# Utility 2.0 Long Range Plan &
# Energy Efficiency and Demand Response Plan

## 2021 Annual Update

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## Prepared for Long Island Power Authority

July 1, 2021

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# Executive Summary

PSEG Long Island (the Utility) is submitting this ***Utility 2.0 Long Range Plan (Utility 2.0 Plan)*** for review by the Long Island Power Authority (LIPA) and the New York State Department of Public Service (DPS). This submittal is in accordance with Public Authorities Law Section 1020-f(ee) and the Amended and Restated Operations Services Agreement dated December 31, 2013. This Utility 2.0 Plan Filing details 28 initiatives previously reviewed by DPS and approved in prior years by the LIPA Board of Trustees. PSEG Long Island seeks a positive recommendation on the Utility 2.0 Plan from DPS and incremental funding approval from LIPA for four proposed initiatives and the scope expansion for two of the already approved and ongoing initiatives.

This Utility 2.0 Plan Filing also includes the 2022 update to PSEG Long Island's ***Energy Efficiency and Demand Response (EEDR) Plan*** (included as Appendix A). PSEG Long Island's energy efficiency (EE) programs make a wide selection of incentives, rebates, and programs available to residential and commercial customers on Long Island to assist them in reducing their energy usage, thereby lowering their energy bills.

## PSEG Long Island Is Executing on its Utility 2.0 Vision

As the overall energy landscape evolves, PSEG Long Island, working with LIPA, continuously seeks ways to evolve its solutions and services to support its customers and their needs. This evolution is underpinned by PSEG Long Island's overall vision for becoming a utility for the future, or Utility 2.0 (Figure ES-1).

**Figure ES-1. PSEG Long Island's Utility 2.0 Vision**

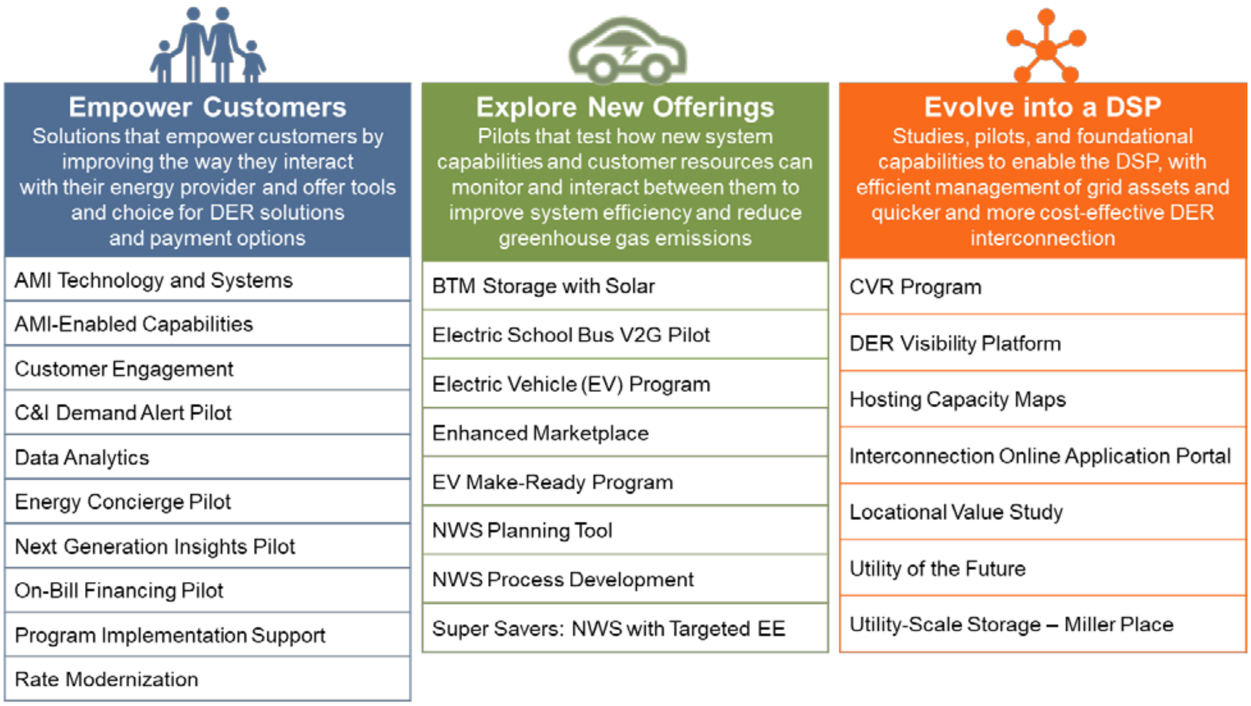
*PSEG Long Island's Utility 2.0 vision is to be a customer-centric, innovative, and forward-looking utility that is dedicated to a clean, reliable, and resilient energy system. PSEG Long Island will achieve this vision by empowering its customers through AMI, exploring new offerings, and evolving to become the utility of the future, including performing functions of the DSP, for Long Island and the Rockaways.*

Through the initiatives that form the Utility 2.0 Plan, PSEG Long Island acts on its vision and continues to transform into a clean and distributed electric system, consistent with New York State's clean energy policies. Specifically, PSEG Long Island executes on its Utility 2.0 vision across three strategic pathways:

1. **Empower Customers through Advanced Metering Infrastructure (AMI) and Data Analytics:** Using AMI and AMI-enabled capabilities as a foundational enabler to deliver greater digital insights to customers.
2. **Explore New Innovative Offerings:** Testing and advancing new ideas, offerings, and technologies that provide the Utility with more experience around new technologies, solutions, and customer strategies that support New York's clean energy goals.
3. **Evolve into a Customer-Centric Distributed System Platform (DSP):** Investing in platforms and tools that support grid planning and operations, while enabling foundational capabilities that support its transition to a DSP.

The portfolio of Utility 2.0 initiatives includes more than 28 programs, pilots, and studies that are being implemented or are planned for implementation in the short term (see Figure ES-2).

