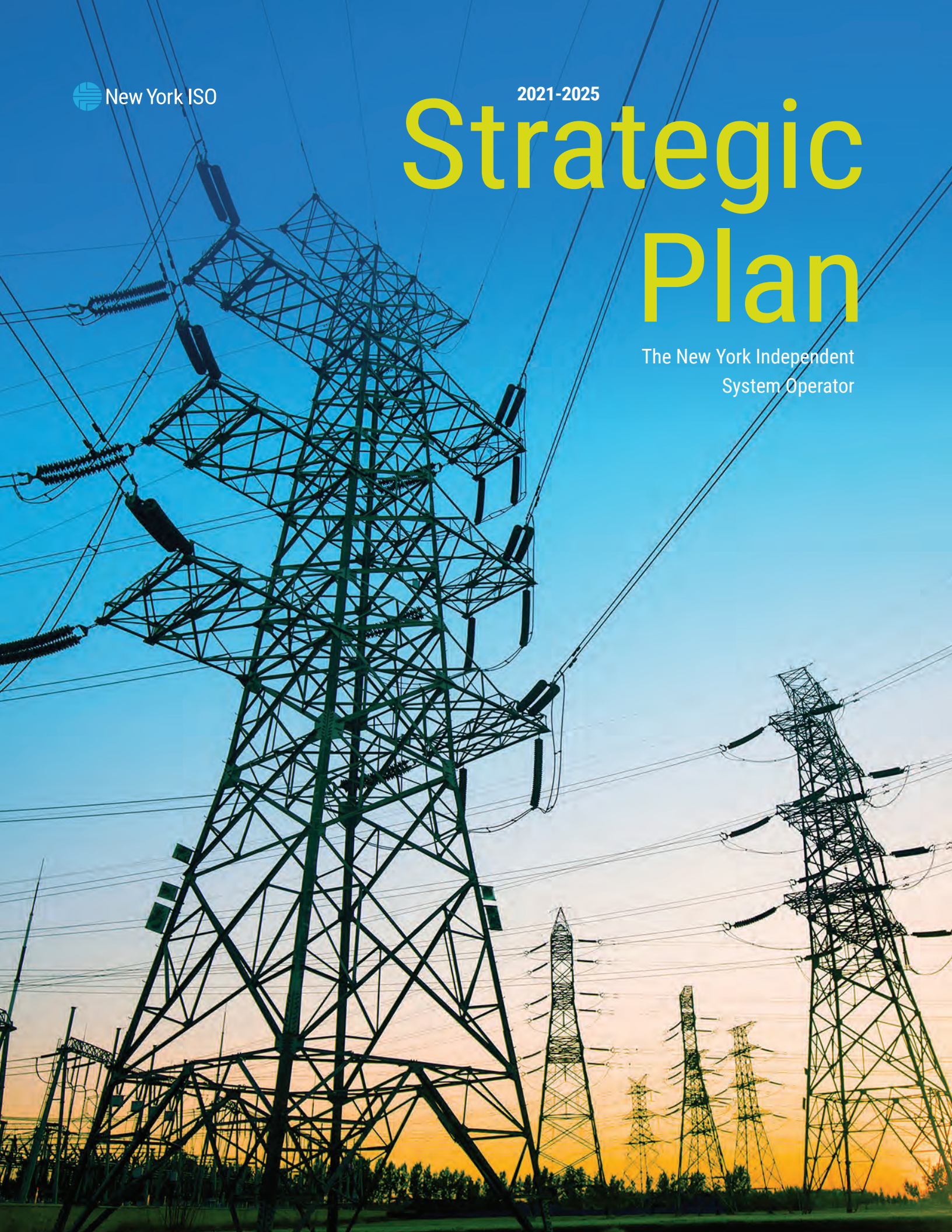
New York ISO

2021-2025

Strategic Plan

The New York Independent System Operator



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Message from the President and Chief Executive Officer

We at the New York Independent System Operator (NYISO) are committed to a future energy grid that reliably serves all New Yorkers. Despite the unique and unexpected challenges of COVID-19, we continue to lead the way to help New York meet its clean energy mandates.

As the organization responsible for reliably operating the bulk electric system, planning the power system for the future, and administering the wholesale electricity markets, we play a critical role in implementation of the state's Climate Leadership and Community Protection Act (CLCPA). The CLCPA seeks to achieve 70% of electric grid generation from renewables by 2030, and zero-emissions electricity by 2040.

The NYISO continues to view our wholesale, competitive electricity markets as necessary to reach these mandates. We view markets as an essential, effective platform for achieving public policy with heightened importance during this period of fiscal strain. The *2021-2025 NYISO Strategic Plan* highlights opportunities to adapt our market structure and prepare for a future grid that is less centralized, more resilient, and cleaner. As the grid continues to see growth in new technologies such as energy storage, distributed energy resources and renewable energy, the NYISO continues to develop market enhancements to support the changing system. We must prepare for a future grid increasingly made up of intermittent resources while maintaining reliability and achieving the lowest cost for consumers.

The NYISO continues to engage with stakeholders, policymakers, and regulators to be a center of transformation for the grid. An example of this effort is a plan for adding carbon pricing to the wholesale energy market. A social cost of carbon dioxide emissions, established by the state and reflected in wholesale energy markets administered by the NYISO, would leverage the efficiency of the markets and give energy suppliers the incentive to invest in cleaner technologies. Carbon pricing continues to gain traction, with more and more organizations recognizing the benefits that carbon pricing would bring to environmental justice communities and to consumers.

The NYISO remains committed to maintaining the high degree of reliability that New Yorkers expect and deserve. The weight of this duty was driven home earlier this year with the advent of the COVID-19 pandemic. We immediately took steps to protect the safety and health of our operators, operating out of dual control centers that were both sequestered from the outside world, which we continued until infection rates went down in New York. At the same time, we moved to a work-from-home scenario for most of our employees, and to virtual meetings for our stakeholders, with a steadfast resolve to deliver on our commitments. For the first time, our Board of Directors and Management Committee met remotely in June instead of in person. Despite the virtual format, the discussions allowed for meaningful feedback on the organization's strategic focus.

