New York ISO
Independent System Operator

Economic Planning Process

2023-2042 System & Resource Outlook

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Electric System Planning Working Group (ESPWG)

Friday June 16th, 2023

Agenda

- System & Resource Planning Overview
- Economic Planning Process Review
- 2023-2042 System & Resource Outlook
- Preliminary Schedule
- Next Steps
- Questions, Comments, & Feedback

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System & Resource Planning Overview

The Roles of the NYISO

- **Reliable Operations**
  Maintaining bulk power system reliability is the cornerstone of the NYISO's mission and focus, shaping how we operate, design markets, and conduct system planning.

- **Efficient Markets**
  Competitive wholesale electric markets provide reliable power at the lowest possible cost to meet consumer needs. We conduct and monitor competitive auctions of wholesale electricity including needed ancillary services every five minutes, every day of the year.

- **Comprehensive Planning**
  An important step in supporting New York's ambitious clean energy goals is to study the future grid to promote a better understanding of what will be needed, including emerging technologies, to meet reliability.

- **Authoritative Source**
  A pillar of our focus is to serve as an independent source of fact-based information on the evolving electric system.

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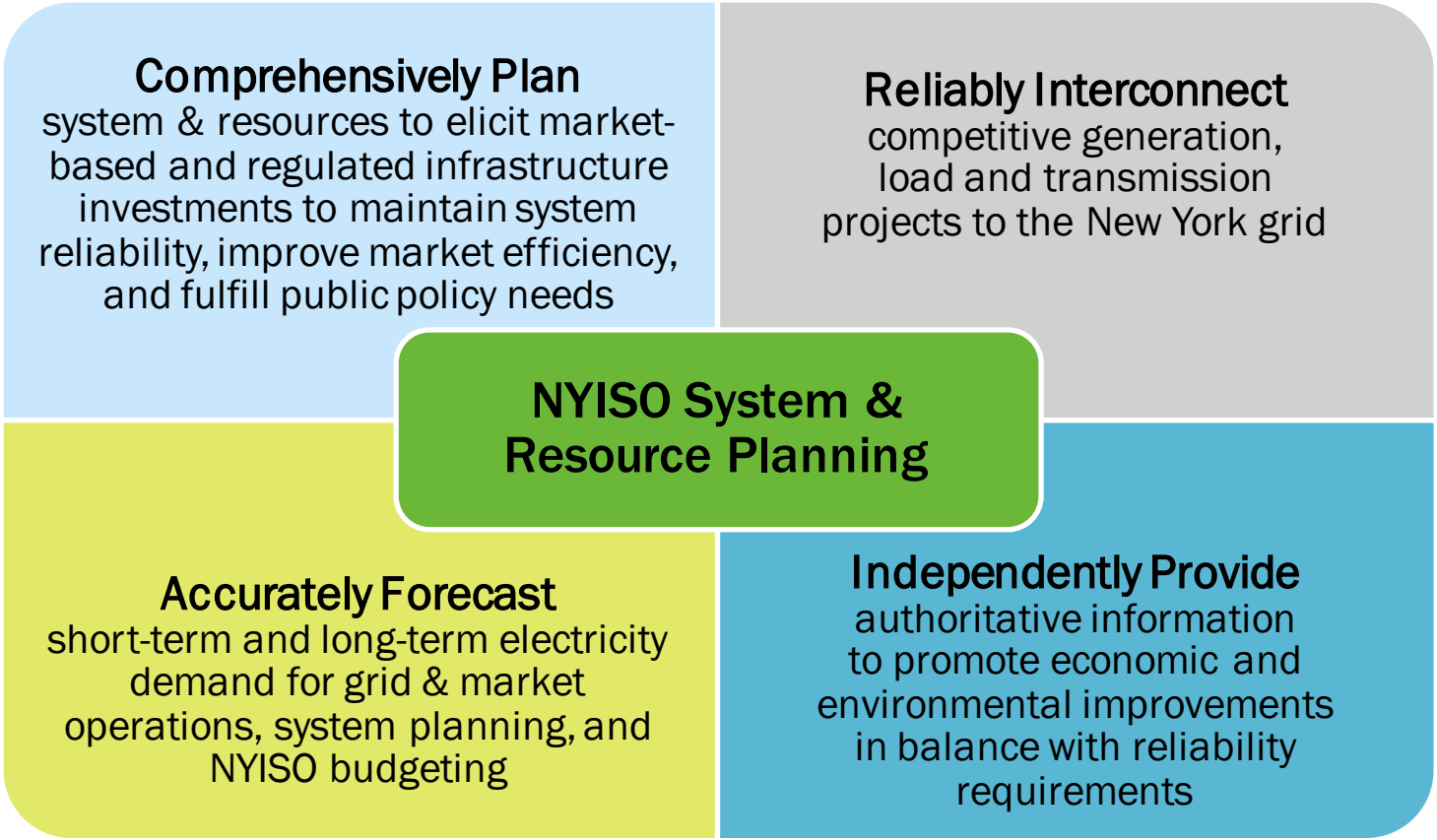

