2021 Approved Market Projects

Product and Project Management

January 19, 2021

This document represents potential 2021 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.

Table of Contents

TABLE OF CONTENTS 2

INTRODUCTION 4

BUSINESS AND FINANCE PRODUCTS 6

1 TCC CREDIT ENHANCEMENTS 6

CAPACITY MARKET PRODUCTS 6

2 BSM RENEWABLES EXEMPTION STUDY 6

3 CRIS TRACKING 7

4 DEMAND CURVE RESET 8

5 TAILORED AVAILABILITY METRIC 9

6 COMPREHENSIVE MITIGATION REVIEW 9

7 EXPANDING PEAK HOUR FORECASTS 10

8 CRIS EXPIRATION EVALUATION – REQUESTED BY NYS UTILITY INTERVENTION UNIT 11

DER PRODUCTS 12

9 DER PARTICIPATION MODEL 12

10 EXPANDING CAPACITY ELIGIBILITY 14

11 ENGAGING THE DEMAND SIDE 14

12 CLIMATE CHANGE AND GRID IN TRANSITION 15

13 HYBRID CO-LOCATED MODEL 17

14 HYBRID AGGREGATION MODEL 17

15 ONGOING TSO AND DSO COORDINATION 18

ENERGY MARKET PRODUCTS 18

16 ANCILLARY SERVICES SHORTAGE PRICING (SOM) 18

17 RESERVES FOR RESOURCE FLEXIBILITY 19

18 CARBON PRICING 20

19 CONSTRAINT SPECIFIC TRANSMISSION SHORTAGE PRICING (SOM) 20

20 LARGE SCALE SOLAR ON DISPATCH 21

21 RESERVE ENHANCEMENTS FOR CONSTRAINED AREAS (SOM) 22

22 GRID SERVICES FROM RENEWABLE GENERATORS - REQUESTED BY NYSERDA 23

TCC PRODUCTS 24

23 RESERVING CAPACITY FOR BALANCE-OF-PERIOD (BOP) AUCTIONS 24

24 TIME DIFFERENTIATED TCCS – REQUESTED BY CALPINE & VITOL 25

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.

Item	Project Name	Product Area	Project Type
1	TCC Credit Enhancements	Business and Finance Products	Prioritize
2	BSM Renewables Exemption Study	Capacity Market Products	Mandatory
3	CRIS Tracking	Capacity Market Products	Mandatory
4	Demand Curve Reset	Capacity Market Products	Mandatory
5	Tailored Availability Metric	Capacity Market Products	Continuing
6	Comprehensive Mitigation Review	Capacity Market Products	Continuing
7	Expanding Peak Hour Forecasts	Capacity Market Products	Prioritize
8	CRIS Expiration Evaluation – Requested by NYS Utility Intervention Unit	Capacity Market Products	Prioritize
9	DER Participation Model	DER Products	Mandatory
10	Expanding Capacity Eligibility	DER Products	Mandatory
11	Engaging the Demand Side	DER Products	Prioritize
12	Climate Change and Grid in Transition	DER Products	Continuing
13	Hybrid Co-Located Model	DER Products	Continuing
14	Hybrid Aggregation Model	DER Products	Continuing
15	Ongoing TSO and DSO Coordination	DER Products	Continuing
16	Ancillary Services Shortage Pricing (SOM)	Energy Market Products	Continuing
17	Reserves for Resource Flexibility	Energy Market Products	Continuing
18	Carbon Pricing	Energy Market Products	Continuing
19	Constraint Specific Transmission Shortage Pricing (SOM)	Energy Market Products	Prioritize
20	Large Scale Solar on Dispatch	Energy Market Products	Prioritize
21	Reserve Enhancement for Constrained Areas (SOM)	Energy Market Products	Prioritize
22	Grid Services from Renewable Generators - Requested by NYSERDA	Energy Market Products	Prioritize
23	Reserving Capacity for TCC Balance-of-Period (BOP) Auctions	TCC Products	Prioritize
24	Time Differentiated TCCs– Requested by Calpine & Vitol	TCC Products	Prioritize

Business and Finance Products

1 TCC Credit Enhancements

1.1 Problem / Opportunity

In 2019, the NYISO reviewed the Report of the Independent Consultants on the GreenHat Default in PJM's Financial Transmission Rights (FTR) market. The NYISO reviewed the report to understand the background, issues and recommendations for the PJM market. Moreover, the NYISO conducted a comprehensive evaluation of its current TCC credit policy and auction practices. As a result of this internal review, potential enhancements have been identified.