Now more than ever, we face both great challenges and great opportunities. We look forward to the collaboration necessary to develop the grid and markets of the future. It is our privilege to reliably serve New York's energy needs.

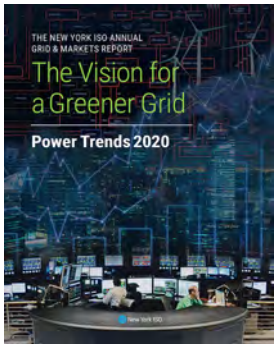
Sincerely,

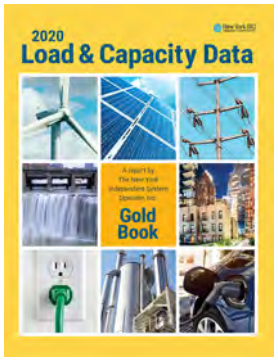
Richard J. Dewey

President and CEO

Key Accomplishments

The past year was distinguished by several notable accomplishments. In addition to maintaining expected system reliability, the NYISO added new critical infrastructure and continued to support New York State policies requiring the development and reliable integration of new renewable resources and distributed energy resources. These accomplishments include:



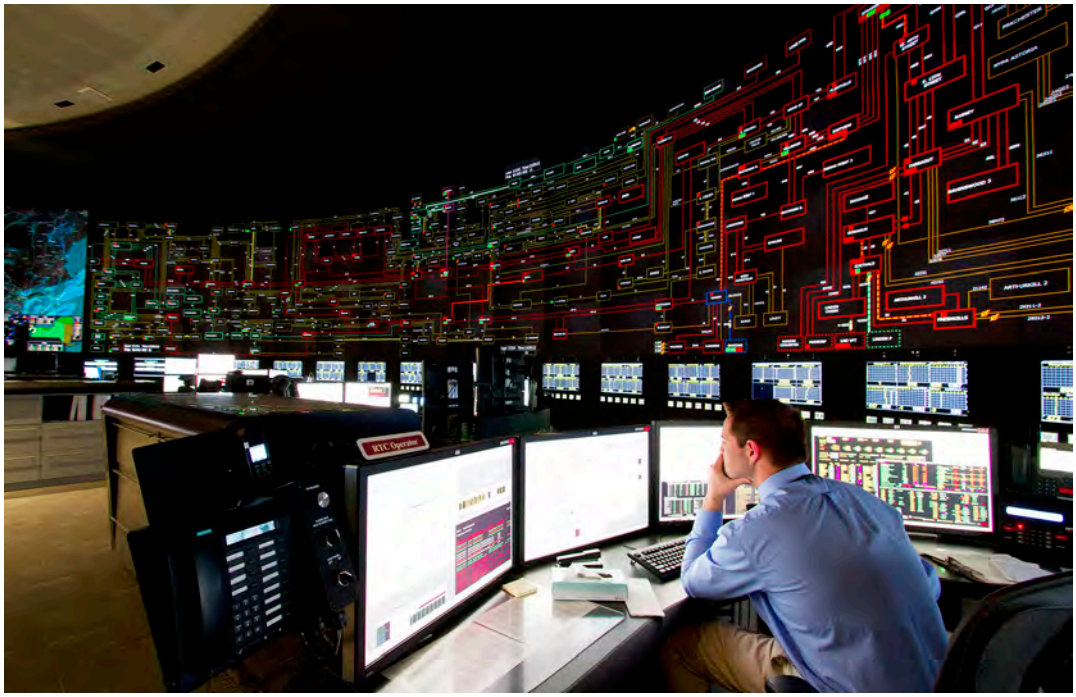


► Download these reports and other NYISO reports, at www.nyiso.com/library

- Rapidly implemented a comprehensive **pandemic response plan** to protect staff, market participants and all other stakeholders, enabling continued delivery on the NYISO mission to maintain reliable grid operation. Actions included sequestration of 37 operations staff and support personnel at the NYISO control centers
- Conducted four **key studies** — the *2019 CARIS* "70x30" scenario, the 2020 *Climate Change* study, the *2020 Reliability Needs Assessment* and the 2020 *Grid In Transition study* — to investigate the reliability and market aspects of potential resource mixes to satisfy New York's Climate Leadership and Community Protection Act (CLCPA)
- Continued to explore the benefits of **carbon pricing** with stakeholders as a key opportunity to use the NYISO's competitive markets to help achieve the CLCPA. Additional information is regularly posted on the carbon pricing landing page
- Implemented **Energy Storage Participation Rules** allowing Energy Storage Resources (ESR), such as batteries, to fully participate in wholesale electricity markets
- Implemented a **Renewable Exemption** to Buyer Side Mitigation that supports entry of new renewable resources into the capacity market while maintaining competitive price signals. Proposed enhancements to the Buyer Side Mitigation Part A tests to sustain competitive market signals and align with public policy and goals. Both of these efforts are part of the **Comprehensive Mitigation Review**
- Received FERC acceptance of the NYISO's **DER Participation Model,** which is the first comprehensive set of rules for integrating DER aggregations into US wholesale energy and capacity markets
- Furthered rules to allow co-located energy storage and renewable resources to participate in the wholesale energy and capacity markets under its **Hybrid Co-Located Model** effort
- In order to support grid reliability with the expected additions of renewable resources envisioned in the CLCPA, completed design of **Solar on Dispatch** participation model
- Advanced important improvements in our energy and ancillary services markets with stakeholder support for **Reserves for Resource Flexibility** and **Ancillary Services Shortage Pricing** designs
- Held the NYISO's first-ever virtual **Joint Board of Directors and Management Committee meeting** at which important feedback was shared on the topics *Navigating Uncharted Territory* and a *Grid in Transition*
- Completed the **Demand Curve Reset** for 2021-2025, a periodic review of the NYISO's ICAP Demand Curves that ensures the capacity market continues to efficiently support reliability and send accurate, transparent price signals
- Successfully implemented **EMS/BMS**, a multi-year project to upgrade both the Energy Management System (EMS) and the Business Management System (BMS), which will position the NYISO to make needed market changes as we transition to a sustainable and distributed power grid
- Finalized **Class Year 2019**, with 78 projects completed in record time, representing a significant increase in the number of clean energy projects seeking interconnection