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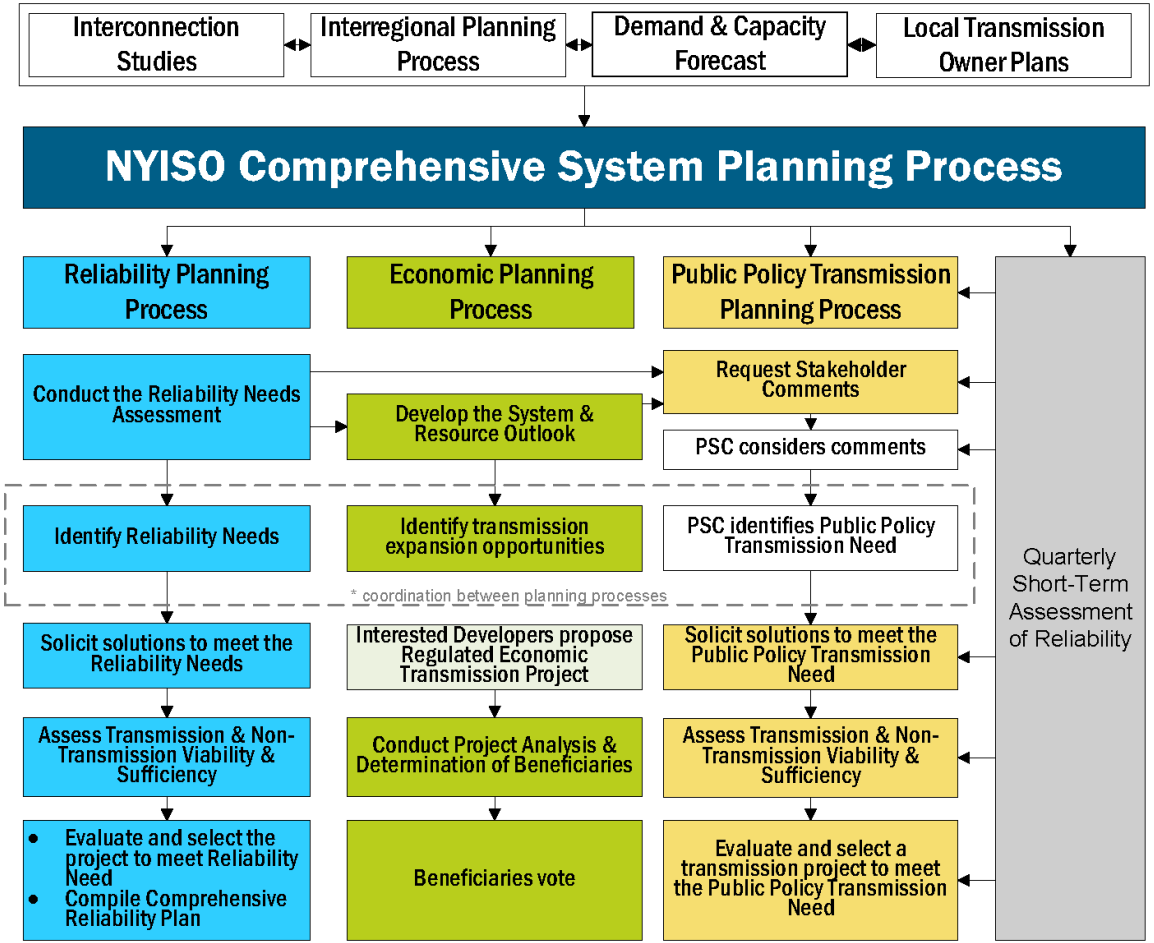

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Economic Planning Process Review

Economic Planning Origins

- In 2007, the Federal Energy Regulatory Commission (FERC) issued Order No. 890 that identified **nine** "Transmission Planning Principles" that established the basis for transmission planning at ISO/RTOs
- The **eighth** principle, and part of the Final Rule, required that all transmission providers (e.g., ISOs/RTOs) complete an economic planning study that provides the opportunity to consider "whether potential upgrades or other investments could reduce congestion costs or otherwise integrate new resources on an aggregated or regional basis outside of a specific request for interconnection or transmission service."

