Master Plan

May Draft

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ICAPWG/MIWG

May 19, 2020 Rensselaer NY

Agenda

- Background
- May Draft Updates
- Timeline
- Appendix I
  - 2020 Master Plan Process
- Appendix II
  - 2020 Master Plan – Strategic Initiatives and Key Themes
- Appendix III
  - 2020 Master Plan – Proposed Project Timelines

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Background

Background

- **The Master Plan was first developed in 2018 and is updated annually**
- **The Master Plan provides a multi-year vision for future NYISO enhancements**
  - It is intended to provide a comprehensive 5-year plan that will enable the NYISO to prepare for anticipated changes to the bulk power system
  - The document serves multiple purposes including providing valuable information for the NYISO's project prioritization and strategic planning processes

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Background

- **In response to stakeholder feedback on prior plans, the 2020 Master Plan includes a number of features to improve readability and clarity**
  - The NYISO will provide a cohesive narrative, while avoiding reiteration of unnecessary project information that is already included within project candidate descriptions
  - Describe how each individual project will support grid reliability and market efficiency
  - Compare and contrast the projects in terms of the level of effort, and the benefit that each will provide for the grid
  - Provide a potential timeline for stakeholders
- **Today, the NYISO will discuss the updated draft of the Master Plan posted with today's meeting materials**

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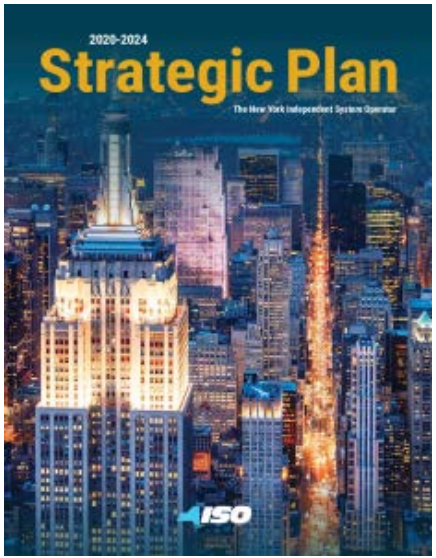
2020 Master Plan Structure

- **The 2020 Master Plan derives the strategic initiatives discussed from the NYISO's 2020-2024 Strategic Plan***
  - The projects discussed in the 2020 Master Plan are grouped under the applicable strategic initiatives



*Link to the Strategic Plan: https://www.nyiso.com/documents/20142/2225883/2020-Strategic-Plan.pdf/e282579c-9988-3ff6-5164-dfea1abfbc13?t=1576765917219

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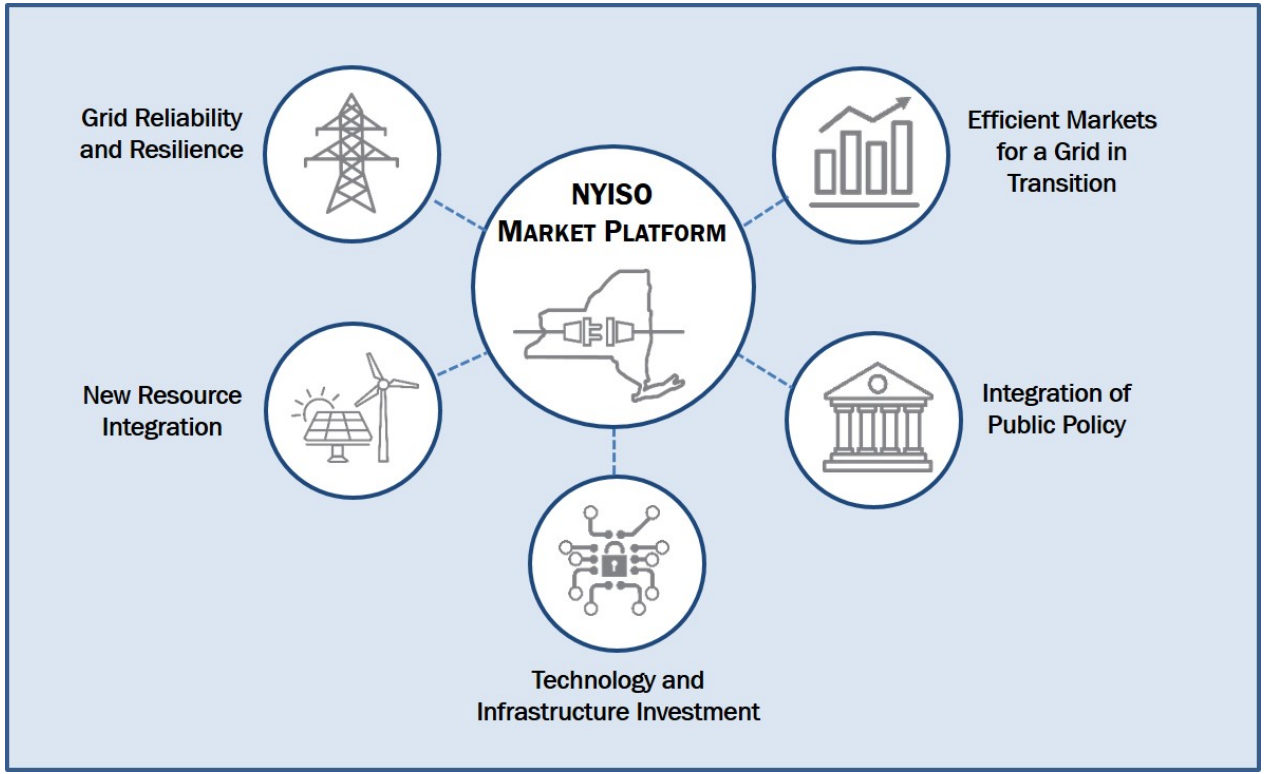
NYISO Strategic Initiatives



