

2020 Market Project Candidates

Product and Project Management

8/28/19

This document represents potential 2020 Market project candidates. Market projects are associated with market rule(s) including market design and study projects as well as any project implementing market rule changes. They are identified through (1) the State of the Market (SOM) Report; (2) internal NYISO discussions; and (3) discussions with Market Participants in the stakeholder process. These project candidates and their corresponding descriptions reflect information known about each of the project candidates as of the date of this document.

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Introduction

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Project Type	Description
Mandatory	Strategic Initiatives and FERC Orders. These projects will be included in the budget
Continuing	Approved in a prior year and have progressed to either software design or Development Complete. Additional projects may be classified as Continuing based on stakeholder feedback. These projects will be included in the budget
Future	Consensus from stakeholder discussions of this projects priority relative to other projects has resulted in these projects NOT being prioritized and initiated in the coming budget year. Resources, time constraints, stakeholder feedback, and other project dependencies have been taken in to consideration
Prioritize	Projects to be prioritized and included in the budget based on a feasibility assessment taking into consideration resources, time constraints, stakeholder feedback, priority score, and other project dependencies. Market projects are included in the stakeholder survey

Market projects that are Prioritize (not Mandatory, Continuing, or Future) are included in the stakeholder survey and scored by the NYISO during the prioritization phase. These projects are included in the budget based on a feasibility assessment taking into consideration resources, time constraints, stakeholder feedback, priority score, and other project dependencies. The table that follows identifies project type for each of the projects included in this document.

Project Name	Product Area	Project Type
BSM Renewables Exemption Study	Capacity Market Products	Mandatory
CRIS Tracking	Capacity Market Products	Prioritize
Comprehensive Mitigation Review	Capacity Market Products	Prioritize
Demand Curve Reset	Capacity Market Products	Mandatory
Enhanced BSM Mitigation Study Period	Capacity Market Products	Prioritize
Enhancing Fuel and Energy Security	Capacity Market Products	Prioritize
Locational Marginal Pricing of Capacity (SOM)	Capacity Market Products	Prioritize
Tailored Availability Metric	Capacity Market Products	Prioritize
DER Participation Model	DER Products	Mandatory
Dual Participation	DER Products	Mandatory
Expanding Capacity Eligibility	DER Products	Mandatory
NYISO Pilot Framework	DER Products	Continuing
5 Minute Transaction Scheduling	Energy Market Products	Prioritize
Ancillary Services Shortage Pricing (SOM)	Energy Market Products	Prioritize
Carbon Pricing	Energy Market Products	Continuing
Enhanced Fast Start Pricing	Energy Market Products	Mandatory
ESR Participation Model	Energy Market Products	Mandatory
Grid in Transition Discussion	Energy Market Products	Prioritize
Hybrid Storage Model	Energy Market Products	Prioritize
Mitigation Thresholds Review	Energy Market Products	Prioritize
Relocating the IESO Proxy Bus	Energy Market Products	Prioritize
Reserves for Resource Flexibility	Energy Market Products	Prioritize
Climate Change Impact and Resilience Study	Planning Products	Continuing
Reserving Capacity for TCC Balance-of-Period (BOP) Auctions	TCC Products	Prioritize

Capacity Market Products

1 BSM Renewables Exemption Study

1.1 Problem / Opportunity

As the portfolio of resources participating in the NYISO’s markets continues to grow and evolve, it is essential that all resources are periodically evaluated to determine which ones should or should not be considered exempt under the NYISO’s proposed compliance revisions to its Services Tariff to implement a “Renewables Exemption” under the BSM Rules. This exemption would allow resources that are “both purely intermittent and that have relatively low capacity factors and high development costs” to be exempt from the Class Year Buyer-side Mitigation (BSM) study.

1.2 Project Objective(s) & Anticipated Deliverable(s)

As part of the NYISO’s proposed compliance revisions to its Services Tariff to implement a “Renewables Exemption” under the BSM Rules, the NYISO proposed that it would periodically review and determine which renewable technologies should be an “Exempt Renewable Technology”, and do so during every ICAP Demand Curve Reset Filing Year.

As 2020 represents the first ICAP Demand Curve Reset Filing Year since the NYISO’s 2016 Renewable Exemption compliance filing, provided FERC accepts the filing, the NYISO would be required to review and make a determination of the technologies that should be an “Exempt Renewable Technology.” (See FERC Docket No, ER16-1404.) The NYISO’s compliance filing, in compliance with the Federal Energy Regulatory Commission’s (FERC’s) Order in Docket No. EL15-64, provides that the review, among other things, would identify renewable technologies that have been shown to have limited or no incentive or ability to suppress capacity prices, nor including technologies that have such incentive or ability.

Under proposed Section 23.4.5.7.13.2.1(b), for each candidate renewable technology evaluated as part of the periodic review, the NYISO will consider the cost of new entry and costs to operate, all potential market revenues, and potential cost savings to Loads due to capacity market price reductions resulting from new entry by the candidate technology. The pending tariff provisions further provide that the NYISO will then use this information to determine which candidate technologies have high development costs and low capacity factors such that they have limited or no incentive to suppress capacity prices. Further, and assuming FERC has accepted the NYISO’s compliance filing, this review would be filed within 60 days of FERC’s acceptance of the ICAP Demand Curves based on the upcoming periodic review. If the review determines that changes to the tariff definition of “Exempt Renewable Technology” are needed, the NYISO would propose them in the filing for the 2021 ICAP Demand Curves.

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1.3 Project Justification

This project would be required if FERC were to accept the NYISO’s compliance filing of proposed revisions its Services Tariff filed with the Commission [on April 13, 2016](#) to implement a “Renewables Exemption” under the BSM Rules. The NYISO cannot predict when FERC will rule on the proposed tariff revisions; however, this project would ensure when FERC does accept the NYISO’s proposal, the NYISO has the necessary information to timely fulfill its obligations.

