

LOCAL TRANSMISSION PLAN

PRESENTATION TO NYISO / INTERESTED PARTIES

November 12, 2021

Transmission Planning



PSEG LONG
ISLAND

We make things work for you.

LTP Contents: Topics that will be Covered

- Overview of LIPA T&D
 - Background
 - Transmission System
 - REV Initiatives/Utility 2.0
- Key Factors Considered
- Planning Horizon
- Data and Models Used
 - Data Sources
 - Models – Major Tools Used
- Transmission Planning Studies
 - Planning Process
 - Study Overview
 - NYISO Interconnection Requests/Ongoing Efforts
 - PSEG – LI Definition of a “Firm” Project
 - Long Island Load Pockets
 - Projects Being Considered

Background

- LIPA owns electric Transmission and Distribution (T&D) system on Long Island
- Acquired from LILCO in 1998
- Power Supply Agreement to meet capacity and energy needs for LIPA system with National Grid renewed in 2013, out to 2028
- Operation Service Agreement to manage electric operations for LIPA's system for 12 years starting January 2014 with PSEG Long Island.
- LIPA, by and through its agent, PSEG Long Island LLC, provides electric service to approximately 1.1 million LIPA customers
- LIPA service area includes Nassau County, Suffolk County, and the portion of Queens County known as the Rockaways, in the State of New York

Transmission System

LIPA's transmission system is designed to provide adequate capability between generation sources and load centers.

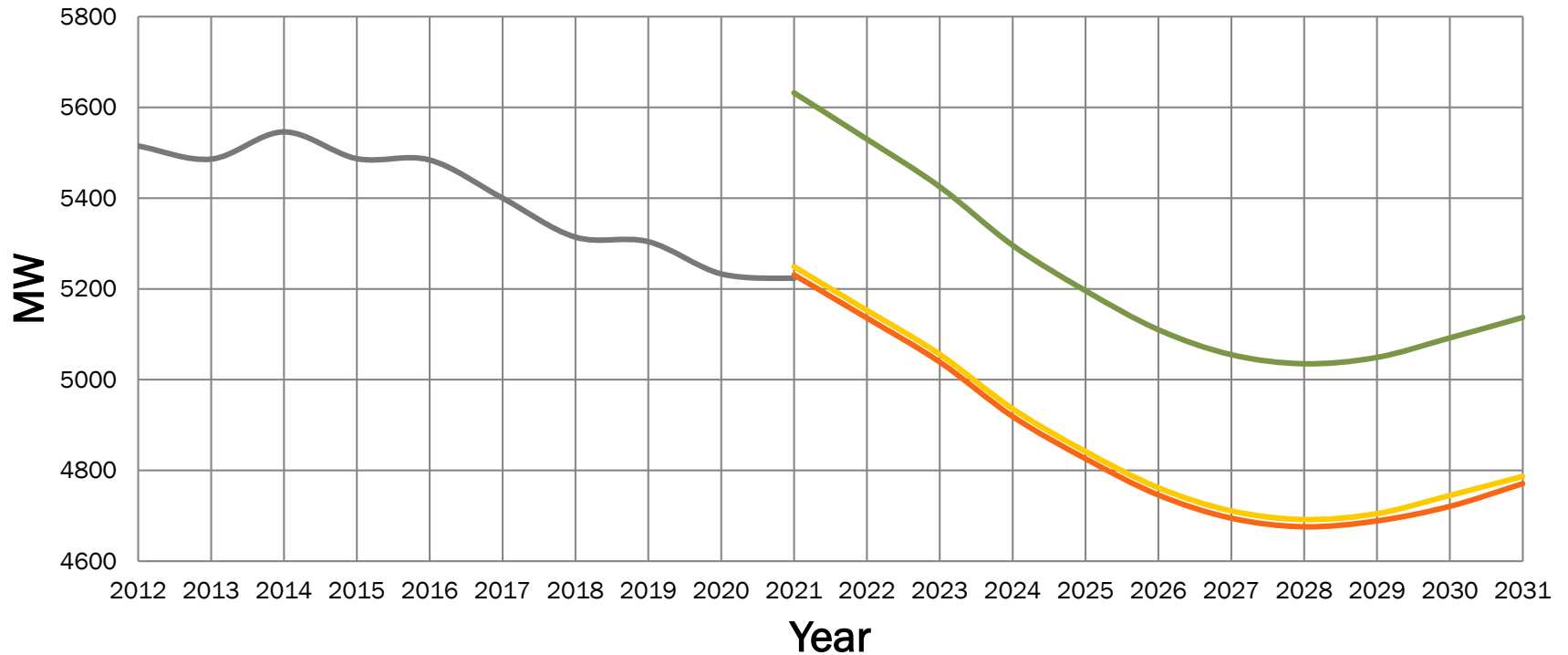
- Over 1,390 miles of transmission (345 kV, 138 kV) and sub-transmission lines (69 kV, 34.5 kV, 23 kV), delivering power through 185 substations in its electric system.
- Interconnections:
 - Two 345 kV
 - Con Ed: Y49 (NYPA) 637 MW, East Garden City to Sprain Brook (NYISO-BPS)
 - Con Ed: Y50 (LIPA/Con Ed) 656 MW, Shore Road to Dunwoodie (NYISO-BPS)
 - Three 138 kV:
 - ISONE: NNC (LIPA/ES) 436 MW, Northport to Norwalk Harbor
 - Con Ed: 300 MW Wheel - (903) Lake Success to Jamaica & (901) Valley Stream to Jamaica
 - Two HVDC:
 - PJM: Neptune 660 MW, Newbridge Road to Sayreville
 - ISO-NE: CSC 330 MW, Shoreham to New Haven

