2022 Market Project Candidates

Product and Project Management

May 13, 2021

This document represents potential 2022 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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Table of Contents

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Introduction

This document represents potential 2022 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. Projects are classified as four project types.

Project Type	Description
Mandatory	Strategic Initiatives and FERC Orders. These projects will be included in the budget
Continuing	Projects approved in a prior year and that have progressed to either Software Design, Development Complete, or Deployment will generally be proposed as Continuing. 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 into 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 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.

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Item	Project Name	Product Area	Project Type
1	Capacity Value Study	Capacity Market	Mandatory
2	CRIS Tracking	Capacity Market	Mandatory
3	DER Participation Model	New Resource	Mandatory
4	Support TSO and DSO Coordination Efforts	New Resource	Mandatory
5	Comprehensive Mitigation Review	Capacity Market	Continuing
6	Grid in Transition	New Resource	Continuing
7	15-Minute Transactions Enhancement - Requested by HQUS	Energy Market	Prioritize
8	5 Minute Transaction Scheduling - Requested by HQUS	Energy Market	Prioritize
9	Adjustment of Energy Offer/Bid Floor (SOM)	Energy Market	Prioritize
10	Advancing NYISO Transparency - Requested by DC Energy	Energy Market	Prioritize
11	Capacity Demand Curve Adjustments	Capacity Market	Prioritize
12	Constraint Specific Transmission Shortage Pricing (SOM)	Energy Market	Prioritize
13	Coordination of Interconnection and Transmission Expansion Study	Planning	Prioritize
14	CRIS Expiration Evaluation	Capacity Market	Prioritize
15	Demand Curve Translation Enhancement (SOM)	Capacity Market	Prioritize
16	Dynamic Reserves (SOM)	Energy Market	Prioritize
17	Eliminate Fees for CTS Transactions with PJM (SOM)	Energy Market	Prioritize ~~Future~~
18	Eliminate Offline GT Pricing (SOM)	Energy Market	Prioritize
19	Engaging the Demand Side	New Resource	Prioritize
20	Enhanced BSM Forecasts Assumptions (SOM)	Capacity Market	Prioritize
21	Grid Services from Renewable Generators - Requested by NYSERDA	Energy Market	Prioritize
22	Hybrid Aggregation Model	New Resource	Prioritize
23	Improve Duct-Firing Modeling (SOM)	Energy Market	Prioritize
24	Improving Capacity Accreditation (SOM)	Capacity Market	Prioritize
25	Internal Controllable Lines	New Resource	Prioritize
26	Lines in Series Constraint Pricing	Energy Market	Prioritize
27	Locational Marginal Pricing of Capacity (SOM)	Capacity Market	Prioritize
28	Long Island Reserve Constraint Pricing (SOM)	Energy Market	Prioritize
29	Monthly Demand Curves (SOM)	Capacity Market	Prioritize
30	More Granular Operating Reserves (SOM)	Energy Market	Prioritize
31	Multi-Level References	Energy Market	Prioritize
32	Reserving Capacity for TCC Balance-of-Period (BOP) Auctions	TCC	Prioritize
33	Storage as Transmission - Requested by NYSERDA	New Resource	Prioritize
34	Time Differentiated TCCs – Requested by Calpine and Vitol	TCC	Prioritize
35	Transmission Security in the ICAP Market	Capacity Market	Prioritize
36	Capacity Transfer Rights for Internal Transmission Upgrades (SOM)	Capacity Market	Future
37	Carbon Pricing	Energy Market	Future
38	Enhanced PAR Modeling (SOM)	Energy Market	Future
39	Long Island PAR Optimization and Financial Rights (SOM)	Energy Market	Future
40	Review of Real-Time Market Structure (SOM)	Energy Market	Future

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Mandatory

1 Capacity Value Study

1.1 Problem/ Opportunity

The NYISO Services Tariff requires a periodic review of the Capacity Values, in which the NYISO will select an independent consultant to re-evaluate the reliability benefit of resources with Energy Duration Limitations in meeting Resource Adequacy criteria. This project will be the first of the periodic reviews and will build on the NYISO's multi-year efforts to value these resources in the ICAP market based on the reliability benefit that the resources provide to the system through a combination of Duration Adjustment Factors and/or weighting factor percentages during the applicable Peak Load Window, as developed through the Expanding Capacity Eligibility and Tailored Availability Metric efforts. As required by the tariff, the Capacity Value Study includes an evaluation of the reliability benefit that different duration-limited resources provide to the system, including a re-evaluation of the Peak Load Windows for Resources with Energy Duration Limitation and hourly weighting factor percentages for wind and solar Resources.

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

This periodic review of Capacity Values seeks to ensure that the ICAP market continues to efficiently support reliability and reflect the value that resources provide to the system, particularly during peak operating hours. The review will be performed by an independent consultant to lead the Capacity Value Study process, which will include any recommendations or changes to capacity accreditation concepts or rules. The independent consultant will provide recommendations on the Energy Duration Limitations, Duration Adjustment Factors, Peak Load Windows for Resources with Energy Duration Limitations, and Peak Load Window weightings for wind and solar resources.

The 2022 deliverable is Study Defined. The NYISO will initiate the process for this study, pursuant to the schedule outlined in Section 5.12.14.3 of the NYISO Services Tariff. The Capacity Value Study will be completed in 2023 and any corresponding changes to Installed Capacity Suppliers would require a 205 process to the NYISO Services Tariff to become effective with the 2025-2026 Capability Year.

1.3 Project Justification

The quadrennial review of the Capacity Values is mandated by the tariff. 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. This periodic review is a resource intensive process for both the NYISO and stakeholders that has a significant impact on the Installed Capacity market as a whole.

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2 CRIS Tracking

2.1 Problem / Opportunity

The NYISO tariff indicates that Capacity Resource Interconnection Service (CRIS) expires if a project has been CRIS-inactive for three years. Recently, as part of the 2019 Class Year Redesign project, the NYISO proposed certain refinements to the CRIS expiration rules that have now been accepted by the Federal Energy Regulatory Commission (FERC). These new rules, for example, address the application of CRIS-inactive status to new projects and load modifiers. The new rules create the need for additional CRIS tracking and monitoring capabilities for the NYISO. The NYISO may also identify opportunities to enhance its current method of tracking CRIS, and CRIS-inactive status, for all projects.

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

This 2022 project deliverable is Development Complete.

2.3 Project Justification

FERC acceptance of these enhanced CRIS rules makes this a required project to meet the new tariff obligation.

Increased market efficiency will be realized by the implementation of automated tracking of resource participation, in the Installed Capacity (ICAP) market, on a rolling historic basis. Automated tracking will reduce the risk of inappropriate market outcomes due to errors or delays that could arise via a manual tracking process.

3 DER Participation Model

3.1 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.

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

The 2019 deliverable for this project was Functional Requirements. In 2020, the NYISO completed software design consistent with the FERC-accepted tariff. In 2021, the NYISO worked on development of the required software including deployment of Software-defined Wide Area Network (SD-WAN), an enabling technology used for telemetry. Once SD-WAN is implemented, MPs, including Demand-Side Ancillary Services Program (DSASP) resources and Energy Storage Resources (ESR), will be eligible to utilize the technology. In 2022, the deliverable is Deployment. The NYISO plans to complete software development of remaining components, testing, MPs' sandbox testing, and deployment to the production environment.

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This project's expected benefits are to allow the NYISO to cultivate a market that is accessible and competitive for DER, aligning with New York State policy goals.

3.3 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 payments to these resources will be impacted by the expanding capacity eligibility rules that became effective in 2021. The NYISO's Day-Ahead Demand Response Program and Demand Side Ancillary Services Program will be eliminated when the DER participation model becomes effective.