2 CRIS Tracking

2.1 Problem / Opportunity

The NYISO is developing a group of interrelated proposals as part of a Class Year/Interconnection Queue Redesign project. Proposals being developed as part of this project were initially discussed with stakeholders in Q1 2019, to be further vetted and refined through Q2 and Q3 2019, followed by tariff language in Q4 2019. The proposals aim to redesign the deliverability process, Class Year procedures, and other interconnection processes in order to expedite the interconnection studies, particularly the Class Year Study and deliverability evaluations. As part of that Class Year/Interconnection Queue Redesign project, the NYISO is proposing more stringent CRIS expiration rules. More stringent CRIS rules may change the frequency and level to which CRIS-inactivity is tracked and CRIS rights are expired. Contingent upon the final proposal and stakeholder approval, the NYISO needs to be able to administer the new CRIS expiration rules.

2.2 Project Objective(s) & Anticipated Deliverable(s)

This project would create a new automated process for tracking resource's ICAP market participation on a rolling historic basis, consistent with new CRIS expiration rules, that may be approved and included in the tariff as part of the larger Class Year/Interconnection Queue Redesign project.

The anticipated deliverable of this project includes:

- Functional Requirements: Q4 2020
- Deployment: Q4 2021

2.3 Project Justification

This project would be required if FERC were to accept the NYISO’s tariff filing of proposed revisions to its Open Assess Transmission Tariff ("OATT") for the Class Year/Interconnection Queue Redesign project. Automated tracking of resource participation in the ICAP market on a rolling historic basis consistent with the new rule that may be approved would increase market efficiency by reducing the risk to market outcomes that would be present if the NYISO were to rely on manually processes to track this high volume of data which becomes larger as resource mix diversity grows.

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3 Comprehensive Mitigation Review

3.1 Problem / Opportunity

The Installed Capacity market has undergone significant changes in both design and resource mix since the NYISO’s BSM measures were first implemented in May of 2008. While there have been many incremental changes to align mitigation measures with changes in the market, there has not been a holistic evaluation of the BSM rules and methodology to evaluate whether the current framework will be adequate in a future with significant renewable resources and policy objectives that impact the capacity market. The BSM rules were originally developed to evaluate traditional generation technologies funded primarily by privately owned capital, but new resource types such as battery storage, renewable generation and distributed energy resources (DER) are fundamentally different in design and operation. Additionally, these resources are more likely than traditional generator technologies to be partially funded by governmental entities to meet policy goals or promote environmental attributes. New rules and tests may be required to provide a better evaluation of these resources for instances of buyer-side market power and thus result in more accurate BSM determinations.

3.2 Project Objective(s) & Anticipated Deliverable(s)

The NYISO will perform a comprehensive review to examine the current BSM framework and principles to determine whether the rules efficiently mitigate concerns of buyer-side market power for both traditional and new resource types with both private and public funding considerations. The 2020 goal for this project is Market Design Complete ~~to discuss with stakeholders the scope of a study, to be performed in 2021, along with a schedule for the work to be performed and the selection of a consultant to perform the study.~~ As part of the review, alternative methods to perform the Mitigation Exemption Test for new resources and Additional CRIS projects will be considered.

3.3 Project Justification

In its most recent Strategic Plan (2019-2023), the NYISO identified the “comprehensive review of the NYISO’s existing market products and operational and planning practices” as a key strategic initiative. Evaluating the mitigation framework is an essential part to ensuring the efficiency of resource entry and exit as the generation mix rapidly changes in the coming years.

4 Demand Curve Reset

4.1 Problem / Opportunity

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

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the projected profit 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.

4.2 Project Objective(s) & Anticipated Deliverable(s)

This periodic review of the ICAP Demand Curves seeks to ensure that the capacity market continues to efficiently support reliability and send accurate, transparent price signals. The review is performed by engaging an independent consultant to lead the DCR 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).

4.3 Project Justification

The quadrennial DCR is mandated by the 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.

5 Enhanced BSM Mitigation Study Period

5.1 Problem / Opportunity

The Services Tariff currently states that all Examined Facilities in a Class Year will be assumed to enter the market beginning with the Summer Capability Period three years after the start of the Class Year; the three-year period beginning three years after the start of the Class Year is referred to as the Mitigation Study Period. This assumption is an oversimplification that was made in an effort to prevent gaming the mitigation tests (Mitigation Exemption Test). However, it is generally an inaccurate assumption that overestimates the timeline of some units, such as Additional CRIS projects, and can underestimate the timeline of larger projects. An inaccurate Mitigation Study Period will result in an inaccurate ICAP Forecast for the unit, and thus an inaccurate BSM determination. Aligning the Mitigation Study Period for each unit with what is realistically expected for that unit will provide more accurate Mitigation Exemption Test determinations.

5.2 Project Objective(s) & Anticipated Deliverable(s)

This effort would continue discussions with stakeholders on the appropriateness of the current evaluation period used during the BSM process and would identify what, if any enhancements can be made to the existing timelines to more appropriately evaluate projects. The deliverable for this project is Market Design Complete.

5.3 Project Justification

Developing a more accurate Mitigation Study Period that aligns more closely with what is expected will improve the accuracy of mitigation determinations.

6 Enhancing Fuel and Energy Security

6.1 Problem / Opportunity

New York’s power grid is anticipated to face increased challenges associated with the generating fleet transitioning in response to economic, environmental, and public policy considerations. Increased dependency on natural gas and intermittent technologies creates an elevated risk to system reliability if those fuel supplies were to be interrupted. The NYISO has engaged the Analysis Group to conduct a study in 2019 to help identify the types and magnitude of potential near-term concerns that could arise by examining various scenarios that place strains on fuel and energy security in New York.