- Published the **2020 Gold Book**, a vital tool for staff, market participants, and energy industry stakeholders providing load and capacity data for the years 2020 to 2030, with energy and peak forecasts provided up to 2050
- Building on our role as an **authoritative source of information**, added blogs and podcasts to our website regarding key industry issues and trends
- Received extensive **national media coverage** from leading news outlets, including the Washington Post and New York Times on how the NYISO has maintained grid reliability in the face of COVID-19
- Issued the **Corporate Social Responsibility Report 2020**, a new yearly publication that quantifies the size and power of the NYISO's social responsibility footprint, identifying employees who volunteer, give to charities, and actively work to help others
- Published **Power Trends 2020**, focusing on how the grid is being shaped by the CLCPA and other policies. The report also highlights opportunities for the NYISO markets, operations, and planning processes to support the renewable and carbon reduction mandates set forth by the CLCPA
- Continued the **IT Strategy** evolution to position the NYISO with the flexibility and agility to comprehensively respond to emerging industry trends through a modern software delivery methodology and expanded automated testing capability; increased IT infrastructure automation and continued adoption of cloud computing infrastructure for targeted solutions
- Continued the **Cybersecurity Strategy** through a wide range of enhancements to the Cybersecurity Operations Center (CSOC) providing a comprehensive 24/7 security operations capability

These key accomplishments build upon the organization's ongoing commitment to lower grid management charges, improve compliance with applicable reliability standards, and facilitate industry compliance with and achievement of state policies, and lower the cost of electricity to consumers across New York.



Grid Operator in the NYISO Control Center.

The NYISO

Introduction

The NYISO, which began operating in 1999, is a not-for-profit corporation primarily regulated by the Federal Energy Regulatory Commission (FERC). The governance, structure and mission of the NYISO comply with the guiding principles in the FERC's open access regulations — Order Nos. 888 and 2000. The NYISO is governed jointly by an independent Board of Directors and market participants (transmission owners, generation owners, other electric power suppliers, end-use consumers, public power and environmental sectors). In accordance with a rigorous code of conduct, NYISO board members and staff are required to be independent from the interests of market participants.

The NYISO is responsible for operating New York's bulk electric system, administering wholesale electricity markets, and conducting system planning. The creation of the NYISO has resulted in reliability and economic benefits for New Yorkers while contributing to unprecedented environmental gains. For the past 20 years, the NYISO's markets have worked to improve system efficiency, supporting a shift toward cleaner sources of generation while upholding the nation's most stringent reliability rules.

Core Values and Mission

The core values and mission of the NYISO establish the foundation from which all of our responsibilities are delivered. Together, they provide the basis for the NYISO's Strategic Objectives, as well as a reference point to guide decision making and actions at all levels of the organization.

Core Values

The core values of the NYISO form the foundation on which we conduct ourselves. The core values are the basic elements of how we go about our work every day in everything we do.

Mission

The mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefit to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policymakers, stakeholders and investors in the power system

Reliable Operations

Maintaining system reliability is the cornerstone of the NYISO's mission, shaping how we operate, design markets, and conduct system planning. Through the efforts of a highly dedicated and skilled workforce, the NYISO manages the flow of electricity across more than 11,000 miles of high-voltage transmission lines serving New York on a minute-to-minute basis, balancing supply and demand throughout the state in accordance with the federal policy of open and non-discriminatory access to the grid.

Working with transmission owners, the New York State Reliability Council (NYSRC), the Northeast Power Coordinating Council (NPCC), and the North American Electric Reliability Corporation (NERC), the NYISO adheres to the nation's strictest set of reliability standards, which include nearly 1,000 requirements designed to promote reliability for New York consumers. To provide the lowest cost power available to reliably meet consumer needs, the NYISO conducts and monitors competitive auctions of wholesale electricity every five minutes, every day of the year.

The NYISO's primary power control center, opened in 2014, is among the most technologically sophisticated facilities of its kind in the world. The control center enables improved operator visibility of wide-area and local grid conditions, enhanced integration of new technologies, and provides many of the situational awareness displays and other tools needed to meet strict requirements for the monitoring and control of the bulk electric system.

Efficient Markets

As market administrator, the NYISO conducts a continuous series of auctions in which load serving entities bid to purchase electric energy offered for sale by suppliers. Similarly, the NYISO administers markets to purchase balancing requirements and

various ancillary services needed to maintain system reliability. The NYISO also operates markets that allow market participants to purchase the installed capacity needed to meet resource adequacy requirements established by the NYSRC. Energy service companies and end-use consumers can provide demand response resources and compete with other suppliers in several of these markets.

Pursuant to its tariff, the NYISO maintains credit requirements that seek to ensure that all market participants entering into transactions provide reasonable assurance to protect the market from the potential for payment defaults. The NYISO's independent market monitor and internal market mitigation and analysis group continually surveil the markets for attempts at manipulation, identify potential market improvements, and report any violations of the tariffs to FERC.

Comprehensive Planning

The NYISO's Comprehensive System Planning Process (CSPP) is a unique, "all source" planning process that evaluates transmission, generation and demand response on a comparable basis.
It is the primary tool for the NYISO to inform transmission expansion and electric infrastructure investment decisions in the New York Control Area (NYCA).