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

NYISO staff recommends pursuing the following TCC credit policy enhancements:

- Update the market-clearing price for the second year of a two-year TCC earlier than current policy.
- Either hold the higher of the payment obligation or the holding requirement on the second year of a two-year TCC, or require payment of both years up front.
- Utilize the Balance of Period auction prices to calculate credit requirements for TCCs currently only subject to the historical congestion rent credit requirement.

The anticipated deliverable of this project includes:

- Q4 2021 Deployment

1.3 Project Justification

This project will enhance credit policy to further mitigate potential risk in the NYISO TCC Market.

Capacity Market Products

2 BSM Renewables Exemption Study

2.1 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 qualifying Exempt Renewable Technology 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.

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

As part of the NYISO's implementation of its BSM Rules found in Attachment H of the Services Tariff, the NYISO must periodically review and determine which renewable technologies qualify to be "Exempt Renewable Technology." The Services Tariff requires this review to be completed every four years during the installed capacity (ICAP) Demand Curve Reset Filing Year to identify renewable technologies that have been shown to have limited or no incentive or ability to suppress capacity prices.

Under Section 23.4.5.7.13.2.1(b), for each candidate renewable technology evaluated, the NYISO will complete its study to 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 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. The results of this review will be filed within 60 days of FERC's acceptance of the ICAP Demand Curves. If the review determines that changes to the tariff definition of "Exempt Renewable Technology" are needed, the NYISO would propose them in this filing.

2.3 Project Justification

This review is mandated by Section 23.4.5.7.13.2 of the Services Tariff.

3 CRIS Tracking

3.1 Problem / Opportunity

The NYISO developed a group of interrelated proposals as part of the 2019 Class Year/Interconnection Queue Redesign project. The proposals aimed 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 this project, the NYISO proposed more stringent CRIS expiration rules that have been accepted by FERC. More stringent CRIS rules may change the frequency and level to which CRIS-inactivity is tracked and CRIS rights are expired. The NYISO needs to be able to administer the new CRIS expiration rules.

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

This 2021 project has a Q4 Development Complete commitment, and will design a new automated process for tracking resource's ICAP market participation on a rolling historic basis, consistent with new CRIS expiration rules, approved in the tariff as part of the larger Class Year/Interconnection Queue Redesign project.

3.3 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 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.

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 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 capital and financial costs assumed in the construction and operation of that unit, along with an estimate of the projected profit earned in the Energy and Ancillary Service markets, to determine which unit has the "lowest fixed costs and highest variable costs among all other units' technology that are economically viable." The unit that satisfies this requirement is then used to determine the underlying parameters for each ICAP Demand Curve over the next four Capability Years.

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 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).

For 2021, the project would complete the DCR study by supporting any required regulatory activities and filings related to the filing required by November 30, 2020 addressing the results of the DCR, as well as preparation for the 2021/2022 Capability Year ICAP auctions and subsequent annual updates that will utilize the new parameters determined by the DCR.

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 Tailored Availability Metric

5.1 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.

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

The objective of this project is to implement the market design changes approved by the BIC and MC in April 2020. The 2021 deliverable is Deployment consistent with approved modifications to these rules.

5.3 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. These rule changes will be filed at FERC in 2020, resulting in a compliance obligation for 2021.

6 Comprehensive Mitigation Review

6.1 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.

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

The NYISO will continue a comprehensive review to modify its Installed Capacity market framework in a balanced manner that (i) preserves competitive price signals and economically efficient market outcomes required to maintain system reliability, and (ii) enables the Climate Leadership and Community Protection Act (CLCPA) goals.