This project will have many facets that ultimately support New York State policy goals and compliance with FERC Order No. 2222, while simplifying the operational matrix of rule sets for small resources offering demand response and/or energy injections, for all stakeholders involved. These changes more closely align the bidding and performance measurements for DER with the rules applicable to generators. By doing this, the NYISO hopes to create rules universally applicable to small resources desiring to participate in an aggregation.

The target deployment in 2022 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 retail/distribution-level programs as well as the NYISO's wholesale markets.

4 Support TSO and DSO Coordination Efforts

4.1 Problem / Opportunity

Throughout the multi-year DER Roadmap effort, the NYISO has worked closely with the Joint Utilities (JU) of New York to develop processes that will facilitate DER participation in the wholesale markets. The NYISO recognizes that bulk system and distribution system operational coordination and situational awareness are necessary to successfully integrate DER into the wholesale markets. The NYISO must continue working with the JU as well as Long Island Power Authority (LIPA) and New York Power Authority (NYPA) to finalize coordination details in preparation for DER participation in Q4 2021.

The NYISO will also continue to participate in the Market Design Integration Working Groups (MDIWG) hosted by the Department of Public Service to discuss Distribution System Platforms (DSP).

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

Throughout the remainder of 2021 and 2022, the NYISO, the JU, LIPA, and NYPA will continue to coordinate in support of DER participation model topics, including but not limited to Transmission Nodes, Dual Participation, and operational tools. The NYISO will review the results of those efforts with its stakeholders in 2022 via NYISO market and operational working groups as an issue discovery effort. The 2022 deliverable will be Issue Discovery.

Additionally, the NYISO will contribute to ongoing efforts at the New York Department of Public Service to develop a Distribution System Platform on which a distribution centered marketplace may proliferate. The NYISO will support these efforts by providing background on current and planned wholesale market constructs.

4.3 Project Justification

This project will help the NYISO and the New York transmission operators to develop the proper tools, communication protocols, and procedures in place to maintain reliability as the penetration of DER on the grid increases.

In the MDIWG efforts the NYISO will advocate for distribution designs in keeping with the ISO's core mission of maintaining a reliable grid and efficient market.

Continuing

5 Comprehensive Mitigation Review

5.1 Problem / Opportunity

The ICAP market has undergone significant changes in both design and resource mix since the NYISO's Buyer Side Mitigation (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 ICAP market.

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

The NYISO will implement changes approved by the NYISO and accepted by FERC as part of its 2021 stakeholder process.

The 2022 deliverable for this project is Deployment. The NYISO will implement the 2021 BSM rule changes, as well as deploy any additional software changes that would facilitate the approved 2021 BSM rules.

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5.3 Project Justification

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 BSM framework is an essential part to ensuring the efficiency of resource entry and exit as the generation mix rapidly changes in the coming years. The NYISO believes it is prudent to discuss options that can be designed and implemented consistent with the timeline necessary to support achievement of the CLCPA goals.

6 Grid in Transition

6.1 Problem / Opportunity

In a time of unprecedented change in the electricity sector, New York's competitive electricity markets must be positioned to unleash the innovation and flexible energy solutions necessary for a reliable transformation towards a zero-emissions power grid. A rapid transition is underway in New York State from a power grid where energy is largely produced by central-station fossil fuel generation, towards a grid with increased intermittent renewable resources and distributed generation.

The pace of this transition is driven primarily by state policy, notably the CLCPA. In addition, technological advancements are expanding the capabilities of new resources and lowering their costs, further driving broader industry changes.

The NYISO is actively working on market enhancements to meet these future challenges. A grid characterized by high levels of intermittent renewable resources, ESR, and DER will require new thinking to adequately balance intermittency on the system. The NYISO approaches this work with two guiding principles: (1) all aspects of grid reliability must be maintained; and (2) competitive markets should continue to maximize economic efficiency and minimize the cost of maintaining reliability while supporting the achievement of New York's climate policy codified in the CLCPA.

Additionally, the study effort will identify the potential level of system flexibility that will be required with increases in intermittent resources and evaluate grid and/or resource attributes necessary to continue to reliably maintain system balance.

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

Using the work completed to date across various NYISO studies and initiatives, including the Reliability and Market Considerations for a Grid in Transition work and Climate Change Study work, identify and if possible quantify through a 2022 study, the potential level of system flexibility and/or grid attributes needed to reliably maintain system balance. Using this information will further evolve the recommendations laid out in previous Grid in Transition discussions. This project will position the wholesale markets to continue to support grid

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reliability as the mix of resources and system needs continues to evolve in New York. The deliverable for 2022 is Study Complete.

6.3 Project Justification

The CLCPA includes the following goals:

- 100% of the state's electricity must be emissions free by 2040
- 9,000MW of offshore wind energy must supply NY by 2035
- 6,000Mw of solar energy be installed in NY by 2025
- Statewide reduction of 185 trillion BTUs through energy efficiency
- 3,000MW of energy storage capacity must be installed to serve NY by 2030

Continuation of this project will help to identify means of maintaining system reliability while addressing the state's goals and mandates in a cost-effective way through creation of proper market mechanisms.

Prioritize

7 15-Minute Transactions Enhancement – Requested by HQUS

7.1 Problem/Opportunity

Intra-hourly transactions allow market participants at eligible proxy buses to submit 15-minute bid curves for each of the four quarter hours. Real-Time Commitment (RTC) RTC software establishes binding external transaction schedules on each external interface for each quarter hour. RTD treats the RTC schedules as fixed interchange (irrespective of price), and Real-Time Dispatch (RTD) prices are used to settle these transactions. This leads to a risk of discrepancy between RTC and RTD, as RTD prices may be higher or lower than the RTC price that was used to establish interchange schedules. This dynamic therefore can affects the usage of 15-minute transactions compared to Day-Ahead transaction bids.

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

The 2022 project will develop and propose market rules to settle 15-minute transactions at RTC prices rather than RTD prices and will have a deliverable of Market Design Complete.

7.3 Project Justification

This effort would reduce trading risk associated with the difference between RTC and RTD prices and would provide additional incentive for market participants to bid intra-hourly transactions. The increase in intra-hourly transaction bids would thus provide the NYISO with greater scheduling flexibility to respond to changing real-time conditions.

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8 5 Minute Transaction Scheduling – Requested by HQUS

8.1 Problem / Opportunity

Currently, interchange with external control areas is achieved on either a 15-minute or an hourly basis using the NYISO's RTC software. A significant portion of Internal Generation is scheduled every five minutes. More frequent interchange scheduling with external control areas could notably improve convergence between prices in RTC and Real-Time Dispatch RTD and provide additional balancing and/or ramping capabilities. With increased penetration of intermittent renewables, 5 minute transactions would provide greater flexibility to RTD and would create more consistency between internal and external resource scheduling.

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

The project builds upon the study completed in 2020 that evaluated the feasibility for scheduling every five minutes with external control areas. This project will expand upon the recommendation from the study by developing market rules and a mechanism to schedule interchange every five minutes using the RTD with Hydro-Quebec. This will include evaluating the benefits of a transaction vs. generator model in greater detail.

The 2022 deliverable will be a Market Design Concept Proposed.

8.3 Project Justification

This market design is expected 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. More frequent interchange scheduling that aligns with internal generation scheduling frequencies will also help to alleviate top of hour and quarter-hour interchange discrepancies between RTC and RTD.

The added flexibility that more frequent interchange scheduling provides is particularly important with the State mandated requirements for renewable generation and other clean energy resources to replace the use of fossil fuel generation.

