

System & Resource Outlook Report

Economic Planning Department

Management Committee (MC)

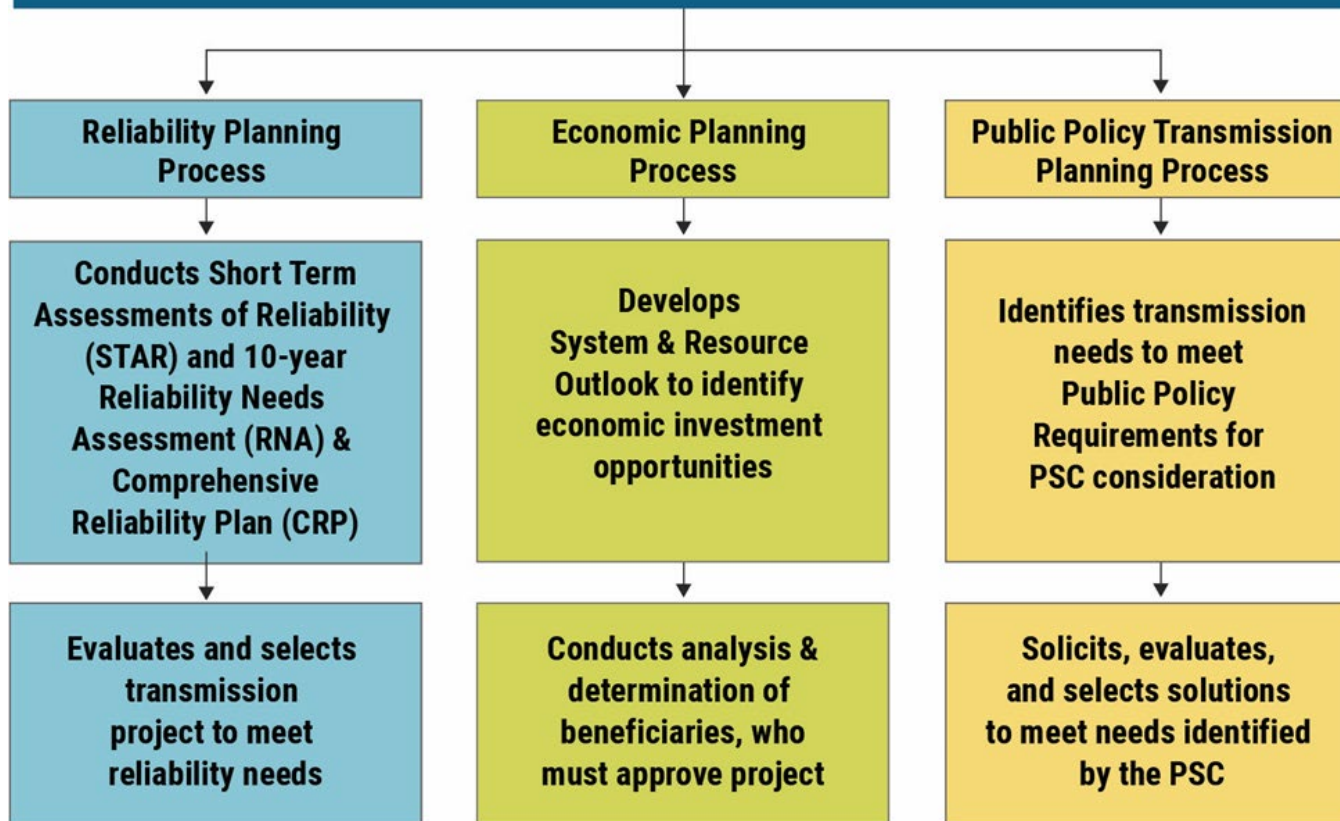
Wednesday August 31st, 2022 - WebEx

Agenda

- **NYISO's Economic Planning Process Overview**
- **System & Resource Outlook Report Key Findings Review**
- **Next Steps**