Key Factors Considered

- **Load Growth**
- **Transmission Planning Criteria**
 - PSEG LI Transmission Planning Criteria:
 - PSEG Transmission Planning Criteria 2016
 - Ensure that electric system will meet applicable reliability requirements (NERC/NPCC/NYSRC)
 - PSEG LI performance requirements for Transmission-Connected resources using non-synchronous generation
- **Targeted Resource Additions**
 - South Fork Projects
- **Local Dispatch Guidelines**
 - Gas Burn Reliability Rules & Transient Recovery Voltage
 - Load Pockets

Zone K Load Forecast

10 Year Peak Forecast



- Weather Normalized Actual Peak
- Gold Book: NYISO 2021 Baseline Coincident Peak, Table I-3a
- Gold Book: NYISO 2021 Baseline Non-coincident Peak, Table I-4a
- Gold Book: NYISO 2021 90th Percentile Baseline Coincident Peak, Table I-7a

Data Sources

- Load Forecast
- NYISO - The Major Source of Base Cases used in Modeling
 - Load Flow
 - Fault Duty
 - Stability
- Generator Owners/HVDC/FACTS Developers
 - MW/MVAR Capability
 - Modeling Characteristics
- Internal Sources
 - EMS Data – PI Historian
 - Equipment Characteristics (e.g., Engineering, Operations)

Models - Major Tools Used

- Thermal / Voltage Analysis

- **PSS®E** : Siemens Power Technologies International's (PTI) Power System Simulator - *Transmission system load flow; thermal, voltage under normal and contingency conditions*
- **TARA** : PowerGEM's steady state power flow software tool - *Load flow studies, N-1-1 power flow analysis and system operating limits analysis*
- **MAPS™** : General Electric's (GE) Multi-Area Production Simulation

- Fault Duty

- **ASPEN™** : Advanced Systems for Power Engineering, Inc. - Short circuit analysis program/ Breaker fault duty analyses

- Stability

- **PSS®E** : Siemens Power Technologies International's (PTI) Power System Simulator - System Dynamic Simulation
- Additional Complex Load Model used for Transient Voltage Recovery Studies

- Other

- **Python**: Software language utilized for automation of various analysis and data management

Planning Process

- The planning process for the T&D System begins with the load forecast.
- Transmission System Studies: Identify transmission system limitations and recommend reinforcements for an area of the system.
 - Results in the development of major transmission capital projects.
- Limiting load level and year at which this load level is reached are critical factors
- Potential Risk Factors
 - Generator unavailability
 - Generator Deactivations
 - Higher Load Levels

