



# Local Transmission Owner Plan (LTP)

October 24, 2013

**Presentation to NYISO Interested Parties** 

## LTP Contents -- What's covered in this presentation



- Overview of LIPA
- Issues Addressed in LTP
- Planning Horizon of the LTP
- Data and Models Used
- Transmission Planning Studies



# LIPA Overview

- Background
- Transmission System



## LIPA Overview: Background

- LIPA owns electric Transmission and Distribution (T&D) system on Long Island
- Acquired from LILCO in 1998
- Contracts for power supply to meet capacity and energy needs
- National Grid (NG)
  - United Kingdom based corporation. NG owns and operates gas and electric T&D systems in the Northeast region
  - Has managed electric operations for LIPA's system, contract expires Dec 2013
  - Owns and operates power plants on LI with sale of capacity and energy to LIPA under the PSA for the next 15 years
- Amended Operation Service Agreement to manage electric operations for LIPA's system for 12 years starting January 2014 with PSEG-LI.



## LIPA Overview: Transmission System

- LIPA's transmission system is designed to provide adequate capability between generation sources and load centers. The Long Island Power Authority (LIPA) owns:
  - Over 1,360 miles of transmission and sub-transmission lines
  - Delivering power through 179 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) 653 MW, Shore Road to Dunwoodie (NYISO-BPS)
  - Three 138 kV:
    - ISONE: NNC (LIPA/NU) 428 MW, Northport to Norwalk Harbor
    - Con Ed: Lake Success to Jamaica (903) and Valley Stream to Jamaica (901), 286 MW wheel
  - Two HVDC:
    - PJM: Neptune 660 MW, Newbridge Road to Sayreville
    - ISO-NE: CSC 330 MW, Shoreham to New Haven



# Issues Addressed

- LIPA T&D Plan
- T&D Planning Criteria & Guidelines
- Other Major Key Factors



### LIPA T&D Plan

- The four strategic areas identified in the Transmission and Distribution Plan:
  - Technical Performance
  - Regulatory Requirements and Compliance
  - Customer Satisfaction
  - Financial Performance
- LIPA Electric Resource Plan 2010-2020, Issued February 2010 (http://www.lipower.org/pdfs/company/projects/energyplan10/energyplan10.pdf)

 Planning Criteria : LIPA Transmission & Distribution Planning Criteria & Guidelines

(http://www.lipower.org/pdfs/company/projects/energyplan10/energyplan10-e6.pdf)



## Major Key Factors (Examples)

- Load Growth
  - Organic Growth
  - Lump Load
- New Resources Added
  - LISF (BP) Solar Farm
  - CD US Solar (enXco) LI Solar Projects
- Dispatch Restrictions
  - Gas Burn Reliability Rules
  - Transient Recovery Voltage (DRSS Phase II Project)
  - Load Pockets
- Future Resources/Repowering Long Island
  - LIPA Generation RFP Caithness II selected by LIPA (716 MW)
  - Peaking, Storage and Demand Response RFP planned for released in October 2013. Designed to replace existing 1960's and 1970's vintage peaking units and meet needs for projected load growth.
  - LIPA Feed in tariff will add 50 MW of solar in 2013 to 2015 time frame. Renewable energy procurements targeted for acquiring 400 MW of additional renewable energy. (100 MW Solar Feed-in tariff approved in October 2013. 300 MW of other renewables to be procured through an RFP targeted for release in October 2013).
  - Barrett and Port Jefferson repowering studies are underway. Northport repowering is study is planned for potential repowering by end of transmission planning period.
- Regulatory
  - NERC Revised BES Definition



# **Planning Horizon**





# Data and Models Used

- Data Sources
- Models



### 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)



- Thermal and Voltage Analysis
  - PSS/E<sub>TM &</sub> PSS/O<sub>TM</sub> Siemens Power Technologies International's (PTI) Power System Simulator<sub>TM;</sub>; transmission system load flow; thermal, voltage under normal and contingency conditions
- MAPS<sub>TM</sub> : General Electric's (GE) Multi-Area Production Simulation
- Fault Duty
  - ASPEN<sub>TM</sub>: Advanced Systems for Power Engineering, Inc Short circuit analysis program Breaker fault duty analyses
- Stability
  - PSS/E<sub>TM</sub>: PTI System Dynamic Simulation
- NERC/NPCC/NYSRC Planning Criteria
  - PSS/E<sub>TM</sub>: N-1-1
- Other Programs
  - SUBREL<sub>TM</sub>: General Reliability's computer program for substation reliability evaluation Computes reliability indices for different substation bus configurations
  - EPRI Probabilistic Risk Assessment (PRA)
  - V&R Energy (Physical and Operating Margin) POM Suite







