

2019 Project Candidates

Product and Project Management

4/25/2018 Revised

This document represents potential 2019 project candidates 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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Business and Finance Products

CRM Integration with Chat

This project would enhance the Customer Relationship Management tool that was implemented in 2017. It would improve the customer experience and provide more automation within the system. One of the key enhancements would be the integration of the Chat feature currently available and in use on the public website, directly with the CRM tool. This will eliminate manual processes currently being employed to link these two channels of customer communication.

Key Topics Enhancements

This project would enhance the information available and the user experience associated with the Key Topics functionality on the NYISO public website. It would add timelines, milestones, and enhanced summary information regarding the key topics that are available on the website.

Public Website Redesign Phase II

This project will build on the work being done in 2018 to launch a new NYISO public website. Additional features will be added and enhanced to further leverage the new Web Content Management system. This will continue to address ease of use and ability to locate content, including continued improvement of the Search capabilities.

Mobile Functionality

This project would deliver mobile application functionality focused on enhancing customer service by making information and/or convenience features accessible to stakeholders through their smart-phones and tablets.

Enterprise Information Management - Data Integration Phase IV [Continuing]

The Enterprise Information Management initiative is a multi-year strategic initiative focused on bringing together process, design, and technology to satisfy market and operations information needs at the NYISO. This phase of the project will migrate the Customer Settlements data mart, positioning the NYISO to upgrade the Oracle database to the latest version, and to retire Oracle Warehouse Builder.

Fuel Mix Data Query Enhancement

This project would add functionality to the fuel mix data, currently being made available as a NYISO OASIS posting and being displayed within the Maps and Graphs on the NYISO Public Website. This project would add the functionality of loading this data to the Public Data Mart in DSS and add an additional Custom Report screen, to be available from the Markets & Operations section of the website.

Transactions Modifications & Confirmation Tool

The Customer Settlements department requires a tool to assist in the validation of external transaction schedules. Customer Settlements staff currently use multiple forms that were originally developed to support the needs of Operations staff. With modifications to these forms required to implement 15-minute and CTS scheduling protocols to support Operation's departmental needs, these forms no longer provide the means for Customer Settlements staff to efficiently administer their validation process.

Metering Submission and Access Redesign

The Java and JBoss technologies that currently underlie the NYISO systems used to manage submission and access to metering data will no longer be supported and therefore require upgrading to the current versions of Java 7 and JBoss 5. Maintaining supported versions of the technologies will allow the NYISO to continue providing secure exchange of meter data. In addition, remaining current with system supporting technologies best positions the NYISO in the evolution of market design by allowing for flexibility and agility in design constructs.

Rate Schedule 12 Settlement [Continuing]

This project is a continuation of a 2017 Business Requirement Project (FRS) and a 2018 Software Design Project (SDS). This project will implement settlements for Rate Schedule 12 to allow for NYISO's settlements systems to provide for cost recovery, consistent with Attachment S to the OATT, for the portion of a Highway System Deliverability Upgrade (SDU) not funded by contributing Class Year Developers.

S&P Credit Ratings Platform Change

Credit ratings are used in determining the amount of unsecured credit a Market Participant may use as collateral. Standard & Poor's (S&P) is one of three credit ratings companies used by the NYISO's Credit Management System (CMS). The NYISO receives daily updated Credit Ratings as a component of CMS. S&P is decommissioning the current version of its platform, RatingsXpress v3, and requiring all clients to upgrade to v4 by April 1, 2019. The NYISO will need to make the required updates to accept the v4 data feed, with final testing and deployment prior to April 1, 2019 to continue receiving S&P's credit ratings.

Financial Risk Assessment and Scoring Enhancement

This project would allow for integration of additional functionality, including reporting, for the NYISO's automated Financial Risk Assessment process used to evaluate each Market Participant's potential risk exposure. The project will also provide for automation of the NYISO Credit Scoring Model. These updates are intended to further increase efficiencies in identifying and mitigating credit risk.

Oracle Financials Upgrade

The Oracle Financials premise product is being sunsetted by Oracle and will not be enhanced after 2020. NYISO is evaluating the upgrade path to an Oracle Financials Hosted Cloud solution.

This project would assess the migration path to move our current data and processes to use this new Oracle solution and then manage that migration.

FERC Form 1 Redesign

This project would procure and install or will create a utility to enter and submit data in a new electronic format as being required by FERC and NAESB. This financial data is currently provided to FERC using FERC's online Form 1 and is supplied quarterly and annually. Currently this is a 2018 project but the NAESB standards have not yet been released. This delay moves the projected deliverable into the 2019 projects timeframe.