**Figure ES-2. Portfolio of Approved Utility 2.0 Initiatives**

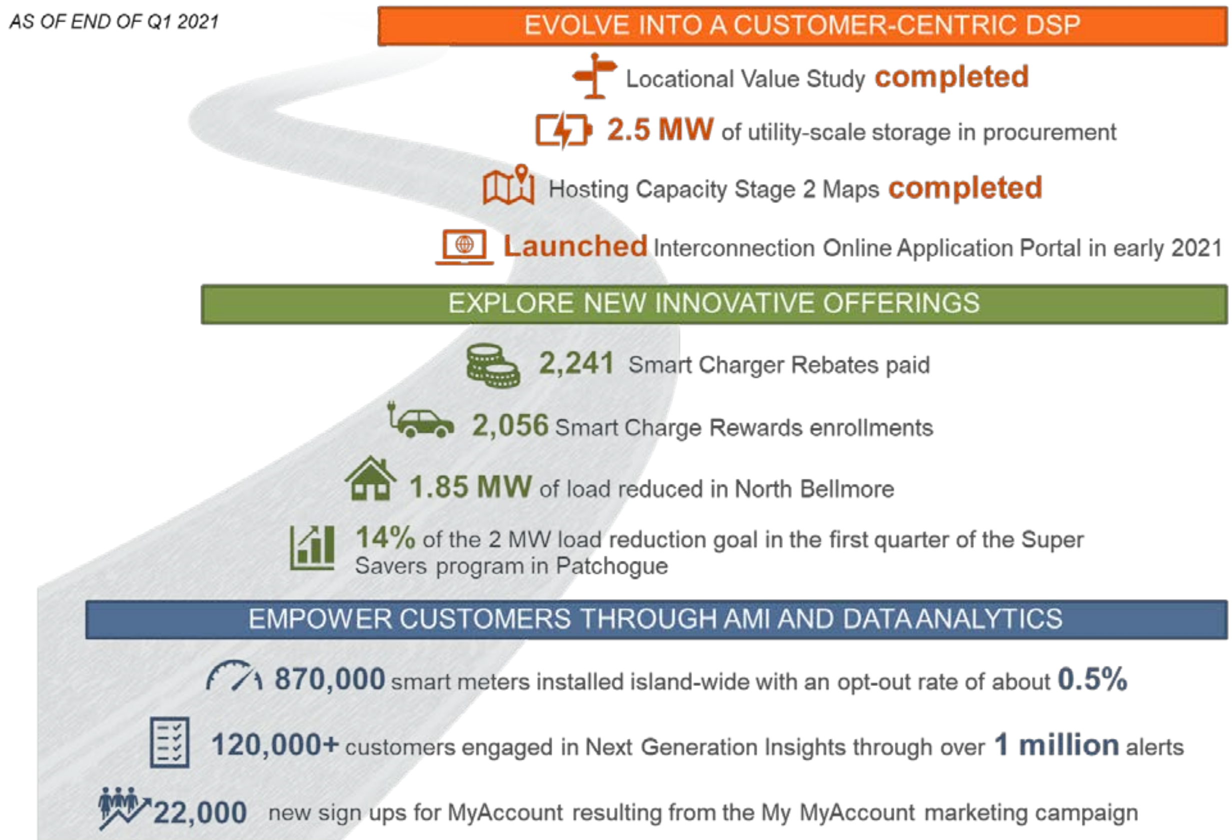



AMI is the foundational technology that enables the benefits and capabilities described in PSEG Long Island's Utility 2.0 Vision. Leveraging the Utility's experience from past meter deployments, PSEG Long Island installed 630,000 meters by the end of 2020 (and subsequently, 870,000 by the end of the first quarter in 2021). The meter installation is supported by an extensive customer engagement initiative that resulted in a reduced customer opt-out rate of 0.53% at the end of 2020, down from 0.77% at the beginning of 2019. PSEG Long Island has continued to develop AMI-enabled capabilities, data analytics, and process changes critical to capturing the customer benefits of an AMI system while it is deployed.

PSEG Long Island continued exploring and implementing new innovative clean energy offerings for its customers, building on its successful track record in delivering EE programs on Long Island. 2020 saw an increase in the participation in the electric vehicle (EV) Program, while in parallel, PSEG Long Island developed an implementation plan for the launch of a ground-breaking EV Make-Ready Program that will support the State's transportation electrification goals.

In the first quarter of 2021, PSEG Long Island completed a Locational Value Study and Tool, launched an online distributed energy resources (DER) interconnection portal (the Interconnection Online Application Portal), and released Stage 2 Hosting Capacity Maps—foundational capabilities and tools to evolve into a customer-centric DSP. A sample of milestones and successes from Utility 2.0 initiatives in 2020 and through the end of the first quarter of 2021 is shown in Figure ES-3.

**Figure ES-3. Success of Utility 2.0 Initiatives as of the First Quarter of 2021**




## Significant Utility 2.0 Benefits Realized with Lower than Planned Spend

Per DPS recommendations, PSEG Long Island provides tracking of actual progress and spend against the original business case for approved initiatives filed with a benefit-cost analysis (BCA). [1] Within this Utility 2.0 Plan, PSEG Long Island includes an update on the progress made to date with all ongoing initiatives, and a year-end accounting of project performance in relation to scope, schedule, benefits, and budget.

PSEG Long Island continued to accrue benefits for its customers from Utility 2.0 initiatives. Operations and maintenance (O&M) savings driven by AMI and AMI-enabled capabilities were the primary means by which customer benefits were realized in 2020 (Table ES-1). These realized benefits are proportional to the level of AMI deployment, the functional maturity of AMI-enabled capabilities, and the participation in customer programs and may vary year-to-year from the original business cases based on actual project spend and schedules. Overall, PSEG Long Island realized $23 million in benefits, 86% of what was projected through 2020.

[1] The benefits reported in the 2021 Utility 2.0 Plan are calculated using methodologies consistent with the ones used in the BCAs filed for the projects. The benefits that are reported align with the benefit definitions that are stated in the PSEG Long Island BCA Handbook. Unless otherwise noted, the stated benefits will not be comparable with financial savings reported by PSEG Long Island outside of the Utility 2.0 Plan.

**Table ES-1. Utility 2.0 Planned and Actual Benefits Through 2020**

| Initiative | Plan ($M) | Actual ($M) | Realized % |
|---|---|---|---|
| AMI Deployment and AMI-Enabled Capabilities | 22.89 | 19.64 | 86% |
| Data Analytics (Proactive Transformer Repair) | - | 0.51 | N/A |
| Behind-the-Meter Storage with Solar | 0.18 | - | 0% |
| EV Program | 2.99 | 2.71 | 90% |
| Super Savers (North Bellmore) | 1.01 | 0.54 | 54% |
| **Total** | **27.07** | **23.40** | **86%** |

The cumulative spend by previously approved Utility 2.0 initiatives through the end of 2020 was higher than planned for capital, primarily due to the acceleration of the AMI deployment schedule. O&M spend was lower than planned, mainly due to delays in the launch of initiatives as a result of the COVID-19 pandemic and other external factors, which are discussed further in later sections of this document. The updated expenditure forecast for previously approved initiatives through 2025 is expected to be lower than the approved budget by approximately $5 million (Table ES-2).

