2023 Enterprise Project Candidates

Product and Project Management

May 10, 2022

This document represents potential 2023 Enterprise project candidates. Enterprise projects are internal-facing technology and back-office support projects that have no market rule changes. These project candidates and their corresponding descriptions reflect information known about each of the project candidates as of the date of this document.

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Introduction

This document represents potential 2022 Enterprise project candidates. Enterprise projects include internal-facing technology and back-office support projects that have no market rule changes. The list includes projects that may be noticeable to Market Participants. These project candidates and their corresponding descriptions reflect information known about each of the project candidates as of the date of this document. Projects are classified as four project types.

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

Enterprise projects are NOT included in the stakeholder survey. Enterprise projects that are Prioritize (not Mandatory, Continuing, or Future) are 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.

Prioritize

1 Access Management Platform Upgrade

The Access Management products support identity and access management requests, authorizations, and provisions within the NYISO organization. In order to continue receiving support from the product vendor beyond 2023, the NYISO is proposing to upgrade the Access Management platform (hardware and software).

2 Block Storage Refresh

The block storage environments at the NYISO provide corporate storage for all of the NYISO's Linux and Windows Servers as well as Oracle and SQL Server databases. Block storage is necessary for the NYISO to operate its markets smoothly and the electrical grid reliably. The NYISO's current block storage environments reach their end of life as of September 2025. Given the critical importance of this infrastructure, it is necessary to maintain vendor support for these key components in order to receive updates, patches, and on-going maintenance.

This project is the start of a multi-year effort to upgrade the block storage environments. In 2023, the NYISO will replace the corporate environment block storage, followed by the Energy Management System (EMS)/Business Management System (BMS) environment block storage in 2024. These replacements will ensure our block storage environment is stable and supported by the vendor.

3 BSS and BillSim Upgrades

The Billing Settlement System (BSS) and Billing Simulator (BillSim) applications currently use a number of outdated technologies. As part of this project, the applications will be updated to remove these outdated technologies and transfer the applications to a modern technology stack.

This project will also include development of automated tests for settlements to ensure the completeness of testing and reduce the testing effort for future changes. The current technological limitations of these applications can make it difficult and costly to manage enhancement requests or to ensure completeness of testing. The proposed upgrades would rectify these limitations.

4 BTM Solar Demand Forecasting Product Enhancements

Behind-the-meter (BTM) solar resources are continuing to grow at a significant pace across the New York Control Area. Maintaining accurate assessments of BTM solar generation capacity and performance is key to both short- and long-term load forecasting efforts. Some of the current processes for tracking solar capacity tracking and forecasting system tuning requires the manual

updating of data compilation programs and management of several databases. The manual tracking of solar BTM capacity can be an overly time-consuming process that is also inherently risky due to the increased potential for data entry/transformation errors. By replacing this process with a more automated one, the speed and accuracy with which these assessments can produced would be significantly increased. Efficiencies could be gained by introducing additional automation into the current solar forecasting capacity management along with future linkage into the NYISO Distributed Energy Resources (DER) aggregation system.

5 Budgeting Tool

The NYISO currently builds its annual budget process through a manual process using Microsoft Excel that has low visibility to internal departments outside of Finance. Files are shared through email and network distribution methods resulting in a manual workflow and process. The primary goal of this project would be to identify and procure a budgeting tool, which would increase efficiencies and visibility with the NYISO's budget development and management.

6 Building Management System (BMS) Controls Upgrade

The NYISO is proposing a multi-year project to replace the Facilities Building Management System (Building MS) at both the Krey Boulevard and Carman Road facilities.

The Facilities Building MS provides the monitoring of the electrical systems and the monitoring and control of the mechanical systems at both buildings. This system is the most important system to NYISO's Facilities staff, as it provides the operational tools and situational awareness displays to effectively and efficiently monitor and control all critical and non-critical Building Systems.

The current Building MS is twenty-six (26) years old, is end of life, and is in need of replacement. In addition, as the End-Of-Life monitoring points fail and are replaced, the replacement points are not compatible with the old BMS system.

7 Carman Security Enhancements

The NYISO is proposing a project to implement a number of physical security enhancements at its Carman Road Facility. Currently, the site is protected from vehicles by a box beam guard rail and K-4 rated arm gates but is vulnerable to pedestrian traffic.