Vendor Management Tool [Continuing]

This project is a continuation of a 2018 Business Requirements Project. NYISO's Procurement Department manually maintains data on procurement activity for over 1,000 vendors and several thousand contracts/ agreements/ tax documents that are used to support approximately 800 annual procurement events. The primary goal of this project is to create a single database, with query/ reporting capabilities, to house all vendor and contract information. This project would facilitate vendor management, minimize errors, and increase organizational efficiency.

Position Control System

The Human Resources department is responsible for managing all of the positions within NYISO, both filled and unfilled, for accurate budget and headcount purposes. Currently, there are labor intensive, manual processes, which are required to track all of the information regarding these positions. This project would identify, procure and deploy a Position Control System, which would track actual staffing levels and costs over time, enabling more efficient vacancy tracking and more accurate staffing and salary budgeting.

Capacity Market Products

ICAP AMS Redesign Phase III [Continuing]

ICAP AMS is a NYISO application that supports a \$3 billion annual capacity market. Developed in house and launched in 2005, ICAP AMS is using multiple aging technologies. The application was built in a rapid succession of numerous market design projects under strict and aggressive implementation timelines, continually adding to its complexity. In 2016, the NYISO identified a multi-phase project for 2017 to start the process of redesigning the ICAP AMS in order to support future requirements. This project is a continuation of Phase II project efforts to re-write the ICAP AMS application over multiple phases to improve end-user experience, increase code quality and maintainability, and automate and streamline testing.

CRIS for External-ROS Transmission Investments [Mandatory]

This project is a continuation of the market design completed in 2018 (See [March 28, 2018 presentation to the Management Committee](#)) and relates to FERC Docket ER17-505 in 2017 (the HQUS waiver request). The 2018 design allows Market Participant-funded transmission projects for new, or upgrades to, scheduled lines to be considered for CRIS in the Class Year process and obtain CRIS MW associated with the incremental transfer capacity from an external control area into the Rest-of-State (ROS) region through External-to-ROS Deliverability Rights (EDRs). EDRs backed by external resources can then participate in the capacity market. Consistent with the NYISO filings in FERC Docket ER17-505 and tariff language approved by stakeholders in 2018, the NYISO will implement software revisions necessary to effectuate this project.

Treatment of Locality Exports and Imports (SOM)

This project will ~~continue to~~ address import and export issues associated with work being conducted in 2018 that addresses Locality Exchange Factors for exports. The objectives are to study and, if necessary modify, the capacity market and planning processes to better account for capacity that is imported from ~~and exported to~~ neighboring Control Areas, including the impacts that imports over AC interfaces have on locational requirements. An update of the ongoing work was presented by General Electric at the [March 7, 2018 ICAPWG meeting](#).

Dynamic Capacity Zones (SOM)

Evaluate a dynamic locational framework that ensures that locational capacity prices would immediately adjust to reflect changes in market conditions. This project will consider the Market Monitoring Unit (MMU) SOM recommendations regarding a dynamic zone construct. This project will also leverage the prior stakeholder discussions on Zone Elimination and On and Off Ramps.

Tailored Availability Metric

Evaluate alternative metrics that could improve the measurement of resource performance and availability. Specifically, assess the current structure, which calculates availability using a rolling-average EFORD. This current method may not accurately represent a unit's preparedness during critical operating periods and may not set an appropriate level of accountability for performance. Enhancing these measurements might help NYISO markets accommodate the entrance of significant renewable generation, as well as create a more efficient cost structure for consumers. This project is a product of the work conducted in 2017 and 2018 on Performance Assurance. More information on the Performance Assurance project can be found in the Analysis Group's [presentation](#) and [report](#) to the October 2017 BIC, and NYISO management's response.

Competitive Entry Exemption for Increased CRIS

Currently, Class Year projects requesting to increase their CRIS are not eligible to request a Competitive Entry Exemption from buyer-side mitigation. This project would be to discuss with stakeholders how the Competitive Entry Exemption rules might need to be modified or expanded to extend an opportunity for eligibility to these projects.

Enhanced BSM Mitigation Study Period

This effort would involve continuing discussions with stakeholders to identify what, if any, enhancements can be made to the existing Mitigation Study Period and timelines used to evaluate projects, in order to result in enhanced determinations.