Developed through its stakeholder governance process, the CSPP establishes a process for identifying reliability and economic needs, as well as transmission needs driven by public policy requirements. This process also establishes the procedures whereby solutions are proposed, evaluated and implemented in order to maintain the reliability of the bulk electric system, reduce system congestion, and respond to identified transmission needs driven by public policy.

Governance

The NYISO strives to achieve its strategic objectives with the guidance of government policymakers and regulators, and the direct

involvement of market sector stakeholders. As it serves the greater interest of the state and the people of New York, the NYISO's efforts are most visible in the forum it provides to share ideas on how to resolve issues and solve problems. With more than 400 market participants, the NYISO engages a wide spectrum of interests, including representatives from public power and environmental parties, end-use consumers, transmission owners, generation owners, and other suppliers.

The governance structure includes three standing committees — the Management Committee (MC), the Business Issues Committee (BIC), and the Operating Committee (OC). Each committee oversees its own set of working groups, subcommittees and task forces. The NYISO's achievement of its objectives depends on the active involvement of participants in the shared governance process.

Responding to the Changing Grid

Historically, electric power flowed from generators across a vast network of transmission and distribution lines before reaching consumers. Energy usage and peak demand grew incrementally, year by year, and growing demand for energy was met through physical expansion of the grid to increase its generating and delivery capacity.

While demand on the grid may no longer be growing at historical levels, planning and operating the grid has grown more complex. Technology, economic forces, and public policy are shaping a more dynamic grid. We are moving away from historical patterns of supply and demand, and towards emerging trends that reflect advances in how electricity is generated and consumed. Public policies are expediting this transformation with a focus on achieving environmental mandates, in particular the passage of the Climate Leadership and Community Protection Act.

This means historical, predictable demand patterns that characterized infrastructure planning over much of the last century are shifting. Consumers, increasingly empowered with intelligent digital technologies and advanced communications tools, are becoming active participants on the grid — adjusting their energy use patterns to reflect grid conditions, and tailoring their energy use to meet their own needs for economic and clean power.

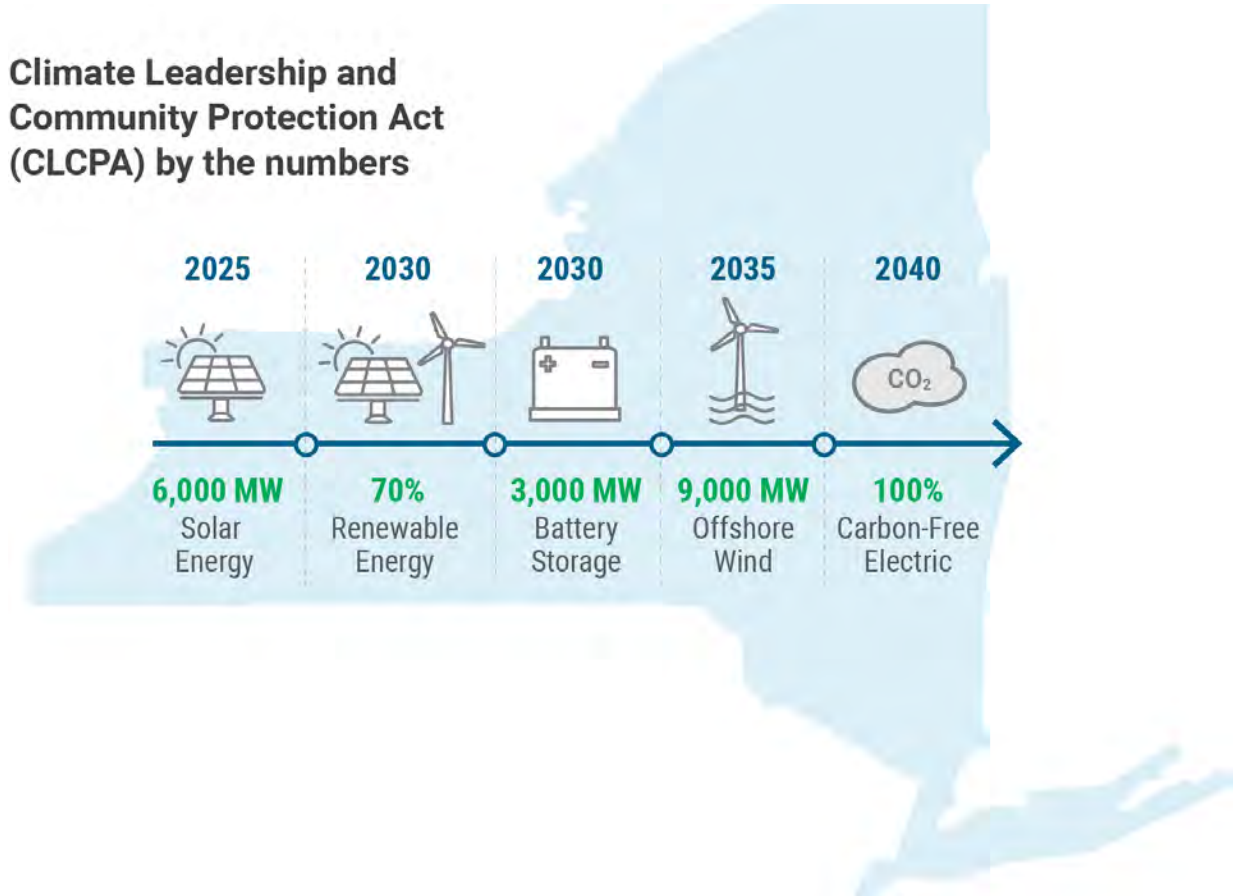
An important step in supporting New York's ambitious clean energy goals is to study the future grid to promote a better understanding of changes that will be needed on the grid, including emerging technologies, to maintain reliability. This dynamic introduces new variables that the NYISO is uniquely poised to meet through competitive wholesale electricity markets. In collaboration with policymakers, regulators and market participants, the NYISO will continue to leverage our expertise in operating New York's power grid through advanced market design and open, transparent system planning in order to reliably and efficiently respond to the energy needs of all New Yorkers.