**Table ES-2. Utility 2.0 Budget, Spend, and Forecast Through 2020**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| **Actual Spend 2019-2020** | Approved Budget | 132.41 | 20.43 |
| | Actual Spend | 137.14 | 12.61 |
| | **Variance** | **(4.73)** | **7.82** |
| **Updated Forecast 2019-2025** | Approved Budget | 265.38 | 84.62 |
| | Updated Forecast | 263.06 | 81.68 |
| | **Variance** | **2.32** | **2.94** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

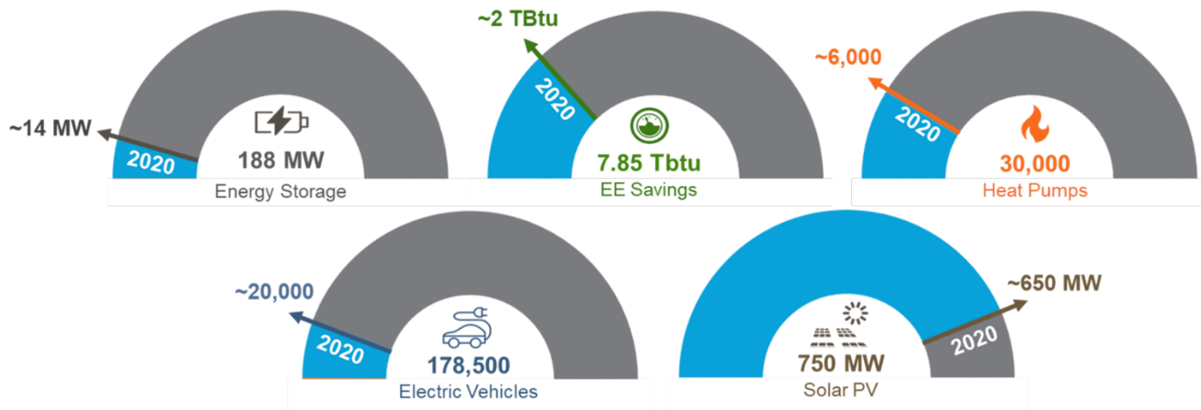
## Utility 2.0 Initiatives Support New York's Clean Energy Goals

LIPA and PSEG Long Island have introduced numerous initiatives over time to secure a cleaner and more affordable energy future for Long Island's residents. Long Island is home to a number of long running and successful EE programs, three large utility-scale solar projects, a vibrant rooftop solar market, and New York's first utility-scale battery project and first offshore wind farm—the 130 MW South Fork Wind Farm.

PSEG Long Island's EE programs support all aspects of the customer base and encompass everything from residential home energy reports that provide customers with their consumption details and insights on managing their energy use to large-scale commercial HVAC systems.

Utility 2.0 initiatives that are either underway or planned for the future will directly contribute to achieving goals in areas such as EE, energy storage, beneficial electrification (heating and transportation), and renewable energy (Figure ES-4). In the 2021 Utility 2.0 Plan, PSEG Long Island is taking one step further in supporting transportation electrification by proposing the expansion of the EV Make-Ready Program at a scale that can support the overall goal of getting more than 170,000 EVs on Long Island by 2025.

**Figure ES-4. Progress Toward Long Island's Portion of the State's 2025 Clean Energy Goals**




## Proposed Initiatives for 2022 Further Support Decarbonization on Long Island

PSEG Long Island is requesting funding to implement four new initiatives starting in 2022. Consistent with the Utility 2.0 Vision, the proposed initiatives support increased customer satisfaction, enable greater system efficiency, and contribute to the reduction of greenhouse gas (GHG) emissions.

The four new initiatives seeking funding are:

1. **Connected Buildings Pilot:** Demonstrating the benefits of integrated controls in homes and buildings that gives customers better insight into their energy usage, enables autonomous response to utility price and dispatch signals, and increases grid edge flexibility.
2. **Suffolk County Bus Initiative:** Investing in two 1.5 MW charging sites to electrify public transportation in Suffolk County.
3. **Bucket Truck Electrification Plan:** Developing an implementation plan to purchase an electric bucket truck and a long-term fleet electrification plan to support the carbon reduction from PSEG Long Island's own fleet of vehicles.
4. **Increasing Hosting Capacity Study:** Identifying cost-effective approaches to increasing circuit hosting capacity to allow for increased adoption of DER on constrained circuits.

PSEG Long Island is also proposing to expand the scope of two ongoing initiatives:

1. **Rate Modernization:** An additional green rate choice to meet customers' desire for an optional renewable energy product and enable customer advocates for New York's clean energy goals.
2. **EV Make-Ready Program:** The EV Make-Ready Program was initially proposed in 2020 to support and accelerate EV adoption on Long Island. The expanded scope and funding request for the EV Make-Ready Program proposed in this filing is based on the results of a detailed implementation plan developed in 2021 and includes additional charging ports and the launch of a fleet electrification advisory service.

Table ES-3 summarizes the funding requests for these initiatives.

**Table ES-3. Funding Request for New Initiatives and Initiatives with Expanded Scope**

| Type | Initiative | Capital 2022-25 ($M) | O&M 2022-25 ($M) |
|---|---|---|---|
| New Initiatives | Connected Buildings Pilot | - | 1.19 |
| | Suffolk County Bus Make-Ready Pilot | 0.60 | 0.45 |
| | Bucket Truck Electrification Plan | - | 0.10 |
| | Increasing Hosting Capacity Study | - | 0.06 |
| Expanded Scope | Rate Modernization | 1.19 | 1.32 |
| | EV-Make Ready Program | 62.39 | 25.72 |
| | **Total** | **64.18** | **28.83** |

## PSEG Long Island's 2022 EEDR Plan Builds on a Successful Track Record

PSEG Long Island's EE programs provide a wide array of incentives and rebates to residential and commercial customers to assist them in reducing their energy usage, thereby lowering their bills. The Utility's proposed 2022 EEDR Plan (included as Appendix A of this document) consists of four programs for residential customers and a multifaceted program for commercial customers.

PSEG Long Island's program philosophy and delivery is structured to respond to market changes and cost-effective EE opportunities during any given year. In alignment with New York's EE policy framework (New Efficiency: New York), PSEG Long Island's 2022 goal is 1,147,670 total MMBtu savings (which includes 327,049 MWh of EE savings). This savings goal is calculated on a gross basis at the customer meter and includes savings algorithm updates based on the most recent program year evaluation.