NYISO's Economic Planning Process

NYISO Comprehensive System Planning Process



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

System & Resource Outlook Scope

**Model
Development**

**Congestion
Assessment**

Renewable
Pocket
Formation

Projected
Operations
& Market
Impact
Analysis

Reference
cases

Sensitives
and
Scenarios

Historic &
Future
Transmission
Congestion

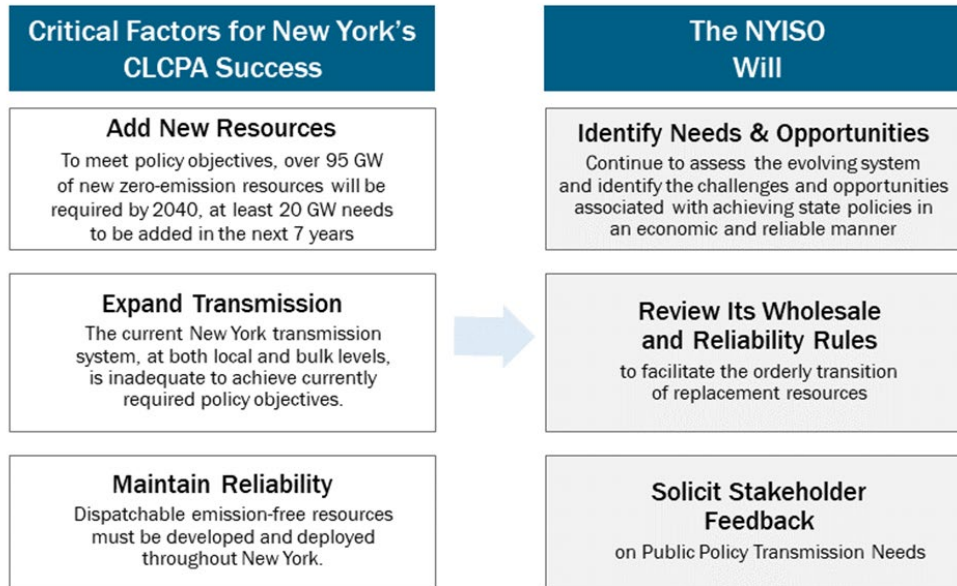
Congestion
Relief
Analysis

Energy
Deliverability
Assessment

System & Resource Outlook Report: Key Findings

2021 – 2040 System & Resource Outlook

Key Findings



Key Finding 1:

- ✓ **The pace of renewable project development is unprecedented and requires an increase in the pace of transmission development**

Every incremental advancement towards policy achievement matters on the path to a greener and reliable grid in the future, not just at the critical deadline years such as 2030 and 2040. In general, resource and transmission expansion take many years from development to deployment.

Key Finding 2:

- ✓ **Coordination of project additions and retirements is essential to maintaining reliability and achieving policy.**