2021-2025 Strategic Plan

Strategic Perspective

Entering a new decade, the NYISO is at the center of the electric industry's transformational change as New York State pursues the most ambitious clean energy mandates in the country. Led by the CLCPA, the state is moving away from traditional, controllable fossil fuel generation to non-emitting, weather-dependent intermittent resources, energy storage and distributed generation. The level of change needed to meet the CLCPA is without precedent.

Signed into law in 2019, the CLCPA seeks to advance the adoption of clean energy technologies across the economy while promoting the transition to a carbon-free power grid. It calls for 70% of the electricity consumed by New Yorkers to come from renewable sources by the year 2030 and 100% zero-emission sources by 2040. In order to achieve these ambitious goals, the state seeks 9,000 megawatts (MW) of offshore wind, 6,000 MW of solar power, and 3,000 MW of battery storage. As the state moves to a largely renewable resource base, it is anticipated that the electrification of technologies across end-use sectors, including transportation, heating and industry, will occur on a wide-scale.



The NYISO is fully engaged with stakeholders and policymakers to identify the challenges and opportunities these new standards present to bulk power system reliability and efficiency. Insights from the aforementioned Comprehensive System Planning Process, other system simulations, and the recent *Grid in Transition* study initiative all support the NYISO's Strategic Plan. These efforts are designed to allow the NYISO to stay a step ahead of necessary changes and ensure that reliability continues to be supported by the most innovative wholesale market design established to keep power flowing at the lowest possible cost. Understanding the potential reliability and operational ramifications of the changing resource mix helps the NYISO evolve wholesale market design to maintain reliability and efficient market operations.

Download our many reports:

Visit www.nyiso.com/library to download the CARIS report, Gold Book, Public Policy Planning Reports, and other NYISO planning reports.

To identify longer-term market, planning and operational enhancements, the NYISO is conducting a number of important studies including the *Congestion Assessment and Resource Integration Study* (CARIS), which includes a scenario analyzing the CLCPA's target of 70% renewable energy production by 2030, and a *Reliability Needs Assessment* (RNA) to evaluate system needs through 2030. The NYISO is also undertaking a multi-phase *Climate Change Impact & Resilience Study* to inform future market, planning and operational enhancements that might be necessary to meet system needs and conditions as demands on, and conditions faced by, the grid change over time.

Currently, the NYISO's assessment of emerging reliability issues indicates that the future challenge stems from the variability and unpredictability of wind and solar generation. As the penetration of these technologies increases, it is likely the grid will need more load-following capability and more fast-response and flexible resources that provide operating reserves to address expected and unexpected changes in net load. The grid will also need a substantial amount of installed reserve capacity that is available to serve load when wind and/or solar generation output is insufficient for periods that may range from minutes to several days. In addition, the need for strategic transmission investments that enhance the operational flexibility of the grid and accommodate the integration of high levels of intermittent renewable generation will be important to examine.

In transitioning from today's grid to the 2040 system and beyond, the NYISO is taking steps to ensure we continue to provide optimal value to our stakeholders, not only through reliable, efficient, forward-minded planning, markets, and operation, but also by refining our business model, safeguarding our financial integrity, and increasing our functional agility on an on-going basis. A key part of the NYISO's organizational strength results from our ability to attract, develop and retain talented staff capable of performing collaboratively at the highest level of competence. In the rapidly changing environment of the grid in transition, the commitment and expertise of our employees is our greatest asset.

Strategic Objectives

Six strategic objectives underlay the various initiatives of the NYISO and provide guidance for the allocation of human, financial, and technological resources. These objectives instill discipline to the use of resources, helping to evaluate and prioritize the NYISO's investments toward those activities that best meet the goals articulated by each objective.

1. **A Leader in Reliability**
   - Promote resource adequacy and transmission security now and in the future.
   - Sustain and enhance reliable operation of the bulk electric system and the wholesale electricity markets.
   - Provide a secure environment to protect the NYISO cyber, physical, and personnel resources.
2. **A Leader in Market Design and Performance**
   - Develop enhancements to the wholesale electricity markets that increase reliability and market efficiency and create value for consumers.
   - Foster a market environment conducive to new investments in the wholesale electricity markets that attract and retain resources needed in the state.
3. **Authoritative Source of Information on Key Issues**
   - Take a proactive leadership role in providing an independent, unbiased source of information on the operation of the bulk electric system and wholesale electricity market in New York, and identifying future needs by analyzing the reliability, environmental and cost attributes of policy and technology choices.
   - Conduct stakeholder outreach activities in leadership forums, national and international conferences, as well as professional and standard setting groups.
4. **Excellence in Execution**
   - Sustain a culture that promotes and strives for flawless performance in all that we do and engenders customer confidence in our operations, markets and planning.
5. **Sustain and Enhance Robust Planning Processes**
   - Strengthen planning capabilities to effectively implement the CSPP, which include reliability, economic, and public policy planning studies and other planning initiatives in New York.
   - Coordinate with market participants, state and regional planning agencies and other key stakeholders to complete studies and to analyze reliability, operations and market impacts of a broad range of energy-related federal and state policy goals, including those related to environment, fuel diversity, energy efficiency and renewables integration.

6. **A Leader in Technology Innovation**
   - Work with regulators and other stakeholders to promote state-of-the-art technologies in order to advance the transformation of the power grid.
   - Develop innovative market products, advanced reliability tools, and information architecture utilizing modern industry capabilities and applicable technology advances.
   - Develop advanced technologies to maintain reliable, optimally performing and secure operation of existing systems.
   - Reinforce and enhance cybersecurity protocols and best practices.

Strategic Initiatives

To meet evolving regulatory requirements, and expected technical, financial and market challenges, the NYISO has identified six key strategic initiatives in addition to its core responsibilities and ongoing project plans. These initiatives provide guidance for projects and resource allocations in 2021 and in the future.