The 2022 proposed budget of $88.9 million for EEDR programs remains nearly equal to the budget for 2021. PSEG Long Island has initiatives that are budgeted for but will not have any MMBtu savings associated with them in 2022, such as the Direct Load Management program at $1.3 million. In 2022, savings from the launch of the first pay for performance partnership with the New York State Energy Research and Development Authority (NYSERDA) are expected.

Given the increased emphasis on advancing energy affordability by developing initiatives focused on energy solutions for low-to-moderate income (LMI) customers, enhanced heat pump rebates and programmatic changes designed to enhance the Home Performance and Residential Energy Affordability Partnership (REAP) programs will total about $5.4 million in spending in 2022.

PSEG Long Island will also continue to monitor Climate Leadership and Community Protection Act (Climate Act) working groups as the definition and tracking for disadvantaged communities (DAC) gets solidified, which is expected to happen in the fall of 2021 (subsequent to this filing), and then incorporate support of DAC into strategic operations in 2022. Outside of the income-qualified programs, approximately $3.4 million in rebate dollars went to customers in DAC and environmental justice (EJ) locations in 2020.

When implementation, evaluation, and other indirect program costs are considered along with payments made through income-qualified programs, approximately 12% of PSEG Long Island's overall EE rebate spending of $40.1 million resulted in benefits to LMI, DAC, and EJ communities. Note that this figure does not include other programs designed to benefit low- and moderate-income customers outside the EEDR plan, such as the Solar Communities feed-in-tariff.

**Table ES-4. Summary of Proposed Programs and Budgets in the 2022 EEDR Plan**

| Program | Savings (MMBtu) | Savings (MWh) | Program Budget ($M) |
|---|---|---|---|
| Energy Efficient Products | 612,027 | 206,010 | 24.4 |
| Home Comfort | 129,673 | 2,776 | 11.5 |
| REAP (Low Income) | 5,953 | 2,361 | 1.35 |
| Home Performance | 31,917 | 2,633 | 4.56 |
| Multifamily | 2,423 | 437 | 0.25 |
| All Electric Homes | 560 | 17 | 0.05 |
| Commercial Efficiency | 262,559 | 82,757 | 32.4 |
| Home Energy Management (Behavioral) | 101,952 | 29,881 | 2.70 |
| Pay for Performance | 606 | 178 | 0.20 |
| **Total, Budget Components with Programmatic Savings** | **1,147,670** | **327,049** | **77.43** |
| Dynamic Load Management Program | N/A | N/A | 1.38 |
| Community Solar | N/A | N/A | 0.40 |
| Religious Buildings | N/A | N/A | 0.40 |
| PSEG Long Island Labor, Outside Services, Advertising | N/A | N/A | 9.28 |
| **Total, Budget Components Not Associated with Programmatic Savings** | **-** | **-** | **11.47** |
| **Total** | **1,147,670** | **327,049** | **88.90** |

## Structure of the Document

This annual update of the Utility 2.0 Plan includes reporting around the status, performance, and spend for previously approved initiatives. PSEG Long Island expects that performance and budget spend will fluctuate year-to-year throughout the duration of the various initiatives. Unless otherwise noted in this filing, PSEG Long Island plans to deliver the scope of the approved initiatives within the overall approved funding and schedule. [2]

The reporting of updates to approved initiatives and the proposals for new initiatives and expansions in the scope of approved initiatives are included in Chapters 2, 3, and 4. Key figures, such as quantifiable benefits and spend, are summarized at the portfolio level in Chapter 5.

Overall, the 2021 Utility 2.0 Plan filing is organized in the following way:

- **Chapter 1** outlines the drivers that shape PSEG Long Island's Utility 2.0 initiatives and the Utility 2.0 vision, strategy, and roadmap.
- **Chapters 2**, **3, and 4** describe the following for each of the three Utility 2.0 pathways:

[2] The duration of the approved funding for each initiative will vary depending on when they were originally filed and whether the schedule for the initiative has been subsequently updated to reflect a change in the end date. For clarity, the duration of each initiative has been noted separately and individually for each initiative in Chapters 2, 3, and 4.

- Progress updates, performance reporting, and budget reconciliation for approved initiatives, and in some cases justification for expanding approved initiatives to include new scope.
- Design, justification, and funding request for new initiatives that will start in 2022.
- Short descriptions of other initiatives being considered for long-term implementation.

- **Chapter 5** provides an overview of the overall Utility 2.0 portfolio benefits, spend, and budgets. This chapter also outlines the expected rate impacts from the overall portfolio based on the expected spend and benefits.
- **Appendix A** contains PSEG Long Island's 2022 EEDR Plan.
- **Appendix B** includes supplemental information related to the EV Make-Ready Program.
- **Appendix C through Appendix E** summarize related initiatives outside the scope of the Utility 2.0 Plan, the business case methodology, and the way LIPA and PSEG Long Island are organized.
- **Appendix F** includes a listing of acronyms and abbreviations used in this document.

# 1. Introduction

PSEG Long Island (the Utility) is submitting this Utility 2.0 Long Range Plan (Utility 2.0 Plan) for review by the Long Island Power Authority (LIPA) and the New York State Department of Public Service (DPS). This submission is in accordance with Public Authorities Law Section 1020-f(ee) and the Amended and Restated Operations Services Agreement dated December 31, 2013.

## 1.1 Executing PSEG Long Island's Utility 2.0 Vision

The global energy industry is undergoing a transformation. Customer preferences and rapidly improving technologies are driving decarbonization and increasing the number of distributed solutions and tools available. Ever-accelerating technology improvements have translated to a lower price of distributed energy resources (DER) to customers and grid automation capabilities that enhance visibility and allow grid operators to optimize the benefits of interconnected DER.

At the same time, state policy is driving the decarbonization of the grid at a fast pace. New York's Climate Leadership and Community Protection Act (Climate Act), passed by the Legislature and signed by Governor Andrew Cuomo in July 2019, is the most ambitious and comprehensive climate law in the country. This law requires the State to reduce economy-wide greenhouse gas (GHG) emissions 40% by 2030 and 85% by 2050.

As the overall energy landscape evolves, PSEG Long Island, working with LIPA, continuously seeks ways to evolve its solutions and services to support its customers and their needs. This evolution is underpinned by PSEG Long Island's overall vision for becoming a utility for the future, or Utility 2.0 (Figure 1-1).