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2020 Master Plan Structure

- **Strategic Initiatives and Key Themes**
  - Grid Reliability and Resilience
  - Efficient Markets for a Grid in Transition
  - New Resource Integration
  - Integration of Public Policy
  - Technology and Infrastructure Investment
- **Proposed project timelines**
- **Potential grid benefits, NYISO effort, and project dependencies**

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May Draft Updates

May Draft Updates

- **Throughout the paper**
  - The terms “Operating Reserve” and “Ancillary Services” were capitalized throughout to reflect that these are tariff-defined terms.
- **Introduction**
  - Include that the initiatives featured in this document will prepare the NYISO for the grid transition to increased weather dependent generation between now and 2030.
- **Strategic Initiatives and Key Themes**
  - Include that the Short Term Reliability Process (“STRP”) was accepted by FERC in April.
  - Edits to remove reference to the phrase “front-of-the-meter generation,” and instead use the phrase “wholesale market generation.”

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May Draft Updates

- **Potential Grid Benefits, NYISO Effort, and Project Dependencies**
  - Clarify that there is a medium-low level of effort anticipated for Reserves for Resource Flexibility, though the level of effort may change depending on the market design ultimately approved by stakeholders.
  - Note that the timeline for Large-Scale Solar on Dispatch is accelerated due to an uptick in the number of solar projects in the NYISO interconnection queue.
  - Clarify that there is no dependency between More Granular Operating Reserves and the Ancillary Services Shortage Pricing, Reserves for Resource Flexibility, and Reserve Enhancements for Constrained Areas projects.
  - Clarify that the Reserve Enhancements for Constrained Areas project will require a high level of effort to complete, with a long development and testing period before deployment.

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May Draft Updates

- **Potential Grid Benefits, NYISO Effort, and Project Dependencies (continued)**
  - Include that the next Demand Curve Reset may have other project dependencies, such as Capacity Demand Curve Adjustments.
  - Clarify that each subsequent study that is part of Expanding Capacity Eligibility/ Capacity Value Study will have a high effort level, and that this study is combined with the recurring study established as part of the Tailored Availability Metric project.
  - Update the Tailored Availability description in this section to note that the 2020 milestone of Market Design Complete was achieved. Include that initial values proposed will be updated every four years as part of a recurring study.
  - Expand upon the description of Engaging the Demand Side.
  - Clarify that the NYISO expects a medium-high effort to complete Hybrid Storage Model because this design will affect multiple NYISO systems and processes.

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Timeline

Master Plan Timeline

- ✓ March 2020 – Meet with each governance sector to get initial feedback
- ✓ April 22, 2020 (MIWG) – Release and discuss the initial draft of the Master Plan
- ✓ April 30, 2020 (BPWG) – Release the initial draft of the Master Plan (no discussion)
- May 19, 2020 (MIWG) – Release and discuss updated draft
- May 28, 2020 (BPWG) – Release updated draft (no discussion)
- August 27, 2020 (BPWG) – Release and discuss near final draft of the Master Plan
- December 2020 – Release final Master Plan

All updates to the Master Plan will be coordinated with the overall project prioritization process