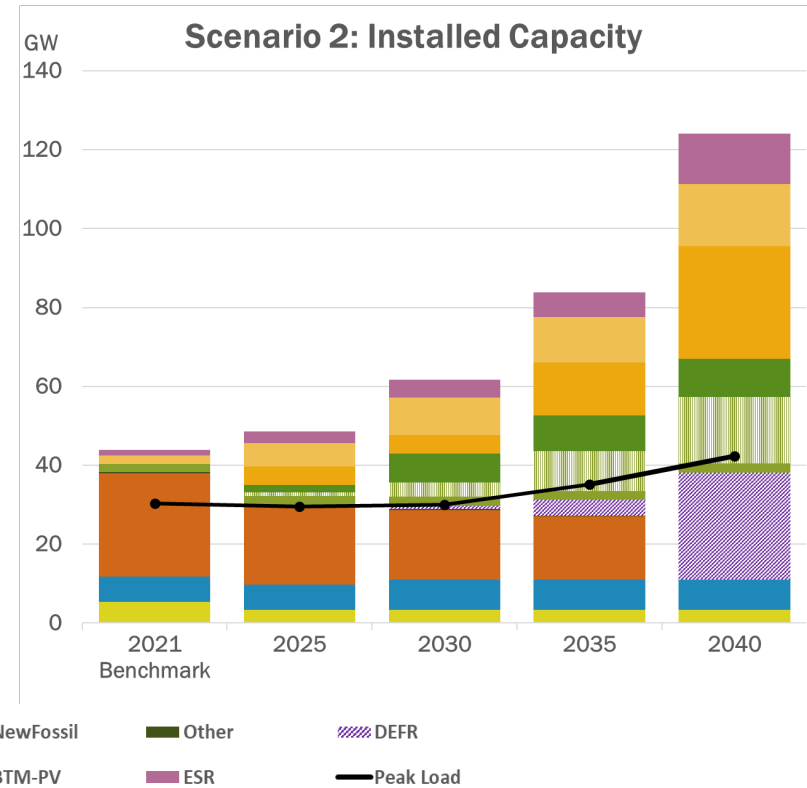
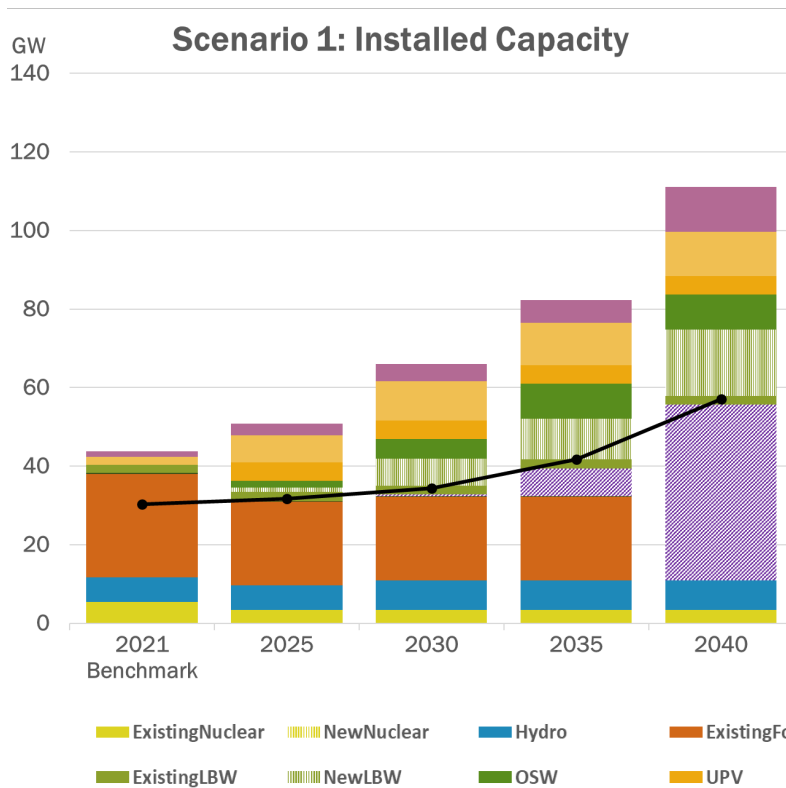
Coordination of renewable energy additions, commercialization and development of dispatchable technologies, fossil fuel plant operation, and staged fossil fuel plant deactivations over the next 18 years will be essential to facilitate an orderly transition of the grid.

Key Finding 3:

- ✓ Significant new resource development will be required to achieve CLCPA energy targets.

The total installed generation capacity to meet policy objectives within New York is projected to range between 111 GW and 124 GW by 2040. At least 95 GW of this capacity will consist of new generation projects and/or modifications to existing plants. Even with these additions, New York still may not be sufficient to fully meet CLCPA compliance criteria and maintain the reliable electricity supply on which New York consumers rely. The sheer scale of resources needed to satisfy system reliability and policy requirements within the next 20 years is unprecedented.

New York Generation Resource Mix Scenarios and Demand Forecast



Key Finding 4:

- ✓ **To achieve an emission-free grid, dispatchable emission-free resources (DEFERs) must be developed and deployed throughout New York.**

DEFERs that provide sustained on-demand power and system stability will be essential to meeting policy objectives while maintaining a reliable electric grid. While essential to the grid of the future, such DEFER technologies are not commercially viable today. DEFERs will require committed public and private investment in research and development efforts to identify the most efficient and cost-effective technologies with a view towards the development and eventual adoption of commercially viable resources. The development and construction lead times necessary for these technologies may extend beyond policy target dates.