Study Overview

- **Seasonal Studies**

- **System Operating Studies** (Summer & Winter) – Highlight system limits/ deficiencies and recommend solutions for the upcoming peak season
- **Operating Guidelines** – Provide information to Transmission Operations to address thermal, voltage, local reliability rule, or short circuit constraints

- **Short Term, Near Term, & Long Term Studies** (Current year, Five year, and 10 year assessments)

- **Area Studies** – Identify area constraints and recommend solutions
- **Ten year Transmission development plan** – Ensure the design of the LIPA transmission system conforms with applicable reliability criteria over the planning horizon

- **Compliance Studies**

- **Studies to address requirements of NERC reliability standards** (NERC TPL-001-4, TPL-007, FAC-014 and FAC-002-2)

Study Overview – Other Major Studies

- **NYISO Interconnection Process**
 - To assess the impact on the LIPA transmission system of proposed new generation or transmission interconnections
- **Short Circuit Study**
 - Ensures that there are no overstressed circuit breakers
- **Angular Stability Study**
 - Ensures that electric system will meet system stability design criteria
- **Voltage Recovery Evaluation**
 - Impact of load types and resource dispatch
- **NYISO coordination efforts**
 - RNA, Deactivation studies, etc.
- **New York State Policies / Public Policy Initiatives**
 - Clean Energy Standard, Offshore Wind Master Plan, Large-Scale Renewable Program, PPTPP, and DEC NOx Peaker Rule