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Economic Planning Implementation

- In response to Order No. 890, the NYISO developed OATT Attachment Y Section 31.3 & 31.5, which establishes studies and analyses that FERC accepted as fulfilling Order No. 890 requirements
- The Economic Planning Process Manual provides additional information and details on how the NYISO performs Economic Planning studies

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Economic Planning Process Studies

1. **System & Resource Outlook, "The Outlook"**
   - 20-year study of current system & projected congestion
   - Identification of challenges related to achieving New York policy objectives
2. **Economic Transmission Project Evaluation (ETPE)**
   - Study of actual transmission project proposals
   - Project with benefit/cost ratio eligible for vote for cost recovery
3. **Requested Economic Planning Study (REPS)**
   - Stakeholder or other interested party requested study
   - Studies performed "subject to resource limits"

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Uses for System & Resource Outlook

- Identify potential challenges to meeting the New York State CLCPA targets
- Inform stakeholders and policy makers where future public policy needs may exist
- Define renewable generation pockets
- Prepare system models to perform Economic Transmission Project Evaluation and/or Requested Economic Planning Studies

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2023-2042 System & Resource Outlook

System & Resource Outlook Objectives

1. Create a biennial report that summarizes the current assessments, evaluations, and plans in the biennial Comprehensive System Planning Process
2. Produce a twenty-year projection of system conditions for demand, generation, and transmission across the New York transmission system
3. Identify, rank, and group congested elements
4. Assess the potential benefits of addressing congestion
5. Develop informative scenario cases
6. Perform technical analyses to inform internal and external stakeholders

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System & Resource Outlook Scope

Model Development

Benchmark

Assumptions

Reference Cases

Sensitivities

Congestion Assessment

Historic & Future Transmission Congestion

Congestion Relief Analysis

Analyses

Resources to Meet Policy Objectives

Renewable Generation Profiles

Renewable Pockets & Energy Deliverability

Future Resource Attributes

Report, Appendix, Data Catalog, & Fact Sheet

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Model Development

Benchmark

- **Validate, test, and tune production cost model performance**
- **Initialize database for 2023-2042 System & Resource Outlook modeling**
- **Process**
  1. Perform production cost model simulation with actual 2021 historic data as input
  2. Compare simulation output with actual system performance for the year 2021 to test model accuracy
  3. Adjust model parameters as needed to align simulated output with actual
  4. Iterate #1–#3

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Model Development

Assumptions

- All assumptions developed pursuant to Economic Planning Process tariff provisions and manual
- Many different policies, forecasts, power system configurations, market structures, and other parameters must be developed to formulate the study
- Study assumptions are presented and reviewed with stakeholders at ESPWG
- Assumptions “matrix” developed for models

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Model Development

Reference Cases for Consideration

- **Base Case**
  - Assumptions align closely with Reliability Planning Process
  - Used for any potential Economic Transmission Project Evaluation (ETPE)
- **Contract Case**
  - Base Case + renewable projects with existing NYSERDA REC contracts
- **Policy Cases (2 Scenarios)**
  - Introduce capacity expansion modeling
  - Contract Case + New York CLCPA carbon-free targets and goals
  - Different scenarios reflect changes in underlying assumptions (e.g., load forecast, technology costs, etc.)

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Model Development

Sensitivities

- As time permits, sensitivity simulations can be performed in capacity expansion and production cost simulations
- Some potential examples include:
  - Flexible Load
  - IRM/LCR
  - Load/Solar/Wind Shape
- Sensitivities allow for determining the impact of single changes to future system buildout and operation

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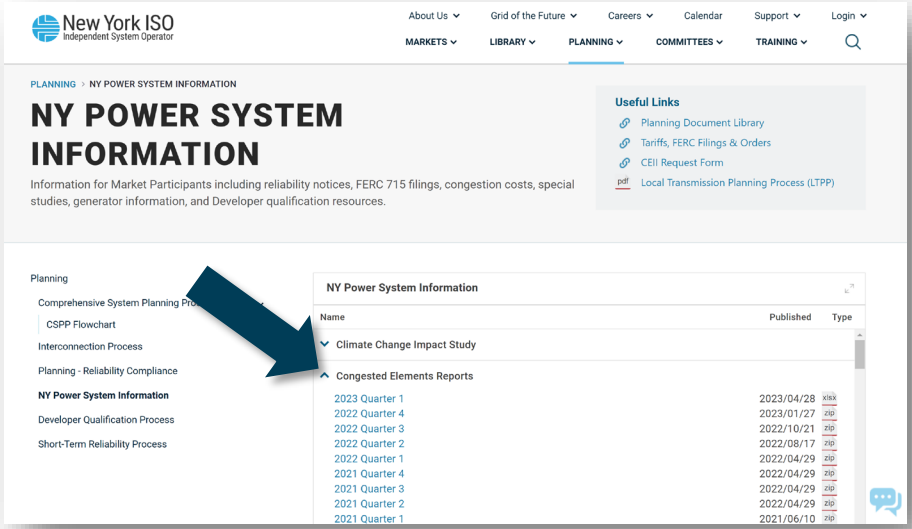
Congestion Assessment

