CRP: Peaker Scenario

Assessing DEC's NOX Limits (Draft) Ruling for Simple Cycle and Regenerative Combustion Turbines

LIPA SYSTEM RESULTS

MARCH 3RD 2019

PSEG LONG ISLAND

We make things work for you.

Agenda

- Background:
  - Impacted Generation in LIPA Service Territory
  - LIPA Transmission System/Load Pocket Overview
  - Study Assumptions
- LIPA system Impact:
  - Study Year 2023 & 2028
- System Operations Impact

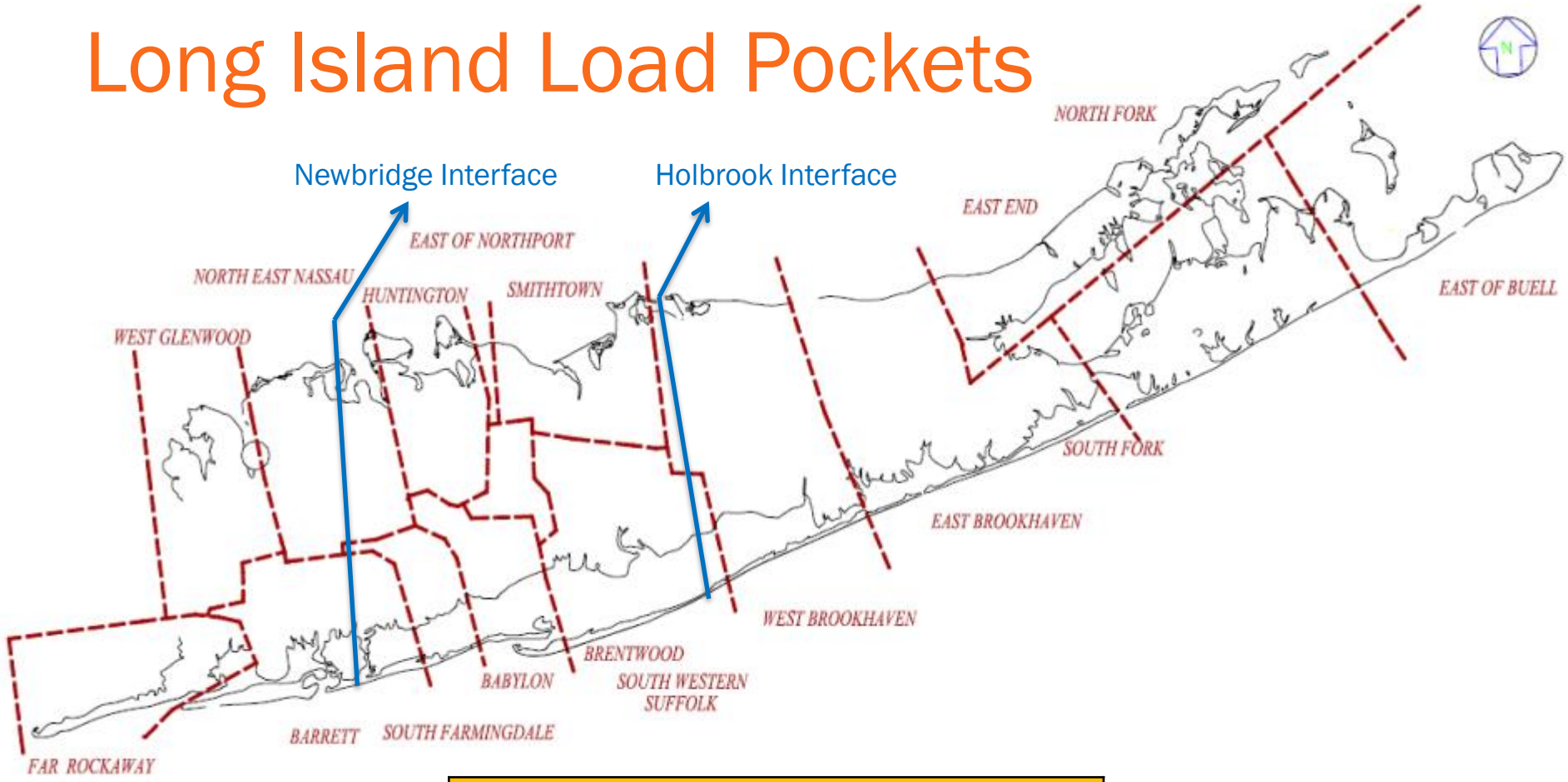
Impacted Generation in LIPA Territory

- The latest draft concept would enforce emission limits in two steps, occurring in 2023 and 2025:
  - Most of the Peaking Units on Long Island will be subjected to the DEC rule and assumed deactivated by 2023
  - Rest of the Peaking units will be regulated and assumed deactivated by 2025