9 Adjustment of Energy Offer/Bid Floor (SOM)

9.1 Problem/Opportunity

The bid and offer floor for internal resources and external transactions is negative $1,000/MWh. Under rare conditions, the NYISO operators may have to reduce external interface limits and/or curtail external transactions to maintain transmission security on an external interface. In such cases, external transaction schedulers are effectively able to "buy" power at arbitrarily low price levels, resulting in uplift for NYISO customers. The MMU recommends raising the bid and offer floor to a level that is closer to the range of potential avoided costs of supply for generation resources.

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

The project scope would be to investigate the impacts of increasing the offer floor for resources and the capping logic required to implement the change. The 2022 project deliverable would be Market Design Complete.

9.3 Project Justification

This project would potentially reduce uplift for NYISO customers by reducing the level of arbitrary low pricing that is not necessarily reflective of associated costs.

10 Advancing NYISO Transparency - Requested by DC Energy

10.1 Problem / Opportunity

There is currently an incomplete set of information that is posted by NYISO. The additional data requested below can be posted publicly or protected through CEII protocols.

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

The following additional data should be posted by the NYISO.

1. State estimator modal and data including
   a. Topology
   b. Branch characteristics
   c. Branch flows
2. Transmission line rating for all transmission lines/facilities monitored, including when they change and why
3. DAM and RTM contingencies. The NYISO has a separate list of contingencies for DAM/RTM relative to what the NYISO models in the TCC auctions, and the NYISO only publishes the TCC contingencies.

The project will review the information requested to determine its classification (public, CEII, confidential, etc.), develop software to automate pulling the data from the appropriate system including working with vendors that support our systems for modifications, and developing software to periodically post data in a manner that is designed to protect CEII and other Confidential Information.

The 2022 project deliverable will be Deployment.

10.3 Project Justification

Open, transparent and competitive ISO markets are essential to facilitate efficient solutions and provides benefits to consumers. FERC has opined many times on the benefits transparent and competitive markets deliver.

- Commission's conclusions in AD14-14 that transparency plays a critical role in improving price formation

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- Without sufficient transparency, market participants may not have the tools necessary to critically analyze and discuss problems and identify potential solutions to market inefficiencies.
- Order No. 704 conclusion: [Such] policies [i.e., the Commission's market-oriented policies for the wholesale natural gas industries] require that interested persons have broad confidence that reported market prices accurately reflect the interplay of legitimate market forces. Without confidence in the basic processes of price formation, market participants cannot have faith in the value of their transactions, the public cannot believe that the prices they see are fair, and it is more difficult for the Commission to ensure that jurisdictional prices are "just and reasonable.

11 Capacity Demand Curve Adjustments

11.1 Problem / Opportunity

The existing quadrennial ICAP Demand Curve reset (DCR) process includes consideration of the slope and shape of the ICAP Demand Curves. However, the NYISO recommends a targeted effort outside of the quadrennial DCR process to review the efficacy of the current slope and shape used by the ICAP Demand Curves to evaluate whether alternative slopes and/or shapes would improve resource adequacy, grid reliability, and price formation.

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

This project would evaluate what, if any, changes to the current slope and/or shape of the ICAP Demand Curves may warrant further consideration. The milestone for 2022 would be Study Complete. If stakeholders and the NYISO intend on pursuing a change, the NYISO recommends completing this effort prior to the start of the next DCR in 2023.

11.3 Project Justification

The work effort and analysis required by the existing DCR process does not provide adequate time to conduct a detailed analysis of the existing ICAP Demand Curve structure's efficacy. This standalone effort would afford stakeholders and the NYISO the chance to more fully evaluate whether a modified structure may improve resource adequacy and grid reliability.

12 Constraint Specific Transmission Shortage Pricing (SOM)

12.1 Problem / Opportunity

Transmission facility and line ratings limit the amount of energy that can flow from one location to the next on the bulk electric system. As transmission constraints arise, the NYISO's energy market software prices the quantity of energy that would be necessary to alleviate them. The existing transmission constraint pricing logic applies a single graduated pricing mechanism to all facilities assigned a non-zero constraint reliability margin (CRM) value. Under the current pricing logic, some transmission constraints are relaxed without being resolved by the graduated mechanism.

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In 2018, the NYISO's Constraint Specific Transmission Demand Curves study concluded that certain enhancements to the current logic would be beneficial and should be further explored with stakeholders. Based on this study, it is expected that the NYISO and its stakeholders will complete a Market Design in 2021 to utilize a revised and more graduated transmission demand curve mechanism that better accounts for the various non-zero CRM values assigned to facilities. Under this new construct, transmission demand curve prices will increase proportionally with the severity of transmission overloads. The design reduces occurrences of constraint relaxation by instead seeking to resolve constraints for internal facilities through use of a graduated transmission demand curve mechanism that includes pricing values for shortages that exceed applicable CRM values.

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

The 2022 deliverable for this project will be Functional Requirements.

12.3 Project Justification

The transmission constraint pricing logic enables the NYISO's market software to re-dispatch suppliers efficiently in the short term to alleviate constraints, and incentivizes long-term investment in locations where suppliers could provide the greatest benefits.

13 Coordination of Interconnection and Transmission Expansion Study

13.1 Problem / Opportunity

The NYISO supports several different interconnection and transmission expansion processes to evaluate the reliability impact of transmission and generation projects that seek to interconnect to FERC-jurisdictional interconnection facilities.

Certain transmission projects are evaluated under the Transmission Interconnection Procedures (TIP) in OATT Attachment P. Such Transmission Projects include all proposed transmission expansions of the New York State Transmission System, regardless of whether the Transmission Developer seeks cost allocation under the NYISO OATT or proposes a market-based project, other than: 1) a new transmission facility or upgrade to an existing transmission facility pursued by a Transmission Owner (TO) as part of a Local Transmission Plan (LTP) or NYPA transmission plan that is not subject to the NYISO's competitive selection process under Attachment Y and for which the TO is not seeking regional cost allocation under the NYISO OATT, and 2) Class Year Transmission Projects seeking CRIS that fall under the NYISO Large Facility Interconnection Procedures in Attachment X to the NYISO OATT.

Other transmission projects are evaluated under OATT 3.7 and would include, for example, LTP projects and NYPA transmission plan projects.

All new Large Generating Facilities and Class Year Transmission Projects that propose to interconnect to the NYS Transmission System or Distribution System are subject to the NYISO

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interconnection procedures in OATT Attachments S and X. Also, projects that materially increase the capacity of an existing Large Generating Facility or Class Year Transmission Project that is interconnected to the NYS Transmission System or Distribution System, or to make a material modification to the operating characteristics of such Large Facilities, also are subject to the NYISO's interconnection procedures. Similarly, Small Generating Facilities that propose to interconnect to the NYS Transmission System or Distribution System are subject to the NYISO's interconnection procedures in OATT Attachment Z.

Each set of interconnection and transmission expansion procedures has base case inclusion rules that establish the updated base case at the start of each study. As a result, it is conceivable for projects to proceed in different interconnection study processes without taking into account projects in another study process that could directly impact each other. The chance of this circumstance occurring is now more likely to be encountered given the transformation of the grid that will be needed to meet CLCPA requirements.

In addition, the NYISO's interconnection procedures provide a mechanism for updates to the Connecting Transmission Owner's system representation, including distribution level updates provided by the Connecting Transmission Owner. With the increasing number of distribution-level interconnections proceeding outside the NYISO interconnection queue, it is important to capture the collective reliability impacts of projects in both NYISO and TO interconnection queues.

