

Appendix G: Scenarios

Long Island Offshore Wind Export Public Policy Transmission Planning Report

**A Report from the New York
Independent System Operator**

DRAFT for May 31, 2023, MC

DRAFT – FOR DISCUSSION PURPOSES ONLY

Appendix G: Scenarios

Description of Scenarios

For the purpose of the Long Island PPTN, the NYISO established three scenarios to evaluate the proposed solutions:

Baseline Scenario:

- 9,000 MW total of offshore wind generation – 6,000 MW in New York City and 3,000 MW in Long Island.
- Planned generation changes, such as known retirements and moderate buildout of upstate renewables and expected generation retirements consistent with *2021-2040 System & Resource Outlook* Contract Case and *2022 Reliability Needs Assessment* Base Case.
- Assumes generic transmission upgrades on the Barrett – Valley Stream 138 kV paths to fully alleviate congestion.

Policy Scenario:

- 12,000 MW total of offshore wind generation (6,000 MW in New York City and 6,000 MW in Long Island).
- Assumes upstate renewable buildout and fossil generation retirements and to meet CLCPA policy mandates consistent with *2021-2040 System & Resource Outlook* Policy Scenario 2 Case and *2022 Reliability Needs Assessment* 70x30 Case.
- Assumes generic transmission upgrades on the Barrett – Valley Stream 138 kV paths to fully alleviate congestion.
- CHPE and CPNY Tier 4 projects modeled in-service.

Policy + Barrett – Valley Stream Constraint Scenario (Policy + B-VS Scenario):

- Policy Scenario without the assumed generic transmission upgrades on the Barrett – Valley Stream 138 kV paths. In the first quarter of 2023, Empire Wind 2 accepted its cost allocation for System Upgrade Facilities but rejected its cost allocation for System Deliverability Upgrades in the Additional SDU Study for Class Year 2021. The System Upgrade Facilities were limited to providing the requested level of Energy Resource Interconnection Service for Empire Wind 2 and did not resolve the existing nearby transmission constraints on the Barrett – Valley Stream 138 kV paths.

In the above scenarios, modeling of offshore wind generators includes generators that currently have a NYSERDA or LIPA award, as well as reasonable assumptions for the remaining amount to achieve the 9,000 MW or 12,000 MW targets.

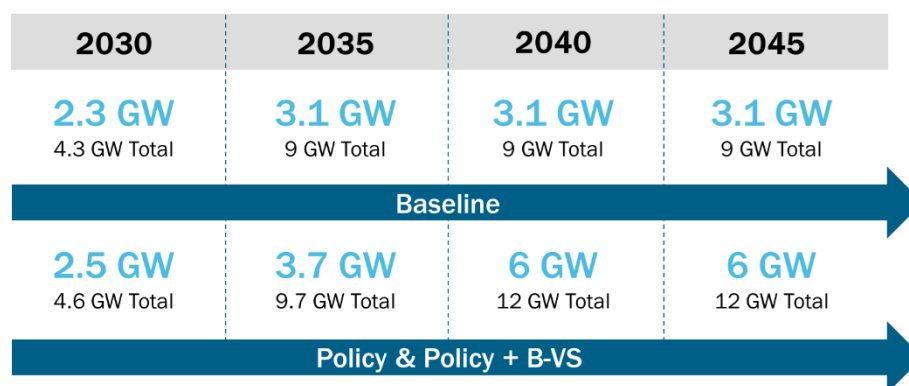
- 3,000 MW in Zone K was achieved by modeling the awarded 139 MW at East Hampton 69 kV,

880 MW at Holbrook 138 kV, 1,260 MW at Barrett 138 kV; and non-awarded 800 MW at Ruland Rd 138 kV.

- 6,000 MW in Zone K was achieved by modeling the awarded 139 MW at East Hampton 69 kV, 1,050 MW at Holbrook 138 kV, 1,350 MW at Barrett 138 kV; and non-awarded 1,150 MW at each of Ruland Rd 138 kV, East Garden City 345 kV, and Northport 138 kV.
- 6,000 MW in Zone J was achieved by modeling the awarded 816 MW at Gowanus 345 kV and 1,230 MW at Astoria 138 kV; and non-awarded 1,310 MW each at Farragut East 345 kV, Farragut West 345 kV, and West 49th St. 345 kV.

The timeline for offshore wind development in the production cost and capacity expansion models is described in Figure 1 below.

Figure 1: Long Island Offshore Wind Addition Timelines



The evaluation of the proposed solutions utilized tools, such as power flow, resource adequacy, production cost simulations, and capacity expansion.

Detailed Description of Models & Tools

Power Flow

Power flow analysis was used in evaluating metrics, such as transfer limit, expandability, and operability. The NYISO used the Baseline Scenario for the Viability & Sufficiency Assessment, as well as in the evaluation of the projects' impacts to system strength. The NYISO used the Policy and Policy + B-VS Scenarios in evaluating the projects' satisfaction of the transfer limit, expandability, and operability metrics. The Class Year 2021 Annual Transmission Baseline Assessment summer peak and spring light load cases were the starting point for power flow analyses and were updated with the following generation and tie line assumptions.

