

NYISO Strategic Plan 2020-2024

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Management Committee Meeting

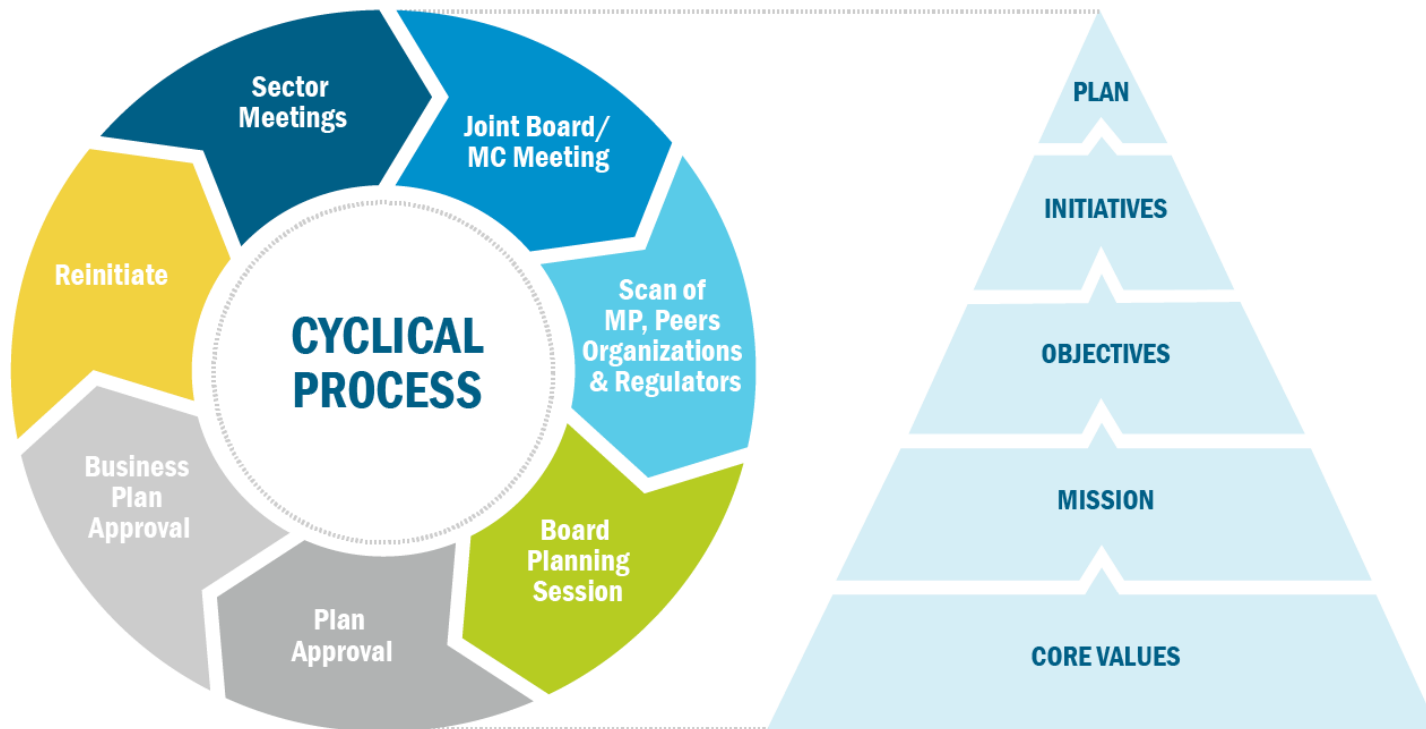
December 18, 2019, Rensselaer, NY

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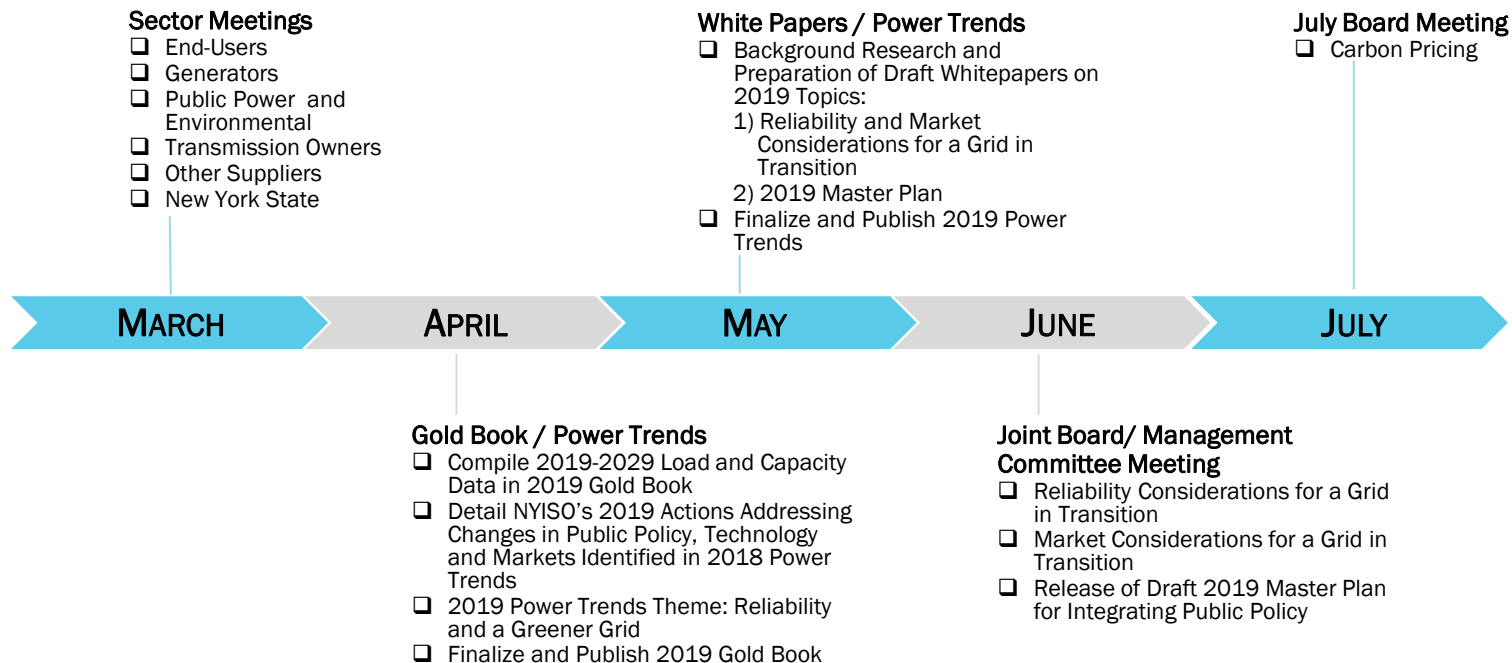
Strategic Planning Process

Process Overview



2019 Planning Timeline

Aligning Strategic Planning, Project Prioritization and Power Trends



2019 Planning Timeline

Aligning Strategic Planning, Project Prioritization and Power Trends





State and Sector Perspective

Sector Meetings Feedback

End Use Consumers

- Importance of consumer impact analysis
- Diverse concerns on carbon pricing
- Class year process acceleration, improvement
- Speed and transparency in planning process
- Policymakers' need for more information
- Comprehensive planning and cost containment

Transmission Owners

- Favor market based solutions and carbon pricing
- Oppose hard cap on developer bids for Public Policy transmission & local trans. upgrades is important issue
- Continue to streamline class year process
- Don't support combining processes into a single comprehensive system planning approach, but see need for improvement
- Supports NYISO DER and energy storage efforts

Generation Owners

- Supports carbon pricing; seeking finality
- Class year process acceleration, improvement
- Leverage whitepaper to educate policymakers
- Revisit generator deactivation process
- Public policy impact on demand curve reset
- More certainty on capacity eligibility and value

Other Suppliers

- Supports carbon pricing and Analysis Group study
- Supports changing NYISO tariff for short-term Competitive Energy Exemption (CEE)
- Improve, accelerate class year process
- Public policy impact on demand curve reset
- Get DER into wholesale market, add economic dispatch
- More transmission and facility details on NYISO website

Public Power / Environmental

- Streamline interconnection process, mitigation rules
- Consider long-term implications of carbon pricing
- Supports Master Plan; adds value to project prioritization
- Need for fast/flexible ramping product
- Cost containment important; fast track TO upgrades
- Need for more transmission to achieve public policy

