2022 IRP Scope of Work

The 2022 Integrated Resource Plan (IRP) will study the supply-side, demand-side, and transmission resources needed for LIPA to continue to provide reliable, environmentally compliant, and cost-effective electric service to customers on Long Island and the Rockaways. The 2022 IRP will build on previous work and identify the actions needed to continue the path towards meeting New York State's nation-leading clean energy goals established in the Climate Leadership and Community Protection Act (CLCPA). The development of the IRP is expected to extend from June 2021 to final report issuance in the third quarter of 2022. The 2022 IRP will be developed by PSEG Long Island, as an agent of and acting on behalf of LIPA. PSEG Long Island will be assisted by a team of consultants, along with the intended use of subject matter experts from Stony Brook University and Brookhaven Science Associates who will focus on identifying the attributes, economics, timeline and feasibility associated with the commercial deployment of emerging technologies. This scope of work document provides background information and outlines the IRP's study period, objectives, tasks, and proposed scenarios.

Separately, PSEG Long Island is initiating a climate vulnerability study that will run parallel to the IRP effort. The climate vulnerability study will focus on climate change impacts on system loads and facility ratings, as well as T&D system resiliency. As applicable and available, these results will be incorporated as inputs to the IRP.

I. Background

The CLCPA includes, among other mandates, a requirement that 70 percent of electricity consumed in the state by 2030 be produced with renewable energy (i.e., the 70 x 30 mandate), the development of 3,000 MW of energy storage by 2030 and 9,000 MW of offshore wind by 2035; and 100 percent zero-carbon electricity production by 2040 (i.e., the 100 x 40 mandate).

While meeting New York State's clean energy mandates poses challenges to all energy service providers, LIPA is in a unique position as a publicly owned and vertically integrated utility whose service territory is literally an island. To meet the NYISO's capacity requirements, LIPA has, over time, entered into a series of long-term power supply contracts with a variety of generators that are physically located on Long Island. LIPA also purchases capacity in the Rest of State (ROS) market and has in place several transmission agreements, including two firm transmission capacity purchase agreements, that enable import of economy energy and/or capacity from neighboring Regional Transmission Organizations (RTO). Many of these contracts, both capacity and transmission agreements, expire within the next ten years[1].

LIPA has approximately 5,500 MW of capacity under contract excluding its 18% ownership of Nine Mile Point 2, of which 3,700 MW is comprised of local fossil-fueled steam and combustion turbine units under long-term contract with National Grid, i.e., the Power Supply Agreement (PSA). The PSA steam units total about 2,300 MW (nameplate) and are, on average, over 50 years old. The balance of the PSA units (i.e.,

[1] Please see the Annual Disclosure Report of the Long Island Power Authority (Fiscal year 2020), System Description starting on page 26.

simple cycle combustion turbines) average close to 50 years in age. While well maintained, it is an old and thermally inefficient fossil fleet. The PSA contract is due to expire in April 2028. The remainder of capacity under contract to LIPA (i.e., units with Power Purchase Agreements (PPAs)) totals approximately 1,900 MW and includes combined cycle and simple cycle units on Long Island, as well as a 685 MW contract for capacity from Marcus Hook, a power plant located in Pennsylvania. Expiration of the various PPAs will occur over an extended period, but the bulk of the capacity under contract will also expire by 2028, with the Marcus Hook contract expiring in 2030.

In addition to capacity contracts, LIPA also has a number of firm transmission capacity agreements with other parties. These include:

- **The Y-49 Cable:** The East Garden City to Sprain Brook interconnection, installed in 1991, is owned by NYPA. Most of the capacity of the Y-49 Cable is used by LIPA under the terms of a contract with NYPA. The contract expires in November 2022.
- **The Cross-Sound Cable (CSC):** A high voltage direct current (HVDC) cable from Shoreham, NY to New Haven, CT that is dedicated to LIPA's use under a firm transmission capacity purchase agreement for 330 megawatts of transmission capacity that enables LIPA to purchase power from New England. The CSC Agreement expires in 2032.
- **The Neptune Cable:** A firm transmission capacity purchase agreement that provides LIPA the ability to purchase power from PJM via an undersea HVDC transmission cable capable of carrying 660 megawatts of electricity. The cable became operational in July 2007; the contract expires in June 2027.