6.2 Project Objective(s) & Anticipated Deliverable(s)

The objective of this project is to explore and develop any market design enhancements that may be prudent in response to conclusions from the 2019 Fuel and Energy Security assessment. These efforts would examine potential adjustments to market structures and/or operational practices that could enhance fuel and energy security in New York, as informed by any potential risks identified by the 2019 study.

6.3 Project Justification

This work would be necessary to complete a market design that encompasses any recommendations from the 2019 study in order to maintain grid reliability in the future. Efforts during this project would seek to bolster New York’s preparedness for an altered resource portfolio by elevating the markets to embrace future challenges that could arise with respect to fuel supply security.

7 Locational Marginal Pricing of Capacity (SOM)

7.1 Problem / Opportunity

An opportunity exists to better align capacity market clearing prices with the marginal reliability value of capacity in each Locality. Achieving this alignment would lower overall costs of satisfying capacity needs.

7.2 Project Objective(s) & Anticipated Deliverable(s)

The objective for this project would be to ~~devise~~ consider a capacity pricing framework where the clearing price at each location is set in accordance with the marginal reliability value of capacity at the location. The deliverable for 2020 is Issue Discovery ~~would be a Market Design Concept Proposed~~.

7.3 Project Justification

This proposal could reduce the costs of satisfying resource adequacy needs, facilitate more efficient investment and retirement decisions, be more adaptable to changes in resource mix (i.e., increasing penetration of wind, solar, and energy storage), and simplify market administration.

8 Tailored Availability Metric

8.1 Problem / Opportunity

One of the issues identified in the Performance Assurance initiative in 2017 included ensuring the availability and performance of capacity suppliers during peak operating hours. The Tailored Availability Metric project addresses this by incentivizing resources to be available and perform during these critical operating periods. Analysis for this project will reassess the current metrics of the derating factors of all capacity resources in order to more accurately reflect performance or availability.

8.2 Project Objective(s) & Anticipated Deliverable(s)

The objective of this project is to implement a market design that reflects higher value to resources that are available and can perform during peak operating hours. For the current derating factors, all hours of operation are weighted equally, following the belief that outages occur randomly. A tailored metric could weight critical operating periods higher than others, under the assumption that these stressed conditions occur during peak hours. Weighting these peak hours reflects the concept that availability and performance during these hours has higher significance to the reliability of the system. Through reevaluating the current structure of how availability and performance of capacity suppliers is measured, tailored metrics will better indicate how much capacity these resources will be allowed to sell in the market. Through a series of analysis, different weighting factors could be applied to peak hours and months, incenting

resources to better perform during these critical time periods. The 2020 deliverable is Market Design Complete.

8.3 Project Justification

The completed market design for the Tailored Availability Metric project is important to maintain reliability of Installed Capacity Suppliers and transparency by enhancing accountability of capacity suppliers.

DER Products

9 DER Participation Model

9.1 Problem / Opportunity

Technological advancements and public policy support are encouraging greater adoption of DER to meet consumer energy needs as well as system needs. DER offer the potential to make load more dynamic and responsive to wholesale market price signals, potentially improving overall system efficiencies.

9.2 Project Objective(s) & Anticipated Deliverable(s)

The 2019 deliverable for this project is Functional Requirements. In 2020, a Software Design deliverable will allow for Deployment in 2021 upon approval from stakeholders and the Board, as well as FERC acceptance of tariff revisions.

Software Design for new software and/or modifications to existing software that supports the business approved functional requirements. Implementation of the dispatchable distributed energy resource participation model in the wholesale markets will include software to facilitate:

- Eligibility and registration
- Aggregations and Modeling
- Bidding and scheduling
- Performance obligations
- Metering and telemetry requirements
- Measurement and verification
- Settlements and cost allocation
- Capacity market participation
- Interconnection, CRIS, and incorporation into planning studies
- Market mitigation
- Dual participation in retail/distribution programs
- Changes to existing demand response programs to enable this effort

This projects expected benefits are to allow the NYISO to cultivate a market that is accessible and competitive for DER, in line with REV state policy goals.

9.3 Project Justification

Throughout 2018 and in 2019 the NYISO has worked through concepts, proposals and Tariff edits to enhance its market rules for DER participation in NYISO’s capacity, Energy and Ancillary Services Markets. The NYISO has also evaluated potential modifications to its existing Demand Response programs in order to enable this effort. Operational and performance changes to existing Emergency Demand Response and Special Case Resource programs are not required at this time but net payments to these resources will be impacted by the outcome of the proposed capacity market rule changes which are to be filed with this project. The NYISO’s Day-Ahead Demand Response Program and Demand Side Ancillary Services Program will be folded into the new DER participation model.

This project will have many facets that ultimately support New York’s REV goals and compliance with FERC Order Nos. 719, 745 and 841, while simplifying the operational matrix of rule sets for product offerings of both demand response and distributed resources, for all stakeholders involved. These changes more closely align the bidding and performance measurements for those resources mentioned with the rule sets for generators. By doing this, the NYISO hopes to create a rule set that is more universally applicable to all resources.

This project will use the rules created in the 2018 and 2019 Market Design effort to develop the functional requirements that will drive the software design effort in 2020.

The software design required to support the functional requirements will include new software and/or modifications to existing software that supports DER eligibility and registration, aggregations, bidding and scheduling, performance obligations, metering and telemetry requirements, measurement and verification of baselines and performance, modeling, settlements, capacity market participation, interconnection, CRIS, incorporation into planning studies, market mitigation, simultaneous participation of DER in retails/distribution-level programs as well as the NYISO’s wholesale program, and changes to the payment structure of existing demand response Capacity suppliers (SCRs) to enable this effort.

10 Dual Participation

10.1 Problem / Opportunity

Current NYISO wholesale market rules do not permit Generators to simultaneously participate in both wholesale markets and in retail markets or programs. The NYISO believes that providing resources with the flexibility to meet wholesale and distribution system needs will deliver the maximum benefit to New York electricity consumers.