Review Capacity Physical Withholding Rules

This project would involve reviewing the current physical withholding rules for the capacity market and discussing with stakeholders if the current rule set is still appropriate, or if portions could be enhanced.

Capacity Transfer Rights for Internal Transmission Upgrades (SOM) [Future]

This project would create a dynamic and efficient framework for reflecting locational planning requirements in the capacity market to better enable the market to provide locational signals in the future, by granting internal capacity deliverability rights for AC Transmission between Rest of State and a Locality when private investors upgrade the AC transmission into a Locality.

Economically Allocate Import Rights [Future]

The Import Rights project would develop a market construct for awarding import rights rather than relying on the first-in-time, first-in-right approach.

BSM Repowering

While there exists a competitive entry exemption to buyer-side mitigation, that exemption may not be adequate to facilitate the replacement of an existing generating unit with a new unit (sometimes referred to as “repowering”). A focused exemption may be appropriate in order to revise market rules so that they do not discourage or prevent replacements, while adequately protecting the integrity of the wholesale markets. This project would seek to evaluate and develop a proposal for a buyer-side mitigation exemption that specifically addresses the concerns with replacement (repowered) generation projects and encourages private investment. This exemption is intended to provide greater certainty and decrease the risk to generation developers/owners that pursue replacement projects. The exemption would be compatible with market-based principles and would not seek to support or encourage subsidized new entry.

EDR and UDR Enhancements

This project will consider expanding upon the External-to-ROS Deliverability Right (EDR) participation model that was developed in 2018 (see [March 28 Management Committee presentation](#)). As part of this effort, the NYISO will consider rules governing allowing an EDR to sink into a Locality, and the transition between EDRs and Unforced Capacity Deliverability Rights (UDRs). This project would also examine the treatment of Capacity Market Import Rights and External CRIS Rights that sink into ROS but after the creation of a new Locality sink entirely into that new Locality.

EDRs for External Transmission Upgrades

This project will consider expanding upon the External-to-ROS Deliverability Right (EDR) participation model that was developed in 2018 (see [March 28 Management Committee presentation](#)). As part of this endeavor, the NYISO will examine the potential for a Market Participant to receive EDRs to participate in the Capacity market by funding transmission system upgrades external to the NYCA that increase transfer capability at an external interface.

Explore Locational Reliability Pricing (SOM)

This project will explore the implications of establishing clearing prices for capacity based upon the marginal reliability value of capacity in each Locality.

External Capacity Performance & Obligations

This effort will build upon the Performance Assurance project developed with stakeholders in 2018. In particular, it was recommended by the consultant (Analysis Group) in its report that the NYISO review the rules by which external resources participate in the NYISO capacity market, including eligibility requirements and offer obligations and terms. In 2018, the NYISO worked with stakeholders on the “Deliverability Requirements for Capacity Imports” effort. This effort has enhanced the notice regarding required documentation of transmission service for external capacity from PJM into the NYISO. The 2019 effort would continue to evaluate what, if any, additional performance requirements and obligations are needed, including an evaluation of documentation requirements to demonstrate deliverability to the NYCA border at other interfaces. This project will evaluate the potential enhancement of requirements for external capacity resources to improve their comparability to internal resources for grid operations. More information on the Performance Assurance project can be found in the Analysis Group’s [presentation](#) and [report](#) at the November 2017 BIC, and NYISO management’s response.

Demand Curve Reset [Mandatory]

The NYISO will work to select a consultant to study and recommend the parameters used to set the NYISO’s ICAP Demand Curves for four years beginning with the Summer 2021 Capability Period. More information can be found in the previous DCR [consultant report](#) and the [NYISO recommendations](#).

BSM to Address Other Price Suppression Actions (SOM)

This project will evaluate the market design options throughout the NYCA to enhance Buyer-Side Mitigation measures. For example, the effort will consider expanding mitigation measures that include market design that can address the effects of activities such as uneconomic retention of supply resources and uneconomic transmission investment on capacity market prices.

Dynamic Setting of Import Rights Limits

The Dynamic Re-allocation of Import Rights project would develop a market construct for adjusting the total Import Rights limits available on each interface on a monthly basis. This process would attempt to shift the then-remaining total Import Right limit from interfaces that have a large

amount of Import Rights remaining available to interfaces that have limited remaining Import Rights available, which may allow additional capacity to be imported into NYCA.