Fundamentally, an IRP matches supply (generation) to demand (electric load). On the generation side, LIPA is facing a transition from its current near total dependence on fossil-fuel fired generation to a resource mix increasingly dominated by offshore wind, with a portion of the existing fossil fleet transitioning to a role of providing back-up generation when the wind resource is not available. Already, two projects selected in NYSERDA's Offshore Wind Renewable Energy Credit (OREC) procurements are planning to feed into Long Island, the Sunrise Offshore Wind Project (880 MW, 2024) and the Equinor Empire Wind 2 Project (1,260 MW, 2026), with more expected to result from NYSERDA's future procurements. The IRP will need to recommend the optimal amount of operating and installed reserves (to be provided by clean, flexible resources, such as storage) that Long Island will need to integrate all of this offshore wind.

On the load side, LIPA has aggressive energy efficiency (EE) and other demand-side management (DSM) programs and, like many utilities, is experiencing reduced (or negative) growth in annual energy sales and peak load. However, this is expected to change with the implementation of CLCPA mandates and increasing electrification from transportation and heating loads.

LIPA's 2022 Integrated Resource Plan will help create a path forward for LIPA to comply with New York State's clean energy and decarbonization goals, address the aforementioned challenges, and continue to serve its customers in a reliable and cost-effective manner.

II. Scope of Work

The scope of work of the study includes assessment of all areas (e.g., the contracts, market structure, policy initiatives) that will and/or may influence the development of an Integrated Resource Plan that best positions LIPA to continue to provide reliable, environmentally responsible, and cost-effective electric service to its customers.

a. Overview

The study will develop 3 - 4 Alternative Scenarios. The study will result in an action plan for the 2022 – 2030 period, including supply- and demand-side resource additions, generation unit ramp downs pursuant to the Power Supply Agreement (PSA) with National Grid, major transmission upgrades needed for reliability and clean energy import/export, and potential extensions of expiring power supply and transmission service agreements.

PSEG Long Island will perform the following steps for each of the Scenarios:

1. Establish assumptions to be used in the analysis including: load forecast, which includes projections of behind-the-meter energy resources and the electrification of heating and transportation; NYISO system-level load; the NYISO resource mix; committed resource additions such as offshore wind; and other resource targets in the CLCPA; and

2. Determine incremental LIPA resource needs by: comparing LIPA's load and resource forecast against key IRP constraints (including resource adequacy requirements, CES and CLCPA targets); identifying gaps for meeting the constraints; identifying cost-saving opportunities under existing arrangements (e.g., PSA unit ramp down, termination of certain imports); and proposing resource solutions.

b. Study Period

The study period will be from 2022 – 2040, which encompasses two key CLCPA milestones - the mandates that at least 70 percent of the electricity consumed in NYS in 2030 will be from renewable resources (i.e., 70 x 30), and that electricity production in NYS will be entirely emissions-free by 2040 (i.e., 100 x 40). While the study period extends to 2040, the 'actionable' period of 2022 - 2030, or the period during which key decisions need to be made (e.g., which contracts to extend, what transmission projects and/or carbon free resources might provide load pocket relief and allow certain fossil units to retire) is the focus of the IRP.

c. Objectives

IRP objectives, along with a brief description of considerations associated with each objective, include the following:

1) Support and meet CLCPA goals/mandates

All IRP scenarios must meet or exceed current CLCPA goals. LIPA intends to participate in all CLCPA related programs (e.g., purchase of renewable energy credits (RECs), ORECs) and meet specific targets (e.g., Battery Energy Storage Systems (BESS) requirements). It should be

emphasized that, while the CLCPA sets mandatory minimums for implementation of certain clean technologies, LIPA will evaluate opportunities to exceed such minimums, both as part of the IRP study and in any BESS and other procurements that may result from the IRP, if doing so would benefit our customers and contribute to meeting our planning objectives.

2) **Develop projections and identify the impacts of beneficial electrification**

   Identify the additional electric load associated with the beneficial electrification of other sectors (such as heating and transportation) on Long Island.

3) **Determine short and long-term resource needs**

   Identify resource needs to meet CLCPA requirements, including flexible generation and carbon-free technologies.

4) **Maintain system reliability**

   All IRP scenarios will be required to meet, or exceed, existing and projected reliability standards and capacity requirements. Moreover, resiliency attributes associated with the various IRP scenario portfolios will need to be considered.

5) **Minimize rate impact to the extent practical**

   The IRP will compare different resource options based on their projected cost and performance and select the preferred portfolio of resources (including amounts, types and locations) that best meet reliability, environmental and affordability criteria.

6) **Benefit disadvantaged communities**

   The CLCPA requires that benefits from clean energy investments be realized by disadvantaged communities. Hence, it will be important to identify the impact of IRP-driven decisions on disadvantaged communities. The definition of disadvantaged communities, though, has not been finalized yet by the Climate Justice Working Group. Nevertheless, NYSERDA's interim definition of disadvantaged communities will be used unless and until an official definition is provided.

d. Tasks

The following outlines the key tasks that will be performed as part of the IRP study.