Grid Reliability and Resilience

- Maintaining power system reliability is the NYISO's primary responsibility, and the role of wholesale markets is critical in carrying out this responsibility. The changing portfolio of resources serving the electric needs of New York requires a comprehensive review of the NYISO's existing market products and operational and planning practices to ensure the continued ability to efficiently and reliably serve New York's electricity requirements. Significant study work is underway to develop a deeper understanding of these evolving focus areas.

Efficient Markets for a Grid in Transition

- The addition of renewable resources, energy storage, and DER will create a more dynamic grid, where supply is increasingly comprised of weather-dependent renewable resources and flexible resources will be needed to balance intermittent generation. Incenting resource flexibility, which includes the ability to respond rapidly to dynamic system conditions, providing controllable ramp with fast response rates, and providing frequent startup/shutdown capability, will be key to future market enhancements at the NYISO.

New Resource Integration

- Technological advancements and public policies, particularly New York State's CLCPA and Reforming the Energy Vision (REV), are encouraging greater adoption of DER and energy storage to meet consumer energy needs. DER and energy storage offer the potential to make load and supply resources more dynamic and responsive to wholesale market price signals and system needs, potentially improving overall system efficiencies. The NYISO believes that opening its markets to DER and energy storage will improve the strength and efficiency of the electric grid.

Integration of Public Policy

- The CLCPA sets the stage for aggressive state action to reduce greenhouse gas emissions and promote expansion of renewables, distributed energy, and storage resources. It is imperative that the NYISO accelerate development of steps to harmonize wholesale electric power market design with state public policy goals.

Technology and Infrastructure Investment

- The capabilities outlined in the NYISO IT Strategy and technology investments in various projects will position the NYISO with the flexibility and agility to comprehensively respond to emerging industry trends like the integration of renewables, energy storage and distributed resources, and at the same time, continue to maintain reliable operations of the grid and market systems while being responsive to increased security risks.

Efficient and Flexible Business Model

- The NYISO strives to maximize the value that we deliver to our stakeholders through the execution of reliable, cost effective service. In the current rapidly changing environment, continuous process improvement, product and service expansion, and business model refinement will shape the NYISO value proposition. The NYISO will improve organizational effectiveness; modernize systems for faster, more flexible response to market and regulatory changes; and continuously scrutinize cost of operations. In addition, the NYISO will continue to emphasize our brand value while delivering premium service to our customers.

Strategic Technologies

Managing grid reliability and the system planning processes that support long-term grid reliability are strategic focus areas for the NYISO. This strategy recognizes that the NYISO will need to continue to advance our capabilities in both of these areas in order to effectively manage an increasingly complex grid.

The NYISO made a strategic investment in grid reliability and market operations software with the implementation of the new EMS/BMS system. This new system establishes a long-term platform for growth, offers higher levels of availability, and improves security of critical systems supporting grid reliability. It is expected that this new EMS/BMS platform will serve the NYISO for the next ten years, and provide a software architecture that will be able to integrate the new market and grid reliability capabilities that will keep the NYISO at the forefront of system operators around the globe.

The NYISO has also introduced technology improvements to expand capabilities related to the development of reliability, economic, and public policy planning studies. The continued implementation of key system planning applications to a new cloud computing environment provides a highly flexible computing platform for our system planning engineers. This new computing environment can quickly scale in response to dynamic system planning study workloads, and helps position the System Planning group to be even more responsive to the NYISO's stakeholders.

Over the next few years, the introduction and proliferation of DER and energy storage is expected to drive the need for more rapid changes in the NYISO's market systems. Grid reliability applications will also need new capabilities that allow the NYISO's Operations personnel to effectively manage an increasingly complex portfolio of energy resources.

NYISO market applications must provide customers with flexibility and options to adjust their market participation models as their blend of resources change. With the integration of DER and energy storage, grid resources will become more dynamic. Aggregations of resources will vary the blend of storage, generation, and load reduction capabilities over time.

These fundamental changes in the business model call for more modern software delivery processes and contemporary architectural designs to respond to market changes. Implemented together, modern software delivery pipelines and application architecture changes can significantly improve the NYISO's ability to respond quickly to needed market changes, and deliver these new functions to the market with greater efficiency.

Beyond the need for market system agility, new information delivery capabilities will be needed by market participants as both traditional resource and distributed resource operators increasingly automate their activity with on-demand systems. These advanced systems will require improved access to NYISO information and timely notification of key market or grid reliability events. Systematic access to NYISO information and notification of important system events will be critical for large-scale management

▸ Critical Infrastructure Protection (CIP):

A set of standards designed to secure the assets required for operating the bulk power system.

The NYISO implements the cyber and physical security standards as part of a layered, "defense-in-depth" posture that seeks to defend its critical infrastructure assets from incursions.

— NYISO's stance on the CIP standards

of distributed resources. It will be a challenge to scale the NYISO's current data services architecture to levels sufficient to meet the likely future needs of market participants. The NYISO will need to add new channels for data access and subscription-based event notifications to support robust, scalable business-to-business integration.

The strategic IT objectives listed below, implemented collectively and in collaboration with our business partners, will provide a significant improvement in the NYISO's ability to respond more quickly to changing market needs while also maintaining the high quality that market participants expect.

Modernize Delivery Capabilities and Application Architecture

- Strategic initiatives to integrate DER and ESR into our wholesale markets highlight the increasing demands to adapt IT systems more quickly to meet rapidly changing business needs. Modern software delivery approaches and more contemporary systems architecture provide an opportunity to significantly improve IT responsiveness to emerging business needs.

Increase Infrastructure Automation and Enhance IT Service Management

- Increased adoption of new technologies, changing development methodologies and advancing security practices all contribute to a more complex IT infrastructure. This complex environment will create additional resource pressure and demand for increased agility from the IT organization. A strategic emphasis on increased automation and improved IT service management processes is required to effectively support the new, modern operating environment.