**Figure 1-1. PSEG Long Island's Utility 2.0 Vision**

*PSEG Long Island's Utility 2.0 vision is to be a customer-centric, innovative, and forward-looking utility that is dedicated to a clean, reliable, and resilient energy system. PSEG Long Island will achieve this vision by empowering its customers through AMI, exploring new offerings, and evolving to become the utility of the future, including performing functions of the DSP, for Long Island and the Rockaways.*

PSEG Long Island's strategy to execute its Utility 2.0 vision is built on three strategic pathways, each supporting the evolution of utility solutions and services from different perspectives (Figure 1-2). The following subsections outline initiatives and tactics the Utility is pursing under the three strategic pathways; these initiatives are described in detail in Chapters 2, 3, and 4, respectively.

### *1.1.1 Empower Customers through AMI and Data Analytics*

PSEG Long Island's objective is to continue to improve customer engagement by leveraging digital capabilities enabled by the advanced metering infrastructure (AMI) being deployed across the island. These capabilities are being built and will improve over time, with the goal to continuously extract value from AMI for the benefit of the Utility's customers.

The foundation for customer empowerment was laid in 2018 when PSEG Long Island's AMI rollout plan was approved by LIPA. Since then, the Utility has managed to deploy approximately 870,000 AMI meters through the end of the first quarter 2021 and is on track to achieve 95% deployment across its customer base by September 2021. The deployment has been ahead of schedule and below budget, even during a period in which the country and the state were managing the impact of the COVID-19 pandemic.

**Figure 1-2. PSEG Long Island's Utility 2.0 Strategic Pathways**


The AMI deployment plan also includes a selection of AMI-enabled capabilities that will provide customers with granular energy usage data and usage-based alerts. These capabilities include a portal for commercial and industrial (C&I) customers, enhancements to the existing customer portal, third-party data access, and an advanced billing engine to support rate modernization.

PSEG Long Island is deploying customer experience pilot projects to test personalized energy insights and to encourage customers to act on those insights to make decisions. Collectively, the initiatives in this strategic pathway comprise a suite of informational and advisory tools that contain the building blocks of the Utility's next generation customer experience. PSEG Long Island intends to continuously monitor the success of these initiatives, evolving or adding to them based on direct customer feedback through its customer engagement plans and successful pilots.

Initiatives under this strategic pathway are organized in six themes:

### *1.1.2 Explore New Innovative Offerings*

PSEG Long Island is at the forefront of clean energy innovation, deploying new customer offerings that expand utility services and identifying new ways in which third-party assets could be used to provide grid benefits. Initially, such offerings are tested through time-limited pilot projects that provide experience around new energy technologies or customer strategies and promote the adoption of clean energy technologies. If successful, these pilots can be scaled across Long Island for the benefit of all customers.

The Utility's innovative clean energy offerings are focused primarily on increasing DER adoption through initiatives such as the Super Savers non-wires solution (NWS) program, electric vehicle (EV) charger incentives, and behind-the-meter (BTM) storage incentives. More recently, PSEG Long Island has launched the EV Make-Ready Program, with the goal to animate and support the market for EV charging infrastructure on Long Island. The Utility is also testing technologies that will transform the way DER interacts with the grid, such as vehicle-to-grid (V2G) technology and a connected buildings technology.

Working with third parties is yet another way PSEG Long Island can reach its customers. Third-party engagement can potentially generate more innovative solutions to improve the environment, increase the efficiency of the grid, and reduce customer costs. The Utility is actively exploring partnerships with third-party market participants to deliver value through business model innovation, such as through its work with REV Connect. [3]

Initiatives under this strategic pathway are organized in four themes:



### *1.1.3 Evolve into a Customer-Centric Distributed System Platform*

PSEG Long Island shares in the vision of transforming into a utility that performs the functions of the Distributed System Platform (DSP) as articulated in New York's Reforming the Energy Vision (REV), offering information and services to DER developers and creating new sources of value for customers and market participants. With the transition to a DSP, grid infrastructure, systems, and programs will be used to integrate DER in an efficient way and animate a robust marketplace of options for customers. As described in New York's REV, the transformation of a utility to a DSP is integral to facilitating the achievement of the State's clean energy goals.

As a future DSP, PSEG Long Island will plan for and operate a dynamic grid that encompasses both sides of the utility meter and relies increasingly on distributed resources and dynamic load management (DLM). To enable this evolution, the Utility is implementing initiatives that ensure its distribution system can serve as the foundation of the DSP. Leveraging the existing transmission and distribution (T&D) infrastructure is critical to efficiently integrating renewable energy into the grid to reduce GHG emissions, lower customer costs, and increase reliability and resilience.

[3] PSEG Long Island participates in REV Connect, a NYSERDA platform set up to support innovation in New York by bringing together companies and electric utilities to accelerate innovative partnerships, develop new business models, and deliver value to New Yorkers. For more information visit nyrevconnect.com

The transition to the DSP will require investments in new software platforms, tools, and grid assets. To support these efforts, PSEG Long Island created a Utility of the Future (UoF) team, which evaluates and invests in technologies and solutions that allow the Utility to achieve the DSP vision in alignment with the initiatives undertaken by peer utilities in New York State and nationwide. UoF investments include but are not limited to, power flow modeling tools, operational platforms, AMI-enabled DER analysis, and information-sharing maps that will help developers identify optimal locations for DER interconnection.

Furthermore, the UoF team is managing the deployment of PSEG Long Island's first utility-scale storage system in Miller Place, directly supporting the state's target to deploy 1,500 MW of energy storage by 2025, while building experience within the Utility around the ways energy storage can be used to defer or avoid the need for grid infrastructure investments. Additionally, the Power Markets group has issued a request for proposals (RFP) for up to 175 MW of utility-scale energy storage.