The 2020 objectives and deliverables for this project include discussions with stakeholders on the development of the MMU's proposed enhancements to the Part A Exemption Test for state-sponsored "Public Policy Resources" as an initial phase. Following the Part A Exemption Test enhancements, several other concepts including Available Capacity Transfer (ACT) would be explored dependent on stakeholder feedback. The NYISO will then continue to explore additional modifications to the NYISO's Installed Capacity market and BSM rules, possibly including the exploration of the Multiple Value Pricing (MVP) concept depending on additional stakeholder feedback.

The goals for 2021 extend to completing the market design for the additional modifications, as appropriate, and implementing any additional software changes that would facilitate the approved 2020 BSM rules.

6.3 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 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. 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, while having a meaningful impact towards the comprehensive review of the NYISO's Installed Capacity market.

7 Expanding Peak Hour Forecasts

7.1 Problem / Opportunity

The NYCA peak load hour is currently defined as the single hour within a Capability Year with the highest measured system load. More recently, a proposal to limit the peak hour to weekdays during the months of July and August is being considered by stakeholders. The peak load is weather normalized, and a peak load forecast for the following year is generated by the NYISO in conjunction with the Transmission Owners. This peak load forecast is used for the IRM study and the ICAP market forecast, and determines the total load obligation for each Transmission District.

Current practice dictates that the Transmission Owners share out their capacity obligation to their Load Serving Entities (LSEs) based on the measured share of load consumed by each LSE during the NYCA peak load hour. Using multiple peak and near-peak load hours (e.g. the top five or top ten load hours) to share our obligations within a Transmission District may improve this process and create more robustly defined and consistent LSE shares. Likewise, in the distribution network, where LSEs use retail customer measures of peak period(s) usage that align with those used by the NYISO to assign capacity cost to their customers, it is imperative that those measurements be representative of the customers' capacity cost causation. Basing any given customer's capacity cost responsibility on metered demand during a single hour or day can place too much weight on an idiosyncratic, random event and not accurately measure the true impact

that customer's use has on the system's capacity need. Using the peaks from multiple high load days would be more stable, and more reflective of long run cost causation.

Currently, the NYCA peak hour is determined using net hourly load as measured on the system. However, it is worth considering whether peak load should be based entirely or in part on gross load, which may become more important as demand response and distributed energy resources penetration increases.

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

This section describes what the project should do to address the business problem or opportunity. It summarizes the approach and desired outcome, and may build on project work in a prior year. It includes the expected deliverables to satisfy the project objective and is tied to the proposed project milestone. The NYISO will work with the stakeholder(s) proposing a project to formulate what may be feasibly delivered in a particular time frame based on resourcing estimated for the effort.

This project will investigate these issues pertaining to capacity obligation shares over multiple peak-type hours and use of gross rather than measured load. Findings and resulting suggestions will be reported and discussed with stakeholders. The project deliverable will be Market Design Concept Proposed.

7.3 Project Justification

This section describes why the candidate project should be considered including what the benefits are and associated risks if we do not complete the project. Examples would include addressing a FERC Order, Tariff requirements, automate manual processes, mitigate risk, market enhancements, and State of the Market recommendations.

Many other jurisdictions consider more than a single hour when determining peak obligations for demand and resources. Given the upcoming changes planned for New York's grid, ensuring the determination of peak load hours used for capacity allocations is robust will be important for maintaining reliability and fair and equitable allocation of costs.

8 CRIS Expiration Evaluation – Requested by NYS Utility Intervention Unit

8.1 Problem/Opportunity

As part of the Class Year Redesign project, NYISO identified proposals providing for more stringent CRIS expiration rules. Some of those were implemented as part of that initiative, while others were deferred for later consideration. Although the new CRIS rules are 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 completely address the treatment of CRIS status for inactive and retired facilities. For example,

those new rules did 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 OATT.

The current tariff provisions may allow facilities to retain CRIS when it should be terminated to facilitate 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 may have benefitted from increased capacity and/or decreased bottled generation created by ratepayer investments in transmission capability, where such transmission capability is modeled in the base case for the facility in its CRIS deliverability evaluation. Despite potentially benefitting from such transmission capability through lower cost upgrades required for the facility to be deliverable, such facility is able to retain all CRIS obtained for up to three years after it retires, rather than immediately making at least the portion facilitated by ratepayer investments available to other new entrants.