NYISO Interconnection Requests / Ongoing Efforts

Queue Pos.	Owner/Developer	Project Name	Date of IR	SP (MW)	WP (MW)	Type/Fuel	County	State	Interconnection Point	S	Last Update	Availability of Studies	FS Complete/ SGIA Tender	Proposed In-Service	Proposed Initial-Sync	Proposed COD
0487	LI Energy Storage System, LLC	Far Rockaway Battery Storage	3/9/15	20	20	ES	Nassau	NY	Far Rockaway 66kV	10	3/31/21	FES, SRIS, FS	11/5/20	10/2021	11/2021	12/2021
0535	sPower Development Company, LLC	Riverhead Expansion	2/23/16	36	36	S	Suffolk	NY	Edwards 138kV	10	2/28/21	FES, SRIS, FS	2/9/2021	10/2022	12/2022	12/2022
0612	Deepwater Wind South Fork, LLC	South Fork Wind Farm	2/14/17	96	96	W	Suffolk	NY	East Hampton 66kV	10	2/28/21	SRIS, FS	2/9/2021	01/2022	08/2022	12/2022
0649	CR Fuel Cell, LLC	Clare Rose	8/3/17	13.9	13.9	FC	Suffolk	NY	William Floyd 66kV	10	5/31/21	FES, SIS, FS	1/7/2021	04/2023	03/2023	04/2023
0650	BRT Fuel Cell, LLC	Brookhaven Rail Terminal	8/3/17	18.5	18.5	FC	Suffolk	NY	W. Yaphank - Yaphank 66kV	10	2/28/21	FES, SIS, FS	1/7/2021	04/2022	01/2022	05/2022
0678	LI Solar Generation, LLC	Calverton Solar Energy Center	10/26/17	22.9	22.9	S	Suffolk	NY	Edwards Substation 138kV	10	2/28/21	SRIS, FS	2/9/2021	10/2020	11/2020	12/2021
0680	Anbaric Development Partners, LLC	Long Island Offshore Wind	11/7/17	1200	1200	W	Suffolk	NY	Ruland Rd. 138kV	6	6/30/21	FES, SRIS		07/2025	11/2025	12/2025
0695	Deepwater Wind, LLC	South Fork Wind Farm II	2/16/18	42	42	W	Suffolk	NY	East Hampton 66kV	10	4/30/21	SRIS, FS	2/9/2021	01/2022	08/2022	12/2022
0738	Empire Offshore Wind LLC	EI Melville	6/12/18	816	816	W	Suffolk	NY	Ruland Rd. 138kV	8	5/31/21	SRIS		06/2023	02/2024	12/2024
0746	Energy Storage Resources, LLC	Peconic River Energy Storage	7/30/18	150	150	ES	Suffolk	NY	Brookhaven - Sills 138kV	10	5/31/21	SRIS, FS	4/26/21	03/2022	03/2022	08/2022
0766	Sunrise Wind LLC	NY Wind Holbrook	9/28/18	880	880	W	Suffolk	NY	Holbrook 138kV	9	6/30/21	SRIS		03/2024	04/2024	05/2024
0792	Anbaric Development Partners, LLC	Long Island Offshore Wind Connecton	1/29/19	800	800	W	Suffolk	NY	Ruland Road 138kV	6	6/30/21	SRIS		07/2025	11/2025	12/2025
0825	Setauket Energy Storage, LLC	Setauket Energy Storage	4/15/19	65.3	65.3	ES	Suffolk	NY	Port Jefferson - Terryville 66kV	8	7/31/21	FES, SRIS		10/2023	11/2023	12/2023
0911	Dimension NY 1 LLC	Southold BESS	10/1/19	20	20	ES	Suffolk	NY	Peconic - Southold 66kV	6	4/30/21	SIS		05/2022	05/2022	05/2022
0912	Hecate Grid Intrepid 1 LLC	Intrepid Storage 09	10/2/19	50	50	ES	Nassau	NY	EF Barrett 66kV	5	11/30/20			10/2021	10/2021	10/2021
0918	Hecate Grid Intrepid 1 LLC	Intrepid Storage 138	10/9/19	250	250	ES	Nassau	NY	Barrett 138kV	5	11/30/20			10/2021	10/2021	10/2021
0925	Hecate Grid Clermont 1 LLC	Clermont 1	10/17/19	100	100	ES	Suffolk	NY	West Babylon 66kV	9	6/30/21	SRIS		12/2022	12/2022	12/2022
0939	National Grid Generation LLC	Far Rockaway Power Station	11/5/19	30	30	ES	Queens	NY	Far Rockaway 66kV	6	3/31/21	SRIS		10/2022	10/2022	12/2022
0940	National Grid Generation LLC	Glenwood Power Station Bat	11/8/19	50	50	ES	Nassau	NY	Glenwood 138kV	3	8/31/20			10/2022	10/2022	12/2022