New York State

- Clean Energy Standard
- Offshore wind development
- Storage deployment target
- DER market participation rules
- "Peaker" rule for gas turbine emissions
- Capacity market and buyer-side mitigation

Joint Board / MC Meeting

NYISO takeaways

Reliability Considerations for a Grid in Transition

- ❑ Feasibility of achieving state goals – how to operate grid with high level of renewables
- ❑ Process for setting future reliability rules (1 loss in 10 years premise) and need to work with NERC, NPCC, NYSRC
- ❑ Importance of NYISO independent voice to inform policymakers of future reliability needs and costs
- ❑ Positive feedback on Power Trends
- ❑ Need to streamline transmission planning process; need for speed and transparency
- ❑ Broaden planning process and reliability needs assessment to include externalities

Market Considerations for a Grid in Transition

- ❑ Energy and ancillary services are market priority for revenue adequacy, investment signals, price signals
- ❑ Need to evolve capacity markets to “reliability markets,” understanding capabilities and characteristics to ensure revenue adequacy
- ❑ Importance of buyer-side mitigation rules for new entrants and repowering – DEC will implement NOx rules
- ❑ Clarity on timing of Master Plan deliverables to help guide investments / prioritize projects to achieve faster implementation
- ❑ Investment signals for transmission development need to make economic sense

Joint Board / MC Meeting

Stakeholder takeaways

Reliability Considerations for a Grid in Transition

- ❑ Consider additional studies to identify gaps in NYISO planning processes with increased renewables/DER
- ❑ No predetermined solutions. Allow MPs to respond if right signal created
- ❑ Key areas likely needing further examination and reform:
 - Is the RNA nimble enough to account for more rapid changes in the entry and exit of traditional resources?
 - Is the 1 loss in 10 years premise the right measure to use or do you need to be more reflective of broader conditions?
 - Does planning need to be more granular to involve more localities?
 - Does the DER process provide confidence that transmission will be approved and cited to actually support public policy goals?
 - Is CARIS robust enough to garner stakeholder support to benefit
 - If transmission is built, are we confident that price signals match resources where they are needed?

Overall Comments

- Power Trends very well received
- Continue to educate policy-makers as independent source of information
- Given policy fluidity, focus on short-term
- Examine what other regions are doing
- Stay in sync with PSC proceedings
- Fuel diversity is important
- Regulatory certainty is important
- Who pays is important






Market Considerations for a Grid in Transition

- ❑ Markets must be designed to entice new/retain existing resources
- ❑ On the energy and ancillary services side, reforms necessary to support a grid in transition should be pursued as a “no regrets” approach
- ❑ Energy and ancillary services will be needed regardless of whether policy resources are pursued for the ICAP markets or through contract/integrated resource planning or some combination of the two
- ❑ More flexible transmission resources are needed – consider more resource-specific capacity markets or different types of capacity products altogether
- ❑ For capacity, new generation is going to have to rely on contracts or markets or both. Preference for markets but if they do not provide the types/amounts of resources sought by policymakers it seems clear that extra-market approaches will be necessary

Challenge to Harmonize Markets with Public Policy

Wholesale Market Evolution Critical for Clean Energy Goals

New York State Climate Leadership & Community Protection Act

 <p>Renewables</p> <ul style="list-style-type: none"> 70% by 2030 <p>Electric Sector GHG Reduction</p> <ul style="list-style-type: none"> 100% by 2040 	 <p>Offshore Wind</p> <ul style="list-style-type: none"> 9,000 MW by 2035 	 <p>Solar Energy</p> <ul style="list-style-type: none"> 6,000 MW by 2025 	 <p>Energy Storage</p> <ul style="list-style-type: none"> 3,000 MW by 2030 	 <p>Energy Efficiency</p> <ul style="list-style-type: none"> 185 trillion BTU reduction by 2025 vs forecast
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WIDE-SCALE ELECTRIFICATION OF HEATING, TRANSPORTATION AND INDUSTRIAL SECTORS