DER Products

DER Participation Model [Mandatory]

The NYISO is developing enhancements to its market rules to permit Distributed Energy Resources (DER) to participate in NYISO's capacity, Day-Ahead and Real Time energy and ancillary services markets. The NYISO is also currently evaluating potential modifications to its existing Demand Response programs in order to enable this effort.

This project will have many facets that align with New York's Reforming the Energy Vision (REV) goals and support compliance with FERC Order No. 719, while simplifying the product offerings for demand response and distributed resources.

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

Links to stakeholder presentations:

[DER 2017 Market Design Concept Proposal \(MDCP\)](#)

[DER 2017 MDCP Summary Presentation](#)

Enabling Technologies for DER

This project will leverage the Map and API software deployed for the 2018 Granular Pricing and Market Price Delivery effort. This project will identify additional NYISO market data, data delivery process improvements, and/or delivery methods that can assist REV development opportunities and DER participation. If additional NYISO market data, data delivery process improvements, and/or delivery methods are deemed to be needed, it is anticipated that a business approved FRS documenting the requirements for this need will be developed.

Links to stakeholder presentations:

[2018 Granular Pricing Updates](#)

[2017 Granular Pricing & Market Price Delivery](#)

NYISO Pilot Framework [Continuing]

The NYISO has initiated a Pilot Project Program to test innovative technology and assist with the development of the Distributed Energy Resource Participation. This project will use the newly-created Pilot Program framework that will allow developers of new or emergent technologies and the NYISO to gain knowledge about the technology's capabilities and uses as well as supporting REV demonstration efforts. This will ultimately inform the NYISO of possible changes to market rules to appropriately incorporate new technology capabilities and meet grid

needs. Resources in the Pilot Program will not receive any compensation from the NYISO for their participation in the Program.

Links to stakeholder presentations:

[Pilot Program Overview](#)

[Pilot Program Guide](#)

Energy Market Products

ESR Participation Model (SOM) [MANDATORY]

In 2019, the Energy Storage Integration and Optimization project will continue to develop and deploy a participation model tailored to Energy Storage Resources (ESRs). The NYISO will develop the software code and implement the ESR participation model in compliance with FERC Order No. 841. The ESR participation model will capture the unique operational characteristics of ESR's, including their ability to withdraw from and inject energy onto the grid, and establish rules for participation in the NYISO's Energy, Capacity, and Ancillary Services markets.

Links to stakeholder presentations: [February 21, 2018 MIWG](#), [December 20, 2017 MIWG](#)

Long Island PAR Optimization & Financial Rights (SOM) [Future]

The PAR-controlled lines between New York City and Long Island (the 901 and 903 lines) are not currently optimized by the NYISO's market software. These lines are scheduled according to the terms of long-standing contracts that pre-date open access transmission tariffs and the NYISO's markets. This causes power to flow in an inefficient direction for the majority of the time in the Day-Ahead Market. Significant efficiency gains may be achieved by improving the operation of these lines. The NYISO should work with the parties to the underlying wheeling agreements to explore potential changes to the agreements or to identify how the agreements can be accommodated within the markets more efficiently. This will require the creation of a financial settlement mechanism to compensate the party that would be giving up some of the benefits from the current operation. The market software/ processes will need to be modified to optimize the LI PARs and create the new financial product. This solution will minimize total production cost by ensuring power flows in the economic direction most of the time.

RTC-RTD Convergence Improvements (SOM)

Differences in the ramp assumptions are a principal driver of price volatility between Real-Time Commitment (RTC) and Real-Time Dispatch (RTD). To reduce unnecessary price volatility that results from such differences, Potomac Economics recommends that the NYISO consider one or more of the following enhancements to improve the modeling of ramp in RTC and RTD:

- Better align the ramp rate assumed in the look-ahead evaluations of RTC and RTD for steam turbine generators with the actual demonstrated performance to account for units that often ramp at a rate that is lower than their claimed ramp rate capability.
- Address inconsistencies between the ramp assumptions used in RTD's physical pass and RTD's pricing pass when units are ramping down from a day-ahead schedule.

- Calculate ramp limits of individual units to reflect that a unit providing Regulation service may not be able to ramp as far in a particular five-minute interval as a unit that is not providing Regulation (since Regulation deployments may lead the unit to move against its five-minute dispatch instruction).

The NYISO has begun work to evaluate several of these options in 2018. This effort would continue that work with a goal of Market Design Complete in 2019.

Links to stakeholder presentations: [January 1, 2018 MIWG](#), [December 5, 2017 MIWG](#)

Enhanced PAR Modeling (SOM) [Future]

Variation in loop flows and in flows across certain 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 other PARs that are located in the NYISO footprint can more accurately model actual 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.

