

Appendix J: Expandability

Long Island Offshore Wind Export Public Policy Transmission Need Evaluation

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

DRAFT for April 25, 2023 ESPWG

Appendix J: Expandability

Long Island Electrical Expandability Results

For purposes of the expandability metrics and given the New York’s public policy goals, the NYISO evaluated the electrical expandability based on the ability of each project to integrate more than the minimum 3,000 MW of offshore wind energy injection into Long Island. The assessment performed N-0, N-1, and N-1-1 analysis for the Policy Scenario based on the assumption that up to 6,000 MW of offshore wind energy may be interconnected to Long Island. Figure 1 summarizes the maximum amount of Long Island offshore wind energy (up to 6,000 MW) that can be accommodated by each project without curtailment under N-0, N-1, and N-1-1 conditions.

Figure 1: Electrical Expandability (Base) Results

Electrical Expandability	Maximum Amount of Long Island OSW (MW)			
	Summer Peak		Spring Light Load	
	N0/N-1	N-1-1	N0/N-1	N-1-1
Base Case	4,550	4,150	2,300	2,050 ¹
T035 - LS Power	5,575	5,125	5,150	4,350
T036 - NextEra Core 1	5,825	5,175	4,525	4,450
T037 - NextEra Core 2	5,825	4,975	4,925	4,150
T038 - NextEra Core 3	6,000	4,850	5,325	4,600
T039 - NextEra Core 4	6,000	4,900	4,925	4,400
T040 - NextEra Core 5	6,000	4,900	4,925	4,375
T041 - NextEra Core 6	6,000	4,875	5,175	4,475
T042 - NextEra Core 7	6,000	4,875	5,175	4,500
T043 - NextEra Enh 1	6,000	6,000	6,000	5,400
T044 - NextEra Enh 2	6,000	6,000	5,175	4,900
T047 - Propel Base 1	5,825	5,050	4,275	3,750
T048 - Propel Base 2	5,825	4,900	4,525	3,725
T049 - Propel Base 3	5,825	5,075	4,225	3,750
T051 - Propel Alt 5	6,000	5,075	5,125	4,300
T052 - Propel Alt 6	5,825	5,025	5,650	5,075
T053 - Propel Alt 7	6,000	5,375	5,300	4,350

The electrical expandability results presented in Figure are based on the following assumptions:

- 1) The results were obtained using TARA’s Security Constrained Dispatch function with DC power flow solution. Internal NYCA controllable lines (with exceptions mention in #3, below)

¹ The flow across the 901/903 PARs exceeded the 300 MW setpoint. The OSW output would have to be curtailed to ~1,550 MW to maintain the PAR schedule and secure all monitored branches.

and the offshore wind generators interconnected to Long Island were adjusted to prevent overloads.

- 2) Long Island internal branches and tie lines of 138 kV and above were secured to their applicable ratings (normal for pre-contingency and LTE for post-contingency).
- 3) PAR schedules controlling flow on the Norwalk-Northport cables were allowed to adjust beyond their initial setpoint of 0 MW. The PAR schedule for the 901/903 lines connecting to Jamaica were held constant at 300 MW.

Because the future offshore wind buildout is unknown at this time, the NYISO further evaluated the expandability of the top-tier projects with a scenario that assumed reasonable changes in the modeling of offshore wind generation (such as injection locations and amounts). Figure 2 below presents these results for the spring light load Policy scenario. The Figure 2 footnotes summarize project-specific offshore wind modeling adjustments that enabled a greater amount of offshore wind injection into Long Island.

Figure 2: Electrical Expandability Results for the Top-Tier Projects Under N-1 and N-1-1 Spring Light Load Conditions

Electrical Expandability - Top Tier	Maximum Amount of Long Island OSW (MW)	
	N-0/N-1	N-1-1
T035 - LS Power	5,150	4,325
T036 - NextEra Core 1 ²	5,125	4,475
T040 - NextEra Core 5 ²	5,175	4,400
T048 - Propel Base 2	4,550	3,725
T049 - Propel Base 3	4,475	3,750
T051 - Propel Alt 5 ³	5,425	4,500
T052 - Propel Alt 6 ⁴	6,000	5,450

² The T036 – NextEra Core 1 and T040 – NextEra Core 5 were evaluated with the offshore wind generation connected at Barrett moved to the proposed Valley Stream 345 kV substation.

³ T051 - Propel Alt. 5 was evaluated with the offshore wind generation connected at Northport moved to the proposed Shore Road 345 kV substation.

⁴ T052 – Propel Alt. 6 was evaluated with the offshore wind generation connected at Northport moved to the proposed Shore Road 345 kV substation. Additionally, the East Garden City offshore wind capacity was increased beyond the initial value in the Policy case.

Figure 3 below shows the most limiting first-level contingencies in the N-1-1 analysis.