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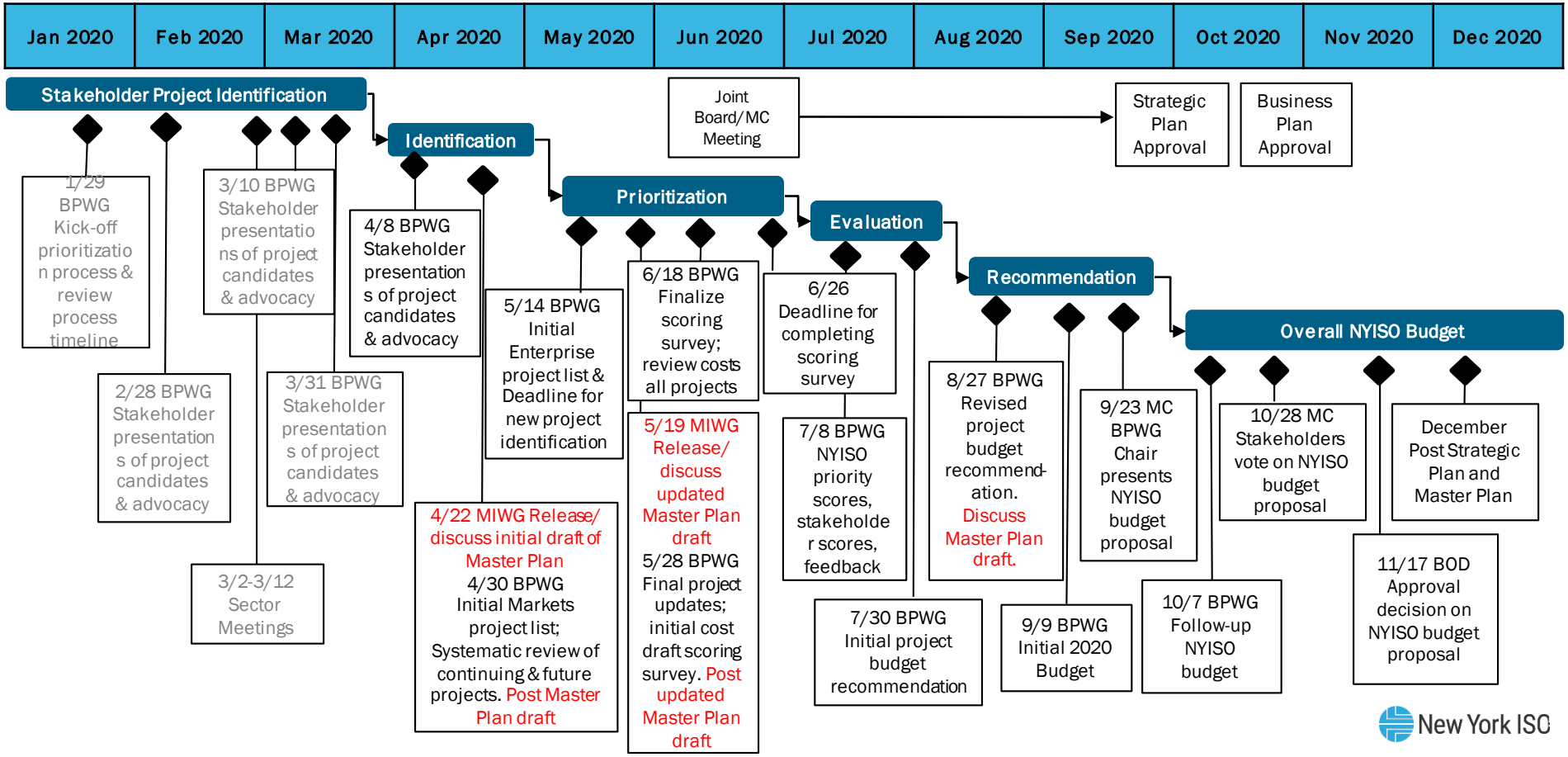
2021 Proposed Project Prioritization Timeline



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DRAFT – FOR DISCUSSION PURPOSES ONLY

Appendix I: 2020 Master Plan Process

Master Plan Process

- **The Master Plan starts with receiving feedback at each of the Sector Meetings**
- **An initial draft of the Master Plan will be produced in mid-April**
  - This draft is intended to share NYISO's initial thoughts based on Sector Meeting feedback
- **An updated draft of the Master Plan will be produced near the end of May**
  - This draft will incorporate additional feedback and identify costs and benefits
- **A near final draft of the Master Plan will be produced near the end of August**
  - This draft will incorporate any changes as a result of the project prioritization and the budget process
- **A final Master Plan will be produced near the end of the year**
  - This final version will incorporate any changes from the final approved budget

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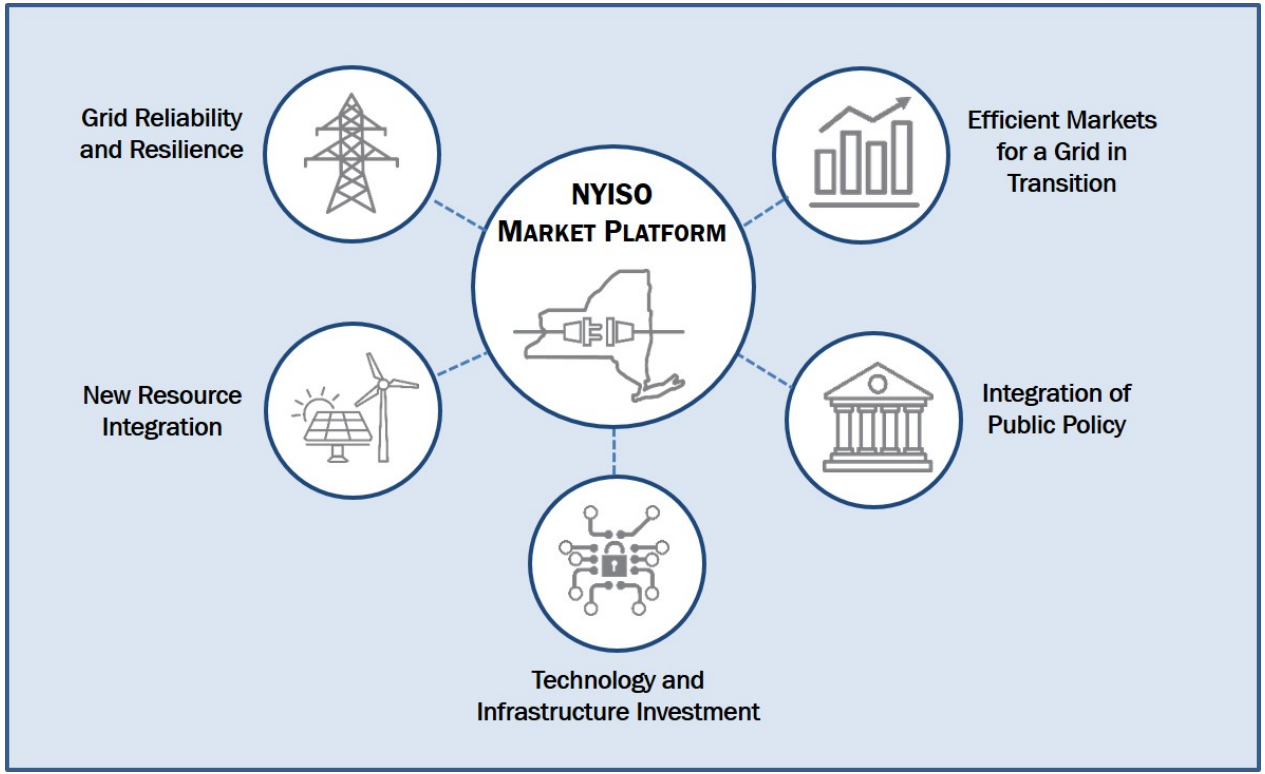
Appendix II: 2020 Master Plan – Strategic Initiatives and Key Themes