Once implemented, these security enhancements, together with the completion of the Alternate Control Center (ACC) Control Room Renovations project, will bring NYISO's ACC to a similar level as the Primary Control Center in both functionality and security.

8 CMS and ConInvoice Data Integration

This is a continuing project from 2022. Finance manages several processes to manually update collateral, prepayments, and Market Participant (MP) transfers and refunds within the Credit Management System (CMS) and the Consolidated Invoice system (Con Invoice). This project would provide an automated solution to link CMS and Con Invoice, eliminating the need for manual data input by both the Accounting and Credit teams.

Automating product integration will result in increased accuracy in both systems and a reduction in manual and redundant work efforts.

9 Contingency Analysis Results for Transmission Owner Situational Awareness

NYISO Operations uses a software application to monitor transmission flows as compared with applicable line ratings. The application provides NYISO operators with a consolidated summary of real-time information, including actual line flow vs. normal rating, post contingency flows to applicable emergency ratings, interconnection reliability operating limit flows to limits, etc. This information can provide the transmission owners (TOs) with valuable situational awareness in real-time to identify differences in projected post contingency flows. This information can also be used to perform a Real-Time Assessment every 30 minutes as required by North American Electric Reliability Corporation (NERC) reliability standards during periods when the TOs' analysis tools are not functioning. The objective of this project will be to develop a solution to provide this information to the TOs in real time on a recurring basis.

10 Control Room Logging Replacement

Control Room Logging (CRL) is a web application created for the NYISO Control Room to record system conditions and control room activity in a consistent manner. These events, or log entries, are recorded and published manually in a daily report at the close of the energy day. Operations needs the ability to quickly change and manipulate logging menus, drop-downs, and fields/event types, which was lost over time in the current software. Simple changes, such as manipulation of the current logging items, takes a longer time to implement without this functionality. The current application has limited search options and it is hard to keep the dropdowns up to date. In addition, Operations would like to implement and application with new functionality, including the ability to integrate into existing systems (such as the EMS or outages) to capture log events automatically. The NYISO proposes to replace the current CRL application with an updated CRL that is more widely used by other ISOs/RTOs and that will meet the current functionalities and enhancements requested by Grid Operations.

11 Credit Price Spread Updates Virtual and External Transactions

Credit requirements for Virtual and External Transactions rely on price differentials at the 97th percentile between the Energy price in the Day-Ahead Market and Real-Time Market. Price differentials are currently determined utilizing data from April 1, 2005, as set forth in the Services Tariff. To ensure credit requirements adequately cover market exposure, this methodology must be re-examined. This project would evaluate the appropriate timeframe of historical data to use to determine the price differentials used in both Virtual and External Transactions credit requirements.

12 Demand Forecasting Operational Reporting Enhancements

Some of the current processes for creating daily (i. e. day-ahead and real-time forecast verification) and monthly (e.g., annual energy budget tracking, weather/DER data validation) forecasting reports require the manual updating of SAS programs and Excel spreadsheets. Efficiencies could be gained by introducing additional automation into the current extract-transform-load and data visualization processes. This automation would enable the Demand Forecasting and Analysis department to better serve the internal and external stakeholders who rely on these reports and post-processed data sets to inform operational, financial, and comprehensive system planning processes.

13 DER Operational Enhancements

The NYISO is in the midst of a multi-year project to modify existing software that will facilitate the integration of DER, most notably, developing a new aggregation system to enable the participation of Distributed Energy Resources in the NYISO Market. The NYISO will initially deploy aggregation system in 2022. The NYISO must implement additional functionality enhancements post go-live in 2023 to support seamless participation of DERs in the NYISO markets.

14 Generator Modeling Database Enhancements

Currently NYISO performs the NERC MOD-32, MOD-026 and MOD-027 standards and NYSRC I4 requirements to review and update the dynamic data of generators in the NY Control Area on an annual basis. At present, the NYISO meets this obligation using an extensive manual process which includes sending 400 emails to the Generator Owners (GOs) and maintaining the dynamics data MS Excel and MS word formats. The NYISO has approximately 700 generating units in its system and maintaining the dynamics modeling data for such a large number of generators in Word documents and Excel formats is time consuming and inefficient. This manual processing of data requires significant resources in terms of workhours, and each manual update and transfer of data represents an opportunity for error. The validation and accuracy of the dynamic models are critical, as the NYISO uses this information to develop the dynamics base cases. which is used by the various departments in Planning and Operations Engineering, as well as external stakeholders including Transmission Owners, Developers etc.