Revising the interconnection and transmission expansion tariffs to provide for coordination among the various processes – both NYISO and Connecting Transmission Owner interconnection study processes – would mitigate the potential for inconsistent treatment among projects developers, would provide for more comprehensive study results, and would help avoid the potential for interactions between projects in different processes.

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

The 2022 deliverable for this project would be Market Design Complete.

- Tariff Updates
- Potential for identification of new requirements for Salesforce Portal

13.3 Project Justification

In addition to the benefits described in the objectives above, this project would also lead to improved efficiencies of the interconnection study process.

14 CRIS Expiration Evaluation

14.1 Problem/Opportunity

As part of the Class Year Redesign project, the NYISO identified proposals providing for more stringent CRIS expiration rules. Some of those proposals were implemented as part of that initiative, while others were deferred for later consideration. Although the new CRIS rules are

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expected to prevent retention of CRIS by certain facilities not participating in the ICAP market and increase deliverability "headroom," the rules, as accepted by FERC and implemented by the NYISO, do not significantly address circumstances under which facilities can retain their CRIS beyond the effective date of their retirement for up to three years and retain unused CRIS with minimal participation in the ICAP market under Section 25.9.3 of the NYISO Open Access Transmission Tariff (OATT).

The current tariff provisions may allow facilities to retain CRIS that, if terminated, could eliminate the need for deliverability upgrades or require less costly deliverability upgrades, thereby facilitating new entry. For example, the existing rules allow a facility to retain its full CRIS by offering as little as 1 MW into the capacity market. Additionally, a facility is able to retain all CRIS obtained for up to three years after it retires, rather than immediately making its unused CRIS available to other new entrants.

Modifying the current tariff language with respect to CRIS transfers may allow for more flexibility as more public policy resources come on to the system. Modifications could include exploring options to include same-location transfers to better facilitate these new entrants.

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

Continuing the work from the 2021, the objective of this project is to develop modifications to CRIS Expiration rules as well as the rules surrounding CRIS Transfers. The milestone for 2022 is a Market Design Complete.

14.3 Project Justification

This project will seek to further enhance and provide additional clarification to the CRIS expiration rules. Further enhancements to the CRIS expiration rules will more appropriately address the retention of CRIS by retired facilities and facilities no longer fully participating in the ICAP market.

Finally, this project will seek to increase the capacity deliverability headroom and potentially lower the cost of market entry to future facilities seeking to participate in the ICAP market.

15 Demand Curve Translation Enhancement (SOM)

15.1 Problem / Opportunity

The ICAP Demand Curves are based on the net cost of new entry (Net CONE) for the demand curve unit for each curve (referred to as a "peaking plant"). These Net CONE costs are estimated in ICAP-terms and then converted into Unforced Capacity (UCAP)-terms based on the regional average derating factor, which reflects the forced outage rates of the existing fleet as well as UCAP-ICAP ratios of intermittent resources. Since the peaking plant is expected to have a low forced outage rate, this method leads the monthly UCAP-based curves to be set higher than if the derating factor of the peaking plant for each curve were used. This inconsistency is expected to be more pronounced as additional intermittent resources are added to the system.

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

This project will investigate the implications of revising the ICAP to UCAP conversion methodology to utilize the estimated forced outage rate of the peaking plant for each ICAP Demand Curve. Findings and resulting suggestions will be reported and discussed with stakeholders. The project deliverable for 2022 will be Market Design Complete.

15.3 Project Justification

Given the upcoming changes planned for the New York grid, ensuring an appropriate method for ICAP to UCAP translation for the ICAP Demand Curves will be important for maintaining reliability and sending accurate market signals in the ICAP market.

16 Dynamic Reserves (SOM)

16.1 Problem / Opportunity

Today, the NYISO procures fixed quantities of operating reserves in specified regions across the state. Under this structure, the static modeling of reserve regions and their associated requirements may not optimally reflect the varying needs of the grid to respond to changes in system conditions by (i) scheduling energy above minimum operating reserve requirements from individual suppliers when sufficient reserves are available or (ii) shifting reserve procurements to lower-cost regions when transmission capability exists.

Based on New York State Reliability Council, L.L.C. (NYSRC) rules, the NYISO is required to procure sufficient reserves to account for the single largest source contingency at all times. However, the current static modeling approach does not account for the potential for the largest source contingency changing based on system conditions and system topology every market run. Dynamically determining the operating reserve requirements could enhance system reliability and market efficiency based on the system needs at any time.

The NYSRC rules also require the NYISO to ensure that transmission facilities are not loaded above their Long-Term Emergency (LTE) rating, post-contingency. In some cases within NYC, the NYISO is permitted to operate transmission facilities above LTE, using generating capacity not otherwise scheduled to provide energy and phase angle regulator actions to quickly secure the transmission facilities, post-contingency. This offers opportunities to reduce production costs by relaxing the transmission limits of facilities that feed New York City load pockets. Currently, operating reserve providers in these NYC load pockets are not compensated for the avoided transmission congestion they enable by allowing certain facilities to be secured to a rating that is higher than LTE.

A dynamic reserve procurement methodology could improve market efficiency through enhancing competition among suppliers, and better aligning market outcomes with how the power system is operated.

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16.2 Objective(s) & Anticipated Deliverable(s)

The market design will seek to leverage the recommendations from the study being conducted in 2021 and develop potential changes to the NYISO's market software and market rules to facilitate more efficient scheduling of operating reserves based on system conditions. Additionally, if determined to be feasible in the prototyping effort as part of the 2021 study, such enhancements could facilitate the capability for reserves to be scheduled in more cost-effective regions if sufficient transmission capability is available to deliver the reserves to another location/reserve region, post-contingency. Finally, the 2021 study is expected to provide additional information regarding how to most efficiently incorporate potential reserve requirements within certain load pockets in New York City into the market software. The deliverable for this effort in 2022 will be Market Design Concept Proposed.

16.3 Project Justification

The Market Monitoring Unit (MMU) has recommended that the NYISO "[d]ynamically adjust operating reserve requirements to account for factors that increase or decrease the amount of reserves that must be held on internal resources [SOM Recommendation 2015-16]." A dynamic reserve procurement methodology could improve market efficiency by scheduling reserves in a less expensive region using available transmission capability to import power into a more constrained region post-contingency, rather than hold reserves in the more expensive reserve area. By scheduling reserves more dynamically, reserves could be shifted to resources in lower-cost regions as transmission capacity is made available or shifted to resources that are not export constrained. Dynamic reserve procurements present opportunities to enhance grid resilience, incentivize resource flexibility, lower total production costs, and increase efficiency in meeting applicable reserve requirements.

This project also considers an additional recommendation made by the MMU in past State of the Market Reports. The MMU has recommended that the NYISO "[c]onsider rules for efficient pricing and settlement when operating reserve providers provide congestion relief [Recommendation 2016-1]."

17 Eliminate Fees for CTS Transactions with PJM (SOM)

17.1 Problem / Opportunity

Coordinated Transaction Scheduling (CTS) was introduced as a market design concept to allow wholesale market operators the ability to schedule efficient transactions based on close to real-time price information. The 2017 SOM report notes that overall performance of CTS improved significantly between 2016 and 2017, but that participation is still much stronger at the ISO-NE interface (where it is required) than the PJM interface (where it is optional). The lower utilization of CTS with PJM can partially be attributed to the relatively large fees that are charged to transactions between NYISO and PJM, while no substantial transmission charges or uplift charges on transactions are charged between New York and New England. The fees and uplift charges present an economic barrier to achieving potential benefits from CTS process at the PJM border.

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The cost of these fees are paid by load, regardless of whether it is charged to transactions because Market Participants (MPs) facilitating transactions must increase their bids to account for the fees.