NYISO Strategic Initiatives



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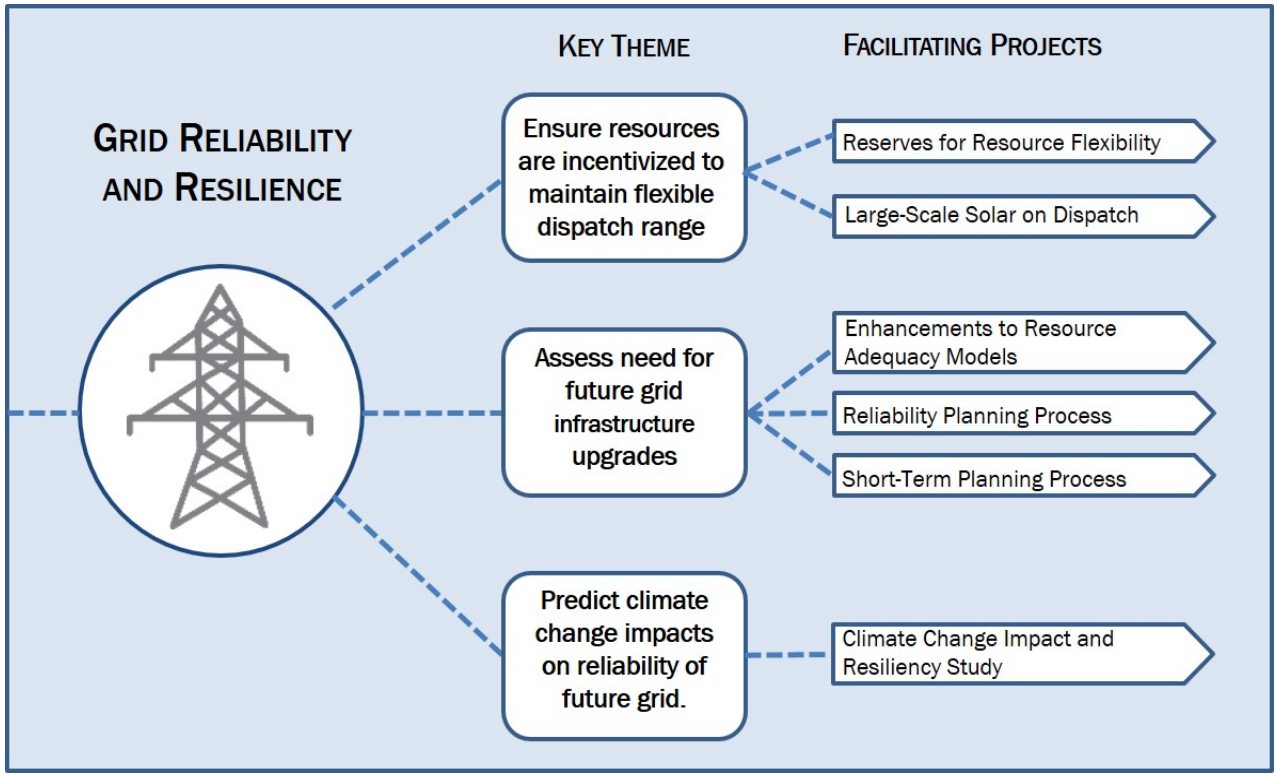
Strategic Initiatives and Key Themes

Grid Reliability and Resilience



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Strategic Initiatives and Key Themes

Grid Reliability and Resilience

Grid Reliability and Resilience		Description
	Incentives for Flexible Dispatch	
1	Reserves for Resource Flexibility	Proposes to expand the procurement of operating reserves in the Southeastern New York (SENY) reserve region
2	Large-Scale Solar On Dispatch	The NYISO recommends that wholesale market solar resources be treated similarly to wind resources. This would require solar plants to submit flexible offers that indicate their willingness to generate at various price levels, and to receive and respond to economic dispatch instructions to curtail output.
	Future Infrastructure Upgrades	
3	Enhancements to Resource Adequacy Models	Evaluate the robustness of the probabilistic reliability models used to support NYCA reliability and in the NYISO markets, and making updates as needed to reflect emerging technologies and changing system dynamics.
4	Reliability Planning Process	The Reliability Planning Process ("RPP") is the NYISO's biennial process to identify reliability needs and, if necessary, select solutions to resolve the needs. The first phase of the RPP is the Reliability Needs Assessment ("RNA") that assesses future resource adequacy and transmission security needs for the New York State Bulk Power Transmission Facilities ("BPTF") in accordance with applicable Reliability Criteria. If the BPTF does not meet the applicable Reliability Criteria, then Reliability Needs would be identified.
5	Short-Term Planning Process	A new Short Term Reliability Process ("STRP") was developed and approved as part of the 2019 stakeholder process. The STRP was approved by the NYISO Board in January 2020 and filed with FERC in February. The STRP builds on the existing Generator Deactivation process by evaluating and addressing Reliability Needs on the BPTF resulting from Generator Deactivations as well as resulting from other changes on the electric grid, such as load and transmission changes.