Figure 3: Spring Light Load N-1-1 1st level contingency definitions

SLL N-1-1	1 st level contingency
T035 - LS Power	Jamaica – Lake Success (903 PAR)
T036 - NextEra Core 1	(NextEra) East Garden City – Sprain Brook 345kV
T040 - NextEra Core 5	(NextEra) Ruland Road – Sprain Brook 345kV
T048 - Propel Base 2	(Propel) Ruland Road – Sprain Brook (Y53)
T049 - Propel Base 3	(Propel) Shore Road – Sprain Brook 345kV
T051 - Propel Alt 5	(Propel) East Garden City – Tremont 345kV
T052 - Propel Alt 6	(Propel) East Garden City – Tremont 345kV B-VS (Propel) Barrett – East Garden City 345kV

Long Island Physical Expandability Results

Under the expandability metric, the NYISO also evaluated each project’s physical expandability. Physical expandability evaluates the number of potential POIs proposed by a project. The potential POIs are broken down into those that are created by a project (“Proposed POIs”) and those that can be reasonably created in the future based on additional modifications to the transmission facilities (“Expandable POIs”). Proposed POIs are where the equipment necessary to make an open POI, e.g., breaker and buswork, are included in the project equipment list and costs. Expandable POIs are those points in a substation where the developer indicated that the project has incorporated space for the necessary POI equipment, but that equipment isn’t included in the project equipment list and costs. The evaluation does not indicate whether project substations could be expanded further to accommodate additional POIs (*e.g.*, addition of bays or conversion to a ring bus). Furthermore, breaker positions were not counted as POIs under certain situations:

- Breaker positions that become available by retiring a line,
- Potential for an OSW generator’s HVDC lead line to connect to a project’s HVDC converter station (i.e. turn into a multi-terminal HVDC system)
- Back-to-back breakers that were proposed to eliminate the potential for a stuck breaker contingency, and
- Equipment spacing concerns based on a preliminary review.

Figure 4 shows the Proposed POIs, and

Figure 5 shows the Expandable POIs for each project at different substations.

Figure 4: Proposed POIs by Zone

Project	Zone K							Zone J		Zone I		Zone H	
	SOUTH GATE 345	EGC 345	VALLEY STREAM 345	NEW BRIDGE RD 345	BARETT 138	BARETT 345	NORTHPORT 138	FARRAGUT 345	TREMONT 345	SPRAIN BROOK 345	DUNWOODIE 345	BUCHANAN 345	RAMAPO 345
T035 - LSPower	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T036 - NextEra Core 1	N/A	3	2	2	3	N/A	N/A	N/A	N/A	2	1	N/A	N/A
T037 - NextEra Core 2	N/A	2	2	2	3	N/A	N/A	1	N/A	2	1	N/A	N/A
T038 - NextEra Core 3	N/A	3	2	2	3	N/A	2	1	N/A	2	1	N/A	N/A
T039 - NextEra Core 4	N/A	4	2	2	3	N/A	2	1	N/A	1	1	N/A	N/A
T040 - NextEra Core 5	N/A	4	2	2	3	N/A	3	N/A	N/A	2	1	N/A	N/A
T041 - NextEra Core 6	N/A	4	2	2	3	N/A	1	N/A	N/A	2	1	N/A	N/A
T042 - NextEra Core 7	N/A	4	2	2	3	N/A	1	N/A	N/A	2	1	2	N/A
T043 - NextEra Enh 1	N/A	2	2	2	N/A	N/A	1	N/A	N/A	N/A	1	N/A	N/A
T044 - NextEra Enh 2	N/A	2	2	2	3	N/A	1	N/A	N/A	N/A	1	1	1
T047 - Propel Base 1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T048 - Propel Base 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	N/A	N/A	N/A
T049 - Propel Base 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T051 - Propel Alt 5	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T052 - Propel Alt 6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T053 - Propel Alt 7	N/A	N/A	N/A	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Figure 5: Expandable POIs by Zone

Project	Zone K					Zone I
	LONG SHORE	EGC 345	BARETT 345	EASTERN QUEENS 138	SHORE ROAD 345	SPRAIN BROOK 345
T035 - LSPower	5	N/A	N/A	N/A	N/A	N/A
T036 - NextEra Core 1	N/A	N/A	N/A	N/A	N/A	N/A
T037 - NextEra Core 2	N/A	N/A	N/A	N/A	N/A	N/A
T038 - NextEra Core 3	N/A	N/A	N/A	N/A	N/A	N/A
T039 - NextEra Core 4	N/A	N/A	N/A	N/A	N/A	N/A
T040 - NextEra Core 5	N/A	N/A	N/A	N/A	N/A	N/A
T041 - NextEra Core 6	N/A	N/A	N/A	N/A	N/A	N/A
T042 - NextEra Core 7	N/A	N/A	N/A	N/A	N/A	N/A
T043 - NextEra Enh 1	N/A	N/A	N/A	N/A	N/A	N/A
T044 - NextEra Enh 2	N/A	N/A	N/A	N/A	N/A	N/A
T047 - Propel Base 1	N/A	N/A	N/A	N/A	N/A	1
T048 - Propel Base 2	N/A	N/A	N/A	N/A	N/A	1
T049 - Propel Base 3	N/A	N/A	N/A	N/A	N/A	1
T051 - Propel Alt 5	N/A	N/A	N/A	N/A	1	N/A
T052 - Propel Alt 6	N/A	1	N/A	1	1	N/A
T053 - Propel Alt 7	N/A	N/A	1	N/A	N/A	N/A