



CURRENT MARKET INITIATIVES RELEVANT TO RELIABILITY

July 9, 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. (Current)

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 continue pursuing in 2020, including: Reserve Procurement for Flexibility, Ancillary Shortage Pricing, and Tailored Availability Metric. The NYISO is continuing efforts to define expectations for external resource deliverability and eligibility obligations. The NYISO has 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 is consulting 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)

Three specific projects in this area is included in the NYISO 2020 Project Plan.

Ancillary Services Shortage Pricing: The NYISO's existing ancillary service shortage prices were assessed in a 2019 study. The study determined changes to the current shortage pricing mechanisms should be pursued in order to strengthen incentives for flexibility, reliability and resilience in light of the grid in transition should be pursued. Market design enhancement proposals are being developed that appropriately consider the interactions between Operating Reserves, Regulation Service, and transmission shortage cost pricing levels. The proposal has evolved to also include a mechanism where the NYISO would procure supplemental reserves to assist with managing net load forecast uncertainty as more renewable resources are added to the grid. The proposal was approved by stakeholders and filed with the FERC on February 1, 2021. **On June 23, 2021, FERC accepted the proposal in part. As part of the order, FERC rejected the addition of supplemental reserves. The NYISO plans to implement the accepted changes on July 13, 2021 pending favorable operating conditions. (Updated)**

Reserves for Resource Flexibility: As load forecast uncertainty increases, it will become more important to ensure that adequate load following capability is available to instantaneously balance load and generation. The NYISO currently procures the minimum amount of operating reserve required to meet applicable reliability requirements. With this project, the NYISO is proposing to increase the amount of reserves procured to incent resource availability and flexibility to support reliable UPNY/SENY transmission flows, improve grid reliability and resilience. This proposal was approved by stakeholders and the FERC. **The NYISO implemented the changes on June 17, 2021. (Updated)**

Tailored Availability Metric: The Tailored Availability Metric project looks to align the availability and performance of capacity suppliers with reliability needs of the system by incentivizing resources to be available and perform during critical operating periods. Analysis for this project will reassess the current metrics of the de-rating factors of all capacity resources in order to more accurately reflect performance or availability. The NYISO's analysis resulted in a proposal to tailor availability factors for performance based resources, such as wind and solar, as well as conventional resources. This proposal was approved by the Federal Energy Regulatory Commission on September 3, 2020 and is intended to be effective in time for the 2021/2022 Capability Year. In December 2020, stakeholders approved amendments to the design to treat Landfill Gas resources similar to wind and solar

resources. The NYISO filed the amendments with the FERC on January 15, 2021 which were accepted. The revisions were made effective for the summer 2021 strip auction. (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. (Current)

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 and work on the market design for the Hybrid Aggregation Model is planned for 2021. The NYISO has begun discussions with its stakeholders on the Hybrid Aggregation Model. (Current)

Demand Curve Reset

This periodic review of the ICAP Demand Curves, for use in May 2021 through August 2025, seeks to ensure that the capacity market continues to efficiently support reliability and send accurate, transparent price signals. Every four years, the NYISO, along with its stakeholder community, conducts a comprehensive review to determine the parameters used in establishing the Installed Capacity (ICAP) Demand Curves. This process is referred to as the demand curve reset (DCR). As required by the tariff, the study includes an examination of potential peaking unit technologies and the financial parameters assumed in the construction and operation of that unit, along with an estimate of the projected net revenue earned in the Energy and Ancillary Service markets, to determine unit with the “lowest fixed costs and highest variable costs among all other units’ technology that are economically viable” that serves in establishing values for each of the ICAP Demand Curves. The quadrennial DCR is mandated by the NYISO’s tariff. The DCR is a resource intensive process for both the NYISO and stakeholders that has a significant impact on the market as a whole.

Key areas for consideration:

- a) Choice of the Cost of New Entry (CONE) unit which determines the economic choice for capacity additions;
- b) Consideration of renewable and/or storage technologies as a viable CONE unit; and
- c) Fuel, siting and permitting considerations in choosing the CONE unit.

The DCR update process started in September 2019. The review is performed by engaging an independent consultant to lead the DCR process. The Analysis Group was the chosen Consultant through a competitive bidding process. In addition to providing recommendations for the parameters and assumptions used in establishing the ICAP Demand Curves, the consultant's efforts include evaluating the shape, slope and zero crossing point for each ICAP Demand Curve. The 2020 objectives and deliverables for this project include a report by the DCR consultant and the NYISO recommendations addressing the ICAP Demand Curves for the 2021/2022 Capability Year, as well as the parameters and assumptions to be used in conducting the subsequent annual updates to derive the ICAP Demand Curves for the 2022/2023, 2023/2024, and 2024/2025 Capability Years. The process culminates in a filing on or before November 30, 2020 of the proposed curves for the first year of the reset period (*i.e.*, the 2021/2022 Capability Year), along with the assumptions and methodology to be used to set demand curves for the subsequent three Capability Years of the reset period (*i.e.*, the 2022/2023, 2023/2024 and 2024/2025 Capability Years). The DCR consultant has released preliminary recommendations. The Consultant's final report on the demand curve recommendations was published on August 5, 2020 and the NYISO's final report including its demand curve recommendations was published on September 9, 2020. The NYISO's Board of Directors heard oral arguments from stakeholders on October 19, 2020. The NYISO's Board of Directors has made a final determination on the demand curve recommendations which was filed with the FERC on November 30, 2020. FERC issued a deficiency letter requesting more information on dual fuel capability for the G-J Locality ICAP Demand Curve and the owner's cost component of the capital cost estimates. The NYISO filed its response to the deficiency letter on February 12, 2021. FERC accepted the 2021-2025 ICAP demand curve recommendations with modification to the recommended amortization period. The new curves were implemented in the May ICAP spot auction. (Current.)