Figure 2: Power Flow Assumptions

	Viability & Sufficiency		Expandability		Transfer & Operability	Grid Strength
	Summer Peak	Light Load	Summer Peak	Light Load	Summer Peak	Light Load
Zone K OSW (MW)	3,000	3,000	6,000	6,000	6,000	3,000
Zone J OSW (MW)	6,000	6,000	6,000	6,000	0	0
Zone K Load (MW net)	4,423 (including 499 MW BTM solar)	1,107 (including 1,108 MW BTM solar)	4,423 (including 499 MW BTM solar)	1,107 (including 1,108 MW BTM solar)	4740	1,055 (including 1182 MW BTM Solar)
Zone K Conventional Generation Dispatch (Pgen MW)	~2,000	~500	~200	~200	~3100	~500
Zone K Conventional Reserve (Pmax - Pgen MW of committed units)	~900	~400	~1200	~1050	~1100	~400
LIPA Imports (MW into Long Island)	NNC = 0 CSC = 0 Neptune = 660 901/903 = -300	NNC = 0 CSC = 0 Neptune = 0 901/903 = -300	NNC = 0 CSC = 0 Neptune = 660 901/903 = -300	NNC = 0 CSC = 0 Neptune = 0 901/903 = -300	NNC = 0 CSC = 0 Neptune = 660 901/903 = -300	NNC = 0 CSC = 0 Neptune = 0 901/903 = -300

Additional details on the modeling assumptions and corresponding assessment are further described in the following appendices: Transfer & Operability in Appendix I, Expandability in Appendix J, and System Strength in Appendix K.

Resource Adequacy Models

The resource adequacy model used for the Long Island PPTN evaluation utilizes the MARS (Multi-Area Reliability Simulations) model from the *2022 Reliability Needs Assessment* (RNA) as the starting point to assess the proposed transmission projects. To establish a reference point for post-project NYCA LOLE impact comparison, the NYISO developed two pre-project models to represent the Baseline and Policy Scenarios for this analysis. Both models leveraged the MARS models developed under the *2022 Reliability Need Assessment* study process for study year 2030.

The following key changes were applied to the Long Island PPTN pre-project cases compared to the RNA's cases:

- The RNA Base Case for study year 2030 was further updated to reflect offshore wind targets and also to remove the proposed Champlain Hudson Power Express HVDC transmission project; and
- The RNA Policy Case Scenario 2 was further updated to reflect offshore wind targets. Both Champlain Hudson Power Express and the proposed Clean Path New York HVDC transmission projects continue to be modeled in this case.

These two models were further updated to reflect the impacts that each project would have on the

affected MARS topology transfer limits. Additional details on the model assumptions and corresponding capacity benefit assessment are further described in Appendix M.

Production Cost Simulations

The production cost model used for the Long Island PPTN evaluation utilizes the MAPS (Multi-Area Production Simulation) model from the *2021-2040 System & Resource Outlook* (Outlook) as the starting point for the three scenarios (Baseline, Policy, and Policy + B-VS). The Outlook study period is from 2021-2040, whereas the Long Island PPTN study period is from 2030-2050. The NYISO simulated discrete years at 5-year intervals to provide a reasonable representation of the twenty-year study period without simulating each year of production cost data.

Production cost savings for a project are calculated as the difference between the pre-project and post-project results over the duration of a project's study period, starting at the estimated in-service date and extending 20 years. The following key changes were applied to the Long Island PPTN pre-project cases compared to the Outlook's cases:

- Extended load forecast, fuel price forecast, and emission price forecast to 2045 to be modeled in production cost simulations. 2045 is considered as the proxy year to represent system conditions from 2045-2050; and
- Increased offshore wind capacity and points of interconnection for offshore wind generators in the three scenarios for the Long Island PPTN compared to the Outlook case assumptions.

Additional details on the production cost simulations are further described in Appendix L.

Capacity Expansion Simulations

The NYISO leveraged the capacity expansion model for Policy Case Scenario 2 from the Outlook in the Long Island PPTN evaluation. For purposes of the evaluation, the NYISO modified the capacity expansion model for Policy Case Scenario 2 to align the offshore wind generation buildout consistent with production cost simulations in this evaluation and modeled transmission upgrades accordingly for each proposed transmission project. This assessment was conducted for both the Policy and Policy + B-VS Scenarios for the top-tier projects for model years 2021-2040.

The following key changes were applied to the Long Island PPTN project cases compared to the Outlook's Policy Case Scenario 2:

- Increased offshore wind production due to reduced curtailment associated with each transmission project, as identified in the production cost simulations;
- Modeled changes in interzonal transfer limits for associated with each transmission project;

and

- Decreased the Zone K capacity reserve margin accordingly for each project based assumed increases in transmission security limits pursuant to the methodology described in Appendix N.

Additional details on the capacity expansion model and corresponding avoided cost assessment are further described in Appendix N.