Operations Implications	Market Implications	Financial Implications
<ul style="list-style-type: none"> Marked increase in number of wholesale resources participating in NYISO markets Increased need to monitor congestion on lower voltage circuits from increased participation of distributed resources Need to coordinate operations with Distribution Systems Platform (DSP) Increased need for flexibility due to resource and load uncertainty (e.g. ramping, load following, quick-start capability) 	<ul style="list-style-type: none"> Increased participation of Distributed Energy Resources, Micro-Grids and Aggregators in wholesale markets Accelerating growth in both grid-scale and rooftop solar as well as on-shore and off-shore wind resources Growth in grid-scale storage as well as aggregations of storage with other distributed resources Increased regulatory and investment risk from state sponsored resource additions and policy actions Increased need to consider mitigation construct 	<ul style="list-style-type: none"> Depressed energy prices with the proliferation of zero marginal cost resources (wind and solar), increasing importance of ancillary pricing Capacity market increasingly provides majority of fixed cost recovery for quick-start resources needed for flexibility Significant increase in number of market participants needing settlement and credit monitoring services Complexity of grid and market operations lead to increase in NYISO personnel and budget requirements



Strategic Plan 2020-2024

Core Values

Integrity

Commitment to honest, ethical, and transparent actions

Innovation

Pursuing creative and sound solutions

Enthusiasm

Having a passion for our work and our interaction with our customers, stakeholders and policy makers



Customer Focus

Understanding the customer perspective

Operational Excellence

Commitment to excellence in all our processes, systems and products

Teamwork

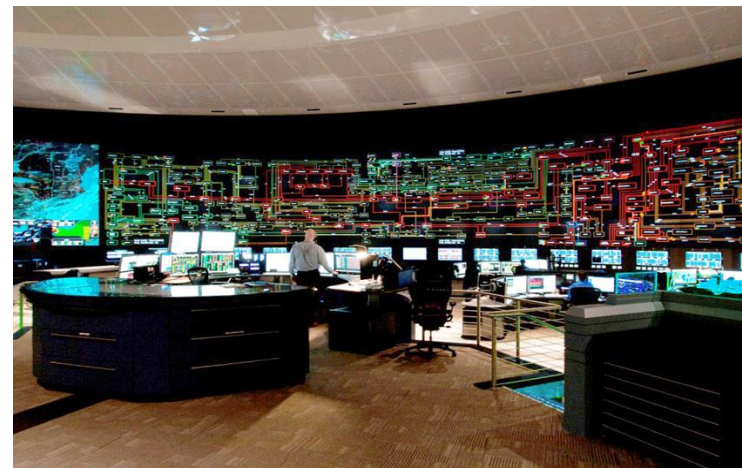
Working together, succeeding together, respecting each other

Accountability

Taking responsibility to do what needs to be done

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 policy makers, stakeholders and investors in the power system