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

This effort would seek to eliminate fees on CTS transactions at the NYISO and PJM interface, or alternatively minimize the fees applied by NY on CTS transactions. The 2022 deliverable for this effort will be Market Design Concept Proposed.

17.3 Project Justification

Charging fees for transactions introduces an unnecessary cost into the marketplace. Eliminating or minimizing transaction fees with PJM would provide a market efficiency gain by setting a Locational Based Marginal Pricing (LBMP) at the border that better reflects the actual marginal cost of energy.

18 Eliminate Offline GT Pricing (SOM)

18.1 Problem/Opportunity

The NYISO's real-time market runs a dispatch model that updates prices and generator schedules every five minutes. Currently, the dispatch model treats 10-minute gas turbines (i.e., units capable of starting up in ten minutes) as if they can follow a 5-minute signal. The MMU has observed that this structure leads to inefficiencies since 10-minute gas turbines are unable to respond in five minutes. As a result, units may receive schedules they are incapable of following. This leads to periods of under-generation, inconsistencies between scheduled transmission flows and actual flows, and inefficient prices that do not properly reflect the balance of supply and demand.

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

The 2022 deliverable for this project would be a Market Design Complete. The scope of this project would involve examining the implications of eliminating the currently existing offline GT pricing logic and presenting potential revisions to market rules to stakeholders.

18.3 Project Justification

This project could enhance market efficiency by better aligning price signals and schedules with operational needs and resource capabilities.

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19 Engaging the Demand Side

19.1 Problem / Opportunity

Engaging consumers to assume greater control of their energy use will help to balance increasing penetration of intermittent generation supporting New York State's zero emission policies. The NYISO's Demand Response programs and DER participation model offer end-users the opportunity to "supply" energy to the wholesale markets. The NYISO also offers Load Serving Entities the opportunity to offer Price-Responsive Load in the DAM. Historically, Price-Responsive Load Bids have constituted only a fraction of total Load by volume.

The NYISO desires to enhance incentives for Load Serving Entities to modulate Load in response to price. Robust participation of flexible, price–responsive Load in both DAM and RTM may provide another tool to balance the NYCA system, address resource intermittency, and support ancillary service providers.

The NYISO's effort to incent flexible Load will include coordination with utilities and the New York State Department of Public Service. Improvements to consumer metering, communication platforms, and access to retail real-time rates are likely to improve end-user load flexibility, and therefore, Load Serving Entity flexibility. These enhancements have the potential to provide end-use consumers with visibility to real-time prices and the opportunity to make informed decisions about when and how to consume energy.

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

The NYISO will work with both internal and external stakeholders to study opportunities for enhanced Load flexibility in the wholesale markets. Further engaging Load participation could allow for more robust price formation that reflects customers' willingness to pay, consistent with the marginal benefit of consuming energy. Evaluation of potential changes to Special Case Resources program to better align with the operational needs may also be considered. Opportunities identified in this effort can then be evaluated to determine whether they merit future market design enhancements. The 2022 deliverable for this project will be Study Complete.

19.3 Project Justification

The NYISO-administered markets may benefit from flexible, price-responsive Load. End-use customers that understand their consumption patterns and have access to real-time prices are enabled to modify behaviors to take advantage of dynamic pricing. Once established, end-use customer consumption patterns can allow Load Serving Entities to bid price sensitivity in the wholesale markets. Incenting Loads to modify behavior would benefit the NYISO's market design and operations, and aligns with New York State policy goals to encourage end-use customer engagement in their energy usage through Reforming the Energy Vision.

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20 Enhanced BSM Forecasts Assumptions (SOM)

20.1 Problem / Opportunity

The "Part A" and "Part B" mitigation exemption tests require the NYISO to forecast energy and capacity market revenues. These forecasts are dependent on whether proposed and existing generating units and UDRs are treated as in service (among other things) when forecasting market outcomes. Current revenue forecast inclusion rules inform the inclusion of new units and exit of existing units based upon unit costs and certain market factors that inform the likelihood of the entry and exit.

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

This project will evaluate proposed revisions to the forecast inclusion rules in order to improve the economic forecast to better reflect market conditions. The project goal for 2022 would be Market Design Concept Proposed.

20.3 Project Justification

This project is proceeding in conjunction with the ongoing Comprehensive Mitigation Review effort. This project would seek to enhance the rules for including new entry and exit of generators in the forecasting models in order to result in a more accurate BSM determination, which would improve the balance between over- and under-mitigation.

21 Grid Services from Renewable Generators – Requested by NYSERDA

21.1 Problem / Opportunity

According to two recent studies by the California Independent System Operator, National Renewable Energy Laboratory, General Electric, Avangrid Renewables, and First Solar, wind and solar resources equipped with inverter controls may be capable of providing certain grid services, including regulation, voltage control, frequency response, and ramping. In 2021, the NYISO is performing a study to evaluate the capabilities of renewable generators to provide grid services under the "Grid Services from Renewable Generators" project.

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

This project will develop market concepts based on the findings of the 2021 study. The 2022 deliverable for this project will be a Market Design Concept Proposed.

21.3 Project Justification

Significant quantities of renewable generation will be required to meet the targets in the CLCPA. These renewable generators may also have the ability to provide grid services, thereby decreasing the cost of renewable integration while decarbonizing the provision of many essential reliability services. Developing market concepts would elevate the ability of renewable generators to provide grid services, while also supporting reliable grid operations.

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22 Hybrid Aggregation Model

22.1 Problem / Opportunity

The NYISO's market rules do not currently allow an ESR and another Generator to be co-located at a single point of interconnection and share the same point identifier (PTID). Instead, where an ESR and another Generator are co-located behind the same point of interconnection, each resource type must be separately metered and have its own PTID.

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

This project is distinct from the DER and ESR Integration initiatives, but it will build on work completed as part of those initiatives. This project is a continuation of the 2021 Market Design Complete effort. The 2022 project deliverable is Functional Requirements.

22.3 Project Justification

State and Federal initiatives such as Renewable Energy Credit (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. The 2020 deliverable developed a market participation model(s) for front-of-the-meter generators plus storage acting as two distinct resources with a shared injection limit that better align the NYISO's market procurement with state and federal efforts to integrate more clean energy into the grid. The 2022 deliverable will establish the functional requirements necessary to implement a new market participation model to improve grid flexibility and resilience by enabling new resource types to provide their full capabilities.

23 Improved Duct-Firing Cycle Modeling (SOM)

23.1 Problem/Opportunity

Combined-cycle generators with duct-firing capability are able to offer such capability into the NYISO's RTM as a portion of their dispatchable range. However, a generator's duct-firing capacity is generally not capable of following a 5-minute dispatch or a 6-second regulation signal. Many generators with duct-firing capability do not offer it into the RTM, while others may self-schedule this capacity inflexibly. Further, a generator may not be able to provide the expected energy during a reserve pickup event when dispatched into its duct-burning range. Enhancing the scheduling of duct-fired capability into the RTM would more accurately reflect the operational characteristics of combined-cycle generators. Additionally, this enhanced scheduling capability could increase the availability of operating reserves and regulation service associated with such capability.

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

The 2022 project deliverable would be Market Design Complete. The study would evaluate the market enhancements that would be required for a combined-cycle generator to reflect its operating characteristics in the duct-burning range as well as the benefits of this functionality.

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23.3 Project Justification

The project would seek to evaluate the enhancements to the scheduling of a generator's duct-firing range capacity that would provide more flexibility for a unit to respond to 5-minute dispatch signals and increase the availability of operating reserves.