Key Finding 5:

- ✓ **As the energy policies in neighboring regions evolve, New York's imports and exports of energy could vary significantly due to the resulting changes in neighboring grids.**

New York is fortunate to have strong interconnections with neighboring regions and has enjoyed reliability and economic benefits from such connections. The availability of energy for interchange is predicted to shift fundamentally as policy achievement progresses. Balancing the need to serve demand reliably while achieving New York's emission-free target will require continuous monitoring and collaboration with our neighboring states.

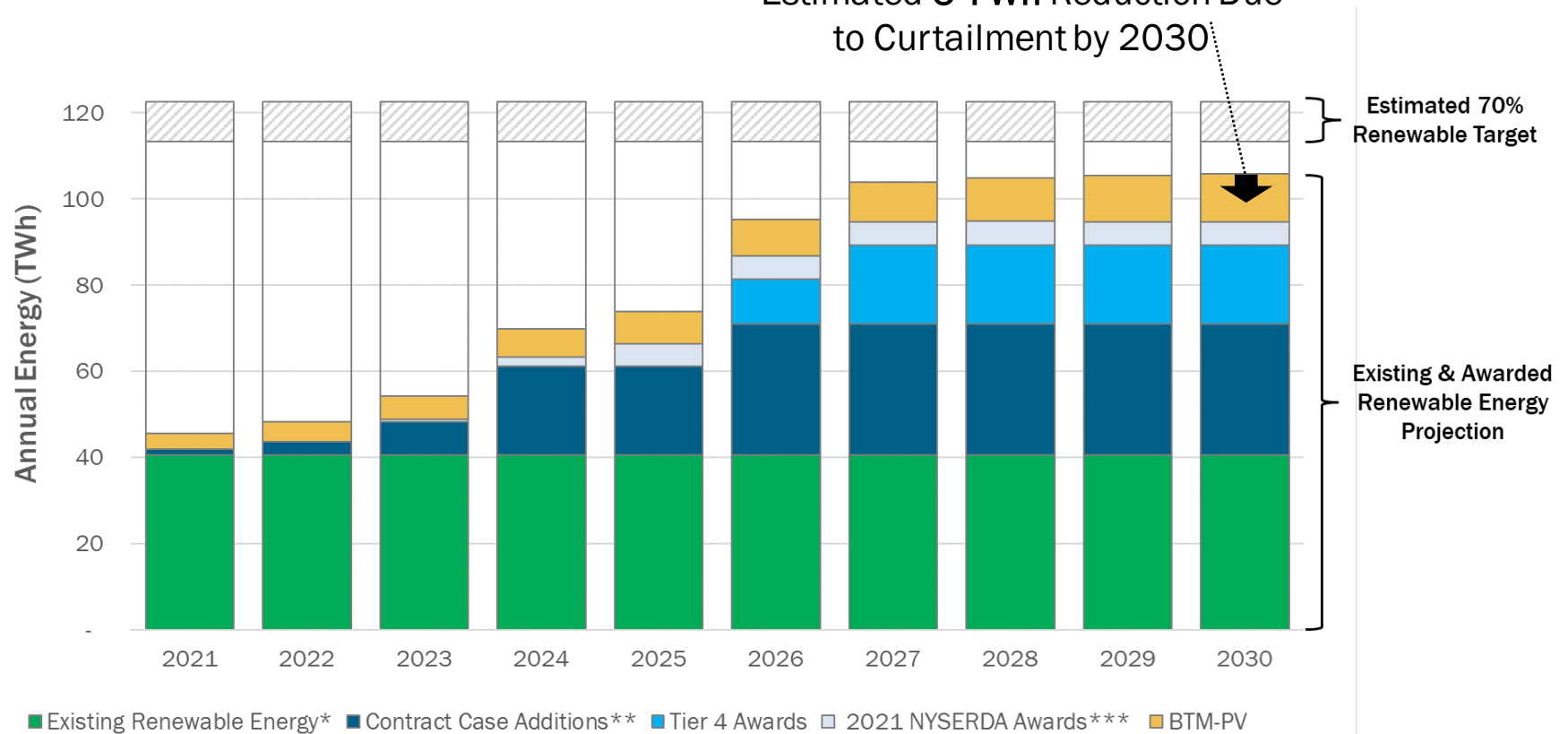
Key Finding 6:

- ✓ **Transmission limitations prevent full delivery of renewable energy.**

A minimum of 5 TWh of renewable energy in 2030 and 10 TWh in 2035 is projected to be curtailed due to transmission limitations in renewable pockets. This equates to roughly 5% less renewable energy that can be counted toward the CLCPA targets.