In addition, with the increase in the penetration of DERs in the system modeling, the dynamic behavior of the DERs becomes essential to analyze the reliability of the system. Maintaining the dynamic data for the number of generators and Distributed Energy Resources (DERs) connected to the NY system will entail a higher level of effort and complexity.

15 GFER Enhancements

The NYISO Generator Fuel and Emissions Reporting (GFER) software is a custom application designed for MPs to submit fuel and emissions information to the NYISO, which gives NYISO more visibility into the fuel availability and emissions limitations of the NY generation fleet. In 2020, the NYISO updated the software to improve usability, efficiency, and maintainability of the application. This project will integrate new functionality to make the system more robust.

16 Grid Operations Web Forms Enhancements

Existing Grid Operations web forms require a redesign to streamline use and increase efficiencies within Operations to allow for continued prioritization of transactions for operational purposes. As part of this effort, to the NYISO will define, implement, and review a suite of automated testing scenarios to be developed to test the screen changes, bug fixes, and improvements. This redesign will create a reusable set of automation to be used for this project and future projects to perform regression testing. Automated regression capabilities will enable higher quality, increased agility, and improved Quality Assurance and user acceptance testing labor efficiencies for all future changes to this functionality.

17 Gurobi Upgrade

The mathematical problem for solving the unit commitment and dispatch optimization is formulated using a Mixed-Integer Programming (MIP) technique. The NYISO utilizes a commercial product solution engine, Gurobi, in its software to solve this problem. Major new releases of this product that include performance improvements and resiliency features occur every two to three years. The NYISO must upgrade the Gurobi versions periodically to maintain support from the vendor.

18 ICAP Supplier Status Enhancements

NYISO's Installed Capacity Market Operations (IMO) team currently manages Installed Capacity (ICAP) supplier statuses manually. As a result, this manual tracking and accounting process requires careful attention and leads to redundant or unnecessary ICAP supplier data in the Automated Market System, because of the binary logic employed to track multifaceted ICAP supplier statuses which all adhere to unique timelines. Automatically tracking ICAP supplier

status will result in more efficient utilization of NYISO resources and reduce the potential for error.

19 IT Development and Control of Compliance Reports

The NYISO's Market Mitigation and Analysis Department (MMA) currently uses a number of reports, dashboards, and screens to comply with Services Tariff Attachment H provisions. MMA has identified areas for improvement to certain existing reports and tools, which are maintained within the MMA Department, and the need for new reports. This project would transfer to the IT Department the maintenance of controlled versions of preexisting reports, dashboards, and screens and the development of new screening tools.

This restructuring will both enhance the consistency and maintainability of current reports, as well as provide new reporting mechanisms to assist MMA in compliance with Attachment H. This effort will help to reduce the risks of non-compliance, maintainability issues, and performance issues.

20 Krey Control Room AV Replacement

The Krey Control Room and associated Operations conference room, simulator room, and gallery have displays and ancillary services that are made up of certain Audio/Video components that are end of life and no longer supported by vendors. This project will evaluate and recommend an upgrade path for all the end-of-life components in this system. Services impacted in these rooms include audio at individual desks and room, room controls (lighting, audio, cable), video feeds, and chart recorder displays.

21 LFDR Upgrade and Enhancements

The Load Forecasting Data Repository (LFDR) is currently the real-time "flight recorder" for the NYISO's operational load forecasting system. Along with being the data warehouse for both real-time (i.e., 5-min) and day-ahead (i.e., hourly) demand forecast information, the LFDR also serves as the long-term archive for weather and BTM solar forecasting and distributed inverter-based solar generation. This project will examine both migrating the LFDR to a new platform and expanding the LFDR's capabilities to include archiving of key economic data sets, integration with non-NYISO system tracking [e.g., Salesforce portal for capacity tracking) and BTM distributed energy resource data (e.g., electric vehicles, fuel-cells, energy storage, and others).

22 Machine Learning Research and Technology Pilot

Machine learning (ML) is a type of Artificial intelligence (AI) that enables software applications and platforms to predict outcomes and trends more accurately without being explicitly programmed to do so.

