planned for mid-December 2021. The NYISO has begun discussions with its stakeholders on the Hybrid Aggregation Model design which will continue into 2022. (Current)