Mature the Enterprise Cloud Management Framework

- With the adoption of cloud computing, significant change has been introduced to IT support and operational structures. In order to ensure that we can successfully integrate and manage cloud computing, existing practices will continue to evolve as we implement new operational models and integration methods.

Advance Cyber Security Risk Management Capabilities

- Cyber-attacks are becoming more prevalent and attackers are adapting and evolving the methods they employ in innovative ways. Continuing the development of a comprehensive security program ensures a heightened ability to detect, respond to, and mitigate cybersecurity risks.

Corporate Governance

Board of Directors

Daniel C. Hill, Board Chair
Former Senior Vice President and Chief Information Officer of Exelon Corporation

Ave M. Bie, Board Vice Chair
Partner in the law firm of Quarles & Brady and former Chair of the Wisconsin Public Service Commission

Michael B. Bemis
Former President of Exelon Power and President of Energy Delivery for the Exelon Corporation, Chief Executive of London Electricity, and Executive Vice President for Entergy Corporation

David R. Hill
Former Executive Vice President and General Counsel for NRG Energy, General Counsel for the U.S. Department of Energy. Currently, Fellow and Adjunct Senior Research Scholar at Columbia University's Center on Global Energy Policy

Roger B. Kelley
Former President and CEO of the New York Power Authority, and former President and CEO of Fortistar Renewables

Mark S. Lynch
Former President and CEO of New York State Electric and Gas Corporation and Rochester Gas and Electric Corporation, and former President and CEO of the New York Independent System Operator

James V. Mahoney
President and CEO of Energy Market Solutions, former President and CEO of DPL, and former President and CEO of EarthFirst Technologies

Teresa F. Marrinan
Former Senior Vice President, US SBU Commercial for The AES Corporation, former officer for the Dayton Power and Light Company, and Founding Partner of Hanover Strategy Advisors LLC

Thomas F. Ryan, Jr.
Former President and Chief Operating Officer of the American Stock Exchange

Richard J. Dewey
President and CEO of the New York Independent System Operator

Corporate Officers

Richard J. Dewey
President & CEO

Robert E. Fernandez
Executive Vice President, General Counsel & Chief Compliance Officer

Emilie Nelson
Executive Vice President

Rick Gonzales
Senior Vice President & Chief Operating Officer

Rana Mukerji
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Corporate Secretary & Board Secretary

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Vice President & Chief Financial Officer

Kevin Lanahan
Vice President, External Affairs & Corporate Communications

Robb Pike
Vice President, Market Operations

Zachary G. Smith
Vice President, System & Resource Planning

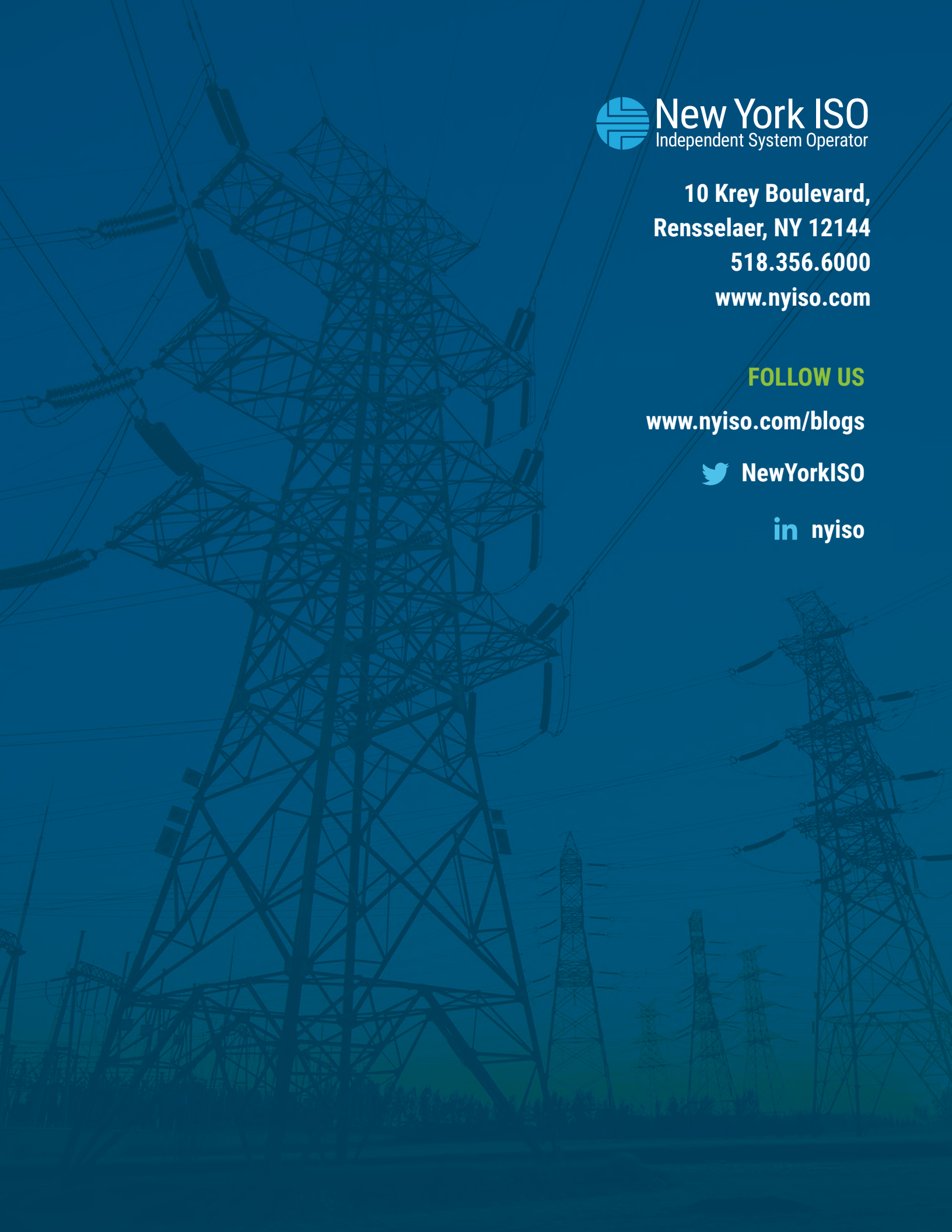
Wesley J. Yeomans
Vice President, Operations