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

Investigate opportunities to make the rules addressing CRIS retention more stringent in cases where CRIS is not fully utilized and propose corresponding modifications to the CRIS retention rules. This investigation should build on the work initiated as part of the Class Year Redesign Project and should consider various circumstances in which CRIS has been granted and/or awarded.

The milestone for 2021 is a Market Design Concept Proposed. Implementation consistent with approved modifications to the CRIS expiration rules would be considered depending on the timing of the approval.

8.3 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 ensure an increase in the capacity deliverability headroom and potentially lower the cost of market entry to future facilities seeking to participate in the ICAP market.

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 was Functional Requirements. In 2020, the NYISO plans to complete software design - consistent with the FERC-accepted tariff. In 2021, the NYISO will work on development of the required software including deployment of SD-WAN (Software-defined Wide Area Network), an enabling technology used for telemetry that is required for DER. Once SD-WAN is implemented; it could potentially be used for telemetry by Market Participants, including Demand-Side Ancillary Services Program (DSASP) resources and Energy Storage Resources (ESR). Completing software development of remaining components, testing, market trials, and deployment to the production environment are planned for 2022.

This project's expected benefits are to allow the NYISO to cultivate a market that is accessible and competitive for DER, in line with Reforming the Energy Vision (REV) state policy goals.

9.3 Project Justification

Throughout 2018 and 2019, the NYISO worked through concepts, proposals, and Tariff edits to enhance its market rules for DER participation in NYISO's ICAP, 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 Program 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 will become effective in 2021. The NYISO's Day-Ahead Demand Response Program and Demand Side Ancillary Services Program will be terminated when the DER participation model becomes effective.

This project has many facets that will 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. These changes more closely align the bidding and performance measurements for those resources mentioned with the rule sets for generators.

The software development required to support the functional requirements includes new software and/or modifications to existing software that supports DER eligibility and enrollment, aggregations, bidding and scheduling, performance obligations, metering and telemetry requirements, measurement and verification of baselines and performance, modeling, settlements, ICAP 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, and changes to the payment structure of existing demand response Capacity suppliers (SCRs) to enable this effort.

10 Expanding Capacity Eligibility

10.1 Problem / Opportunity

The NYISO recognizes that resources of various durations provide different reliability benefits to the grid. The NYISO anticipates that shorter duration resources will increasingly enter the markets in the upcoming years, and conducted a study of the reliability benefit of duration limited resources and subsequently proposed rules to allow these shorter duration resources to participate in the markets and to value these resources based on the reliability benefit that they provide to the system. The NYISO will re-evaluate the identified Duration Adjustment Factors 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 Duration Adjustment Factors requires software changes to the NYISO systems to allow shorter duration resources into the markets.

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

The successful implementation of these market changes is dependent on developing software to account for short duration resources using the concepts (Peak Load Windows, Energy Duration Limitations, etc.) developed in 2019. The NYISO will implement the Duration Adjustment Factors from its first study for the 2021-2022 Capability Year.

10.3 Project Justification

This project is expected to have 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.

The NYISO has been engaged in a multi-year effort to allow shorter duration resources to be eligible to participate in the NYISO markets. Implementation of the necessary software for this project will promote overall market efficiency.

11 Engaging the Demand Side

11.1 Problem / Opportunity

Further engaging the wholesale demand side participation will become increasingly important as deployments of intermittent wind and solar resources increase to support New York's decarbonization goals. The wholesale demand side is more than just Demand Response suppliers, it is that portion of the NYISO market resources modeled at load nodes including DER (Demand Response, Energy Storage Resources and generation) along with load that only consume energy. Today, suppliers are dispatched by the NYISO to meet load that has limited flexibility. Load is generally seen as "uncontrollable" by system operators, whereas generation resources are considered controllable. The NYISO-administered markets currently feature demand side participation opportunities through the SCR program, EDRP, DSASP, DADRP, price responsive load bids by Load Serving Entities in the Day-Ahead Market, and in the near future also through

the DER participation model. Eventually, controllable and flexible load may be desirable to balance inflexible/intermittent supply and provide ancillary services. The net effect of a more engaged Demand Side will look like overall load modification in the NYISO-administered markets.