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10.2 Project Objective(s) & Anticipated Deliverable(s)

The rules proposed in the DER market design allow for the flexibility of all resources in the NYISO markets to also offer services in the retail markets. Dual participating resources will be required to comply with all NYISO market rules for services offered to the wholesale market, and non-compliance may result in financial penalty. Resources must appropriately reflect any non-wholesale (e.g., retail) obligations in wholesale market Bids. Resources will still be required to follow NYISO dispatch instructions at all times, and will submit offers to NYISO when providing non-wholesale service regardless. Resources will receive payments for Energy or Ancillary Services through wholesale offers properly reflecting all obligations.

The 2019 deliverable for this project includes Functional Requirements, and in 2020, Development Complete and Deployment upon approval from stakeholders and the NYISO Board, as well as FERC acceptance of proposed tariff edits. The NYISO will continue to work with utilities to support operational coordination framework for DSP development, which is an ongoing effort in enabling dual participation for DER and Aggregators. The project will have high benefits, enabling resources to access both retail and wholesale market opportunities for maximized economic and grid benefits.

10.3 Project Justification

Technological advancements and public policy support are encouraging greater adoption of DER to meet consumer energy needs as well as system needs. DER offer the potential to make load more dynamic and responsive to both wholesale and retail market price signals, potentially improving overall system efficiencies. Resources participating in the wholesale markets will continue to be obligated to follow all applicable NYISO market rules and utilize good utility practices.

11 Expanding Capacity Eligibility

11.1 Problem / Opportunity

The NYISO recognizes that resources of various durations provide different reliability benefit to the grid. The NYISO anticipates that shorter duration resources will increasingly enter the markets in the upcoming years, and conducted a review of the Capacity Values and subsequently proposed rules to allow shorter duration resources to participate in the markets and to value these resources based on the reliability benefit that the resources provide to the system. The NYISO has proposed to re-evaluate the identified Capacity Values periodically to accurately reflect the reliability benefit of short duration resources in the As-Found System over time, and to send appropriate investment signals to developers. The implementation of the capacity values requires software changes to the NYISO systems to allow shorter duration resources into the markets.

11.2 Project Objective(s) & Anticipated Deliverable(s)

The successful implementation of these market changes is dependent on developing software to account for short duration resources and their corresponding capacity values. The NYISO will begin the deployment phase of this project in 2020 and intends to implement the capacity values from its first study for the 2021-2022 Capability Year. This project has high benefits as the NYISO is expecting that a large number of short duration resources will enter the market in the coming years. This project seeks to improve the efficient operation of the grid with respect to these new resources.

11.3 Project Justification

The NYISO has been engaged in a multi-year effort to allow shorter duration resources to be eligible to participate in the NYISO markets. The market design for the DER project proposes revisions to the NYISO Services Tariff to require a periodic review of the Capacity Values. The goal of the periodic review is to assess the changes to the reliability benefit of resources in the grid through time to continue to support reliable grid operations. Additionally, implementing software for this project will promote overall market efficiency.

12 NYISO Pilot Framework

12.1 Problem / Opportunity

Technological advancements and evolutions in DER market design drive a desire for the NYISO to understand distributed resource aggregation and dispatch in a test environment before DER developers commit to wholesale market participation. The NYISO and Market Participants can share knowledge on DER coordination efforts and aggregation configurations without risking the economic welfare of consumers and the broader market. Before DER can further define the electrical landscape of the NYISO market, a Pilot Program presents an opportunity for the NYISO and Market Participants to learn and best prepare for a distributed grid.

12.2 Project Objective(s) & Anticipated Deliverable(s)

The NYISO expects this effort to span two years, with the anticipated Study Complete in 2020. This project involves a number of stakeholders in testing, and requires continuous development of operating procedures to accompany new methodologies. The project will have medium benefits, as the results of the study will ultimately allow the NYISO to identify modifications to market rules that appropriately incorporate new technological capabilities and meet grid needs. In order to effectively execute this study, the following deliverables will need to be completed:

- Share the lessons learned from completed pilot projects assessed with internal and external stakeholders
- Create a final report of the cumulative findings and performance of all pilot projects

12.3 Project Justification

In conjunction with the development of the Distributed Energy Resource Participation Model, the NYISO will use the Pilot Program to test new energy technologies and identify rule and tariff modifications for DER. This project will use the Pilot Test Environment and framework to allow developers of new or emergent technologies and the NYISO to gain knowledge about the technology’s capabilities and uses as well as supporting REV demonstration efforts. Pilot Projects are not compensated for their participation in the Pilot Program.

This project helps to position the NYISO to study and test future trends in electric generation, storage and price responsive dynamic loads that will change the landscape of the current electrical grid. Technological advancements and public policy support are encouraging greater adoption of Distributed Energy Resources (DER) to meet consumer energy needs as well as system needs. DER offer the potential to make load more dynamic and responsive to wholesale market price signals, potentially improving overall system efficiencies.

Energy Market Products

13 5 Minute Transaction Scheduling

13.1 Problem / Opportunity

Interchange scheduling with Hydro-Quebec (HQ) is currently achieved on either a 15-minute or an hourly basis using the NYISO’s Real-Time Commitment (RTC) software. More frequent transaction scheduling with external control areas could improve convergence between prices in RTC and RTD and offer increased flexibility to the market optimization software, as the penetration of intermittent renewables increases. The NYISO has also determined that 5-minute transaction scheduling would be a pre-requisite for external resources to be eligible to provide operating reserves, and perhaps other ancillary services.

HQUS believes that allowing external resources to be scheduled based on RTD will place these on equal footing with internal generation and will reduce the occurrence of over or under commitment of external resources.

13.2 Project Objective(s) & Anticipated Deliverable(s)

The project would study the potential for other interties to also be scheduled on a 5 minutes’ basis, depending on the discussion with HQ and other control areas, namely, PJM, ISONE and Ontario.