0941	National Grid Generation LLC	Southampton Power Station	11/8/19	30	30	ES	Suffolk	NY	Southampton 66kV	5	1/31/21	FES		10/2022	10/2022	12/2022
0942	KCE NY 21, LLC	KCE NY 21	11/8/19	60	60	ES	Suffolk	NY	Pulaski 66kV	9	6/30/21	SRIS		11/2024	11/2024	12/2024
0949	National Grid Generation LLC	Port Jefferson Power Station	11/19/19	100	100	ES	Suffolk	NY	Port Jefferson 138kV	4	3/31/21	FES		10/2022	10/2022	12/2022
0956	Holbrook Energy Storage	Holbrook Energy Storage	12/10/19	294.9	296.4	ES	Suffolk	NY	West Bus 138 kV	9	6/30/21	SRIS		03/2023	04/2023	05/2023
0957	Holtsville Energy Storage	Holtsville Energy Storage	12/10/19	76.8	76.8	ES	Suffolk	NY	Holtsville Patchogue 66kV	6	3/31/21	SRIS		03/2023	04/2023	05/2023
0958	Empire Offshore Wind LLC	EI Oceanside	12/10/19	96	96	W	Nassau	NY	Barrett 138 kV	9	6/30/21	SRIS		06/2024	08/2024	12/2025
0959	Empire Offshore Wind LLC	EI Oceanside 2	12/11/19	1280	1280	W	Nassau	NY	Barrett 138 kV	9	6/30/21	SRIS		06/2024	08/2024	12/2025
0961	Calpine Mid Atlantic Development	Bethpage Battery Energy Stc	12/18/19	20	20	ES	Nassau	NY	Grumman Substation 66 kV	3	3/31/21			01/2022	03/2022	08/2022
0965	Yaphank Energy Storage, LLC	Yaphank Energy Storage	12/21/19	76.8	77.6	ES	Suffolk	NY	William Floyd - Brookhaven 66kV	9	6/30/21	SRIS		03/2023	04/2023	05/2023
0966	Suffolk County Energy Storage, L	Suffolk County Storage	12/21/19	40.3	40.3	ES	Suffolk	NY	West Babylon - Lindenhurst 66kV	8	7/31/21	SRIS		03/2023	04/2023	05/2023
0971	Savion, LLC	East Setauket Energy Stora	1/10/20	125	125	ES	Suffolk	NY	Holbrook-Miller Place 138kV	8	7/31/21	SRIS		03/2024	04/2024	05/2024
0982	National Grid Generation LLC	West Babylon Power Station	1/22/20	50	50	ES	Suffolk	NY	Holbrook 138kV	5	7/31/20			10/2022	10/2022	12/2022
0987	Sunrise Wind LLC	NY Wind Holbrook 2	1/29/20	924	924	W	Suffolk	NY	Holbrook 138kV	9	6/30/21	SRIS		01/2023	04/2024	05/2024
0994	KCE NY 22, LLC	KCE NY 22	2/12/20	90	90	ES	Suffolk	NY	Holbrook-Sills Road 138kV	9	6/30/21	SRIS		11/2024	11/2024	12/2024
1008	KCE NY 26, LLC	KCE NY 26	4/28/20	60	60	ES	Suffolk	NY	Jamesport - Peconic 66kV	4	7/31/21			10/2023	11/2023	12/2023
1010	Vineyard Wind	Vineyard Wind I	4/30/20	1403	1403	W	Nassau	NY	East Garden City 345kV	5	8/31/21			07/2026	11/2026	12/2026
1011	Vineyard Wind	Vineyard Wind II	4/30/20	1403	1403	W	Suffolk	NY	Pilgrim 138kV	3	1/31/21			07/2026	11/2026	12/2026
1012	Suffolk County Energy Storage II	Suffolk County Storage II	5/4/20	76.86	76.86	ES	Suffolk	NY	Southold 66 kV	5	7/31/21	FES		01/2024	03/2024	05/2024
1020	Beacon Wind LLC	EI Fort Salonga	5/21/20	1300	1300	W	Suffolk	NY	Northport 138 kV	4	4/30/21			12/2026	03/2027	11/2027
1021	Beacon Wind LLC	EI East Shoreham	5/27/20	1300	1300	W	Suffolk	NY	Shoreham 138 kV	5	6/30/21			12/2026	03/2027	11/2027
1022	Equinor Wind US LLC	EI Glenwood Landing	5/27/20	1300	1300	W	Nassau	NY	Shore Road 345 kV	4	8/31/20			12/2026	03/2027	11/2027
1023	KCE NY 27, LLC	KCE NY 27	6/2/20	50	50	ES	Suffolk	NY	Tiana - Quogue 66kV	4	7/31/21	FES		09/2022	10/2022	10/2022
1045	Bay State Wind	NY Wind Holbrook 2	7/3/20	1050	1050	W	Suffolk	NY	Holbrook 138kV	5	1/31/21			01/2023	04/2024	05/2024
1046	Island Park Energy Center, LLC	Barrett Energy Storage Cent	7/6/20	200	200	ES	Nassau	NY	Barrett 138 kV	5	2/28/21			05/2023	09/2023	12/2023