Animating load in the NYISO-administered markets will require close 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 will be necessary to improve load flexibility, and should be a focus of these efforts moving forward. These enhancements will provide consumers with visibility to real-time prices which offers them with the ability to make more informed decisions about when and how to consume energy.

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

The NYISO will work with both internal and external stakeholders to identify opportunities to enable more demand side participation in the wholesale markets through issue discovery, such as including flexible load as supply in the price formation in the Installed Capacity and Energy markets. Further engaging load participation could allow for more robust price formation that reflects customers' willingness to pay, consistent with their marginal benefit of consuming energy. Evaluation of potential changes to SCR program to better align with the operational needs may also be considered. Any opportunities identified to further engage demand side participation can be used to develop future market design enhancements.

11.3 Project Justification

The NYISO-administered markets may benefit from more robust demand side participation. Further enabling and encouraging loads to be more engaged in understanding their consumption patterns and responsive to real-time prices is not a trivial change to NYISO market design and operations, but will benefit grid reliability and improve market efficiency. Tangible benefits may not appear in the near term, however long-term trends point towards more customer engagement as technology supports more load interactivity. This is apparent with the state's actions to encourage more customer engagement in their energy usage through its REV actions. The NYISO's DER participation model, anticipated to be deployed in Q4 2021, is the next step toward animating load in the wholesale markets. That participation model builds upon the NYISO's experience with demand response programs, and will begin the technological advances needed in the future.

12 Climate Change and Grid in Transition

12.1 Problem / Opportunity

In a time of unprecedented change in the electricity sector, New York's competitive electricity markets are 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 and distributed generation will require new thinking. We approach 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 will inform the NYISO's planning, forecasting, and operations, as well as the development of wholesale market mechanisms to enhance grid resilience.

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

Continue to study, investigate, discuss, and develop concepts described in the Reliability and Market Considerations for a Grid in Transition report. This project will also examine identified impacts to the bulk power system under the conditions modeled in Phase I and II of the Climate Change and Impact Resilience (CCIR) study. If wholesale market design changes are necessary to address specific impacts/issues, then the NYISO would propose concepts to address those impacts/issues. This project will position the wholesale markets to continue to support grid reliability as the mix of resources and system needs continues to evolve in New York.

12.3 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 addressing the state's goals and mandates in a cost-effective way through creation of proper market mechanisms along with any identified issues in the CCIR study that would have otherwise impacted reliable grid operations in the future ensuring the ability to reliably serve load in New York.

13 Hybrid Co-Located Model

13.1 Problem / Opportunity

The NYISO's market rules do not currently allow an ESR and an intermittent Generator to be co-located at a single point of interconnection and participate in the market with a Point of Interconnection that is less than the combined capabilities of the Generators.

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

This project is a continuation of the 2020 Hybrid Storage model Market Design Complete commitment and will work to integrate the rules and software needed to enable large-scale weather dependent and energy storage resources to participate as co-located resources behind a single interconnection point.

The 2021 project deliverable is Deployment for any software changes deemed necessary to support the market participation rules as approved from the 2020 Hybrid Storage Model project deliverable.

13.3 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. The 2020 deliverable developed a market participation model for front-of-the-meter generators plus storage acting as two distinct resources with a shared injection limit that better aligns the NYISO's market procurement with state and federal efforts to integrate more clean energy into the grid.

14 Hybrid Aggregation Model

14.1 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.

14.2 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 2020 Hybrid Storage model effort and will develop market rules that allow the aggregation of an ESR and another Generator co-located behind the same point of interconnection to share a single PTID and act as a single resource. The 2021 project deliverable is a Market Design Complete.

14.3 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. 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 2021 deliverable will create a new market participation model to improve grid flexibility and resilience by enabling new resource types to provide their full capabilities.

15 Ongoing TSO and DSO Coordination

15.1 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. 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.

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

Throughout the remainder of 2020 and 2021 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 via NYISO market and operational working groups as an issue discovery effort.