Review of RACT Compliance Plans (SOM) [Future]

NOx bubble constraints were established by the NYISO in the LRR pass of SCUC for three generator portfolios in New York City based on the compliance plans they filed with the Department of Environmental Conservation. Currently these portfolios use the “System Averaging” compliance option which requires the operation of a steam turbine unit in order to reduce the overall NOx emission rate from a portfolio containing higher-emitting gas turbine units. Owners of generation in NOx bubbles likely have additional RACT compliance options, which may result in lower emissions at lower cost. Since commitments of steam turbines are necessary for the associated gas turbines to operate (or even provide non-spinning reserves), they are categorized as for local reliability and the resulting out-of-market costs are uplifted to the market. If generators select lower cost options to comply with RACT standards, uplift may be reduced, or these units may be committed economically instead of out of market.

Additionally, the MMU assessed that it is likely that NOx bubble commitments had the effect of increasing rather than decreasing overall NOx emissions across electric generating units in New York City. This is because the commitment of steam turbine units typically crowds-out generation from new, fuel efficient generation with selective catalytic reduction capability, and

it is rare that these commitments would reduce production from older gas turbines as they were intended. According to the MMU, steam units emit approximately 13 times more NO_x per MWh than the newer generators with emission-reduction equipment. As part of this endeavor, the NYISO will discuss a review process for RACT compliance plans with impacted stakeholders.

Performance-based Reserve Payments (SOM) [Future]

Operating reserve providers are currently compensated the same regardless of performance in response to NYISO instructions. Consequently, the market may not provide efficient performance incentives to resources that are frequently scheduled for reserves. This effort will consider ways to account for performance as part of payments to reserve providers.

5-minute Transaction Scheduling with HQ

In 2017, the NYISO identified that more frequent transaction scheduling with external control areas could improve convergence between prices in RTC and RTD and offer increased flexibility to the market optimization software as the penetration of intermittent renewables increases. This project would propose a mechanism to enhance the real-time interchange scheduling processes by allowing the economic scheduling of interchange across controllable interties with Hydro-Quebec (HQ) every 5 minutes, using the 5-minute RTD. Interchange scheduling with HQ is currently achieved on either a 15-minute or an hourly basis using the RTC software.

Model 100+kV Transmission Constraints (SOM)

Market incentives for investment in resources on the 115kV system in upstate New York are inadequate partly because these facilities are not reflected in the NYISO's Energy and Ancillary Services markets. Currently, these constraints are managed through out-of-market actions, which has contributed to the need for cost-of-service contracts to keep older capacity in service. Since these 115kV constraints are not reflected in the market scheduling process, real-time dispatch and day-ahead commitment decisions are sometimes inefficient. This project will continue the implementation of a methodology for managing certain 115kV transmission constraints in the Day-Ahead and Real-Time markets, including mitigation measures for resources that are committed or dispatched to manage these constraints. This effort was identified as beneficial both by the external Market Monitor and the 2017 Integrating Public Policy Market Assessment.

Links to stakeholder presentations: [February 21, 2018 MIWG](#)

Dynamic Reserve Requirements (SOM) [Future]

In some cases, the reserve requirement for a local area could potentially be met more efficiently by importing reserves (i.e., reducing flows into the area and thus removing the transmission constraint that necessitates the reserve region) rather than scheduling reserves on resources within the reserve region. This project will examine whether to modify the market software to optimize (i) the upper limit on the amount of reserves that can be held on Long Island; and (ii) the amount of reserves that should be held in SENY considering that the SENY reserve need can also be met by reducing the pre-contingency flows over the UPNY-SENY

interface. This effort was identified as potentially beneficial both by the MMU and the 2017 Integrating Public Policy Market Assessment report.

Constraint Specific Transmission Shortage Pricing (SOM)

The NYISO currently uses a single graduated transmission constraint pricing mechanism to set prices under many transmission constraint conditions. However, some transmission constraints are not resolved using this graduated mechanism. This project will continue 2018 efforts to develop enhancements to the current graduated transmission pricing mechanism. In 2019, the NYISO will seek stakeholder approval of a completed market design for the proposed enhancements, including any required tariff language revisions. This effort was identified as potentially beneficial by the MMU, the 2017 Securing 100+ kV Facilities whitepaper, and the 2017 Integrating Public Policy Market Assessment report.