Progress Towards “70x30” Mandate

Estimated 5 TWh Reduction Due to Curtailment by 2030



Key Finding 7:

- ✓ **Transmission expansion is critical to facilitating efficient CLCPA energy target achievement.**

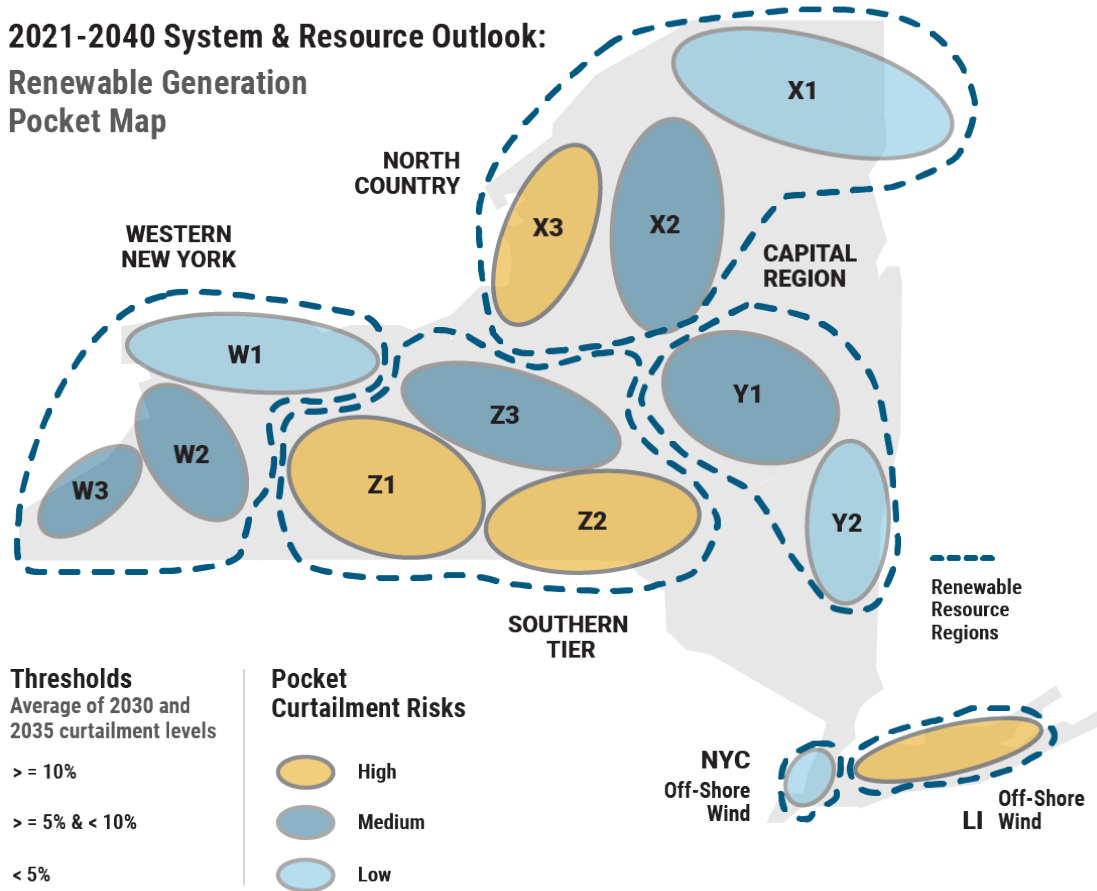
The current New York transmission system, at both local and bulk levels, is inadequate to achieve currently required policy objectives. Some renewable generation pockets throughout the State already face curtailments, more curtailments will be experienced in the future and will become more constrained as an increasing number of intermittent generation resources interconnect.