15.3 Project Justification

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

Energy Market Products

16 Ancillary Services Shortage Pricing (SOM)

16.1 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 reserves, will become increasingly important.

The NYISO's current shortage pricing structure and related demand curves were assessed in a 2019 study. The study identified considerations for potential changes to the current shortage pricing architecture. In 2020, the NYISO is working to develop proposed enhancements to the current reserve shortage prices and reserve demand curves, as well as further evaluating the potential procurement of reserves in excess of minimum requirements.

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

The 2021 project deliverable will be Deployment based on the market design expected to be approved in 2020.

16.3 Project Justification

This project will position the NYISO's markets to continue to provide efficient price signals reflecting the operational needs of the system as the grid transitions to higher intermittent penetration.

17 Reserves for Resource Flexibility

17.1 Problem / Opportunity

The Reserves for Resource Flexibility project has identified the opportunity for better aligning operational needs and conditions of the grid with reserve requirements. Specifically, two opportunities have been identified for enhancements. First, the project seeks to increase the 30 minute reserve requirement for the Southeastern New York (SENY) reserve region to levels that would enable transmission assets to be returned to Normal Transfer Criteria following a contingency. The second enhancement seeks to better align the pricing outcomes with real-time grid conditions. This would be achieved by replicating the current logic applied to the SENY 30-minute reserve requirement in real-time during a Thunderstorm Alert (TSA). Extending this logic to the NYC reserve region would reduce the 10-minute and 30-minute NYC reserve requirements to zero in real-time during a TSA.

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

The deliverable for this project in 2021 will be Deployment based on the market design expected to be approved in 2020.

17.3 Project Justification

Additional upward ramping capability in SENY will enhance the NYISO's ability to more effectively manage the transmission system and real-time operations uncertainty. Procuring additional reserves in SENY is intended to facilitate the return of transmission system assets to Normal Transfer Criteria post-contingency potentially avoiding out of market actions that may otherwise be needed. Reducing the Zone J reserve requirements to zero in real-time during a TSA is intended to improve the alignment of pricing outcomes with grid conditions.

18 Carbon Pricing

18.1 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.

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

This phase of the NYISO's carbon pricing project will deliver a Software Design to effectuate the NYISO's carbon pricing proposal.

18.3 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.

19 Constraint Specific Transmission Shortage Pricing (SOM)

19.1 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.

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, the NYISO proposes 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 would increase proportionally with the severity of transmission overloads. The NYISO also proposes to eliminate most 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.

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

The 2021 deliverable for this project will be Market Design Complete.

19.3 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.

20 Large Scale Solar on Dispatch

20.1 Problem / Opportunity

Large scale solar installations are just beginning to enter the New York Control Area (NYCA). While solar technology can offer many benefits, it can also pose challenges to reliable grid operation due to its variable nature. Indeed, the NYISO already contracts with solar forecasting entities to provide predictions of output from such resources. As higher levels of intermittent resources like solar connect to the grid, it is important to have appropriate market mechanisms to manage this variability with flexible resources that can follow a dispatch signal. Solar resources have a demonstrated ability to reduce their output in response to a dispatch signal, and the NYISO seeks to implement this capability within its energy markets.

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

This project will continue the effort first described in NYISO's 2018 Market Design Concept proposal for a Solar Participation model resources. It is anticipated that the 2021 project will consist of the deployment for solar on Economic Dispatch.

20.3 Project Justification

Large scale solar resource entry has the potential to cause reliability issues due to the variable nature of solar resource output, but these resources are also capable of contributing to system reliability due to their flexibility. The NYISO does not have a market construct that allows it to send an economic market basepoint signaling a solar resource to reduce its output in response to system needs. The ability to send an economic market basepoint signaling a solar resource to

reduce its output in response to system needs increases reliability while decreasing total production cost.

21 Reserve Enhancements for Constrained Areas (SOM)

21.1 Problem / Opportunity

Based on New York State Reliability Council (NYSRC) rules, the NYISO is also required 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.

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 does not reflect the flexibility of the grid to respond to system needs by utilizing the transmission system to import capacity into generation-constrained regions. As reserve regions become smaller, this static modeling can potentially lead to market inefficiencies and unnecessary price volatility.