This project would deliver a report that considers a proposed mechanism to enhance the real-time interchange scheduling processes by allowing the economic scheduling of interchange

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across interties nominally every 5 minutes using the RTD. Interchange scheduling is performed on a 15-minute and an hourly basis using the RTC software.

13.3 Project Justification

A market design to accommodate 5-minute interchange scheduling across controllable interties with HQ would be expected to improve price convergence between RTC and RTD, improve market efficiency by increasing the amount of available resources for dealing with real-time system changes and/or events, and increase the flexibility of the NYISO's market operations to respond to fluctuations in intermittent output. More frequent interchange scheduling that aligns with internal generation scheduling will also alleviate top of hour and quarter-hour interchange discrepancies.

This is particularly important with the growing objectives in NY State for renewable generation and for the replacement of fossil fuel generation. HQ's large, flexible and low carbon hydropower generation represents a solution to support grid flexibility in a 70% by 2030 world.

14 Ancillary Services Shortage Pricing (SOM)

14.1 Problem / Opportunity

State energy and environmental policies are expected to encourage significant increases in intermittent generation. As intermittent penetration increases, the provision of ancillary services such as regulation and reserve will become increasingly important. The ongoing transition of the resource fleet presents an opportunity to incentivize increased flexibility and resilience in the NYCA as the grid evolves. In addition, new capacity market pay-for-performance programs and other market changes in neighboring ISO/RTO regions may drive net exports from the NYCA during times of high stress on the grid, which could adversely impact reliability.

The relative value of the NYISO's ancillary service shortage prices will be assessed in a 2019 study. The study will also recommend potential changes to the current shortage pricing architecture intended to strengthen incentives for flexibility and resilience in light of the grid in transition and pricing for services in neighboring markets. Potential market design enhancements will need to appropriately consider the interactions between Operating Reserves, Regulation Service, and transmission shortage cost pricing levels. The proposed market design changes will also consider the implications of other ongoing reserve and shortage pricing related initiatives, including:

- Constraint Specific Transmission Shortage Pricing
- More Granular Operating Reserves
- Reserves for Resource Flexibility

This project was identified as beneficial by the Market Monitoring Unit, the 2018 NYISO Management Response to Analysis Group’s Performance Assurance report, and the 2017 Integrating Public Policy Market Assessment report.

14.2 Project Objective(s) & Anticipated Deliverable(s)

The 2020 project deliverable will be Deployment. Depending on the work completed in 2019, 2020 work may also include a Market Design Complete presentation and the development of functional requirements.

14.3 Project Justification

This project will position the NYISO to incentivize flexibility and resilience as the grid transitions to higher intermittent penetration. It will also address the implications of pricing incentives for products and services in neighboring ISO/RTO regions.

15 Carbon Pricing

15.1 Problem / Opportunity

New York State (NYS) public policy in recent years has been to promote carbon-free resources through the Clean Energy Standard. However, the wholesale electricity markets operated by the NYISO do not fully align with these policy objectives. As a result, the wholesale markets are restricted in their ability to signal cost-effective carbon dioxide (“carbon”) abatement options and send effective price signals to retain needed units to sustain the reliable operation of the grid.

In 2017, the Brattle Group published a report detailing how pricing carbon into the NYISO’s wholesale markets could help to harmonize wholesale markets and New York State’s public policies. After the report was published, a NYISO, New York State Energy Research and Development Authority, and Department of Public Service team worked with the Integrating Public Policy Task Force (IPPTF) to analyze the mechanics and benefits of incorporating carbon into NYISO’s wholesale markets. These efforts culminated in the NYISO’s publication of a Carbon Pricing Proposal at the end of 2018. In 2019, the carbon pricing proposal is being vetted through the NYISO’s working group process, targeting a 2019 goal of Market Design Complete. The NYISO will seek agreement from the State, as well as approval from stakeholders, the NYISO Board, and FERC on the NYISO carbon pricing proposal.

15.2 Project Objective(s) & Anticipated Deliverable(s)

This phase of the NYISO’s carbon pricing project will develop Functional Requirements to effectuate the NYISO’s carbon pricing proposal.

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15.3 Project Justification

Harmonizing state policies and wholesale market design will provide consumers with more efficient ways to achieve public policy goals at the lowest possible cost. This project will improve market signals, which increases locational and temporal efficiency. Carbon pricing will also support the orderly entry and exit of resources consistent with state policy objectives.

16 Enhanced Fast Start Pricing

16.1 Problem / Opportunity

Start-up and minimum-generation (no load) costs are not included in supplier energy market offers today, because they are not considered marginal costs. Not enabling fast start resources to include these costs in their economic offers may undervalue their contributions to managing an increasingly volatile grid.

On December 20, 2017, FERC instituted a proceeding in Docket No. EL18-33-000, pursuant to Federal Power Act Section 206, concerning fast start pricing in the NYISO's markets. Consistent with the Commission's instructions, the NYISO filed an Initial Brief on February 12, 2018, outlining the NYISO's proposed approach to amend its tariffs and revise its market software to:

- (1) modify pricing logic to allow fast-start resources' commitment costs (i.e., start-up costs and minimum generation (no-load) costs) to be reflected in prices; and
- (2) allow the relaxation of all dispatchable fast-start resources' economic minimum operating limits by up to 100 percent for the purpose of setting prices.

The NYISO's Market Monitoring Unit has also previously recommended incorporating the startup costs of gas turbines into LBMPs to ensure Gas Turbines (GTs) are able to recover their costs fully through LBMPs.