- The planning process for the T&D System begins with the load forecast. The load forecast at the system level is developed on both a weather-normalized and weather probabilistic basis. Load forecasts are also developed for specific load pockets using system load data acquired by the Energy Management System (EMS) and other systems in LI T&D Operations
- Transmission System Studies: Identify transmission system limitations and recommend reinforcements for an area of the system. Results in development of major transmission capital projects.
- Load Level is a Critical Factor rather than a Year

The following pages and descriptions represent studies and projects that are currently under consideration, and as part of the on-going planning process, they are continually being reviewed, other options considered and hence updated. Therefore, the need, timing of and the actual project recommendation to address any issue may not be as indicated.



## Study Overview

- Short Term (6 months to 5 years)
  - System Operating Studies (summer & winter) Highlight current problems or deficiencies and anticipates conditions during the upcoming peak season. Short term, but indicates future impact.
  - Operating Guidelines Addresses very short term, temporary issues and provides Operations with solutions (i.e., DRSS, Generating unit outages, etc.)
- Mid- Range (5 to 10 years)
  - Area Studies Studies of LIPA Load Pockets, other reinforcements
  - Mid-Range Studies (10 years forecast) a study that identifies requirements and corrective and/or preventive actions associated with reliability problems over the next 10 years.
- Long Term (10 to 20 years)
  - Long Term Study -Look at horizon to predict possible long-term asset requirements due to load forecasts, anticipated asset conditions, and reliability problems.
  - Regional & Regulatory Studies These address concerns of NERC, the PSC, NPCC, etc., and address continual improvement in the entire electric system.



## Other Major Electric System Studies

- NYISO's System Reliability Impact Studies Determine impact on the LIPA transmission system of proposed new generation or interconnections and recommend reinforcements to the system as required. Could result in development of major Transmission Capital Projects, Interconnection additions
- Short Circuit Study Transmission Breakers: Ensure that there are no overstressed circuit breakers. Also when studying generation additions and/or major modifications to the transmission system.
- Angular Stability Study: Ensure that electric system will meet system stability design criteria. Also studied with generation additions and/or major modifications to the transmission system.
- N-1-1 Assessment: Ensure that electric system will meet system reliability testing criteria (NERC/NPCC/NYSRC).
- Voltage Recovery Evaluation: Impact of load types and resource dispatch
- **STARS:** New York State Transmission Assessment and Reliability Study



## 2013 FERC 715 Filing (NYISO 2013 Gold Book)

Firm - 138 kV and Above	nstall Year Proposed
Riverhead – Wildwood 138kV	2016
■ Riverhead – Canal 2 <sup>nd</sup> 138 kV	2016
Holtsville DRSS – West Bus 138kV	2014
Randall Ave DRSS – Wildwood 138kV	2014



Non-Firm – 138kV and Above	Install Year Proposed
<ul> <li>Pilgrim – West Bus 138 kV (Tapping)</li> </ul>	2015
West Bus – Kings Hwy 138 kV	2015
Pilgrim – Kings Hwy 138kV	2015
Northport – Pilgrim 138 kV	2017
Pilgrim – Sagtikos 138kV	2017
Sagtikos – West Bus 138kV	2017
<ul> <li>Sagtikos – Pilgrim 138kV (Phase Shifter)</li> </ul>	2017
<ul> <li>Ruland – Holbrook 138kV (Phase Shifter)</li> </ul>	2017
Ruland – West Bus 138kV	2017
<ul> <li>Valley Stream – East Garden City 138 kV</li> </ul>	2017
Newbridge – Bellmore 138kV	2017
<ul> <li>Bellmore – Bellmore 138kV (Phase Shifter)</li> </ul>	2017
Bellmore 138 kV Substation	2017
<ul> <li>Sagtikos 138 kV Substation</li> </ul>	2017
■ 2 East Garden City – Newbridge 138 kV conversions to 345k	XV 2017
Reconductoring of Holbrook – Sills Road 138 kV	2017
Reconductoring of Bethpage – Pilgrim 138 kV	2017



## Long Island Load Pockets





NC 2013 Peak Load:	<b>261 MW</b>		
Generation (MW):			
FPL FTU's	<u>108</u>		
Total:	108		
Key Items: Far Rockaway Steam Retirement (2012) Must Run Generation			

### **•** Significant impact from Superstorm Sandy in the area

- Work is being done to enhance reliability in the area.
- Far Rockaway 69 kV and 33 kV bypasses implemented to mitigate the impact from of future storms.