Links to stakeholder presentations: [February 21, 2018 MIWG](#), [January 16, 2018 MIWG](#)

Eliminate Fees for CTS Transactions with PJM (SOM) [Future]

Efficiency benefits of the CTS process with PJM have been limited since it was implemented in the fourth quarter of 2014. The 2015 SOM report addresses this issue and observes that there has been a far greater utilization of CTS bidding at the ISO-NE interface since it was implemented in the fourth quarter of 2015. 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. These charges present an economic barrier to achieving potential benefits from CTS process at the PJM border. This project will evaluate the potential benefits of eliminating the allocation of NYISO charges to transaction between New York and PJM.

Enhanced Fast Start Pricing (SOM) [MANDATORY]

On December 20, 2017, FERC instituted a proceeding in Docket No. EL18-33-000, pursuant to FPA section 206 concerning fast start pricing in NYISO markets. Consistent with the Commission's instructions, the NYISO filed an Initial Brief on February 12, 2018 outlining the NYISO's proposed approach to amend its tariffs and revise its market software to: (1) modify pricing logic to allow fast-start resources' commitment costs (*i.e.*, start-up costs and minimum generation (no-load) costs) to be reflected in prices; and (2) allow the relaxation of all dispatchable fast-start resources' economic minimum operating limits by up to 100 percent for the purpose of setting prices. This project will begin developing the market design changes discussed in the NYISO's Initial Brief.

Pricing Reserves for Congestion Management (SOM) [Future]

The NYISO is required to maintain flows such that if a contingency were to occur, no transmission facility would be loaded above its Long-Term Emergency (LTE) rating post-contingency. However, in some cases, the NYISO is allowed to use operating reserve capacity to satisfy this requirement. This allows the NYISO to increase utilization of the transmission

system into load centers, thereby reducing production costs. Since such operating reserve providers are not compensated for helping manage congestion, the market may not provide efficient signals for investment in new and existing resources with flexible characteristics.

This project will examine potential ways of improving market signals for resources that are providing congestion relief but are offline.

Carbon Pricing

In 2017, the Brattle Group published a report detailing how pricing carbon into NYISO's wholesale markets could help to harmonize the wholesale markets and New York State's public policies. After the report was published, a NYISO, NYSERDA, and DPS "Joint Staff" 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. In 2018, IPPTF work continues with the goal of developing a Joint Staff Carbon Pricing proposal by the end of 2018.

In 2019, this project will continue the vetting of wholesale market concepts for incorporating the cost of carbon into the NYISO's wholesale markets through the NYISO working group process. The goal of the 2019 effort will be a completed market design for stakeholder approval.

Energy Market Software Performance

The EMS/BMS hardware upgrade will be deployed in 2019, providing a new platform for the market software that is expected to provide significant performance benefits. However, the NYISO has completed a number of complex market design efforts since the EMS/BMS project was initiated, and the performance impact that these projects may have on the market solve time when they are all implemented is unknown. This project will study opportunities to enhance market solution efficiency and will provide more information to the NYISO and its stakeholders about the benefits of potential enhancements.

More Granular Operating Reserves

This effort will pursue a study to determine whether the NYISO should establish and secure a distinct 10-minute reserve requirement for New York City. Exploring load pocket reserves, [as well as reviewing and evaluating potential enhancements to current scheduling practices to ensure deliverability of reserves from resources located within load pockets](#), would further enhance the location-specific value of maintaining short notice responsive resources in desirable locations. This effort has been identified as potentially beneficial in both the 2018 Performance Assurance Management Response and the 2017 Integrating Public Policy Market Assessment report.

Reserve Procurement for Resilience

This effort will consider enhancements to the current operating reserve shortage pricing construct to facilitate procurement of additional operating reserves beyond established minimum requirements to incent resource performance and promote grid resiliency.

Procurement of additional reserves above minimum requirements could enhance resilience by recognizing the value of resource availability to be responsive to unanticipated real-time operating needs. The additional financial incentives could also encourage procurement of the necessary fuel to meet scheduled obligations and incent improved resource performance. This effort was identified as potentially beneficial by the 2017 Integrating Public Policy Market Assessment report.

Flexible Ramping Product

In 2018, the NYISO developed a market design concept proposal with stakeholders for a flexible ramping product as part of the Integrating Public Policy initiative. This project will pursue a study to further inform discussions regarding implementation of such a product for the NYISO markets. A flexible ramping product could be necessary for the NYISO to deal with forecast uncertainty and/or increased ramping needs in a future with more intermittent renewable resources, and the flexibility that such a future demands. This effort was identified as potentially beneficial by the 2017 Integrating Public Policy Market Assessment report.