16.2 Project Objective(s) & Anticipated Deliverable(s)

In its Initial Brief, the NYISO requested an implementation date of Q4 2020. The NYISO expects to complete the fast-start pricing market design in 2019, with implementation to follow in 2020. Project efforts will be dependent on the timeline that is expected to be determined by the FERC. The following deliverables will be in scope once a response is received from the FERC, prior to deployment:

- Revision of functional requirements and market design to reflect any changes mandated by the FERC's response to NYISO's initial brief.
- Consumer Impact Analysis
- Determination of necessary tariff revisions
- Presentation describing market design, Consumer Impact Analysis, and any tariff changes to MIWG, BIC, and MC
- Software development

16.3 Project Justification

Anticipating and resourcing this effort will enable the NYISO to quickly bring its markets into compliance with the FERC 206 filing on incorporating startup costs within LBMPs for fast-start resources.

17 ESR Participation Model

17.1 Problem / Opportunity

The NYISO has developed and submitted to FERC in compliance with Order No. 841 a market participation model for ESRs that recognizes their unique physical and operational characteristics to both inject and withdraw energy. ESRs' ability to modulate load in response to prices and grid conditions, can help grid operators handle peak demand, manage the variability of intermittent resources, provide quick responding standby service, such as synchronous operating reserves and could significantly increase both resource flexibility and grid resilience. Although certain types of ESRs can participate in the NYISO markets today, the existing market products offer limited opportunities to provide Energy and Ancillary Services. Recognizing these limitations, this project will implement the participation model for ESRs to provide increased resource flexibility and reliable market operations while preparing for a future where a significant number of generation assets are intermittent and weather-dependent.

In early 2018, FERC issued Order No. 841 requiring to ISOs/RTOs to develop an ESR participation model to allow storage resources to participate in the wholesale markets. The NYISO will develop the software code and implement the ESR participation model to comply with FERC Order No. 841.

17.2 Project Objective(s) & Anticipated Deliverable(s)

The ESR participation model will capture the unique operational characteristics of ESRs, including their ability to withdraw and inject energy onto the grid, and establish rules for participation in the NYISO's Energy, Installed Capacity, and Ancillary Services markets. This project is a continuation of the implementation project started in 2019. The objective of the project in 2020 is Deployment.

17.3 Project Justification

The ESR participation model will be implemented on the new NM platform that will be deployed in October 2019 as part of the EMS/BMS Upgrade project. The participation model will leverage the benefits provided by the new EMS/BMS platform to meet the performance needs that are required to be met in production after the ESR participation model is deployed.

18 Grid in Transition Discussion

18.1 Problem / Opportunity

New York State’s Green New Deal (“GND”) 2040 carbon neutral end state and 2030 70% renewable energy transitional state contain specific renewable energy and energy storage capacity targets and mandates. These public policy mandates are likely to implicate multiple areas of market design. Designing markets that achieve these states in an economically efficient manner is important. The NYISO is undertaking a white paper to scope the issues that will need to be addressed in response to New York State’s clean energy targets; however, further discussion on specific design objectives and prospective elements throughout 2020 is warranted. Significant cost savings in implementing the clean energy objectives could be realized with well-tailored market design. There is value in considering different stakeholder perspectives in an effort to develop lower cost solutions to achieve state policies.

18.2 Project Objective(s) & Anticipated Deliverable(s)

The objective of this project is to solicit a variety of stakeholder perspectives on key market design issues that may be implicated by New York State’s clean energy mandates and objectives. In a series of monthly meetings throughout 2020, the NYISO would make available a forum to address a single topic, allowing stakeholders to provide their perspectives, including presentations that describe the problem and potential solutions. For each topic and/or subject area, the NYISO would provide appropriate background, including any education on the current market design, take stakeholder input, and track issues that generate stakeholder interest. The 2020 deliverable would be Issue Discovery. Following this comprehensive review, stakeholders will prioritize NYISO market design changes for 2021 with the target of “Market Design Proposed”. Key subject areas and representative questions include but are not limited to the following:

1. Future of Fossil Generation
 - What should the role of combustion units be?
 - Should combustion units be limited to biofuels?
 - The role of fossil units for resilience/outage/unavailability/electrification?
 - For resilience?
 - Other reserves?
 - To address unlikely transmission outages, for example?
 - To reduce more carbon in other sectors through electrification?
 - To the extent fossil purchase offsets elsewhere?
2. Implications of a Carbon Neutral Grid

- What if any role should loads' carbon footprint offsets play in assuring carbon neutrality given remaining fossil generation?
- How should we measure and accommodate fossil units to the extent they support electrification of other higher carbon sectors reducing carbon emissions, and how should we measure and accommodate their impact?
- What is the relevance of carbon pricing for achieving the 2030 transitional 70% renewables state or 2040 carbon neutral end state?

3. Reliability and Market Considerations

- What are appropriate market structures for assuring reliability in the 2030 and 2040 cases?
- What are the appropriate ways of setting reliability requirements and measuring reliability with a system comprised primarily or completely of renewables and storage of different durations?
- How should the system accommodate potentially reduced UCAP contribution arising from correlated renewable outages?
- What role should real time retail pricing play to assure customer load reductions when correlated outage events occur?
- Where should the cost of loss of load be considered?

4. Capacity Market Enhancements

- What, if any, capacity market changes may be needed to maintain reliability at lower cost given state mandates?
- What changes might allow optimizing the combination of storage, wind (and potentially fossil) resources?
- Given uneven renewables injection, how should balance of system costs be identified and allocated? What, if any, changes in cost allocation for these resources may be needed?
- Given a synergetic reliability contribution of storage/renewables/potential fossil facilities, how should capacity payments be allocated?

5. Energy Market Enhancements

- What, if any, energy and ancillary services market changes may be needed?
- Absent mandates and moratoria, how might energy market changes assure that transitional and end-state renewable generation targets are met?
- What, if any, ancillary service changes are needed to support flexible resources?
- What, if any, changes in cost allocation might be expected or appropriate?