- Rockaway Beach 33kV Bus Reconfiguration with the addition of capacitor banks
- Reconductor Valley Stream to Whiteside 69kV
- Reconductor Lake Success to Stewart Manor 69kV
- Cedarhurst 33 kV to 69 kV conversion
- Reconductor Far Rockaway to Arverne 33kV OH circuit or a new circuit to Far Rockaway to Arverne
- New 33 kV circuit between Rockaway Beach and Arverne
- Add a fourth 69/33kV step down bank at Far Rockaway
- Add new Wavecrest substation tapping circuits 33-211 and 33-309
- Far Rockaway 69 kV reliability project



### Barrett Load Pocket

NC 2013 Peak Load:	759 MW		
<b>Generation (MW):</b>			
Barrett Steam	389		
<b>Barrett GTs</b>	282		
Freeport GTs	<u>75</u>		
Total:	746		
Key Items:			
Con Ed Wheel -286 MW			
Phase Shifter Operating Region			
Barrett Repowering			
<b>Barrett GT 7 Retirement (2012)</b>			
<b>Must Run Generation</b>			

#### Significant impact from Superstorm Sandy in the area

• Work is being done to enhance reliability in the area.

- Ring bus between Long Beach and Park Place substations \_
- Reconductor both Long Beach Barrett 33kV circuits or a new circuit From Barrett to Long beach
- West Hempstead 69kV Double Bus Tie
- Barrett 138kV Bus Reconfiguration
- Add third Barrett Valley Stream 138k circuit or East Garden City Valley Stream 138 kV circuit Valley Stream 138kV bus re-configuration (Phase II)
- Add second 138/33kV bank at Barrett
- Bellmore Newbridge 138kV circuit or Barrett Bellmore 138 kV circuit
- New Bellmore 138kV substation with a 138/69kV step down bank
- Bellmore 138kV Phase Shifter
- New Bellmore Massapequa 69kV circuit
- Convert Barrett to Greenfield to Bellmore from 33 kV to 69 kV
- Valley Stream 69 kV reliability project \_



NC 2013 Peak Load:	475 MW
Generation (MW):	
<b>Glenwood FTU's</b>	80
<b>Glenwood GT's</b>	102
Trigen NDEC CC	<u>44</u>
Total:	226
Key Items:	
Con Ed Wheel - 286 MW	7
<b>Glenwood Steam Retiren</b>	nent (2012)
<b>Must Run Generation</b>	

- New Syosset to Shore Rd Cable 138kV with Phase Shifter
- Construct new 69kV line from Great Neck to Port Washington
- Carle Place 138kV, 54 MVAR capacitor bank
- Install 1 Ohm series reactor on EGC –Herricks 69kV cable
- Upgrade the following circuits :
  - EGC Herricks 69kV
  - Lake Success Sperry 69kV
  - Lake Success Stewart Manor 69kV
  - Valley Stream Whiteside 69kV



## North East Nassau Load Pocket

NC 2013 Peak Load:	515 MW	
Generation (MW):		
<b>Glenwood FTU's</b>	80	
<b>Glenwood GTs</b>	102	
Grumman	95	
Hempstead RR	<u>62</u>	
Total:	339	
Key Items:		
<b>Glenwood Steam Retirement (2012)</b>		
<b>Must Run Generation</b>		

- Addition of 75 MVAR reactor at Newbridge
- Syosset 138kV bus re-configuration
- New 69 kV circuit between Ruland and Plainview
- Add new 69 kV substation (Old Bethpage) with tapping to a new 69kV line between Ruland Rd and Plainview
- Two East Garden City Newbridge 138 kV circuit conversions to 345kV
- Add new 69kV, 27 MVAR Capacitor Bank at Brookville
- Add new Nassau Hub 69 kV substation with supplies from East Garden City and Mitchell Gardens
- Upgrade Newbridge Rd 138/69kV Bank #6
- Reconductor the following circuits:
  - Newbridge Road Jericho 69kV
  - Orchard Locust Valley 69 kV
  - Glen Head Orchard 69 kV
  - Glenwood Orchard 69kV
  - Grumman New South Rd 69kV
- Replacement of approximately ten 69kV Breakers in Nassau area