Appendix

Timeline of Anticipated Projects Supporting Strategic Initiatives

Initiative	2021 Projects	2022 Projects	2023 Projects	2024-2025 Projects
Grid Reliability and Resilience	▪ Climate Change and Grid in Transition ▪ Large-Scale Solar On Dispatch ▪ Reserves for Resource Flexibility ▪ Enhancements to Resource Adequacy Models ▪ Grid Services from Renewable Generators	▪ Climate Change and Grid in Transition ▪ Operational Situational Awareness ▪ Enhancements to Resource Adequacy Models	▪ Operational Situational Awareness ▪ Enhancements to Resource Adequacy Models	▪ Operational Situational Awareness ▪ Enhancements to Resource Adequacy Models
Efficient Markets for a Grid in Transition	▪ Ancillary Services Shortage Pricing ▪ Constraint Specific Transmission Shortage Pricing ▪ Reserve Enhancements for Constrained Areas ▪ Demand Curve Reset ▪ Expanding Capacity Eligibility (ECE) ▪ Tailored Availability Metric (TAM) ▪ Expanding Peak Hour Forecasts ▪ BSM Renewables Exemption Study	▪ Constraint Specific Transmission Shortage Pricing ▪ Reserve Enhancements for Constrained Areas ▪ More Granular Operating Reserves ▪ ECE and TAM Capacity Value Studies ▪ Capacity Demand Curve Adjustments	▪ Reserve Enhancements for Constrained Areas ▪ More Granular Operating Reserves ▪ ECE and TAM Capacity Value Studies ▪ Capacity Demand Curve Adjustments ▪ Demand Curve Reset	▪ Reserve Enhancements for Constrained Areas ▪ More Granular Operating Reserves ▪ Demand Curve Reset
New Resource Integration	▪ DER Participation Model ▪ Engaging the Demand Side ▪ Hybrid Co-Located Model ▪ Hybrid Aggregation Model	▪ DER Participation Model ▪ Engaging the Demand Side ▪ Hybrid Aggregation Model	▪ Engaging the Demand Side ▪ Hybrid Aggregation Model	▪ Engaging the Demand Side ▪ Hybrid Aggregation Model
Integration of Public Policy	▪ Carbon Pricing ▪ Comprehensive Mitigation Review ▪ CRIS Expiration Evaluation ▪ NextEra Transmission Owner Integration ▪ Public Policy Transmission Expansion ▪ Economic Planning Process	▪ Carbon Pricing ▪ CRIS Expiration Evaluation ▪ Public Policy Transmission Expansion ▪ Economic Planning Process	▪ Public Policy Transmission Expansion ▪ Economic Planning Process	▪ Public Policy Transmission Expansion ▪ Economic Planning Process

Initiative	2021 Projects	2022 Projects	2023 Projects	2024-2025 Projects
Technology and Infrastructure Investment	▪ Enterprise Information Management – Data Integration ▪ Gurobi (MIP) Migration and Upgrade ▪ Cloud Computing ▪ Cybersecurity Protection Strategies ▪ IT Infrastructure Automation ▪ IT Service Management Improvements ▪ Database Upgrade ▪ Transmission & Generation Scheduling System Replacement ▪ Load Forecasting System Upgrade and Build Out ▪ Network Infrastructure Upgrades ▪ Linux and Storage Infrastructure Refresh ▪ Windows System Upgrade ▪ Application Platform Upgrades	▪ Cloud Computing ▪ Cybersecurity Protection Strategies ▪ IT Infrastructure Automation ▪ IT Service Management Improvements ▪ Database Upgrade ▪ Transmission & Generation Scheduling System Replacement ▪ LFDR (Load Forecast Data Repository) Upgrade and Enhancements ▪ Network Infrastructure Upgrades ▪ Windows System Upgrade ▪ Application Platform Upgrades ▪ ACC Control Room Renovation ▪ SCUC Performance Enhancements	▪ MIP Upgrade ▪ Cloud Computing ▪ Cybersecurity Protection Strategies ▪ IT Infrastructure Automation ▪ Database Upgrade ▪ Application Platform Upgrades ▪ Enterprise Storage Refresh ▪ ACC Control Room Renovation ▪ SCUC Performance Enhancements	▪ Cloud Computing ▪ Cybersecurity Protection Strategies ▪ IT Infrastructure Automation ▪ Database Upgrade ▪ Load Forecasting System Upgrade ▪ Application Platform Upgrades ▪ Enterprise Storage Refresh
Efficient and Flexible Business Model	▪ TCC Credit Enhancements ▪ Accounting and Settlement Integration ▪ FERC Form 1 Redesign	▪ Transaction Modifications & Confirmation Tool ▪ Working Capital Application Enhancements ▪ Credit Management System & Consolidated Invoice Data Integration ▪ Credit Management System Enhancements	▪ Settlement Systems Redesign ▪ Budget Management & Reporting Tools ▪ Oracle Financials & Settlement System Data Integration ▪ Electronic Payments ▪ Credit Management System Enhancements	▪ Settlement Systems Redesign ▪ Procure to Pay Enhancements ▪ Oracle Financials & Settlement System Data Integration ▪ Electronic Payments ▪ Credit Management System Enhancements



New York ISO
Independent System Operator

10 Krey Boulevard,
Rensselaer, NY 12144
518.356.6000
www.nyiso.com

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