This project involves a collaboration between NYISO's Market Mitigation & Analysis team and IT, to assess potential new business innovation opportunities using ML that could benefit the NYISO. The project begins with an external consulting engagement to conduct research and facilitate the identification of a potential use of ML, then moves to a technology pilot leveraging currently available ML services to demonstrate specific ML capabilities.

23 Market Validation, Reporting, and Penalty Tracking Enhancements

The NYISO's IMO team administers several manual market validation and reporting processes as well as ICAP Supplier penalty calculations that are achievable only through software developed and tested within IMO. These tools and processes include (i) the Spot Market Validation tool to independently recalculate the Spot Auction clearing price and analyze MP behavior, (ii) the ICAP Market Report to post recent and historic market data publicly and which replaces the annual ICAP Market report to FERC, and (iii) Dependable Maximum Net Capability penalty calculations authorized by the Market Services Tariff. The project will enhance the ICAP AMS to include functionality that automates each of these important tools and processes.

24 Meter Services System

Meter Services Entities (MSEs) provide metering and meter data services for various entities within the NYISO markets through existing Tariff rules supported by the NYISO MSE Manual, Revenue Metering Requirements Manual, and MSE Registration Packet. Currently, however, the administrative functions to support the collection and auditing of meter inventory data from both MSEs and Member Systems are being performed through spreadsheets and manual processes.

The objective of this project is to develop a software application for better management of meter inventory data provided by MSEs and Member Systems. This application would be accessible by external entities (MSEs and Member Systems), as well as NYISO Customer Settlements and other internal NYISO departments for viewing and reporting purposes.

25 Modernizing ASIS

Automated Suspect Identification System (ASIS) is the rule engine used to validate the market outcomes, including prices, generated by Network Manager (NM) application. ASIS performs a critical function for Market Validation. It helps ensure that NYISO can thoroughly validate the market outcomes, to the extent possible, which helps provide reasonable assurance that prices are reflective of system conditions.

ASIS currently use a number of outdated technologies and depends on multiple databases and external interfaces.

The objective of this project is to remove these outdated technologies and transfer the applications to a modern technology stack. This multi-year project will also include consolidating

dependencies on external interfaces and development of automated tests to reduce the testing effort for future changes Natural Gas Notices Enhancement Project

The NYISO receives email notifications from natural gas pipelines and local distribution companies ranging from informational postings, planned outage data, capacity constraints, Operational Flow Orders, force majeure, interruption of service notices, etc. These notices contain a significant amount of information but are often cumbersome to process and quickly obtain relevant information for real-time operations. This project would enhance NYISO Grid Ops situational awareness of critical, real time gas notices by developing a system for managing the notices and providing relevant information to the NYISO operators.

26 Network Manager Cisco Refresh

The NYISO's current EMS/BMS hardware and software will be end-of-life in 2024. It is critical that the EMS.BMS hardware and software remain stable, and vendor supported, so the NYISO cannot extend the use of the hardware and software past their end-of-life dates. This project is a multi-year effort to replace the current hardware and upgrade the software and migrate Network Manager to this new platform.

27 Next Gen Security Architecture

The Access Management products support identity and access management requests, authorizations, and provisions within the NYISO organization. In order to continue receiving support from the product vendor, the NYISO is proposing to upgrade the Access Management platform (hardware and software).

28 OASIS Reliability Improvement

The underlying storage technology used by the OASIS application to publish critical business documents to mis.nyiso.com must be replaced to provide for a more efficient and reliable delivery process. This project will be the start of a multi-year effort to replace this storage technology. This year, the NYISO will pilot a new technology solution utilizing a few of the existing OASIS postings to gauge success before selecting solutions and future year deployment.

29 OMS Enhancement

The NYISO proposes adding two functions to the NYISO's new Outage Management System (OMS). First, the NYISO plans to develop functionality in OMS that will support Transmission Owners' and Generation Owners' ability to upload and download transmission and generation outage requests via XML, with the existing Transmission Outage Application (TOA) provides. Implementing an XML interface will reduce risks of manual entry errors. The development of this functionality will be supported internally and by consultant.

Second, the NYISO plans to develop a new Available Transfer Capability (ATC) report within OMS to aid in transfer limit coordination with our neighboring Reliability Coordinators. Within TOA there is the possibility of having differences in limits on NYISO external interfaces with its neighbors, which creates inefficiencies and MP risks.