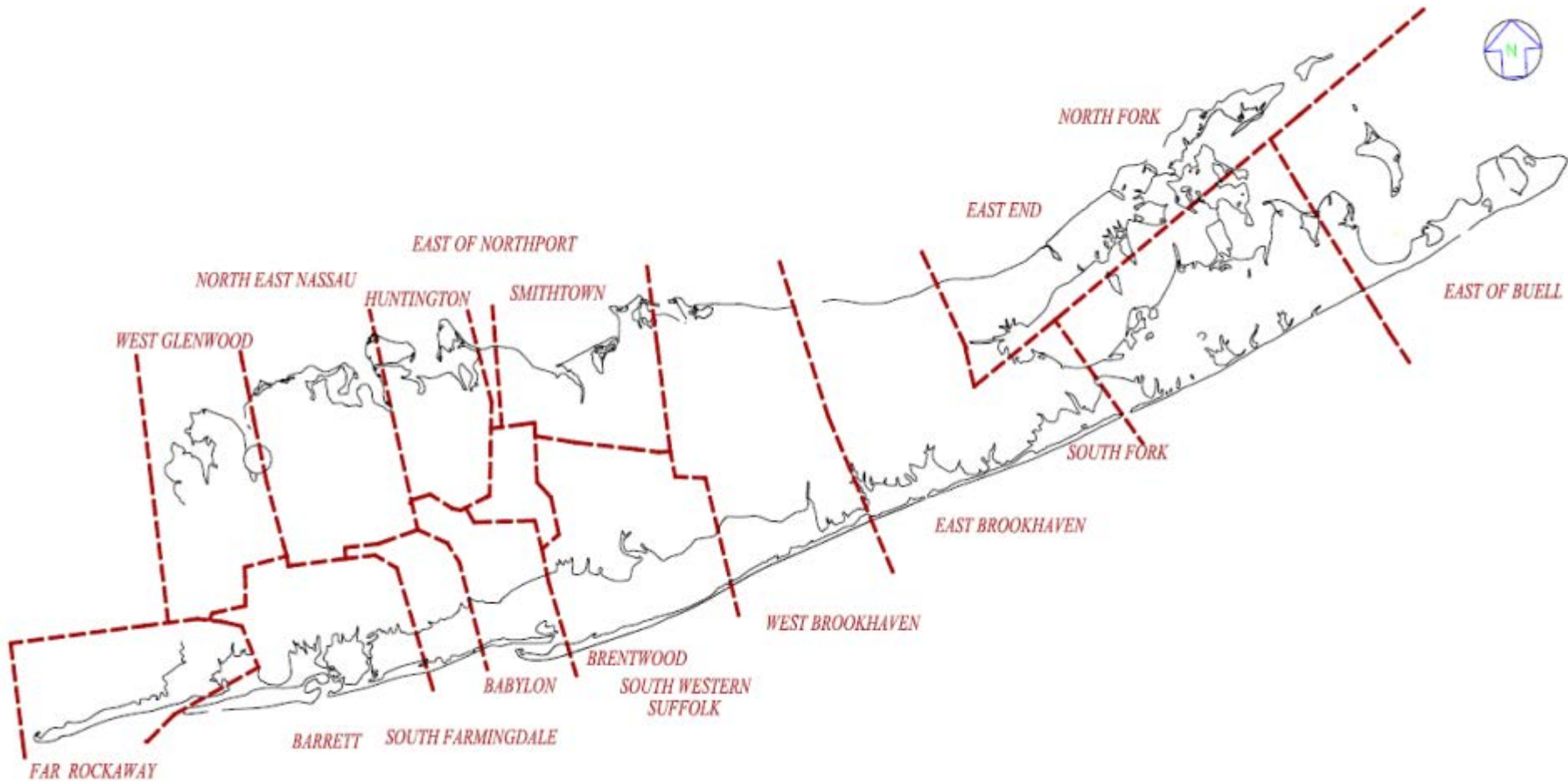
Reference: Area K: NYISO Interconnection Queue 10/14/2021