- Based on the 2018 NYISO Gold Book, Total Generation Summer Capability will be decreased on Long Island:

Year	Total Long Island Generation (MW)
2018	5301
2023	4344
2028	3955

Long Island Load Pockets



Generation Subject to DEC Regulation (Nameplate MW)				
Year Affected	Total	West of Newbridge	Central	East of Holbrook
2023	1021	251	68	701
2025	406	168	0	239
Total	1427	419	68	940

Study Assumptions

- PSEG Long Island performed a five year and a ten year analysis consistent with PSEG Long Island transmission planning practice.
- Generators impacted by the regulation have been assumed deactivated in the study.
- Zone K load used in this study is taken from the 2018 Gold book for 50/50 coincident summer peak load and 90/10 extreme weather peak load. Off peak load is calculated based on 70% of summer peak load.

Year	Normal Weather Peak Load 50/50 (MW)	Extreme Weather Load 90/10 (MW)	Off Peak Load (MW)
2023	5176	5634	-
2028	5253	5718	3678

Study Assumptions (Continued)

- Transmission security analysis has been performed on the entire LIPA System (NYCA Zone K) for both Bulk Power Transmission Facilities (BPTF) and non-BPTFs.
- Load Pocket Analysis has been performed for the following Load Pockets:
  - Barrett
  - West Glenwood
  - Smithtown
  - South West Suffolk
  - West Brookhaven
  - East Brookhaven
  - East End (North and South Forks)
- N-1-1 analysis has been performed on the LIPA system in line with TPL-001-4 NERC standard.
- Compensatory MW has been modeled interconnecting into the substations where generators affected by the proposed regulation are connected.

2023 LIPA System Impact

- Thermal and voltage violations have been observed in N-1 and N-1-1 study
  - Worst N-1 violations generally occurred when studying the East End load pocket due to its forecasted load growth and assumed generator deactivations.
  - Majority of the N-1 violations occur in the East Brookhaven and East End areas from lack of eastern resources after the loss of a high capacity path.
  - Similarly, N-1-1 Violations occur in the East Brookhaven and East End areas due to the lack of eastern resources after the loss of two transmission paths.
  - Extensive voltage violations are observed across the system and are especially prevalent in the East End load pocket.
- The result concluded that a total of ~320 MW of compensatory MW* with reactive power capability that meets the PSEG Long Island Interconnection requirements is required to solve all post contingency N-1 and N-1-1 violations across LIPA system.

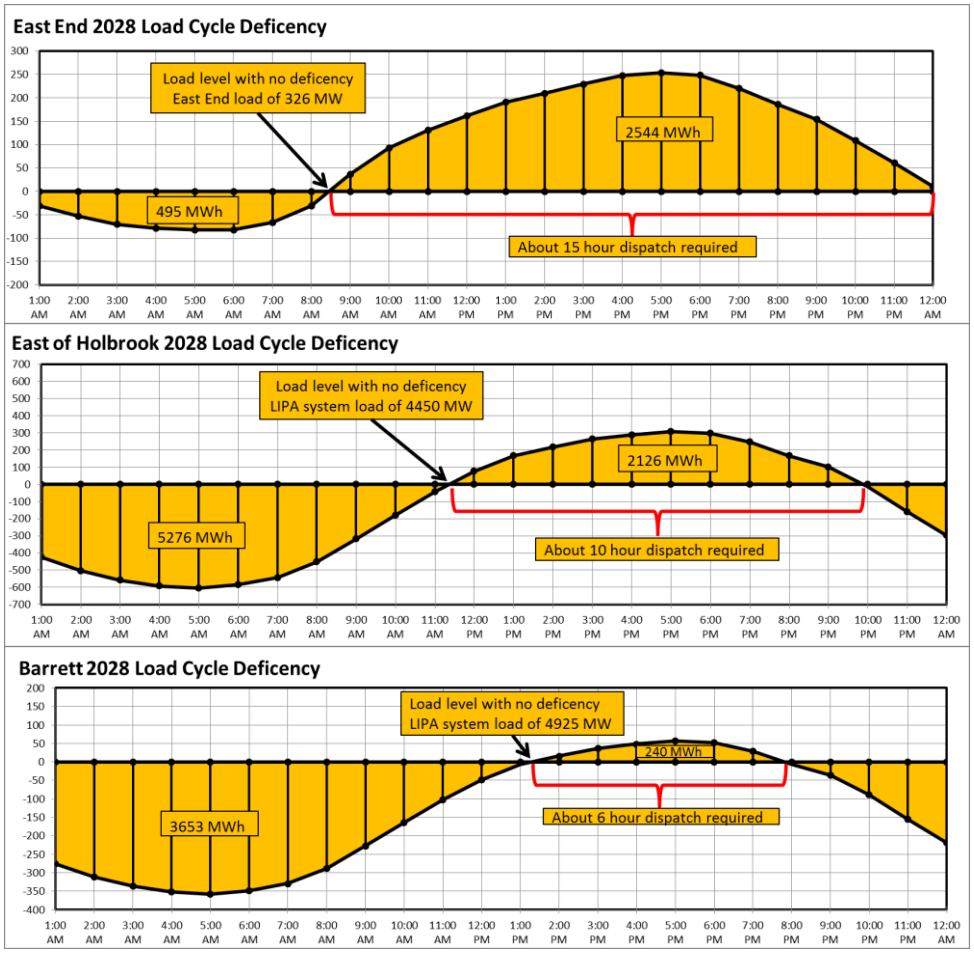
*MW deficiencies shown above are not intended to relate to a specific type of solution.