NC 2013 Peak Load:	265 MW
Generation (MW):	
Calpine CC	<u>76</u>
Total:	76
Kev Items:	
West Babylon GT	
<b>Must Run Generation</b>	

- Reconductor Levittown Plainedge 69kV
- New North Lindenhurst substation tapping into South Farmingdale to West Babylon 69 kV line
- Reconductor South Farmingdale New North Lindenhurst 69kV
- Reconductor Sterling Lindenhurst 69kV
- Reconductor limiting portion of Bethpage Pilgrim 138kV
- Convert Ruland Rd South Farmingdale 69kV underground cable (69-751) to 138kV Or New Ruland South Farmingdale 138kV
- New South Farmingdale West Babylon 138 kV
- New South Farmingdale 138kV substation with a 138/69kV step down bank
- New West Babylon 138kV substation with 138/69kV step down banks



NC 2013 Peak Load:	103 MW
Generation (MW):	
Total:	0
Key Items: 23kV load in Village	
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- New Greenlawn 69kV Double Bus Tie
- New Capacitor Bank at Huntington 23kV
- New Greenlawn 6UL 33kV Ring Bus to replace current 23kV section of substation
- New Greenlawn Huntington/West Neck 23 kV (33 kV design)
- Reconductor Ruland Rd State School 69kV
- Reconductor Elwood Greenlawn 69kV
- Reconductor Commack Elwood 69kV



NC 2013 Peak Load:	219 MW
<b>Generation (MW):</b>	
West Babylon GT	<b>49</b>
Babylon RR	15
Pinelawn CC	84
Total:	148
Key Items:	
Pilgrim Phase Shifter	
Must Run Generation	

- Reconductor Brightwaters Watson 69kV Circuit No. 1
- Reconductor Ruland Road Pinelawn 69kV
- Reconductor Babylon West Babylon 69kV



NC 2013 Peak Load:	218 MW
<b>Generation (MW):</b>	
NYPA GT	47
PPL FTUs	<u>87</u>
Total:	134
Key Items:	
Pilgrim Phase Shifter	
<b>Must Run Generation</b>	

- Reconfigure or Reconductor circuits between Brentwood and Pilgrim (69-660)
- New Kings Highway substation tapping into Pilgrim West Bus 138kV
- By-Pass Elwood on the Pilgrim Commack Pulaski 69kV circuit
- New West Bus Pilgrim 138kV with a Phase Shifter
- Add new 27 MVAR Capacitor Bank at Deer Park
- Add the sixth Northport Pilgrim 138kV cable
- Add New Brentwood (Sagtikos) substation
- Convert the Pilgrim Brentwood 69kV circuit No. 3 to 138kV tapping to New Brentwood (Sagtikos)
- Add new 138/69kV bank and 138/13kV load at Brentwood
- Convert Pines substation to 138kV with a 138/13 kV step down bank
- Tap Hauppauge Central Islip 138kV at Pines
- Reconductor Brentwood Deer Park 69kV
- New Deer Park Pinelawn 69kV circuit



NC 2013 Peak Load:	228 MW	
<b>Generation (MW):</b>		
Huntington RR	24	
State College	<u>47</u>	
Total:	71	
Key Items:		
Northport Phase Shi	fter	
Must Run Generation - Holtsville GTs		

	<b>Projects</b>	Being	Considered	in Area
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- New 80 MVAR Reactor at Elwood
- Reconductor the following circuits :
  - Port Jefferson Stony Brook 69kV
  - Elwood Pulaski 69kV
  - Deposit Indian Head 69kV
  - Nesconset Holbrook 69kV
  - Pilgrim Commack 69kVcircuit
  - Nesconset Smithtown 69kV circuit
  - Replace Elwood 138/69kV transformer with 224MVA
- New supply to Indian Head 69kV or 138 kV Pilgrim/Northport
- New circuits:
  - Nesconset Centereach 69kV circuit
  - Pilgrim Indian Head 69kV circuit



NC 2013 Peak Load:	371 MW
Generation MW):	
Islip RR	9
Total:	<u>9</u>
Key Items:	
Must Run Generation - Holtsville GTs	