Initiatives under this strategic pathway are organized in four themes:



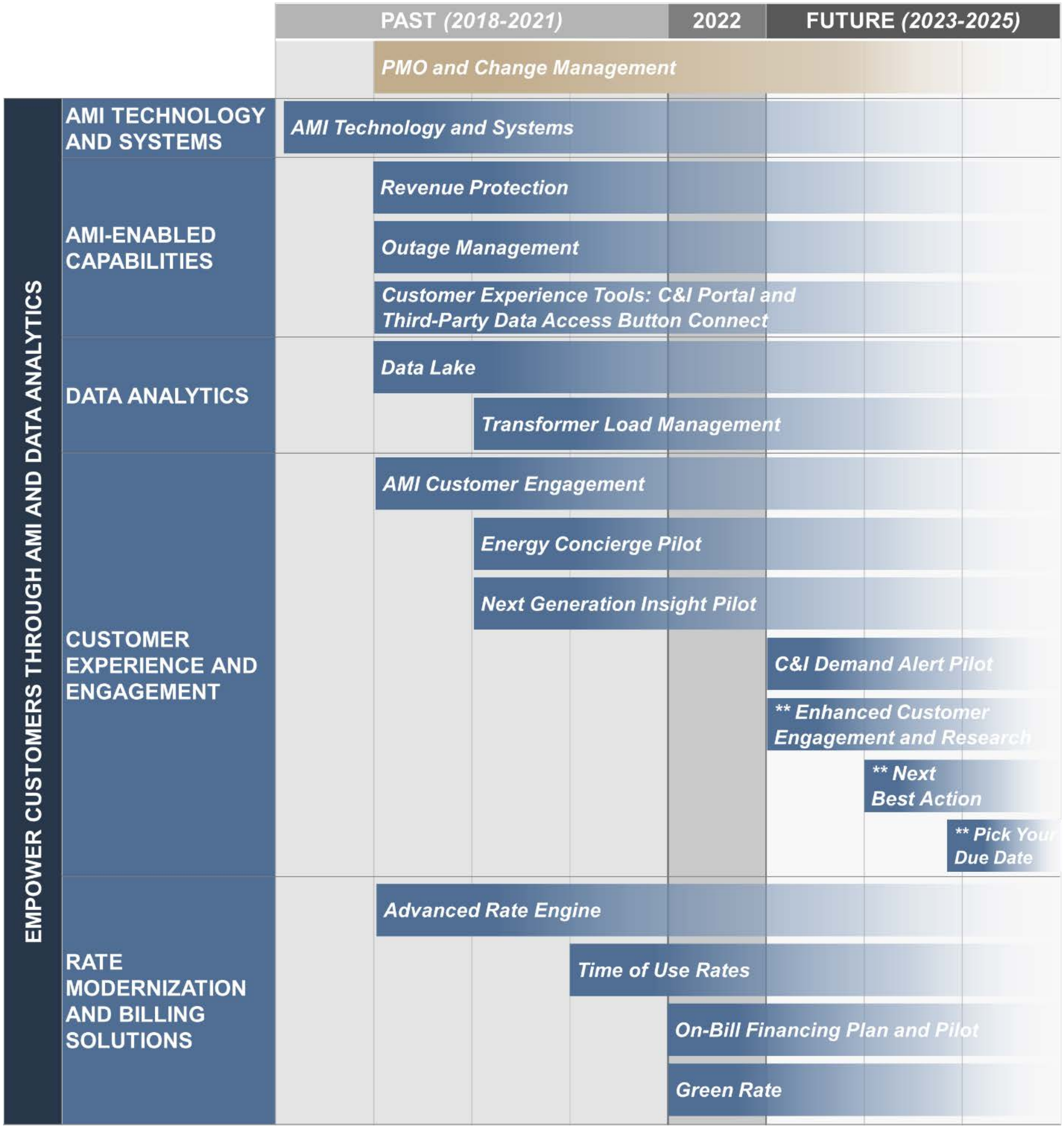
### *1.1.4 Utility 2.0 Roadmap*

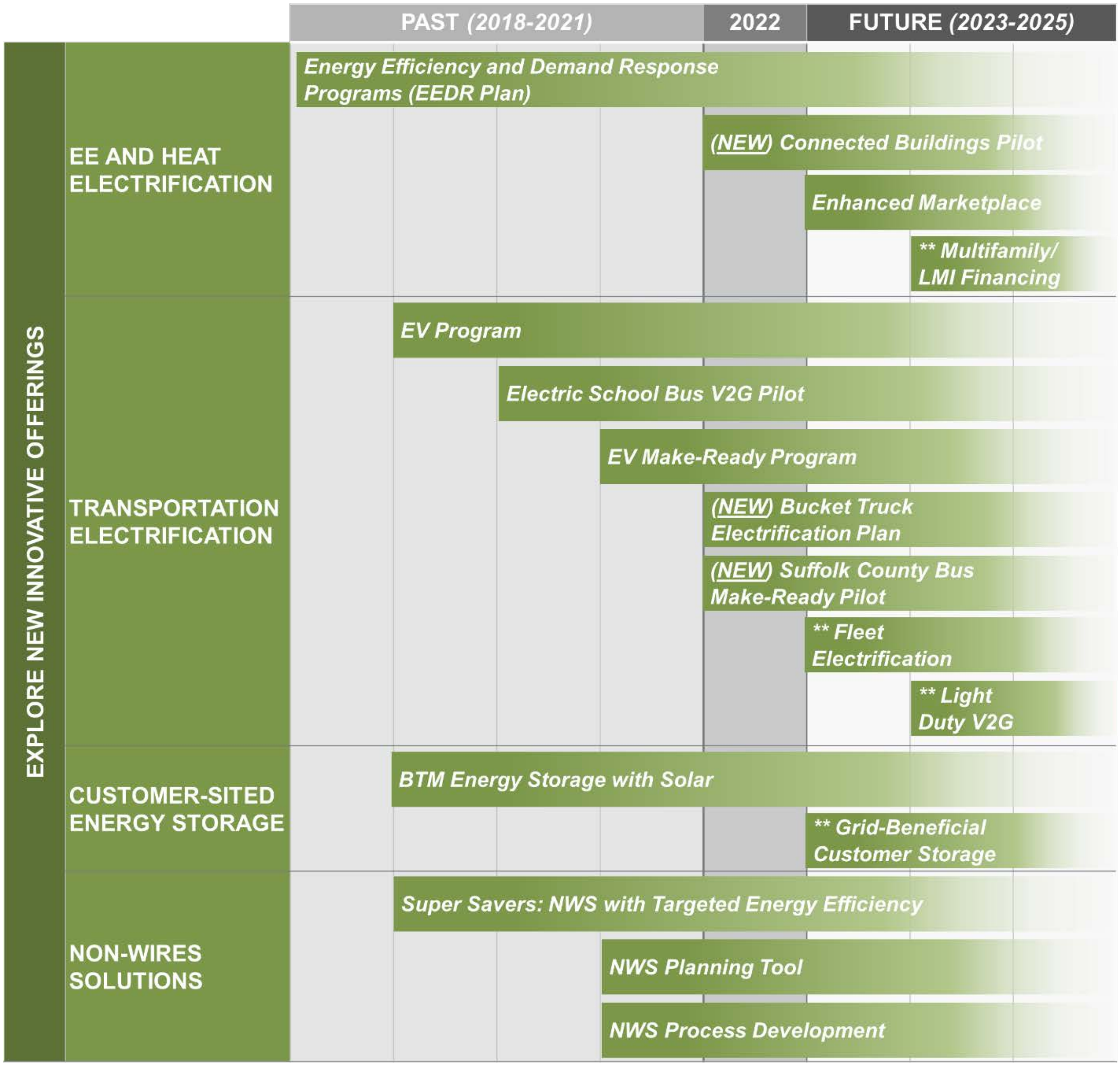
Achieving PSEG Long Island's Utility 2.0 vision requires careful evaluation of the initiatives required in the short term, as well as those planned in the long term. The Utility has a number of ongoing initiatives across the three strategic pathways that comprise the Utility 2.0 strategy. Four new initiatives are also being proposed in this year's plan. These new initiatives provide complementary capabilities to ongoing work.