Links to stakeholder presentations: [April 3, 2018 MIWG](#), [March 7, 2018 MIWG](#)

Ancillary Services Shortage Pricing

This project will reevaluate the NYISO's current Ancillary Services shortage pricing values in consideration of the relative shortage pricing values for each product. Performance incentives in neighboring ISO/RTO regions indicate that a review of the NYISO's current shortage pricing values could offer significant value. In addition, the relative value of ancillary services and resources flexibility may increase as the NYISO moves toward a future with more intermittent renewable resources. Further improvements to the current shortage pricing values could enhance the financial incentives for the construction and operation of resources with specific capabilities in desirable locations. This project has been identified as potentially beneficial in the Integrating Public Policy Market Assessment report.

Real-Time Performance Incentives

As intermittent renewable penetration increases, negative LBMP's are expected to occur more frequently. Today's settlement rules may not adequately incentivize generators to follow NYISO dispatch during negative pricing excursions. This project will continue the review of current performance incentives that was initiated in 2018, with the goal of proposing improvements with a completed market design by Q2 of 2019. This project was recommended in the 2017 Integrating Public Policy Market Assessment.

DAM Congestion Settlement Re-Allocation Automation

The NYISO has a robust set of procedures and tools for performing the monthly DAM Congestion settlements specified in Attachment N of the OATT. A portion of this process is supported by outdated software that was developed in 2007 by an outside vendor. Maintaining this externally developed code is difficult and time-consuming and does not comport with the NYISO's IT application management process and standards. Creating an in-

house automated replacement will improve application security and data integrity, ease of use, reliability of results, and improve the NYISO's ability to keep the underlying technologies of the application current.

LPTs Redesign

This project intends to improve alignment of the Load Pocket Thresholds (LPT) with expected market conditions during transmission-constrained intervals in New York City. General examples of potential improvements include:

- Increasing the frequency of fuel indexing of LPTs to be closer in time to that of the fuel indexing of references.
- Updating and improving the formula that the NYISO uses to predict Load Pocket transmission constraints in an upcoming month.

These improvements will result in a more appropriate representation of market conditions and, therefore, could result in more efficient market outcomes.

Automated Default Mitigation Implementation

Default bid mitigation is a Tariff-prescribed mitigation measure that requires the Market Participant to submit bids equal to a reference level for a period of time. This project will implement software changes to ensure that during these mitigation periods, generator bidding will conform to the Tariff rules for default bid mitigation.

Enterprise Products

Database Platform Upgrades - 2019 [Continuing]

This is a continuation of a multi-year effort to upgrade the NYISO's database systems and implement changes to improve the overall performance of critical databases. This technology lifecycle project is necessary to ensure the ongoing availability of security patches and vendor support for critical systems.

Application Platform Upgrade Phase - 2019 [Continuing]

This is a continuation of a multi-year effort to replace aging server infrastructure and migrate to a new application platform standard. This phase includes hardware/operating system migrations and middleware upgrades.

Identity and Access Management (IAM) – 2019 [Continuing]

This is a continuation of a multi-year project to improve identity and access management (IAM) controls for cyber systems and physical facilities. The IAM 2019 project builds upon the completed deliverables from earlier IAM project phases. This phase seeks to further extend automated provisioning capabilities and implement infrastructure upgrades for enhanced security and improved system availability.

Microsoft Systems Upgrade [Continuing]

This is a continuation of a multi-year effort to upgrade NYISO's aging Microsoft Systems infrastructure. This technology lifecycle project is necessary to maintain system performance and availability, as well as ensure ongoing vendor support for critical systems.

Network Infrastructure Upgrade [Continuing]

This is a continuation of a multi-year project to replace and/or upgrade network infrastructure components. This technology lifecycle project is necessary to maintain system performance and availability, as well as ensure ongoing vendor support for critical systems.

IT Service Management Improvements

This a multi-year effort to upgrade NYISO's aging IT Service Management to implement changes to improve the overall performance of a critical system. This technology lifecycle project is necessary to ensure the ongoing availability of security patches and vendor support for critical systems.

IT Infrastructure Automation

This project is the implementation of tools and processes to automate a number of infrastructure management function which support critical systems.

Network Attached Storage (NAS) Replacement - 2019

This a multi-year effort to upgrade the NYISO's Network Storage Platform. This technology lifecycle project is necessary to ensure the ongoing performance, stability, availability of security patches and vendor support for critical systems.