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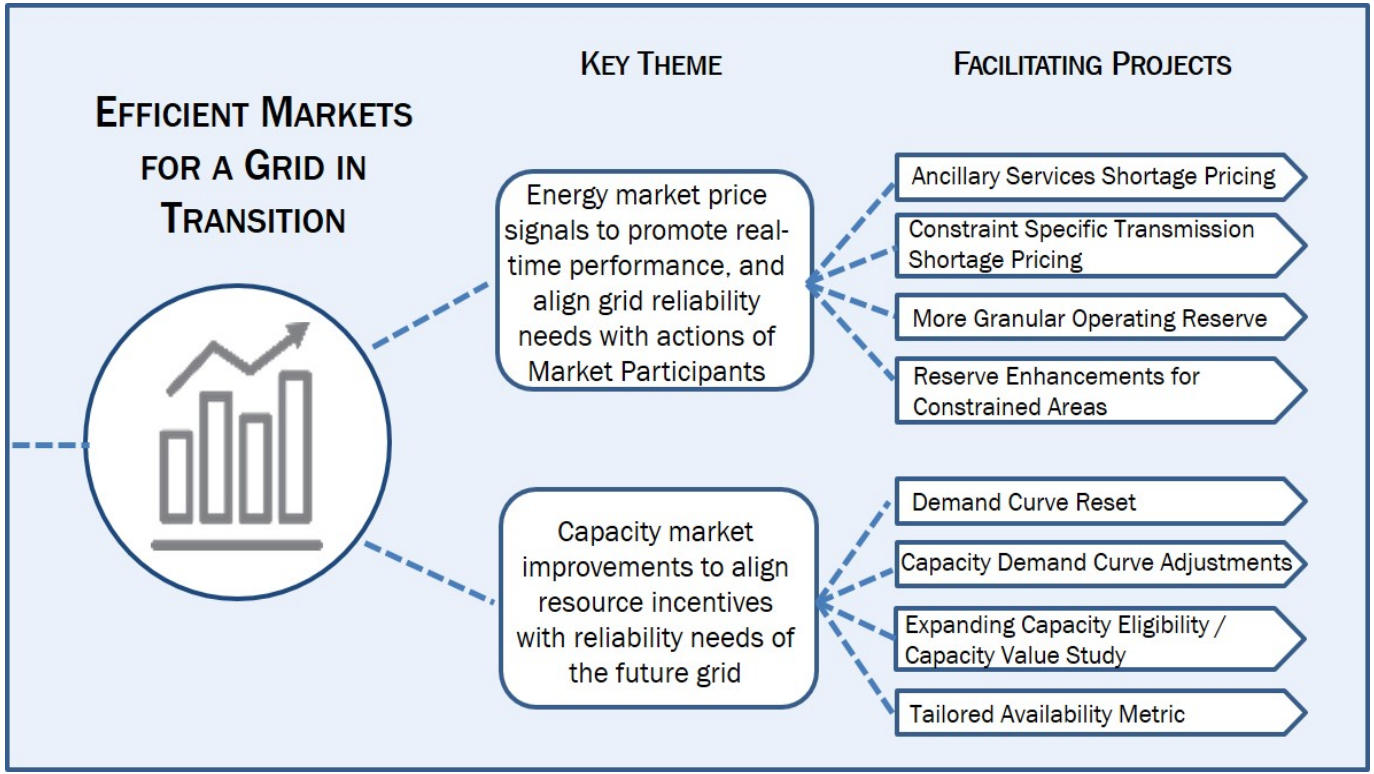
Strategic Initiatives and Key Themes

Efficient Markets for a Grid in Transition



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Strategic Initiatives and Key Themes

Efficient Markets for a Grid in Transition

Efficient Markets for a Grid in Transition		Description
	Performance and Alignment	
7	Ancillary Services Shortage Pricing	The purpose of this project is to evaluate the NYISO's Ancillary Services shortage pricing values, considering the operator actions taken to maintain operating reserve requirements, market incentives necessary to maintain flexibility, and payment incentives in neighboring markets, especially pay-for-performance capacity market designs.
8	Constraint Specific Transmission Shortage Pricing	Improve resource scheduling efficiency and investment signals by enhancing the way that constraints on the transmission system are priced in the NYISO's energy markets.
9	More Granular Operating Reserve	Implementing reserve requirements within certain New York City load pockets that would better represent the value of short-notice responsive resources in desirable locations.
10	Reserve Enhamcements for Constrained Areas	Dynamically procure Operating Reserves based on system needs and transmission capabilities, which will enable Operating Reserves to be scheduled more efficiently in constrained areas.
	Capacity Markets and Alignment	
11	Demand Curve Reset	Every four years, the NYISO, along with its stakeholder community, conducts this comprehensive review to determine the parameters used in establishing the Installed Capacity (ICAP) Demand Curves.
12	Capacity Demand Curve Adjustments	This effort includes exploring alternative slopes and shapes of the ICAP Demand Curves that may help stabilize capacity market pricing outcomes and improve the predictability of future market revenues as large quantities of new resources are deployed across New York State in the coming years.
13	Expanding Capacity Eligibility/Capacity Value Study	Assess the changes to the reliability benefit of resources in the grid through time to continue to support reliable grid operations.
14	Tailored Availability Metric	This project will help the NYISO to maintain the availability and incentivize performance of capacity suppliers during peak operating conditions. The Tailored Availability Metric project addresses this by incentivizing resources to be available and perform during these critical operating periods.