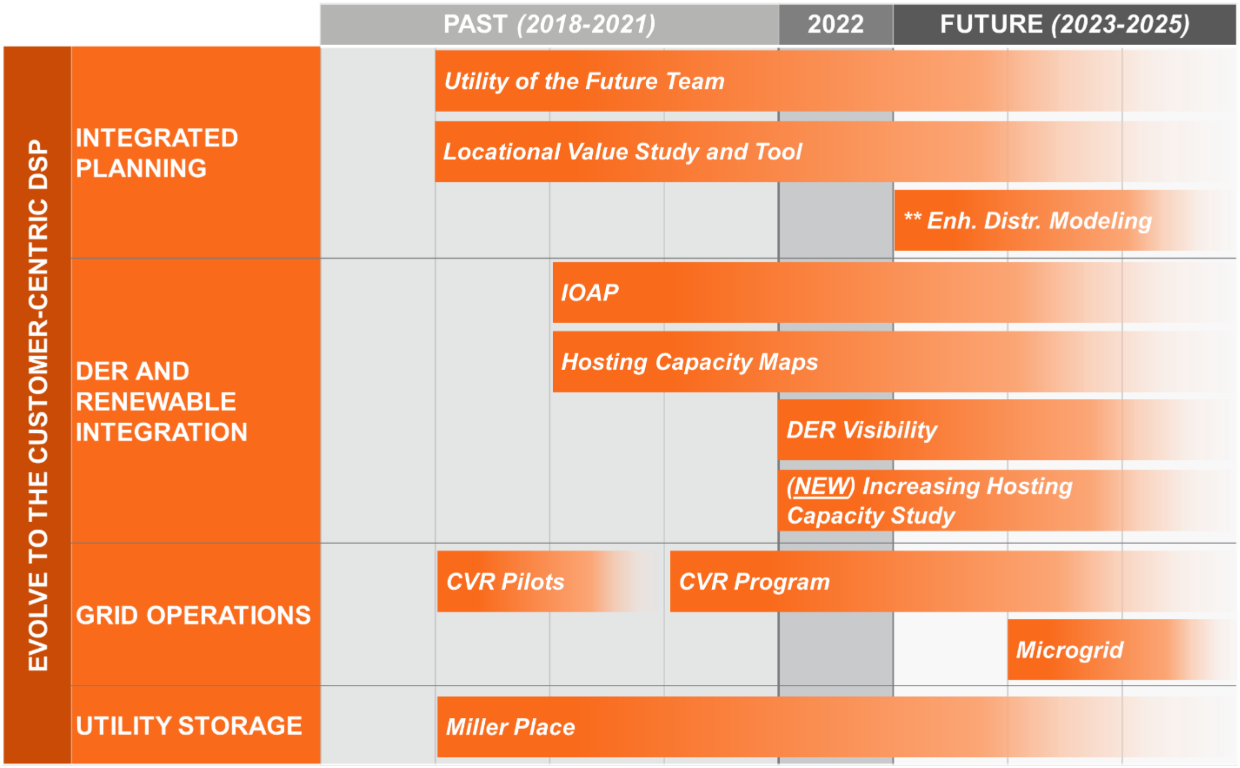
Figure 1-3 illustrates a roadmap for all ongoing and proposed initiatives as of 2021, including those that PSEG Long Island is evaluating for implementation in the next 4 years. The roadmap is organized across 13 themes, which are grouped around the three Utility 2.0 strategic pathways. The roadmap shows the launch date for all initiatives, with the end date open as ongoing initiatives may be extended beyond their originally proposed duration.

New initiatives proposed to start in 2022 are marked in the roadmap as NEW, whereas potential future initiatives being evaluated internally are marked with two stars (**). These initiatives are described in further detail in Chapters 2, 3, and 4.

**Figure 1-3. PSEG Long Island's Utility 2.0 Roadmap**




PAST (2018-2021)
2022
FUTURE (2023-2025)
EXPLORE NEW INNOVATIVE OFFERINGS
EE AND HEAT ELECTRIFICATION
Energy Efficiency and Demand Response Programs (EEDR Plan)
(NEW) Connected Buildings Pilot
Enhanced Marketplace
** Multifamily/ LMI Financing
TRANSPORTATION ELECTRIFICATION
EV Program
Electric School Bus V2G Pilot
EV Make-Ready Program
(NEW) Bucket Truck Electrification Plan
(NEW) Suffolk County Bus Make-Ready Pilot
** Fleet Electrification
** Light Duty V2G
CUSTOMER-SITED ENERGY STORAGE
BTM Energy Storage with Solar
** Grid-Beneficial Customer Storage
NON-WIRES SOLUTIONS
Super Savers: NWS with Targeted Energy Efficiency
NWS Planning Tool
NWS Process Development




** Potential future initiatives being evaluated internally are included for illustrative purposes.

## 1.2 Challenges and External Factors Impacting the Program

As PSEG Long Island was developing the 2021 Utility 2.0 Plan, New York State and the whole country was still recovering from the impacts of the COVID-19 pandemic. As detailed further throughout the document, the pandemic impacted PSEG Long Island's ability to deliver the planned scope of work for some of the ongoing Utility 2.0 initiatives; as a result, some initiatives were postponed or delayed.

Both the 2021 Utility 2.0 Plan and 2022 Energy Efficiency and Demand Response (EEDR) Plan were developed using assumptions and data that is generally reflective of pre-pandemic behavior and analysis. While it is too early to know definitively, customer behavior and preferences may change in the future as society adapts to what may be a post-COVID-19 norm. PSEG Long Island is committed to delivering the initiatives and outcomes proposed in both plans; however, the Utility also recognizes the need to maintain flexibility and adaptability to respond to changing customer behavior and needs.