Strategic Objectives

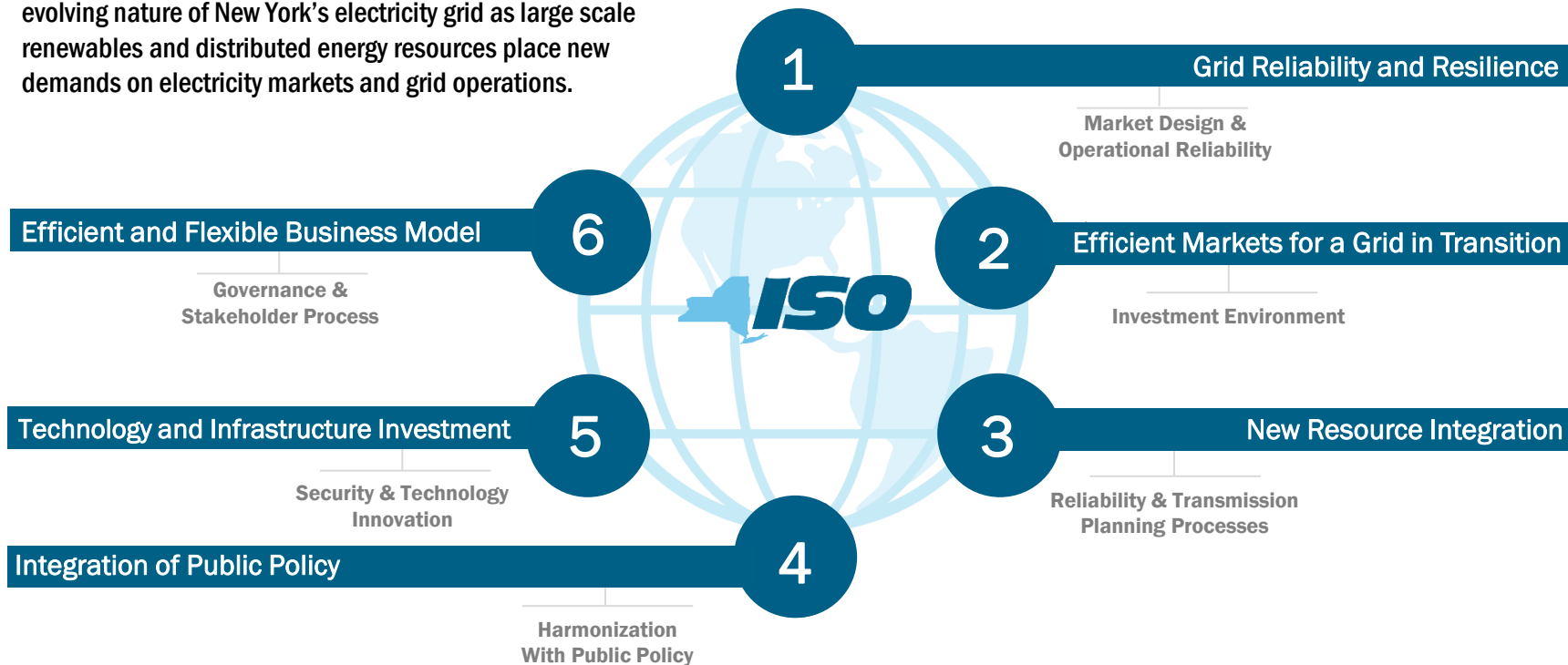


Strategic Initiatives



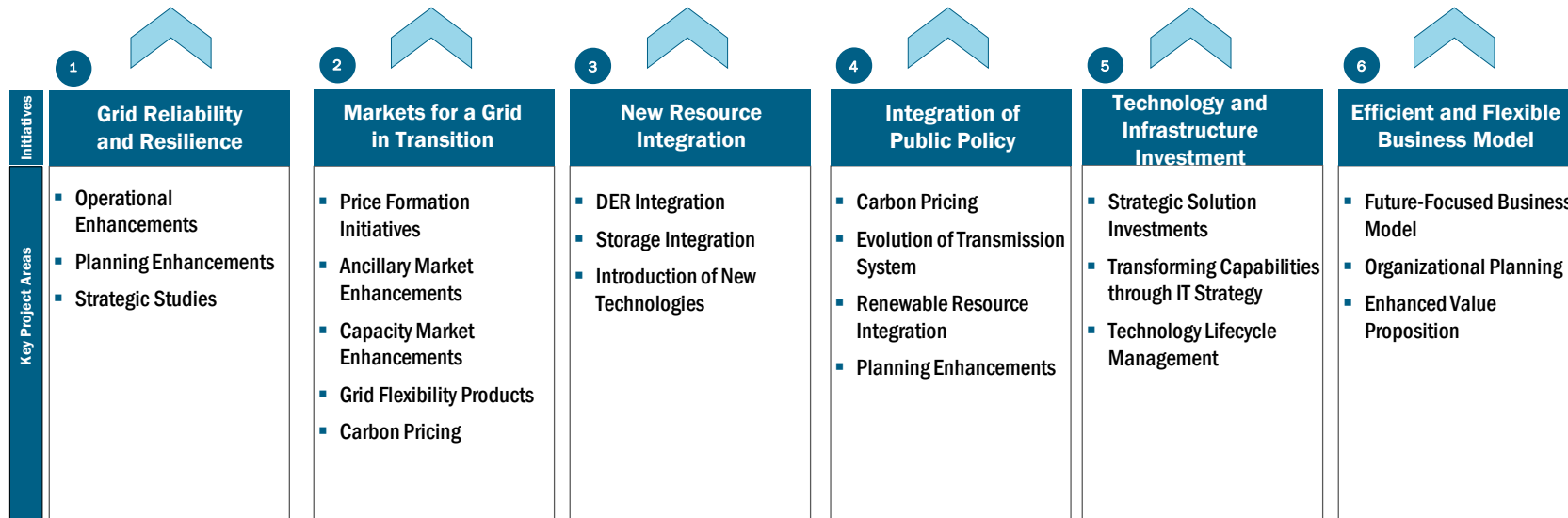
NYISO on the Leading Edge of the Energy Transition

NYISO employs six Strategic Initiatives to address the evolving nature of New York's electricity grid as large scale renewables and distributed energy resources place new demands on electricity markets and grid operations.