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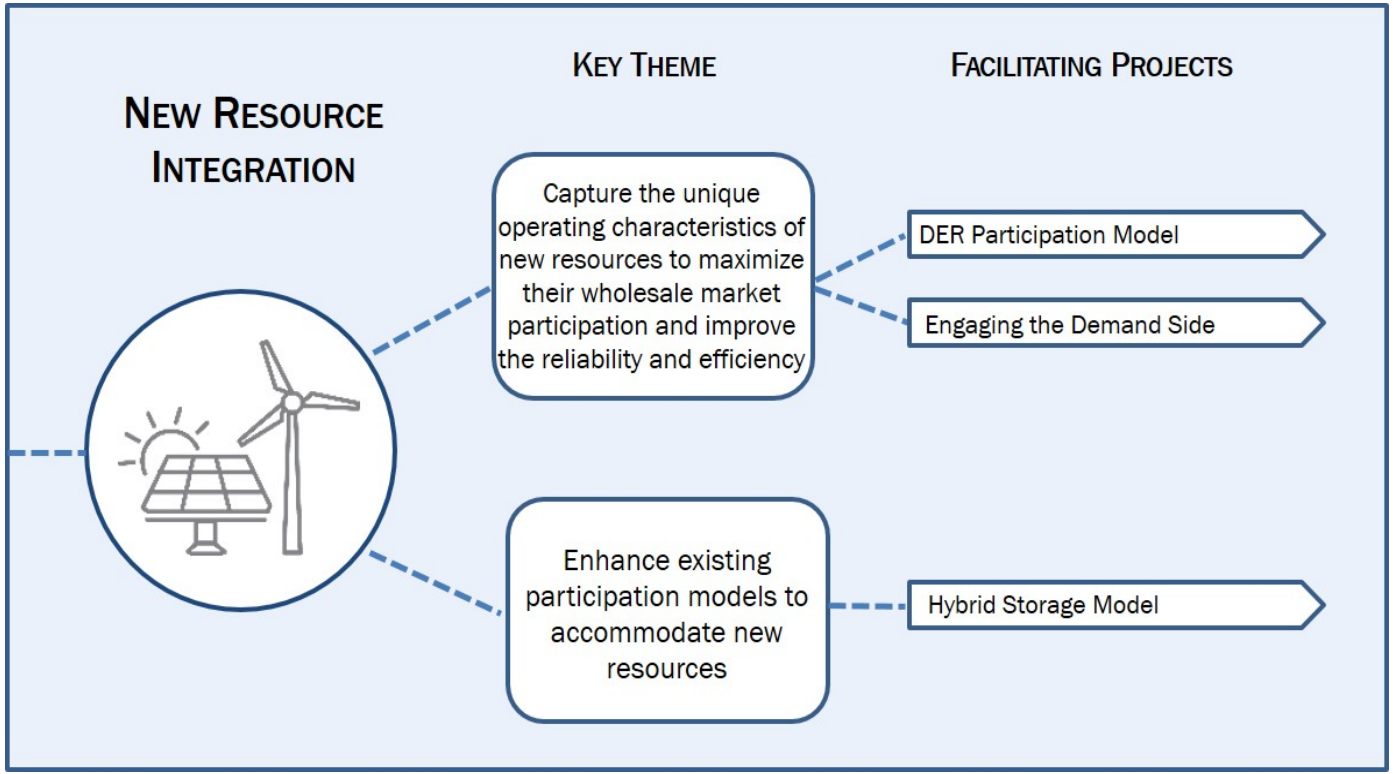
Strategic Initiatives and Key Themes

New Resource Integration



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Strategic Initiatives and Key Themes

New Resource Integration

New Resource Integration		Description
	Wholesale Market Participation	
15	DER Participation Model	Harmonize New York's REV goals and compliance with FERC Order Nos. 719, 745 and 841, while simplifying the operational matrix of rule sets for product offerings of both demand response and distributed resources, for all stakeholders involved.
16	Engaging the Demand-Side	Controllable and flexible load can help to balance inflexible/intermittent supply and provide Ancillary Services.
	Participation Model Enhancement	
17	Hybrid Storage Model	Develop market participation rules for front-of-the-meter resources co-located with ESRs.