Historic Congestion

- Per the tariff, the NYISO posts historic transmission congestion metrics to the public website on a quarterly basis: https://www.nyiso.com/ny-power-system-information-outlook/
- Metrics are compiled in The Outlook and presented for easy comparison to simulated future data to identify trends



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Congestion Assessment

Future Congestion

- Future transmission congestion is quantified in production cost models for each of the Reference Cases
- Modeling assumptions drive presence, magnitude, and trends of transmission congestion
- Basis for defining renewable generation pockets

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Congestion Assessment

Congestion Relief Analysis

- Congestion Relief Analyses are performed to examine the effects of relieving transmission line constraints on specific paths or on a system-wide level
- NYISO is considering conducting a “copper sheet” analysis, where all internal NYCA transmission constraints are relaxed, to help quantify the effects of transmission congestion on energy deliverability of renewable resources

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Analyses

Resources to Meet Policy Objectives

- Climate Leadership & Community Protection Act (CLCPA) will require significant resource buildout
- Estimated amount of new generation required to meet some targets is uncertain
- Capacity expansion model can help to identify potential resource buildouts to meet policy objectives
- New assumptions and study updates may lead to new findings beyond 2021-2040 System & Resource Outlook

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Analyses

Renewable Generation Pockets & Energy Deliverability

- Perform Renewable Generation Pocket and Energy Deliverability analyses similar to 2021-2040 System & Resource Outlook
- Renewable Generation Pockets will be based on Contract and Policy cases
- New pockets may be identified based on renewable generation curtailments and transmission congestion grouping in the Contract and Policy cases

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Analyses

Renewable Generation Profiles

- DNV-GL was commissioned in 2022 to develop detailed hourly offshore wind profiles for 22 historic weather years
  - Presentation Link
  - Data Link
- DNV-GL has been commissioned for follow-up work to extend detailed hourly profile development to land-based wind and solar profiles
- New renewable generation profiles will be used in The Outlook

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Analyses

Future Resource Attributes

- Existing thermal generation and future Dispatchable Emissions Free Resource (DEFR) are evaluated as system evolves to meet CLCPA targets
- Performance characteristics are analyzed to help determine potential future system needs of dispatchable generation resources

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Report

Report & Supplemental Documents

- NYISO Planning will continue its effort to make reports more accessible by using an expanded appendix to house the dense technical assumptions and analyses on individual topics supporting the report
- Anticipated 2023-2042 System & Resource Outlook publications:
  - Report
  - Appendices
  - Data Catalog
  - Fact Sheet
- Draft documents will be reviewed at stakeholder meetings

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Preliminary Schedule

Preliminary Targeted Study Schedule

Month	2023			2024		
	Q2	Q3	Q4	Q1	Q2	Q3
Benchmarking						
Assumptions Development						
CapEx Modelling						
Production Cost Modelling						
Analyses						
Report						

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Next Steps

2023 Q2 Targeted Schedule

2023 Q2	Month	April					May				June			
	Week	1	2	3	4	5	1	2	3	4	1	2	3	4
	Benchmarking						X	X	X	X	X	X	X	X
	Assumptions Development								X	X	X	X	X	X
	CapEx Modelling										X	X	X	X
	Production Cost Modelling													
	Analyses													
	Report													

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Next Steps

- **Upcoming ESPWG Meetings**
  - Process improvements review
  - Production cost model benchmark results
  - Assumptions review & discussion

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Questions, Comments, & Feedback?

Email additional feedback to:
JFrasier@nyiso.com

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2023-2042 System & Resource Outlook Data Catalog

Report

Report Placeholder

Study Summary

Summary Placeholder

Stakeholder Presentations

November 18, 2022

2021 Outlook Lessons Learned

NYSERDA Outlook Suggestions

June 16, 2023

2023-2042 Outlook Kickoff

Report Appendices

Data Documents

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Our Mission & Vision

Mission

Ensure power system reliability and competitive markets for New York in a clean energy future

Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

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