<https://www.nyiso.com > documents > NYISO-Interconnection-Queue.xlsx>

PSEG-LI Definition of a “Firm” Project

- In general, for a project to be considered “Firm” it must meet the following criteria:
 - Full budget approval through internal review
 - Preconstruction external outreach completed, stakeholder feedback obtained and addressed (if necessary)
 - Project Management has a defined scheduled start and completion date that is within the current or next year’s cycle
 - Operating Committee approved System Impact Study (SIS) if applicable
 - For projects subject to Article VII, have a determination from NYPSC that Article VII application is in compliance
- Any project that does not meet the above criteria will be considered “Non-Firm”

Long Island Load Pockets



Projects Being Considered

The following slides summarize projects that are currently under consideration as part of the on-going planning process.

These projects are continually being reviewed and considered as non-firm at this time. As such, the need, timing of, and/or the actual project recommendation may change.

Summary of Projects – 100kV & above

Firm Projects - 100 kV and Above

Proposed In-Service Date

None

Non-Firm Projects - 100 kV and Above

Proposed In-Service Date

Southampton to Deerfield New 138kV Circuit

2028

Syosset to Shore Road New 138kV Circuit

2031

Other Projects Being Considered

Load Pocket	Project	Summary of Changes	Firm Status	SIS	Article VII	Proposed In-Service Date
Far Rockaway	33 kV Arverne to Rockaway Beach Reconductor	Reconductor the 33 kV Arverne to Far Rockaway circuit to increase the thermal rating of the circuit	Non-Firm	N/A	N/A	6/1/2022
	33 kV Arverne to Rockaway Beach new Circuit	Install a new 33 kV circuit between the Arverne substation to the Rockaway Beach substation.	Non-Firm	N/A	N/A	6/1/2025
Barrett	69kV New Massapequa Substation	Construct a new 69kV substation. 69kV supply will come from tapping the existing 69kV line from Massapequa to Sterling	Non-Firm	N/A	N/A	6/1/2023
West Glenwood	33 to 69 kV Belmont Substation	Upgrade substation to 69kV from Whiteside and Lake Success .	Non-Firm	N/A	N/A	6/1/2024

Other Projects Being Considered (cont.)

Load Pocket	Project	Summary of Changes	Firm Status	SIS	Article VII	Proposed In-Service Date
Northeast Nassau	69 kV Ruland to Round Swamp to Plainview New Circuits	Install a new 69 kV circuit from the Ruland Rd. substation to the Round Swamp Substation to the Plainview substation.	Firm	N/A	N/A	6/1/2022
	69 kV Round Swamp Substation	Construct a new 69 kV substation. 69 kV supply will come from tapping the new Ruland Rd. to Plainview circuit (previous item)	Firm	N/A	N/A	6/1/2022
	138 kV Syosset to Shore Road New Circuit	Install a new 138 kV circuit from the Syosset substation to the Ruland Road substation.	Non-Firm	Under Review	Not Filed	6/1/2031
South Farmingdale	69 kV Berry St. to South Farmingdale Reconductor	Reconductor the 69 kV Berry St. to South Farmingdale circuit to increase the thermal rating of the circuit.	Non-Firm	N/A	N/A	6/1/2028
Brentwood	69 kV Pilgrim Bus Reconfiguration	Reconfigure connections to 69kV Buses at Pilgrim substation in order to divert post contingency power flow and eliminate thermal overloads.	Non-Firm	N/A	N/A	12/1/2023

Other Projects Being Considered (cont.)

Load Pocket	Project	Summary of Changes	Firm Status	SIS	Article VII	Proposed In-Service Date
Southwest Suffolk	23 kV Fire Island Pines to Ocean Beach New Circuit	Install a new 23 kV circuit from the Fire Island Pines substation to the Ocean Beach substation.	Non-Firm	N/A	N/A	6/1/2024
West Brookhaven	69kV Terryville Substation	Install a new 69kV circuit between Terryville and Flowerfield substations	Non-Firm	N/A	N/A	6/1/2023
East Brookhaven	69 kV Moriches Series Reactor	Install a 2-ohm Series Reactor on the 69 kV South Manor - Moriches circuit to mitigate thermal constraints on the circuit.	Non-Firm	N/A	N/A	6/1/2030

Other Projects Being Considered (cont.)

Load Pocket	Project	Summary of Changes	Firm Status	SIS	Article VII	Proposed In-Service Date
East End	East of Buell 23 kV to 33 kV Conversion	Convert the Hero, East Hampton, Buell, Amagansett, Hither Hills, Navy Road, and Culloden Point substation from 23 kV to 33 kV	Non-Firm	N/A	N/A	6/1/2024
	69 kV Bridgehampton to Buell New Circuit	Install a new 69 kV circuit from the Bridgehampton substation to the Buell substation.	Non-Firm	N/A	N/A	6/1/2025
	69kV Canal to Deerfield Double Circuit Reconfiguration	Reconfigure Canal to Southampton to Deerfield overhead circuits so that two overhead circuits run from Canal to Deerfield.	Non-Firm	N/A	N/A	6/1/2026
	138 kV Southampton to Deerfield New Circuit	Install a new 138 kV circuit from the Southampton substation to the Deerfield substation.	Non-Firm	Under Review	Not Filed	6/1/2028

Questions?

Document Posted on PSEG Long Island Web site

<https://www.psegliny.com/aboutpseglongisland/legalandregulatory>

Questions?

Please send any comments you may have to

LTP-PSEGLongIsland@pseg.com