The NYISO expects to go-live with OMS in Q4 2022, and these functions would be added to the application in 2023.

30 On-Boarding of New Resources

Improving the current process for on-boarding new resources will be required to facilitate the rapidly increased volume of resources using battery storage, solar and/or wind technologies that are seeking to participate under the multiple participation models (*e.g.*, ESR, Solar, Wind, CSR, DER/Aggregations, and HSR), and to mitigate the significant strain on many NYISO departments. The NYISO seeks to streamline processes and provide educational material that focus specifically on the on-boarding process. The educational material is expected to be targeted by technology type and/or participation model and cover a broad range of information that spans the various stages of the on-boarding process, *e.g.*, early stage interested entities that are assessing the New York market, developers working towards market participation and MPs with project specific technical questions.

The project will document the current on-boarding processes, identify opportunities to streamline those processes, and create easily accessible self-serve on-boarding educational material that include, but are not limited to FAQs, checklists, knowledge articles, info graphics and training videos.

31 Ongoing TCC Collateral Coverage Assessment Tool

Transmission Congestion Contracts (TCC) credit requirements have been developed and analyzed in collaboration with the NYISO's outside consultant over several years. These requirements utilize current market clearing prices to mark to market TCCs and update the amount of credit coverage held by the NYISO. As time passes and data becomes available, the NYISO has worked with its outside consultant to back test this methodology in order to ensure appropriate collateral coverage is maintained. However, the NYISO credit team currently does not have the ability to track ongoing collateral coverage as auctions occur and updated data becomes available.

The objective of this project is to design and develop an ongoing collateral coverage assessment tool utilizing a defined set of metrics to provide the credit team the capability to monitor TCC collateral coverage.

32 Outage States Portal/Dashboard

The NYISO's IMO team administers ICAP Supplier outages states procedures in coordination with the NYISO's ICAP MMA and Scheduling departments. This process requires frequent email

communication with ICAP Suppliers and careful and consistent tracking of internal and external communication regarding ICAP Supplier outages over long periods, 6-12 months or longer.

The project will develop software, "Outage States Portal," for more effective tracking of outages, and closer coordination and communication between the NYISO and the impacted Market Participants and tracking and communication of tariff-defined deadlines.

33 Price Correction Report Modifications

The Market Administration and Control Area Services Tariff Attachment E prescribes NYISO's reporting requirements pertaining to price corrections. The NYISO's Market Validation (MV) team currently uses software built in 2014 to produce a Price Correction Report following the processing of price corrections to inform MPs about the details of those price corrections as required by the Tariff. The MV team proposes enhancements to the software used to produce these reports to streamline and improve the efficiency of the process, including removal of extraneous fields from the user interface and improving the searchability of past correction details.

34 Redundant Wind/Solar Forecast Feed - Independent Vendor

There are more than 5,000MWs of intermittent wind and solar resources for which the NYISO Energy Markets require forecasted production (including BTM Solar). This number is expected to grow rapidly in the coming years to meet New York State's aggressive renewable generation targets. The NYISO uses an outside vendor to provide these forecasts for the Day-Ahead and Real-Time Energy Markets. However, if the NYISO's forecast vendor were to experience an interruption in its ability to deliver forecasts for an extended period of time, such an outage would have a detrimental impact on the efficiency of the NYISO's Energy Markets. Ramifications of such an interruption will only grow larger as the markets rely on more and more intermittent resources. With this effort, the NYISO seeks to establish a secondary intermittent forecast vendor to create redundancy for this critical process. This is analogous to the redundant weather feeds NYISO subscribes to from two different vendors today for demand forecasting.

35 Secure Communication Channel with MPs

MMA and MPs currently exchange information primarily via email. This project would either leverage existing platforms used by the NYISO or implement a new platform that would allow MMA and MPs to exchange information in a more efficient and secure manner.