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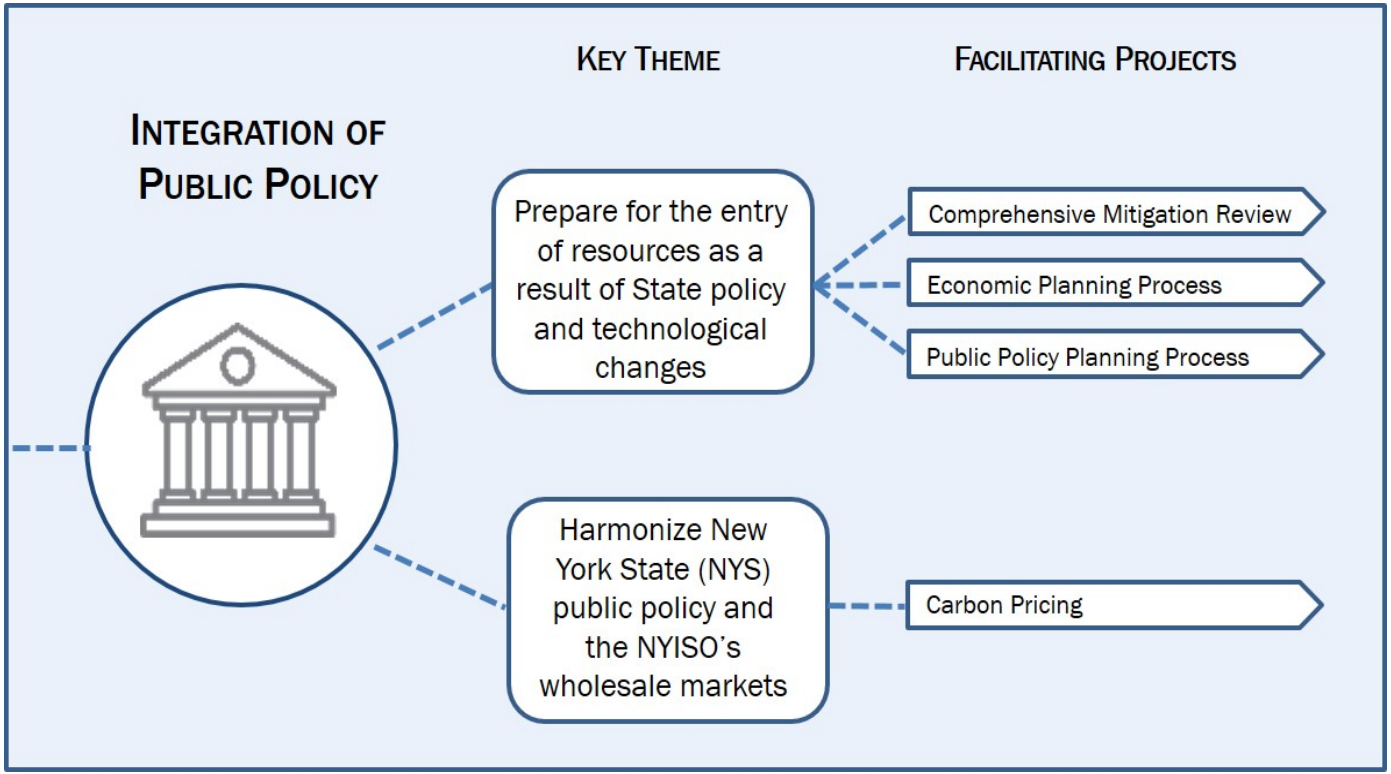
Strategic Initiatives and Key Themes

Integration of Public Policy



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Strategic Initiatives and Key Themes

Integration of Public Policy

Integration of Public Policy		Description
	New Resource Entry	
18	Comprehensive Mitigation Review	Will allow the NYISO to further prepare for the entry of resources as a result of State policy and technological changes.
19	Economic Planning Process	The purpose of the CARIS studies is to identify whether transmission build-out or the introduction of other resources is economic based on forecasted congestion costs within the NYISO market.
20	Public Policy Transmission Planning Process	The NYISO's Public Policy Transmission Planning Process is the means by which the NYISO addresses transmission needs that are driven by Public Policy Requirements
	Public Policy and Market Harmonization	
21	Carbon Pricing	Seeks to harmonize New York State (NYS) public policy and the NYISO's wholesale markets by incorporating the social cost of carbon dioxide ("carbon") emissions when scheduling resources through the energy markets.