6. Effective Capacity Market Mitigation

- What does BSM look like in a 2040 full renewables case?
- How should supply side mitigation change?

- What BSM and SSM outcomes should we be seeking to support the 2030 transitional mandates?
- How should bidding rules and SSM change to accommodate increased DAM v. RT risk?

7. Inter-regional Coordination

- How may these mandates affect trade with neighboring ISO/RTOs?
- How may these mandates affect New York’s historic ability to provide mutual reliability support?

8. Future of the Competitive Market

- Would we and should we still have a competitive market?

18.3 Project Justification

This project should be considered given mandates highlighted in the PSC Order Establishing Offshore Wind Standard and Framework for Phase 1 Procurement (Case 18-E-0071 – In the Matter of Offshore Wind Energy), PSC Case 15-E-0302, Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard, Order Adopting a Clean Energy Standard (issued August 1, 2016) (“CES Order”), PSC Case 18-E-0130 In the matter of Energy Storage Deployment Program Order Establishing Energy Storage Goal and Deployment Policy (December 13, 2018) and the governor’s state of the state commitments and subsequent PSC Orders. The intention is to identify means of addressing the state’s goals and mandates in a cost-effective way while continuing to reliably serve load.

19 Hybrid Storage Model

19.1 Problem / Opportunity

The NYISO’s market rules do not currently allow two Generators of different types to be co-located at a single point of interconnection and share the same point identifier (PTID). Instead, where two or more resource types are co-located behind the same point of interconnection, each resource type must be separately metered and have its own PTID.

19.2 Project Objective(s) & Anticipated Deliverable(s)

This project seeks to develop market participation rules for front-of-the-meter renewable generators collocated with Energy Storage Resources, with a 2020 milestone of Market Design Complete. This deliverable includes a consumer impact analysis and a Market Design Complete presentation to stakeholders. 2020 project efforts will build on work completed as part of the Energy Storage Resource and DER Integration initiatives, by developing market rules that better integrate large-scale weather dependent and energy storage resources co-located behind a single interconnection point.

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This project is distinct from the DER Integration initiative which has developed aggregation rules for resources that are generally distributed behind multiple interconnection points.

19.3 Project Justification

State and Federal initiatives such as REC procurements provide incentives for developers to couple storage and intermittent renewable assets. Such programs are aimed at reducing the output volatility and improving the availability of intermittent resources. 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. The new market participation model is also expected to improve grid flexibility and resilience by enabling new resource types to provide their full capabilities.

20 Mitigation Thresholds Review

20.1 Problem / Opportunity

Load Pocket Thresholds ("LPT") are mitigation measures designed to prohibit exercise of market power by the NYC units that might exist under constrained conditions. These thresholds strictly limit the bidding leeway of NYC energy generators, relative to their energy references—a general requirement explained in Services Tariff Section 23.3.1.2.2. In certain situations, the LPTs, which are based on previous months' data may over or underestimate the future month's true conditions and hence may lead to over or under mitigation. A review of the mitigation behavior thresholds could identify opportunities to improve upon the LPT methodology.

20.2 Project Objective(s) & Anticipated Deliverable(s)

This project intends to perform a comprehensive review of mitigation behavioral thresholds, including solicitation of feedback from stakeholders. This project will review all thresholds used for conduct and impact for mitigation including the current Load Pocket Threshold process. The objective of this project would be to evaluate methods to improve upon the LPT methodology based on observations from the last several years of its application. For example, this project will consider the following improvements:

- Modifying the measure that predicts potential market power for each load pocket in the coming month, based on the number of transmission constrained hours in the previous 12 months. Among other problems, the existing measure miscalculates upcoming tightness of load pockets by neglecting the systematic tendency for strong summer peaks in constrained hours, but fewer such constraints over the rest of the year.
- Revising the measure of "lowest allowable LPT." That measure uses 12-month averaging of load-weighted and fuel-price-adjusted LBMPs, to calculate expected load-pocket LBMP in the coming month, and takes 2% of that figure to generate "lowest allowable LPT." The formula that calculates a weighted average of past load-pocket LBMPs can be revised in

ways that will better predict load-pocket LBMP in the upcoming month, and hence create a more appropriate measure of lowest allowable LPT.

- The Tariff requires the NYISO to fuel-price-adjust the LPTs, allowing the NYISO to specify the method of fuel adjustment. Currently, MMA implements this requirement by fuel-adjusting the LBMP term in on a monthly basis. However, MMA proposes to change the frequency of fuel-adjusting LPTs from monthly to daily, so that each day LPTs maintain consistency with the daily-evolving fuel-price component of energy reference levels.
- Automating the process of calculating LPTs which currently consists of several steps, some of which are time consuming and labor intensive and hence prone to error. MMA proposes to work with IT to create a fully automated process with measures in place to validate results from each execution

20.3 Project Justification

This project would allow for a comprehensive review of the LPT methodology and process to identify ways to improve the accuracy of and verification process for LPT calculations.

21 Relocating the IESO Proxy Bus

21.1 Problem/Opportunity

The NYISO’s market software currently uses the BRUCE station as the proxy bus to schedule transactions with Ontario’s Independent Electric System Operator (IESO). The selection of the BRUCE station as the location of the IESO proxy bus is the determining factor for how the commitment software distributes the power flow for scheduled energy between IESO and NYISO. Analysis of the actual historical delivered energy from transactions between IESO and NYISO indicate a potential improvement that can be made with the power flow results from the NYISO’s commitment software. Historically, ~85%-95% of the scheduled energy between IESO and NYISO is realized over the direct ties, as compared to the ~70%-85% that is scheduled by the commitment software today.

21.2 Project Objective(s) & Anticipated Deliverable(s)

This project would explore the options for a more optimal IESO proxy bus that more closely aligns power flow shift factors for energy schedules between IESO and NYISO with actual, observed power flows. The 2020 deliverable for this effort would be Deployment of the improved IESO proxy bus.