36 Settlement Systems Effective Dating and Filtering of Billing Entities

Settlement Systems generate invoices for all MP billing entities in the NYISO Market Information System. Currently, because these entities are not effective dated, when an invoice runs, it is processed for all entities, including those either no longer in the NYISO markets or not active in

that billing hour. This results in the generation of large volumes of empty or zero records. These records are more than 55% of the records created each day, equating to one million per market day or half a billion per year. This generation of empty records impacts multiple areas within the Finance systems, including settlements, credit, working capital, and the DSS ADD reports, leading to inefficiencies and potential errors. This project will update the Settlement Systems to filter and eliminate resources and billing organizations that are not currently active from being included in billing calculations, thereby reducing the volume of meaningless data from being produced in each billing run.

37 Smart Grid Upgrade

This project will upgrade the software application which is being used by Grid and Market Operations in creating new signals (e.g., active, reactive power signals), calculating phase angle differences, and setting different alarm thresholds, such as voltage, frequency, oscillation energy, etc. from version 2017 to 2002 Currently, Grid and Market Operations are using the 2017 version of this software in production. The software vendor released a new version of the application in December 2020. This release incorporates enhanced functionalities and new features that NYISO Operations can benefit from improved visualization and situational awareness. In addition, one of the key features of the 2020 version is the data compression, which helps to reduce the storage requirement. Storage of PMU data is a recurring issue due to the vast amount of real time and historical data that is being stored.

38 Transaction Modifications API

The NYISO works closely with its neighboring external control areas to process external transactions. The current communication methods between NYISO and the external control areas consist of email and MS-Excel files.

This project seeks to implement an interface that would allow external control areas to pull transactional data on a periodic basis and eliminate the manual processes of creating and emailing spreadsheets back-and-forth with the NYISO. also Implementing such an interface would improve the NYISO's efforts to comply with NERC and NAESB standards for Inadvertent Accounting.

39 Watchlist for Rest of State Units

Currently in the Rest of State (ROS) locale, a method to automatically mitigate generators which can impact prices in their locations does not exist. ROS generators are subject to mitigation for guaranteed payments and prospective mitigation in response to Locational Based Marginal Price impacts. On occasion, new facilities are added to the network model, which could present opportunities for generators to exercise market power. These new facilities change the topology in a manner which makes certain existing facilities the only option to relieve constraints, thus putting them in a position to exercise market power. In order to effectively monitor these units

for potential mitigation, MMA requires an automated method to gather information needed to evaluate conduct. There is currently no automated report that gathers the information needed to determine if market power is triggered by existing units.

Continuing

40 Application Platform Upgrade

In order to keep the NYISO markets running smoothly and operate the electrical grid reliably, the NYISO must upgrade the underlying application platform infrastructure periodically to ensure the ongoing availability of security patches and vendor support for critical systems. Additionally, software vendors release new features in new application platform versions that the NYISO can often utilize to improve the overall performance, support, and maintenance of applications used in the running of the NYISO markets. This project is a continuation of a multi-year effort to replace aging application platform infrastructure and migrate to a new application platform standard. This technology lifecycle project is necessary to ensure the ongoing availability of security patches and vendor support for critical systems.

41 Database Upgrade

In order to keep the NYISO markets running smoothly and operate the electrical grid reliably, the NYISO must upgrade the underlying databases periodically to ensure the ongoing availability of security patches and vendor support for critical systems. Additionally, software vendors release new features in new database versions that the NYISO can often utilize to improve the overall performance, support, and maintenance of databases and applications that use them. This project is a continuation of a multi-year effort to upgrade the NYISO's database systems to the latest software version 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.

42 EMS/BMS Operational Enhancements

The NYISO completed a multi-year project in 2020 to upgrade both the EMS and the 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. In 2020, the NYISO kicked off the multi-year, EMS/BMS Operational Enhancements Project to implement additional functional enhancements identified as post go-live changes. This project is a continuation of this effort.

43 IT Infrastructure Automation

The focus of this continuing, multi-year effort is on increasing automation of various IT management activities. By enhancing the NYISO infrastructure with supporting processes and current and prospective tools, the NYISO will be increasingly responsive in supporting the frequency of change required by the business. Automation of activities, such as patching and upgrade processes, will also serve to improve the NYISO's security posture while reducing business impact of services.

44 ITSM Security Enhancements

Cyber security threats continue to grow and become more sophisticated, requiring NYISO to rely on tools and processes to protect its IT assets and services. The IT Service Management (ITSM) Security Enhancements project is a multi-year effort to automate the discovery of hardware and software assets and services in NYISO's on-premises and hybrid cloud environments, track and manage the lifecycle of security vulnerabilities, provide an end-to-end solution for security incident response, and automate data collection and reporting for Critical Infrastructure Protection process optimization. This project builds upon NYISO's investment in a strategic unified platform designed to transform business and IT processes with digital workflows.