- Reconductor Great River to Watson 69kV
- Tap Bayport Great River 69kV at Sayville
- Tap Sayville Watson 69kV at Great River
- Add new 27 MVAR Capacitor Bank at Macarthur 69kV
- New Holbrook Bayport 138kV circuit
- Convert Bayport substation to 138kV with a 138/69 kV step down bank
- Reconductor and updated CT ratio on MacArthur Holbrook 69 kV at Holbrook



### West Brookhaven Load Pocket

NC 2013 Peak Load:	351 MW	
Generation (MW):		
Caithness CC	310	
<b>Port Jefferson Units</b>	<b>491</b>	
Holtsville GTs	516	
NYPA Holtsville	<u>135</u>	
Total:	1452	
Key Items:		
Pilgrim Phase Shifter		
<b>DRSS Phase II at West Bus</b>		
Caithness 2 CC -716MW		
Must Run Generation		

- Replace Holbrook 69kV bus tie breaker with a Double Bus tie breaker
- Replace Holbrook Bank 2-2A and Port Jefferson Bank 1with 224 MVA
- Reconductor the following circuits :
  - Holbrook Sills Rd 138kV
  - Holtsville GT LNG Holtsville West Yaphank 69kV
  - Holbrook Gershow West Yaphank 69kV
  - West Yaphank Yaphank 69kV
  - Port Jefferson Mount Sinai 69kV
- Remove Line Trap at Holtsville a/w 138kV Holtsville Sills Rd.
- New 138kV circuit with phase shifter, Holtsville West Bus Ruland Road
- Sills Road substation expansion
- Create a 69kV path from Eastport to Mastic to South Shirley to North Bellport
- Convert Mastic and South Shirley substation to 69kV
- New Setauket, North Patchogue and Middle Island substations
- Create West Yaphank 138kV substation with a 138/69kV bank
- New 138kV circuit from Sills Rd to West Yaphank 138kV
- New 138kV path from Pt Jeff to Mt Sinai to Coram to Sills Road Substation



NC 2013 Peak Load:	247 MW	
<b>Generation (MW):</b>		
Shoreham GTs	150	
Wading River	235	
<b>Cross Sound Cable</b>	<b>330(DC tie)</b>	
LISF (BP Solar)	32	
Total:	747	
Key Items:		
DRSS Phase II at Wildwood		
CSC Online, East End NC load		
Must Run Generation		

- Dynamic Reactive Support System Project at Wildwood
- New South Manor substation tapping into Riverhead to Eastport 69 kV line
- Upgrade Wildwood Riverhead from 69 kV to 138 kV
- Reconductor Moriches Eastport 69kV
- Reconductor Eastport Riverhead 69kV
- Upgrade Brookhaven Riverhead from 69 kV to 138 kV
- Upgrade existing Edwards Ave Riverhead 138 kV
- New Substation with two 69/13kV Banks at Calverton/Riverhead Resorts
- New Riverhead Shoreham 138 kV circuit



## East End Load Pocket

NC 2013 Peak Load:	365/407 MW	
(Normal/extreme weather)		
Generation (MW):		
East Hampton	24	
Greenport	52	
Southampton	9	
Southold	7	
Total:	92	
Key Items:		
<b>East End Generation</b>		
<b>D-VAR, DRSS Phase I Transient</b>		
Voltage Recovery		
Montauk diesel retired		

- New Southampton Capacitor
- East Hampton Amagansett 23 kV (33 kV design) with Amagansett substation expansion
- 2<sup>nd</sup> Riverhead Canal 138kV Cable
- New Cutchogue substation
- New Canal to Southampton cable 69 kV
- New Wainscott substation
- New second Canal to Wainscott 69kV/138kV underground cable
- New Bridgehampton to Buell 69kV Cable
- Tap Bridgehampton to Buell 69kV and Bridgehampton to East Hampton 69kV at Wainscott
- Tap Southold to Buell 69kV circuit at Wainscott
- New Navy Road substation (replace Montauk substation)
- Convert Amagansett/Hither Hills/Montauk/Culloden substations from 23kV to 33kV
- Upgrade CT ratio on both sides of the Orient Southold 23kV



## **Document Posted on LIPA Web site**

http://www.lipower.org/company/papers/ltpp.html

## **Questions?**

Please send any comments you may have to

LTPComments@lipower.org