21.3 Project Justification

Developing a more accurate power flow result out of the commitment optimization is expected to lead to improved resource scheduling and pricing outcomes.

22 Reserves for Resource Flexibility

22.1 Problem / Opportunity

The 2017 Integrating Public Policy Market Assessment demonstrated that the volatility of NYCA load may increase significantly from one 5-minute real-time market interval to the next as more weather-dependent renewable resources are added to the grid. 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 anticipates that intermittent generators will be able provide adequate down-ramp capability when needed, because both wind and solar units will be dispatchable in the future. However, a product that procures more up-ramp capability could confer significant operational benefits.

The NYISO currently procures the minimum amount of operating reserve required to meet applicable reliability requirements. With this project, the NYISO proposes to examine the potential to increase the amount of reserves procured, thus incentivizing resource flexibility to support grid reliability and improve grid resilience.

The 2018 Master Plan proposed further investigation into a “Flexible Ramping Product,” as well as the procurement of additional reserves, under an initiative titled “Reserve Procurement for Resilience.” Subsequent research into the flexible ramping products offered by other control areas and discussion with stakeholders led NYISO staff to conclude that these two project descriptions ultimately offered different ways of addressing the same market need for more up-ramp capability, which NYISO staff believes can best be achieved in the near-term by assessing changes to the amount of reserves procured.

22.2 Project Objective(s) & Anticipated Deliverable(s)

The deliverable for this project in 2020 will be Deployment. 2020 work will further develop the market design concept that is expected to be proposed in 2019 as part of the “Reserve Procurement for Resilience” project. Depending on the 2019 progress, 2020 efforts may include the development of a Market Design Complete presentation and functional requirements.

22.3 Project Justification

Procuring additional reserves could yield more efficient market outcomes by enabling procurement of reserves to respond quickly to the volatility introduced by additional intermittent resources. This project will also support improved incentives for flexible resources and price signals that reflect the resource capabilities required to maintain reliability. By procuring reserves through the market and providing schedules for such service, resources are provided improved incentives for performance and to take the required actions to ensure availability of the capability procured.

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Planning Products

23 Climate Change Impact and Resilience Study

23.1 Problem / Opportunity

To inform the NYISO's planning, forecasting, and operations, as well as the development of wholesale market mechanisms to enhance grid resilience.

23.2 Project Objective(s) & Anticipated Deliverable(s)

Phase II is expected to identify and examine impacts to the bulk power system under the conditions identified in Phase I that could potentially impact system stability and resiliency, focusing specifically on the ability of the system to meet NYCA load requirements and facilitate prompt system restoration in the event of an outage or disruption. The deliverable would be a reliability type analysis using the load forecasts from Phase I.

23.3 Project Justification

Continuation of on-going project.

TCC Products

24 Reserving Capacity for Balance-of-Period (BoP) Auctions

24.1 Problem / Opportunity

The ISO currently conducts Centralized TCC Auctions twice each year. In each of those auctions, six-month and one-year TCCs are available for purchase, and two-year TCCs are available in some of these auctions. However, TCCs covering periods shorter than six months are not available in those auctions. Instead, market participants wishing to purchase shorter-term TCCs must do so in the BoP Auctions, which are held each month.

Currently, the NYISO's tariffs require that all transmission capacity not associated with Existing Transmission Agreements or outstanding TCCs and not reserved through conversion of Existing Transmission Capacity for Native Load (ETCNL) to ETCNL TCCs or Residual Capacity Reservation Rights (RCRR) to RCRR TCCs be made available for sale in the Centralized TCC Auctions. As a result, the opportunity for market participants to acquire shorter-term TCCs in BoP Auctions may be significantly limited. Other ISO/RTOs reserve some transmission Capacity for sale in their monthly Financial Transmission Right auctions.

Consequently, this proposal seeks to modify the ISO’s current software and procedures to permit the ISO to reserve a portion of available system transfer capability, which it would then release into the BoP Auctions. This will permit auction participants to purchase additional shorter-term TCCs in the BoP Auctions.

24.2 Project Objective(s) & Anticipated Deliverable(s)

This project includes working with stakeholders to develop market rule changes to accommodate the potential for reserving a portion of otherwise available transmission capacity for release in the BoP Auctions. This would entail tariff changes to permit the ISO to reserve this transfer capability, modifications to the ISO’s current procedures for ensuring that transfer capability is allocated among auction rounds, modification of the ISO’s current software and procedures for allocating revenue collected from the sale of TCCs in the auction, and development of procedures for determining the BoP Auctions into which the reserved transfer capability would be released.

Due to the potential increased complexity that could arise from making less than the full quantity of the transmission capacity associated with ETCNL available for sale in the Centralized TCC Auctions, the implementation of reserving a portion of otherwise available transmission capacity for release in the BoP Auctions may have a dependency on the automation of the ETCNL feasibility analysis process and the automation of an inventory system to calculate the remaining feasible ETCNL

24.3 Project Justification

Today the TCC Automated Market System and other supporting systems do not support the reservation of transmission Capacity for sale in BoP Auctions. Certain stakeholders have previously requested this capability.

The proposed solution is intended to:

- Generate more efficient market outcomes; consistent with the MMU’s expectation that “selling more of the capability of the transmission system in the [BoP] auctions (by holding back a portion of the capability from the six-month auctions) would likely raise the overall amount of revenue collected from the sale of TCC’s (2018 State of the Market Report for the New York ISO Markets at 39)”;
- Address stakeholder requests for such enhancements to the current TCC auction design; as auction participants have indicated interest in reserving transfer capability for release in BoP Auctions in surveys of auction participants preceding each of the last six Centralized TCC Auctions; and
- Provide additional opportunities for interested parties to obtain shorter-duration TCCs because it would remove a constraint that limits the availability of shorter-term TCCs in the BoP Auctions.