45 Microsoft 365 Enhancements

Following work on the Microsoft 365 implementations of Teams, Exchange Online, Office 365, Intune, Information Protection and Defender services in 2021 and 2022, the NYISO will continue to build the value of our Microsoft 365 subscriptions by expanding the NYISO's adoption of Microsoft 365 cloud services, reducing the size of the NYISO's on-premises infrastructure footprint and the corresponding administrative overhead, freeing up NYISO staff for higher-value work. This project will provide access to new features and capabilities not available in an on-premises deployment, including security and information protection enhancements. Implementing transformative cloud technologies with the continued implementation of Microsoft 365 positions the NYISO to improve service, features, and functionality to both internal and external customers.

46 Network Infrastructure Upgrade

The NYISO network infrastructure includes many different components that are critical to delivering networking services to NYISO end-users, business units, and external customers. Such components include key infrastructure such as switches, routers, firewalls, and other network devices that interconnect and protect our systems. All of these components require active vendor support to provide 24x7 assistance and to receive necessary updates to protect from vulnerabilities. A number of the NYISO's network infrastructure components are entering the vendor-mandated end-of-life state. As a result, the NYISO will no longer receive necessary

security patches to mitigate new cyber risks and/or software bugs once that threshold has been passed.

Given the critical importance of this infrastructure, it is necessary to maintain vendor support for these key components in order to receive updates, patches, and on-going maintenance. This project is a continuation of a multi-year effort to continue replacing outdated hardware with the objective of providing secure service delivery while modernizing and streamlining the NYISO's data centers in accordance with current industry best practices and vendor recommendations.

47 Unified Communications Platform

With the NYISO moving indefinitely to a hybrid workforce, there is a need for an easy-to-use audio and video solution that supports hybrid meetings for in-person and remote attendees. Purchases in 2021 and 2022 were made to outfit the most commonly used conference rooms at both our Krey and Carman facilities with new audio and video equipment. In 2023, there are nine remaining small to mid-sized conference rooms that will need to be outfitted as well as our large conference rooms which will audio visual upgrades to support large meetings for internal and external participants. The NYISO has recently returned to hosting in person meetings for MPs and will need to provide an interactive way for participants to join remotely if they cannot attend in person.

48 UPS Replacement

The NYISO is proposing a multi-year project to replace the two Uninterruptible Power Supply (UPS) Systems located at the Krey Boulevard facility in Rensselaer. These UPS systems provide "clean" power (i.e., power which is free of electrical noise and voltage spikes and drops) to all mission critical loads including the Primary Control Room and Data Center.

To provide full redundancy, the systems are in a 2N configuration, meaning that each unit individually can support all mission critical equipment. Therefore, if one unit is taken out of service for whatever reason, the second unit can serve the full mission critical electric load.

The existing UPS systems were installed in 2006 when NYISO first moved into the building at 10 Krey Blvd. In 2022, the units will be sixteen (16) years old, end-of-life and will need to be replaced. In addition, NYISO has been notified that the manufacturer will no longer be able to support these systems after March 2023. While the UPS is being replaced at Krey Blvd, primary control room operations will be performed out of the Carman Road facility. By having the ACC Renovations project completed, NYISO Operations can operate from the ACC for the 2–3-month duration of the UPS Replacement to be completed by March 2023.

As of March 2022, the project team is obtaining bids for the two new UPS systems. The new systems will be ordered and received by the end of 2022 with installation scheduled for late Q4 2022 – Q1 2023.

49 Windows System Upgrade

This project is a multi-year effort to upgrade NYISO's aging Windows Systems. Corporate Control Room Network Manager desktops are required to support the daily responsibilities of the Control Room Operators. Given the age of the existing fleet of these desktops, it is expected they will fail at an increasing rate, making the need for vendor support a high priority. Included in the effort will be the replacement of NYISO Network Manager workstations that have reached end-of-life (out of warranty support starting in 2021). This technology lifecycle project is necessary to maintain system reliability, performance, and availability, as well as ensure ongoing vendor support for critical systems.