24 Improving Capacity Accreditation (SOM)

24.1 Problem / Opportunity

The resource mix is evolving and the NYISO's markets need to continue to accurately value resources for the attributes they provide in meeting system reliability. Specifically for the Installed Capacity market, a review of resource adequacy concepts including the determination of capacity requirements as well as resources' contribution to reliability is needed.

As the resource mix transitions to one more dependent on resources that rely on the sun or wind to produce energy and/or resources with energy limitations, each resources' contribution to reliability also evolves. For example, as more solar generation is added to the grid the peak load shifts to non-daylight hours therefore making it less valuable to resource adequacy.

The resource adequacy contribution of all resources must be reviewed as the diversity and performance of the resource mix changes, and must be accurately reflected in the Installed Capacity market and its processes.

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

The objective for this project would be to expand on the principles established with the Expanding Capacity Eligibility, Tailored Availability Metric, and Capacity Valuation projects to apply to all resources. The deliverable for 2022 would be a Market Design Concept Proposed.

24.3 Project Justification

Properly valuing resources contribution to maintaining grid reliability, known as capacity accreditation, will provide the signals necessary to maintain a diverse resource mix. Enhancing these capacity accreditation measures will allows the Installed Capacity market to continue to support grid reliability as the transition of the resource mix unfolds.

25 Internal Controllable Lines

25.1 Problem / Opportunity

As of April 2021, there are no internal controllable lines in operation within the NYCA. Although NYISO has high-level rules to allow Internal Unforced Capacity Deliverability Rights (UDRs) to participate within the ICAP Market, these rules also have gaps including, but not limited to, the

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determination of requirements for providing capacity on the Internal UDR and the determination of obligations for the Internal UDR that sells capacity.

Additionally, market rules for the scheduling and pricing of internal controllable lines within the Energy Market do not exist.

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

The development of market rules for internal controllable lines that will support outcomes in the best interests of all stakeholders is needed. This project would begin with developing market rules for the scheduling and pricing of internal controllable lines within the Energy Market. Based on these newly developed rules, the NYISO would evaluate and, if necessary revise, the existing ICAP market rules for Internal UDRs to ensure compatibility with the expected operation of internal controllable lines in the Energy Market. These newly-developed rules must also consider how internal controllable lines could be used to support state and local programs.

This project will proceed to a Market Design Complete on a point-to-point internal controllable line and complete an assessment on the feasibility of implementing a multi-terminal internal controllable line, and at a minimum present the full set of market rules to the Business Issues Committee in 2022. This would allow the NYISO to proceed with a market design on a point-to-point internal controllable lines if it is determined that the multi-terminal line problem is extremely complicated, but allow the NYISO to complete a market design for both point-to-point and multi-terminal internal controllable lines if no issues are found.

25.3 Project Justification

State and local initiatives such as Tier 4 REC procurements and NYC Local Law 97 provide incentives for developers to deliver renewable generation into congested areas using HVDC lines. The 2022 deliverable will create a new market participation rules for the operation of internal controllable lines.

26 Lines in Series Constraint Pricing

26.1 Problem/Opportunity

The NYISO developed a process to determine and incorporate transmission facilities into the market models. Following the incorporation of new facilities, the NYISO identified that some of the new facilities consisted of line segments that make up the same transmission line. These line segments are known as being “in-series.” It was observed in real time that some of these line segments were binding and being priced via the existing graduated transmission demand curve mechanism due to a lack of available physical resources capable of providing the needed relief. Other line segments that are in-series with the binding facility were observed to be binding simultaneously. Therefore, they were also being priced by the graduated transmission demand curve mechanism.

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The graduated transmission demand curve mechanism as currently implemented applies needed relief from the demand curve to an individual facility in an isolated fashion. Therefore, any relief provided by the demand curve applies only to a particular constrained line segment without consideration of the corresponding impacts that such relief may have on other, lesser overloaded line segments. In contrast, if a physical resource were available to provide relief under similar conditions, the market software would account for the relief available from the physical resource when assessing multiple constraints on a single line segment, as well as the ability of the physical resource to simultaneously provide relief to in-series line segments.

As a result, in September 2019, the NYISO removed a number of in-series line segments from the market model so that the normally most limiting line segment among the segments in-series is modeled in the market. This solution reduced the impact of multiple constraints in-series from being priced by the graduated transmission demand curve mechanism simultaneously, but this method is not as dynamic or robust as allowing the relief provided by the graduated transmission demand curve to be accounted for on other facilities.

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

The 2022 project deliverable would be a Study Complete that evaluates the feasibility for a more dynamic solution. However, the design and implementation of this project will be dependent on the Constraint Transmission Shortage Pricing project.

26.3 Project Justification

A more dynamic solution to the current methodology for addressing the application of the graduated transmission demand curve mechanism to in-series line segments could enable all of the line facilities that are in-series to be modeled in the market model while ensuring appropriate and efficient pricing outcomes.

27 Locational Marginal Pricing of Capacity (SOM)

27.1 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 could lower overall costs of satisfying capacity needs.

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

The objective for this project would be to devise 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 2022 would be a Market Design Concept Proposed.

27.3 Project Justification

This proposal could reduce the costs of satisfying resource adequacy needs, facilitate more efficient investment and retirement decisions, and be more adaptable to changes in resource mix

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(*i.e.*, increasing penetration of wind, solar, and energy storage). It may also lead to capacity pricing outcomes that are difficult to anticipate and a market that is administratively complex.

28 Long Island Reserve Constraint Pricing (SOM)

28.1 Problem/Opportunity

The Day-Ahead Market (DAM) and Real-Time Market (RTM) schedule resources to satisfy reserve requirements, including specific requirements for 10-minute spinning reserves, 10-minute total reserves, and 30-minute total reserves on Long Island. However, reserve providers on Long Island are currently paid based on the clearing prices for the larger Southeastern New York (SENY) reserve region (Load Zones G-K).

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

The project scope would include conduct of a study to further evaluate the current compensation rules for Long Island reserve providers, and whether revisions thereto may be reasonable and provide for improved efficiency in pricing outcomes and performance incentives for Long Island reserve providers. The 2022 project deliverable would be a Market Design Complete.

28.3 Project Justification

The project would seek to evaluate whether revisions to the current compensation rules for Long Island reserve providers may better reflect the value of reserve capability on Long Island.

29 Monthly Demand Curves (SOM)

29.1 Problem / Opportunity

The capacity market is divided into summer and winter Capability Periods of six months. Within each Capability Period, the capacity requirements and Demand Curves remain constant, although the reliability value of resources is much greater in high-demand months (e.g., July) than in low-demand months (e.g., October). The constant Demand Curves ensures that resource owners have an incentive to coordinate their planned outages through the NYISO outage scheduling process throughout the year; however, it may lead to inefficient incentives for resources that are not consistently available during all 12 months of the year. There may be value in setting the Demand Curves in a manner that allocates the annual net cost of new entry value in proportion to the marginal reliability value of capacity across the 12 months of the year.

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

This project will evaluate the implications of translating the annual net cost of new entry value into monthly capacity Demand Curves. Findings and resulting suggestions will be reported and discussed with stakeholders. The project deliverable for 2022 will be Issue Discovery.

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29.3 Project Justification

This effort would concentrate incentives for resources to sell capacity into New York during the months when the reliability value of capacity is greatest. This change would also enable flexibility in the ability to allocate incentives to different months, as the evolution of the New York generating fleet may drive changes in which months carry the peak demand.

30 More Granular Operating Reserves (SOM)

30.1 Problem/Opportunity

In 2020, the NYISO proposed enhancements to implement reserve requirements for certain load pockets within New York City to provide location-specific market signals consistent with reliability needs. In 2021, as part of the Reserve Enhancements for Constrained Areas study, the NYISO investigated the feasibility of modeling local reserve requirements in New York City load pockets based on available transmission capability. These new requirements would account for the flexibility of the grid to respond to system needs by utilizing the transmission system to import capacity into generation-constrained regions. Additionally, load pocket reserves could provide further incentives for resources to locate in important, supply constrained areas of the NYCA.