2028 LIPA System Impact

- Thermal and voltage violations have been observed in N-1 and N-1-1 study
  - Similar to the 2023 results, the worst N-1 violations generally occurred when studying the East End load pocked due to its forecasted load and lack of resources East of Holbrook.
  - Barrett Load pocket shows an N-1 violation due to lack of local generation resource.
  - Additional N-1 violations are observed from the large power transfer west to east due to the eastern Long Island generation assumed deactivated by 2025.
  - Similar to the 2023 results, N-1-1 violations in East End and East Brookhaven Area are observed in study year 2028. Additional N-1-1 violations are observed considering the loss of interties connecting to adjacent Areas due to a generation deficiency on Long Island.
  - Extensive voltage violations are observed across the system and are especially prevalent in the East End load pocket.
- The result concluded that additional ~300 MW for a total of ~620 MW of compensatory MW* with reactive power capability that meets the PSEG Long Island Interconnection requirements is required to solve all post contingency N-1 and N-1-1 violations across LIPA system.

*MW deficiencies shown above are not intended to relate to a specific type of solution.

2028 Load Cycle By Area



Each area requires their compensatory MW to be dispatched for different durations on a peak day

- The East End is the longest cycle requiring 15 hours of dispatch
- East of Holbrook compensatory MW requires 10 hours of dispatch
- Barrett load pocket requires the shortest dispatch at 6 hours.

System Operations Impact

- Detrimental Impact to the system restoration plan,
  - This will eliminate the LIPA restoration plan Black Start units.
  - Potential deactivation of the auxiliary power generators for Power Stations.
  - The near complete loss of 10 minute and 30 minute quick start resources.
    - Without these resources, PSEGLI would be extremely limited at LIPA system load pick up until the return of base load steam or combined cycle units.
- Loss of the identified units would render the system unable to secure for the loss of gas supply (NYSRC Rule G.3).
  - Dispatch of the affected units are required to alleviate thermal violations post contingency and Recover system voltage to pre-contingency limits.
  - Without these units, additional use of oil at the Northport site will be required to secure pre-contingency.
- Reduced flexibility in dispatch to alleviate pre and post contingency violations.

System Operations Impact (Continued)

- Reduced capacity could result in a higher probability for the use of emergency control actions (Ex. Emergency support, voltage control, load shed).
- Increase in the potential for activating under voltage load shedding scheme in the East End.
- Reduced maintenance capability in the Off-peak shoulder months.
- Distribution System Impact due to deactivation of specific distribution connected generation.
- Potential System Protection Impact
  - System Grounding and Relay Protection

Summary

- Potential deactivation of the peaking Units in LIPA system will result in a total of ~620MW deficiency by 2028.
- Majority of the deficiency is due to the forecasted load growth in the East End pocket and assumed generator deactivations.
- 2028 N-1-1 analysis shows that the remaining Long Island generation and LIPA tie line import capability will not meet the peak load demand of Zone K for loss of two supplies.
- It should be noted that MW deficiency identified in the study may be addressed through alternative means, including but not limited to Non-Firm LTP system upgrades.
- Potential deactivation of the peaking units will reduce the capability for operations to secure the transmission system on a daily basis and would significantly impact the flexibility to accommodate system maintenance or outages.

Thank you