Strategic Overview

NY State's clean energy requirements will be met by leveraging the power of competitive markets to drive efficient, reliable outcomes. The NYISO Strategic Plan guides the design and implementation of a portfolio of market products that achieves the proper balance of supporting public policies while maintaining reliability and economic efficiency.



1

Grid Reliability and Resilience

Priority Projects in Support of Strategic Initiatives

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 will require 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 needed to take a deeper dive into evolving focus areas.

Operational Enhancements

- Operational Situational Awareness
- Operational Impact Assessments of Environmental Retirements
- Reserve Procurement for Flexibility
- Solar on Dispatch
- Enhancements to IRM/LCR Models

Planning Enhancements

- Comprehensive System Planning
- Process Improvements
- Planning for Environmental Impacts

Strategic Studies

- Enhancing Fuel and Energy Security
- Impact of Climate Change Study

2

Efficient Markets for a Grid in Transition Priority Projects in Support of Strategic Initiatives

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.

Price Formation Initiatives

- Improving Capacity Price Formation
- Constraint Specific Shortage Pricing
- Enhanced Fast Start Pricing

Grid Flexibility Products

- Reserve Procurement for Flexibility

Ancillary Market Enhancements

- Ancillary Services Shortage Pricing
- Reserve Enhancement for Constrained Areas

Capacity Market Enhancements

- Tailored Availability Metric
- Capacity Value Study
- Demand Curve Reset

Renewable Resource Integration

- Carbon Pricing in the Energy Market
- Comprehensive Mitigation Review

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New Resource Integration

Priority Projects in Support of Strategic Initiatives

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

DER Integration

- DER Participation Model
- Meter Service Entity
- Dual Participation

Storage Integration

- Energy Storage Resource Participation Model

Introduction of New Technologies

- NYISO Pilot Framework
- Hybrid Storage Model

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Integration of Public Policy

Priority Projects in Support of Strategic Initiatives

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

Carbon Pricing

- Design Carbon Pricing in the Energy Market
- Implement Carbon Pricing in the Energy Market

Evolution of Transmission System

- Public Policy Transmission Planning Expansion
- Comprehensive System Planning Process Improvements

Renewable Resource Integration

- Solar on Dispatch
- Hybrid Storage Model
- Comprehensive Mitigation Review

Planning Enhancements

- Planning for Environmental Impacts

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Technology and Infrastructure Investment

Capabilities and Priority Projects in Support of Strategic Initiatives

The capabilities outlined in the 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 grid and market systems while being responsive to increased security risks.

Strategic Solution Investments

- EMS/BMS System Upgrade
- Distributed Energy Resources
- Energy Storage
- Enterprise Information Management - Data Integration
- Expanding Capacity Eligibility

Transforming Capabilities through IT Strategy

Strategic Objectives:

- Modernize Delivery Capabilities and Application Architecture
- Increase Infrastructure Automation and Enhance IT Service Management
- Mature the Enterprise Cloud Management Framework
- Advance Cyber Security Risk Management Capabilities

Technology Lifecycle Management

Multi-year plan for technology focused on driving IT efficiency, managing costs and delivering business value.

Technology Lifecycle Projects:

- Database Upgrade and Platform Migration
- Network Infrastructure Upgrade
- Application Platform Upgrade - 2020

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Efficient and Flexible Business Model

Priority Projects in Support of Strategic Initiatives

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 the cost of operations. In addition, the NYISO will continue to emphasize our brand value while delivering premium service to our customers.

Future-Focused Business Model

- Financial Risk Assessment and Scoring Enhancements
- Settlement Systems Redesign and Modernization
- Finance Systems Data Integration
- Budget Recovery and Cost Management Enhancements

Organizational Planning

- Improved Performance Management Process
- DER Penetration Staffing Impact Planning
- Senior Staff Succession Planning
- Enterprise Succession Planning

Enhanced Value Proposition

- Campaign to Promote Value of Markets
- Branding and Reputation Management
- Customer Relationship Management Enhancements
- Process Improvement for Agility

Questions?