As the potential implementation of load pocket reserve requirements is considered, a dynamic reserve procurement methodology that does not exist today is an important pre-requisite to improve market efficiency, better aligning market outcomes with how the power system is operated, and avoid the potential for unnecessary price volatility.

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

The 2022 project deliverable will be Market Design Concept Proposed. The More Granular Operation Reserves design and implementation would be dependent on the market design for Dynamic Reserves in 2022.

30.3 Project Justification

The MMU has recommended that the NYISO "[m]odel local reserve requirements in New York City load pockets [Recommendation 2017-1]." This effort has also been identified as beneficial in both the 2018 Performance Assurance Management Response and the 2017 Integrating Public Policy Market Assessment Report. Additionally, this effort will reflect the locational reliability value provided by resources in certain load pockets within New York City.

31 Multi-Level References

31.1 Problem / Opportunity

This project supports the gas electric system coordination by providing more sophisticated and efficient methods for MPs and the NYISO to model generator fuel availability, fuel costs, and operational situations.

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The enhanced functionality will also allow the MMU and Market Mitigation and Analysis Department to more effectively implement tariff requirements, allow greater flexibility in creation of references to meet market conditions, and provide additional transparency to MPs. This will allow for more accurate reference levels for non-traditional generation (*e.g.*, DER, CSR, Hybrid Storage resources).

31.2 Objective(s) & Anticipated Deliverable(s)

This project will implement several functional enhancements to the Reference Level Software (RLS) web application as well as the Reference Calculation Engine. Some functional enhancements include allowing multiple fuels for a single reference and cost adjustment reports. The project deliverable for 2022 will be completion of Functional Requirements.

31.3 Project Justification

The functional enhancements will allow MMA analysts a greater ability to quickly and accurately identify potential problems with reference levels, which could subsequently lead to erroneous mitigations potentially affecting both LBMP and uplift.

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

32.1 Problem / Opportunity

The NYISO currently conducts Centralized Transmission Congestion Contracts (TCC) Auctions twice each year. In each of those auctions longer duration TCCs (six-month, one-year, and/or two-year) are available for purchase. However, TCCs covering periods shorter than six months are not available in those auctions. Instead, MPs wishing to purchase shorter-term TCCs must do so in the Reconfiguration Auctions, which are held each month. Reconfiguration Auctions may be conducted as either single month auctions or Balance-of-Period (BoP) Auctions. BoP Auctions encompass all remaining months of the applicable Capability Period.

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 MPs 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 build upon the 2020 and 2021 project efforts related to the development of software and rule/procedure revisions to permit the NYISO to reserve a portion of available system transfer capability, which it would then release into the BoP Auctions. Such functionality would permit auction participants to purchase additional shorter-term TCCs in the BoP Auctions.

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

This project is intended to build on the efforts undertaken in 2020 and 2021 to develop market rule changes to accommodate the potential for reserving a portion of otherwise available transmission capacity for release in the BoP Auctions. The project will complete the software changes to the TCC Automated Market System and other associated systems needed to support the market changes in 2022, and the deliverable will be Development Complete.

32.3 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.

The proposed solution is intended to:

- Address stakeholder requests for such enhancements to the current TCC auction design, as auction participants have consistently indicated interest in reserving transfer capability for release in BoP 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.

33 Storage as Transmission – Requested by NYSERDA

33.1 Problem / Opportunity

The unique characteristics of energy storage allow these assets to provide many potential services to grid operators. During normal operation, storage often has very positive impacts on transmission systems by relieving peak demand through injections and reducing congestion through off-peak charging to bring power where it will be needed later. In some instances, storage used exclusively as a transmission asset may be able to provide a faster and cheaper option for providing the same or similar services as traditional alternatives, while providing valuable optionality to scale or augment project size or operation in the future. Current market rules treat storage as a Generator, and therefore as a resource. There is currently no pathway by which a storage project could be treated as providing a transmission function and therefore be compensated as transmission. Market rules for such projects would need to consider what impact market participation may have to avoid double payment while allowing for flexibility and reduced revenue requirements through transmission rates. The project should also consider whether modifications to the interconnection and/or transmission expansion procedures would be required to accommodate such projects. Finally, the project should consider whether it is feasible for storage to provide a transmission function, and if so, whether compensation as a transmission asset in transmission rates is appropriate.

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

This project has two primary components. The first component would have the NYISO develop a process to consider whether storage could perform a transmission function and be operated as

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as such, and if so, whether it is appropriate to provide compensation for storage in transmission rates. If such treatment is feasible, the second component would have the NYISO develop rules and methods for operating the storage as a transmission asset, taking multi-use and double payment issues into consideration, as well as the various use cases. These components are related and may depend on one another.

This process should include discussions with developers in this space, review of the literature from FERC on the issue, and consideration of similar projects in other jurisdictions. The deliverable of this project would be a report evaluating the feasibility of storage providing a transmission function and market rules for evaluating and operating storage as a transmission asset. The 2022 deliverable for this project would be Market Design Concept Proposed.

33.3 Project Justification

Transmission upgrades may be necessary to ensure delivery of clean energy across New York's electric grid. However, transmission development is often difficult, expensive, and on very extended time frames. If it is feasible for storage to provide a transmission function, utilizing storage as transmission could provide another alternative for providing these services on a shorter timescale and potentially at lower cost, while preserving valuable optionality in the process. Such treatment would provide another path for storage to be integrated into the New York State power system.

34 Time Differentiated TCCs – Requested by Calpine and Vitol

34.1 Problem / Opportunity

The project seeks to disaggregate the TCC product from its current 24-hour time span to include additional, more granular products covering shorter timeframes. This enhancement, which is a feature requested by certain Market Participants (MPs), is intended to improve the commercial function and forward congestion price transparency. Currently, the availability of only a 24-hour product may limit the effectiveness in serving as an efficient forward hedging mechanism against congestion for certain MPs' interests because it does not provide forward congestion price signals from TCC auctions that distinguish between the congestion patterns than can occur during different periods of the day or week. MPs could utilize more granular TCC products to tailor portfolios to better hedge congestion costs during different periods of the day or week. This additional flexibility could benefit MPs under current grid conditions, as well as future grid topologies with increased levels of intermittent resources, which have notable variations in output in daytime hours versus nighttime hours. Additionally, defining more granular TCCs may make other market design improvements possible.

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

This project's deliverable would be a Market Design Complete building upon the 2021 project efforts to develop a Market Design Concept Proposed and would include working with stakeholders to finalize market rule changes needed to facilitate the creation of TCC products that apply to different periods of time and the market design proposed in 2021.

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Due to the potential increased complexity of multi-period granular TCC auctions, the implementation of more granular TCC products may depend on the automation of the Existing Transmission Capacity for Native Load (ETCNL) feasibility analysis process and the automation of an inventory system to calculate the remaining feasible ETCNL and Original Residual TCCs.

34.3 Project Justification

Breaking out the TCC product into time differentiated products may: (1) improve the commercial functionality of TCCs to provide tailored congestion hedges for all MPs, including intermittent generation; (2) reduce the cost of congestion hedging for MPs; (3) improve forward congestion price signals from TCC auctions to distinguish between time periods where congestion patterns can vary; and (4) permit other market design improvements.