1) **Identify the supply-side resource options necessary to meet the short and long-term resource needs under a variety of scenarios**

   Identify supply resource portfolio(s) necessary to meet short and long-term needs and CLCPA requirements that are cost effective and meet reliability standards. This includes total supply resources (MW) and timing of additions; off-island imports; bulk energy storage systems; distributed energy resources, such as community-based wind and solar; the type, amount (MW) and timing of flexible resources sufficient to meet the needs of

OSW; and other intermittent resources as well as other CLCPA-compliant resource options and emerging technologies that may be identified in the course of developing the IRP.

2) **Develop load forecasts for various scenarios and identify potential demand-side resource options consistent with CLCPA mandates and goals**

3) **Disadvantaged community impacts**

Develop and apply a qualitative approach to determine the impact of IRP-driven decisions on disadvantaged communities. In addition to environmental impacts (e.g., reduction in greenhouse gases (GHGs) and criteria pollutants), this analysis will identify other benefits for disadvantaged communities associated with clean energy resources and/or reduced fossil generation consistent with CLCPA requirements.

4) **Disposition (e.g., extension, expiration) and timing thereof of existing contracts for fossil-fueled generation (i.e., PSA units and non-PSA units) and for certain transmission contracts.**

The key questions to be addressed in the IRP are:

i) Can some PSA unit blocks be 'ramped down' for economic reasons prior to the 2028 expiration of the PSA without violating resource adequacy and reliability requirements, and what is the optimal sequencing of the ramp downs?

ii) Which PSA and non-PSA units are needed for reliability?

iii) Identify the need for firm capacity purchases from neighboring regions.

Assume that existing contracts will expire at the end of their term and make assessment as to whether any are needed to be extended for reliability or economic reasons. Reduce, and by 2040 eliminate, dependence of fossil fuel generation. Assume the generator unit retires if a contract is not extended.

5) **Transmission projects necessary to support achievement of objectives**

The IRP will identify transmission investments needed for reliability for all scenarios and sensitivities. Related questions to be evaluated in the IRP include:

(1) Are there load pockets that may benefit from non-wires alternatives (local generating units, batteries)? Where and how much?

(2) Will Long Island need additional intertie capacity for import/export, apart from the additional capability already being sought to meet the Public Service Commission's 2020 Public Policy need? Should LIPA extend its cable contracts with Cross Sound Cable and Neptune?

6) Reliability impacts (IRM/LCR) of suggested plan(s)

The IRP will identify the impact on NYCA's Installed Reserve Margin (IRM) and Zone K for each scenario and sensitivity.

7) Cost to Consumers

Analyses will identify the relative incremental cost of ieach resource portfolio for each scenario and sensitivity. However, it should be noted that the actual cost to consumers of specific resources and associated rate impacts will be determined at the time that LIPA conducts procurements or takes other actions to fulfill the needs identified in the IRP.

8) Environmental impacts

Analysis will identify greenhouse gas and criteria pollutant emissions reductions for each scenario and sensitivity.

9) Potential energy security issues

Each scenario will be assessed as to its energy diversity and reliance on sources with exposure to supply interruption.

10) Resiliency Considerations

The IRP will have a discussion of system resiliency for each scenario and sensitivity in terms of both resource supply and transmission.

11) Feasibility and Challenges

An overall qualitative assessment of each scenario in terms of its feasibility (i.e., likelihood of being achieved) from an economic, time, complexity, and control perspective. The assessment will also cover what is needed to achieve the scenarios (i.e., potential market changes, development, and type of flexible generation).

12) Develop an action plan through 2030

The action plan will reflect the necessary steps that LIPA should undertake to best position itself to serve its customers reliably, environmentally responsibly, and economically in both the short and long-term. It will clearly identify the key actions and investments that LIPA should undertake in order to achieve the IRP objectives.

e. IRP Scenarios

This section describes a preliminary set of scenarios subject to further review and refinement with the IRP consultant. Additional scenarios may be developed based on stakeholder comments. The IRP will look at 3-4 scenarios with a limited number of sensitivities around those scenarios.

- The "Baseline Scenario" will be developed assuming the contract expiration(s) and retirement(s) of some of the existing fossil-fueled generation and allowing for other units to remain online because of reliability or economics.
- One more alternative scenarios will examine accelerated transmission and/or storage investments, allowing for advancing the retirement of fossil-fueled generation.
- Additional alternative scenarios will examine the potential impact of LIPA increasing investments in efficiency and/or demand response, as well as accelerating electrification programs.
- Several sensitivity cases will be developed around the main scenarios.