Operations & Reliability Products

EMS/BMS System Upgrade [Continuing]

This is a multi-year project to upgrade both the Energy Management System (EMS) and the Business Management System (BMS). The EMS encompasses the core reliability functions used by the system operators such as load flow and contingency analysis. The BMS encompasses the day ahead and real time energy market functionality.

TOA Platform Upgrade Phase III [Continuing]

This project continues the efforts started in 2016 to upgrade the TOA (Transmission Outage Application) used for transmission and generation outage scheduling and coordination by the NYISO and stakeholders. The dated platform is costly to both change and test, which limits the NYISO's ability to implement new functionality. Additionally, there is also an increasing concern with our ability to support the application on aging technologies. The goal of this project is to replace the end-of-life software and hardware of the TOA by replacing it with a new application

built on a modern technology framework that is easier to support and enhance to meet customer expectations.

PI System Upgrade [Continuing]

The PI Server currently in production is not compatible with the new version of EMS/BMS software that the NYISO is implementing as part of the multi-year EMS/BMS Upgrade Project. The PI System Upgrade project will update PI Server to a version compatible with the new EMS/BMS platform, and will be performed in conjunction with the EMS/BMS Upgrade testing and deployment. In addition, the new version of PI Server will result in decreased database licensing costs and improved maintainability and reliability.

EMS/BMS Workstation Upgrade [Continuing]

As part of the EMS/BMS upgrade project, NYISO must deploy new operator workstations that host the Network Manager (NM) platform in the control room and to run the Day-Ahead Market. The new workstations are being setup to support parallel execution of the markets in the NM-R and NM environments until we switch over to the NM platform. The scope of this project is to add new NM workstations and update the ESX cluster in place, which will run both Ranger and NM virtual workstations. This upgrade is required to be completed before the EMS/BMS System Upgrade.

Gurobi (MIP) Refresh [Continuing]

The math engine responsible for solving the unit commitment and dispatch optimization for Ranger and the EMS BMS replacement (NM) is a commercial product called Gurobi. Major releases of this product occur every two years and mainline support rolls off for a particular release after about four years. This project is to upgrade to the current version of Gurobi along with the hardware systems it runs on.

Load Forecaster Upgrade & Buildout [Continuing]

~~The NYISO's current Load Forecaster application, MetrixIDR, supplied by Itron, Inc., is nearing end of vendor support. Itron has a dedicated software development team working on enhancing MetrixIDR to meet the requirements of a global customer community. In order to mitigate risk and enhance the NYISO's load forecasting capabilities, this project would upgrade the NYISO's current version with the newest release of MetrixIDR.~~

E-Tagging Refresh and Performance Improvements

The NYISO E-Tagging software was developed in 2006, and has not been upgraded since deployment. Internal and External Stakeholders have experienced issues with the performance of the E-Tagging approval process, as well as other issues. This effort intends to update the software to improve performance and prepare for expandability to support future scheduling initiatives. This project will improve NYISO's ability to integrate initiatives pertaining to transactions and make the system more robust.

Planning Products

Interconnection Project Queue (or Portal) Automation [Continuing]

This is a continuation of a 2018 Business Requirements Project. NYISO's Interconnection Projects team currently uses a manual process to manage both the receipt of Interconnection Project requests and to manage the administration of the Interconnection Projects queue. The NYISO is experiencing a sustained increase in the number of Interconnection Project requests received. This project will implement a solution to allow for automated management of the interconnection processes to create increased efficiencies in the interconnection process and to improve customer service for parties involved in the interconnection process.

Comprehensive System Planning Process Review [Continuing]

The purpose of this project is to review the NYISO's separate comprehensive system planning processes and consider whether it may be beneficial to revise and/or further integrate the reliability, economic, and public policy planning processes.

Deliverability Base Case Automation

Deliverability analysis, as an important part of many NYISO studies, is required for NYISO business areas including capacity markets and the interconnection process. Since the deliverability base case has specific assumptions related to the modeling of generation capacity, grandfathered rights and external tie flows, the case setup takes considerable time and requires careful development. Currently, this is done manually. This project aims to develop deliverability base case using an automated process through Transmission Adequacy & Reliability Assessment (TARA) software. Automating the deliverability base case creation will significantly increase the work efficiency, reduce human error as well as mitigate potential risk in losing expertise and experience in creating deliverability base cases.