The NYISO recently proposed to introduce a Zone J reserve region with 10 and 30-minute reserve requirements beginning in late-June 2019. The Zone J reserve region will provide region-specific market signals consistent with reliability needs in New York City.

The NYISO is also exploring the potential implementation of more granular reserve requirements within certain New York City load pockets that would better represent the value of short-notice resources in desirable locations. As the potential implementation of load pocket reserve requirements is considered, a dynamic reserve procurement methodology that does not exist today could be useful to improve market efficiency, better aligning market outcomes with how the power system is operated, and avoid the potential for unnecessary price volatility.

21.2 Objective(s) & Anticipated Deliverable(s)

The deliverable for this effort in 2021 will be Study Complete. The study will seek to develop potential changes to the NYISO's market software to facilitate more efficient schedule operating reserves based on system conditions. If determined to be feasible, 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. This study will also evaluate potential ways to compensate operating reserve providers that help manage transmission congestion to determine if market incentives can be improved to maintain resource flexibility. Finally, the study will explore how to most efficiently

incorporate potential reserve requirements within certain load pockets in New York City into the market software.

21.3 Project Justification

The 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 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 reserves 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 two additional recommendations 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]." The MMU has also recommended that the NYISO "[m]odel local reserve requirements in New York City load pockets [Recommendation 2017-1]."

22 Grid Services from Renewable Generators - Requested by NYSERDA

22.1 Problem / Opportunity

According to two recent studies by CAISO, NREL, GE, Avangrid Renewables, and First Solar, wind and solar resources equipped with inverter controls can provide grid services, including regulation, voltage control, frequency response, and ramping. The upgrades required to the renewable plants were minimal, if any, and resulted in provision of services at the same or better levels of performance as compared to traditional generators, while simultaneously easing the integration of additional renewables onto the grid.

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

This project has two primary components. The first component would have the NYISO work with renewable generators to determine what upgrades, if any, are required to typical inverters and controls to allow renewable generators to provide grid services. The second component would evaluate the current NYISO market designs for grid service products to determine what barriers may exist that prevent renewable generators from providing the grid services of which they are capable. The study will evaluate these components and identify additional steps, if necessary, to allow renewable generators to provide grid services.

22.3 Project Justification

Significant quantities of renewable generation will be required to meet the targets in the CLCPA. These renewable generators also have the ability to provide grid services, thereby decreasing the cost of renewable integration while decarbonizing the provision of many essential reliability services. Barriers that prevent renewables from providing these services will serve only to increase the costs of grid operation and overall emissions and should be removed as soon as practicable as the number of renewable generators continues to accelerate.

TCC Products

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

23.1 Problem / Opportunity

The NYISO currently conducts Centralized 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 project effort 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. This will permit auction participants to purchase additional shorter-term TCCs in the BoP Auctions.

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

This project is intended to build on the efforts undertaken in 2020 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 develop the system requirements to the TCC Automated Market System needed to support the market changes.

23.3 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:

- 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 in surveys of TCC MPs; 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.

24 Time Differentiated TCCs – Requested by Calpine & Vitol

24.1 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 is limited in its 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.

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

This project's deliverable would be a Market Design Concept Proposed and would include working with stakeholders to develop market rule changes needed to facilitate the creation of TCC products that apply to different periods of time (i.e., either day or week) to supplement the current 24-hour product, including an assessment of:

- The number of different types of TCCs that would be valid during each month.
- The hours in which each of those types of TCCs would be valid.
- The procedures the NYISO would use to auction those TCCs, to establish the prices of those TCCs, to allocate auction revenue, and to allocate costs or revenues associated with increases or decreases in transfer capability.
- Other market design improvements that might be made possible as a result of this project.

Completion of this project would define the following within the TCC market and related systems:

- TCC auction design to support the sale of more granular TCC products
- Revenue allocation methodology adjustments to support the more granular TCC products
- Potential changes in credit policy to accommodate the new TCC products

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.

24.3 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 weekly and daily time periods where congestion patterns can vary; and (4) permit other market design improvements.