35 Transmission Security in the ICAP Market

35.1 Problem / Opportunity

The resource mix is evolving and the NYISO's markets need to continue to accurately value resources for the attributes they provide in meeting system reliability. Specifically for the ICAP market, a review of reliability criteria used for the determination of minimum installed capacity requirements, as well as each resource's contribution to reliability, is needed.

As the resource mix transitions to one more dependent on resources that rely on the sun or wind to produce energy and/or resources with energy limitations, each resources' contribution to reliability also evolves. Including Transmission Security more explicitly in the ICAP market can help send price signals to incent resources to meet both Transmission Security and Resource Adequacy requirements and avoid out of market constructs to maintain reliability.

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

The objective for this project would be to evaluate how to incorporate the impact the resource mix has on Transmission Security more holistically into the Installed Capacity market. The deliverable for 2022 would be Deployment to implement any approved changes.

35.3 Project Justification

The NYISO believes that expanding the measures of reliability used to establish installed capacity requirements by including Transmission Security could be a key to the future success of the Installed Capacity market to better facilitate the transition of the resource mix.

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36 Capacity Transfer Rights for Internal Transmission Upgrades (SOM)

36.1 Problem / Opportunity

Granting internal capacity deliverability rights for transmission between zones would incentivize merchant investment in supply resources, demand resources, and transmission facilities, since right-holders would not be limited to a cost-of-service rate.

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

This project would create a new process for granting capacity transfer rights based on internal transmission upgrades that increase transfer capability into areas with Locational Minimum Installed Capacity Requirements that can be offered into the NYISO's ICAP market. The deliverable for 2022 would be Market Design Concept Proposed.

36.3 Project Justification

Deliverability constraints create substantial barriers to entry for competitive new suppliers and imports, which reduces competition in the market. Transfer rights would increase market efficiency by creating a dynamic framework for incorporating system upgrade needs into capacity price signals.

37 Carbon Pricing

37.1 Problem / Opportunity

New York State 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 pricing 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, a complete Market Design proposal was vetted through the NYISO's working group process. 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.

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

The next phase of this project is anticipated to be software development and implementation. If New York State supports moving forward with carbon pricing, the NYISO will seek stakeholder and Board approval to submit the proposed carbon pricing tariff revisions to FERC under Section 205 of the Federal Power Act. Upon FERC acceptance of the tariff revisions, NYISO intends to begin software development.

37.3 Project Justification

Harmonizing state policies and wholesale market design will provide 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 and maintaining grid reliability.

38 Enhanced PAR Modeling (SOM)

38.1 Problem / Opportunity

The MMU observed that variations in loop flows and in flows across certain Phase Angle Regulator (PAR)-controlled lines were among the leading causes of transient price spikes in 2015 and 2016. Discrepancies between modeled and actual loop flows and modeled and actual flows across PAR-controlled lines lead to transient shortages where generation must be ramped up to account for scheduling discrepancies and flexible generators cannot ramp quickly enough to compensate for changes. This subsequently leads to spikes in shadow costs or LBMPs. Mechanisms incorporated into the market solution may help to alleviate these discrepancies between modeled and actual loop flows and flows on PAR-controlled lines.

Adjusting the last telemetered flows on fixed scheduled PARs and using these adjusted values as inputs to RTC and RTD to account for variations in generation, load, interchange, and the operation of other PARs that are located in the NYISO footprint can more accurately model the actual power PAR flows realized. In addition, developing a mechanism to forecast deviations between telemetered and actual loop flows and telemetered and actual fixed PAR flows and incorporating these adjustments within RTC and RTD can more accurately reflect real-time system conditions, resulting in more efficient prices and schedules and reducing unnecessary price spikes. This initiative also involves evaluating improvements to the modeling of day-ahead loop flows and flows on PAR controlled lines.

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

The scope of this study will include discussion of the current modeling of loop flows and fixed PAR schedules in the market software. The NYISO will also review potential improvements to PAR modeling as part of this study. The 2022 deliverable for this effort would be Study Complete.

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38.3 Project Justification

This project could lead to more efficient modeling of loop flows and fixed-schedule PAR flows, which has the potential to result in more efficient scheduling of New York Control Area (NYCA) resources; in addition, this effort has the potential to enhance price transparency by reducing unnecessary price volatility. This project may improve convergence between RTC and RTD, as well as between the DAM and RTM.

39 Long Island PAR Optimization and Financial Rights (SOM)

39.1 Problem / Opportunity

Scheduling of PAR-controlled lines between New York City and Long Island (*i.e.*, the 901 and 903 lines) is not currently optimized in the NYISO's market software. These lines are scheduled according to the terms of long-standing contracts that predate open access transmission tariffs and the NYISO's markets, which can result in inefficient power flows. Significant efficiency gains may be achieved by improving the operation of these lines.

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

The NYISO will investigate the creation of a financial settlement mechanism to compensate the party that would be giving up some of the benefits from the current operation. Completion of this study will necessitate discussions with PSEG-Long Island and Con Edison. The NYISO should work with these parties to explore potential changes to wheeling agreements or to identify how the agreements can be accommodated within the markets more efficiently. The 2022 deliverable for this effort would be Study Complete.

In later project phases, the creation of a new financial product to allow the owner of the PARs to benefit from PAR optimization will include an internal determination of the necessary modification/ creation of NYISO credit, settlement, and other processes to facilitate a new financial right and the Long Island PAR optimization. The market software/ processes will also need to be modified to optimize the Long Island PARs and create the new financial product.

39.3 Project Justification

This solution will explore mechanisms to minimize total production cost by ensuring power flows in the economic direction most of the time in the DAM. Optimizing the Long Island PARs and creating a financial right to compensate the affected transmission owners has been cited by the MMU as a recommendation for improvement.

40 Review of Real-Time Market Structure (SOM)

40.1 Problem / Opportunity

The NYISO's markets and grid are evolving as the resource mix changes due to market influences and public policy along with changing load patterns due to increase electrification and behind-the-meter resources. This project will require the NYISO's real-time markets to predict the load

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shape for longer periods and be more reliant on the strategic use of energy storage resources to manage multiple load peaks throughout the day. All of these factors will result in an increasingly complex real-time market to ensure that demand is reliably met with the least cost solution.

Currently, the NYISO's Real-time Market is conducted using RTC and RTD programs. The RTC and RTD programs optimize resource schedules and prices based on a 2.5 and 1 hour look-ahead periods, respectively. Even under current market conditions, these programs can produce divergent prices and schedules. The NYISO studied the drivers of these divergences in 2018. The study concluded that there were incremental changes that could improve the convergence between RTC and RTD marginally.

Due to the increased complexity of the real-time market as the grid evolves and the limited improvements available to the current RTC and RTD, a larger effort is required to evaluate the whole structure of the Real-Time Market to ensure that it is able to meet the complex needs of the grid in the future.

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

The NYISO will consider a real-time market structure that is capable of supporting market and grid operations in a future with more intermittent resources, higher forecast uncertainty, and greater reliance on small distributed resources. While considering the real-time market structure changes, the NYISO will also evaluate and provide recommendations to address:

- Improvements to 15-minute/CTS Scheduling
- Improving RTC/RTD Coordination (SOM-2012-13)
- Considering the length of the RTD/RTC Look Ahead
- Possibly modifying calculations for LBMPs/application of Uplift Payments
- Including Quick Start Commitments in RTD
- Enhancing RTD-CAMs

The 2022 deliverable for this effort is Study Complete.

40.3 Project Justification

The NYISO must prepare for significant grid changes that were not considered when RTC and RTD were designed. Failure to carefully review the fundamental structure of the RTM software could eventually lead to reliability concerns such as failing to appropriately incentivize the necessary resource capabilities to address intermittent volatility, and increase less efficient and potentially more costly out of market actions.

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