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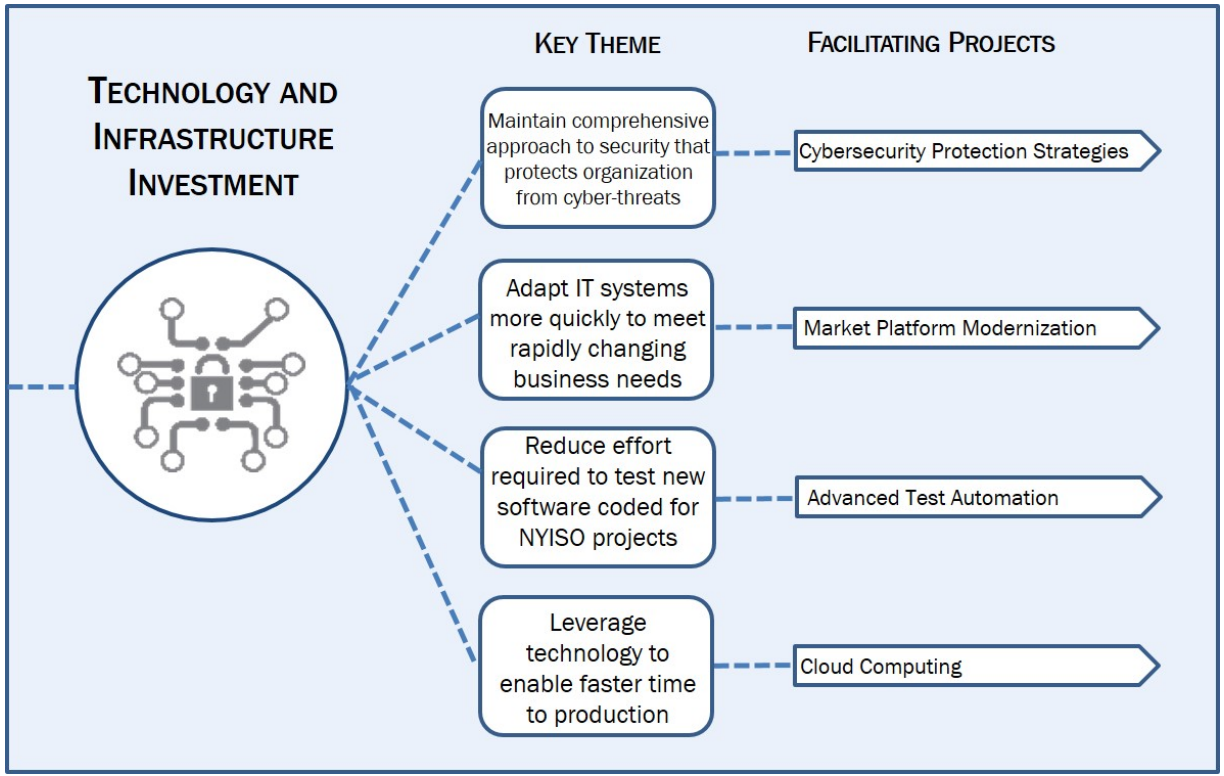
Strategic Initiatives and Key Themes

Technology and Infrastructure Investment



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Strategic Initiatives and Key Themes

Technology and Infrastructure Investment

	Technology and Infrastructure Investment	Description
22	Cybersecurity Protection Strategies	The NYISO views cyber and physical security as a crucial component of its strategic plan, and invests significant time and resources to maintain a comprehensive approach to security that protects the organization and allows it to fulfill its mission to reliably operate the electric grid and wholesale electricity markets in New York State.
23	Market Platform Modernization	The goal of this IT strategic initiative is to optimize the market platform to be adapted quickly and safely to enable the NYISO to be responsive to the emerging business needs of a grid in transition.
24	Advanced Test Modernization	The goal of this IT strategic initiative is to reduce the time and effort required to validate software changes
25	Cloud Computing	This IT strategic initiative focuses on building capabilities that will allow the NYISO to effectively manage the cost, risk, and efficiency of cloud based services.

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Appendix III: 2020 Master Plan Proposed Project Timelines

Strategic Initiatives and Key Themes

Grid Reliability and Resilience

Grid Reliability and Resilience		2020	2021	2022	2023	2024	2025
	Incentives for Flexible Dispatch						
1	Reserves for Resource Flexibility	MDC	DC	DEP			
2	Large-Scale Solar On Dispatch		DEP				
	Future Infrastructure Upgrades						
3	Enhancements to Resource Adequacy Models		Ongoing				
4	Reliability Planning Process	Ongoing					
5	Short-Term Planning Process	DEP	Ongoing				
	Climate Change Impacts						
6	Climate Change Impact and Resiliency Study	SC	CP				

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Strategic Initiatives and Key Themes

Efficient Markets for a Grid in Transition

	Efficient Markets for a Grid in Transition	2020	2021	2022	2023	2024	2025
	Performance and Alignment						
7	Ancillary Services Shortage Pricing	MDC	DC	DEP			
8	Constraint Specific Transmission Shortage Pricing	MDC	DC	DEP			
9	More Granular Operating Reserve	MDC	DEP				
10	Reserve Enhamcements for Constrained Areas		SC	FR	DC	DEP	
	Capacity Markets and Alignment						
11	Demand Curve Reset	SC	DEP		SD	SC	DEP
12	Capacity Demand Curve Adjustments		SC	MDC	DC		
13	Expanding Capacity Eligibility/Capacity Value Study	DC	DEP	SD	SC		DEP
14	Tailored Availability Metric	MDC	DEP	SD	SC		DEP

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Strategic Initiatives and Key Themes

New Resource Integration

	New Resource Integration	2020	2021	2022	2023	2024	2025
	Wholesale Market Participation						
15	DER Participation Model	SD	DEP				
16	Engaging the Demand-Side		ID	SD	SC	CP	CP
	Participation Model Enhancement						
17	Hybrid Storage Model	MDC	DC	DEP			

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Strategic Initiatives and Key Themes

Integration of Public Policy

	Integration of Public Policy	2020	2021	2022	2023	2024	2025
	New Resource Entry						
18	Comprehensive Mitigation Review	MDC/DEP	MDC/DEP				
19	Economic Planning Process	Ongoing					
20	Public Policy Transmission Planning Process	Ongoing					
	Public Policy and Market Harmonization						
21	Carbon Pricing	FR	SD				

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Strategic Initiatives and Key Themes

Technology and Infrastructure Investment

	Technology and Infrastructure Investment	2020	2021	2022	2023	2024	2025
22	Cybersecurity Protection Strategies	Ongoing					
23	Market Platform Modernization	Ongoing					
24	Advanced Test Modernization	Ongoing					
25	Cloud Computing	Ongoing					

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Our mission, in collaboration with our 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

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