Key Finding 8:

- ✓ **Four pockets will particularly benefit from transmission expansion.**

The Finger Lakes (Z1), Southern Tier (Z2), Watertown (X3), and Long Island. Without investment in transmission, these areas of the New York grid will experience persistent and significant limitations to deliver the renewable power from these pockets to consumers in the upcoming years.

2021-2040 System & Resource Outlook: Renewable Generation Pocket Map



Thresholds

Average of 2030 and 2035 curtailment levels

> = 10%

> = 5% & < 10%

< 5%

Pocket Curtailment Risks

- High
- Medium
- Low

Next Steps

Report Changes Since 8/17 BIC Approval

- Minor spelling, grammar, and formatting adjustments
- Pg. 5 – Updated diagram to shorten wording & reorder boxes
- Pg. 7 – Removed contracted renewable bar charts for simplification
- Pg. 7 – Removed *"and 100% zero-emission generation by 2040"*
- Pg. 8 – Added *"Until new technologies emerge, continued operation of fossil will be required in some manner during the grid transition."*
- Pg. 10 - *"(or fossil generation retained)"* after *"dispatchable emission-free resources must be added to the system"*
- Pg. 7 & 41 – added new footnote to chart *"***Tier 4 awards exclude associated renewable projects with existing Tier 1 awards"*

Posted With Today's Meeting...

- **Comments from Independent Market Monitor**
 - MMU Memo
 - MMU Presentation
- **This Presentation**
- **System & Resource Outlook Report**
- **System & Resource Outlook Report Appendices**

Next Steps

- **Post Comments from Independent Market Monitor**
- **Seek Board of Directors Approval in September**
- **Public Information Session After Board Approval**

Questions, Feedback, Comments?

Email additional feedback to:
JFrasier@nyiso.com

2021-2040 Outlook Data Catalog

ESPWG/TPAS Presentations

May 20, 2021

Model Benchmark Results

September 22, 2021

System & Resource Outlook Update

October 25, 2021

Capacity Expansion Model Primer

System & Resource Outlook Update

November 19, 2021

System & Resource Outlook Update

December 19, 2021

System & Resource Outlook Update

January 25, 2022

System & Resource Outlook Update

February 9, 2022

System & Resource Outlook Update

Base & Contract Case Results

February 25, 2022

System & Resource Outlook Update

March 8, 2022

System & Resource Outlook Update

March 24, 2022

System & Resource Outlook Update

Contract Case Congestion Analysis

April 1, 2022

System & Resource Outlook Update

April 26, 2022

System & Resource Outlook Update

May 23, 2022

System & Resource Outlook Update

June 2, 2022

System & Resource Outlook Update

June 8, 2022

System & Resource Outlook Update

Updated 6/2 Presentation

June 21, 2022

System & Resource Outlook Update

August 8, 2022

System & Resource Outlook Update

August 17, 2022 (BIC)

System & Resource Outlook Update

Reports



6/7 – Draft Report Chapter 1
6/16 – Draft Report Chapters 1-4
6/21 – Draft ES + Chapters 1-5
7/14 – Draft Report
7/14 – Draft Appendix
7/26 – Draft Appendix
8/8 – Draft Report
8/8 – Draft Appendix
8/17 – Draft Report
8/17 – Draft Appendix

Data Posted to ESPWG

Assumptions Matrix v1
Capacity Expansion Assumptions Matrix v1
Contract Case Renewable Projects
Emissions Price Forecast
Fuel Price Forecast
Capacity Expansion Assumptions Matrix v2 (Redline)
Capacity Expansion Assumptions Matrix v3 (Redline)
Production Cost Assumptions Matrix v2 (Redline)
Capacity Expansion Assumptions Matrix v4 (Redline)
Capacity Expansion Assumptions Matrix v5 (Redline)
Policy Case Hourly Load Forecasts
Policy Case Zonal Capacity Expansion Preliminary Results
Capacity Expansion Assumptions Matrix v6 (Redline)
Capacity Expansion Assumptions Matrix v7 (Redline)
S1 & S2 New Generator Additions
Hourly Load Forecasts
Capacity Expansion Assumptions Matrix – Final
Production Cost Assumptions Matrix – Final
Detailed Model Output Data File

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