In addition to managing the impact of the COVID-19 pandemic, in the aftermath of Tropical Storm Isaias, which made landfall on Long Island on August 4, 2020, PSEG Long Island focused significant resources to improving systems and processes that are critical to future storm responses. As a result, some of the ongoing Utility 2.0 initiatives (particularly those that require support from informational technology and customer technology) have changes in their implementation schedule.

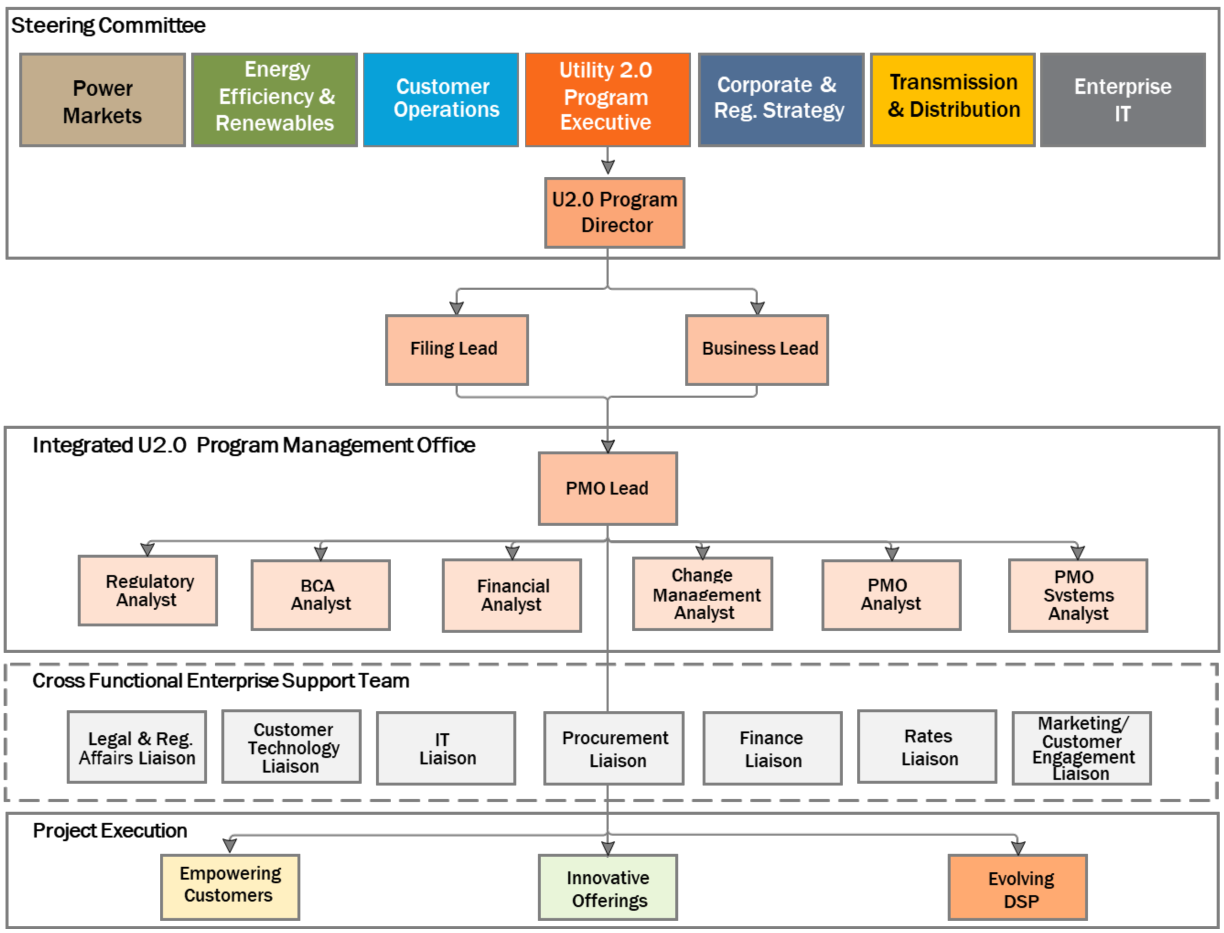
Despite these challenges, PSEG Long Island is on track to deliver impact across all the key areas of New York State's clean energy policy. As illustrated in Section 1.4, Long Island's progress toward the 2025 goals set by the State in areas such as energy efficiency (EE), energy storage, and renewable energy is as planned and, in some cases, ahead of the plan.

## 1.3 Utility 2.0 Program Management

PSEG Long Island's Utility 2.0 vision is realized through an enterprise-wide program that includes more than 30 initiatives with a total budget of more than $300 million. These initiatives span multiple functional groups with considerable departmental interdependencies and regulatory oversight and impact the organization, its processes, and its technology.

PSEG Long Island has established a cross-functional Utility 2.0 Steering Committee to provide executive oversight of the progress of various projects and initiatives and to coordinate and share information across customer service, T&D, IT, and other key stakeholders (Figure 1-4). The mandate of the Steering Committee is to: "Unite the broader set of functions that influence the customer experience to realize PSEG Long Island's Utility 2.0 vision."

**Figure 1-4. Utility 2.0 Governance Structure**




Supporting the Steering Committee is the Program Implementation Support initiative (Section 2.4). Originally conceived to support AMI-related activities, this initiative now supports all Utility 2.0 initiatives through a Program Management Office (PMO). The PMO is delivering targeted support in areas such as business process design and change management to high value projects and establishing a progress reporting system for key stakeholders.

At the recommendation of the New York DPS, PSEG Long Island produces a Utility 2.0 Outcomes Dashboard on a quarterly basis, which summarizes updates on the execution of ongoing Utility 2.0

initiatives. The dashboard highlights implementation challenges and lessons learned, and documents success stories from the delivery of initiatives across the three strategic pathways that make up the Utility 2.0 strategy.

As Utility 2.0 evolves, PSEG Long Island will continue to adapt and enhance program governance, project lifecycle support, budget oversight, risk management, and reporting and management of project health and success accordingly.

## 1.4 Supporting the Achievement of Statewide Clean Energy Goals for 2025

Long Island has a big role to play in New York State meeting its goals defined by the climate laws and policies that shape the State's energy landscape. PSEG Long Island wants to ensure it contributes its share.

**Figure 1-5. Long Island's Share of the Statewide Clean Energy Goals for 2025**[4]

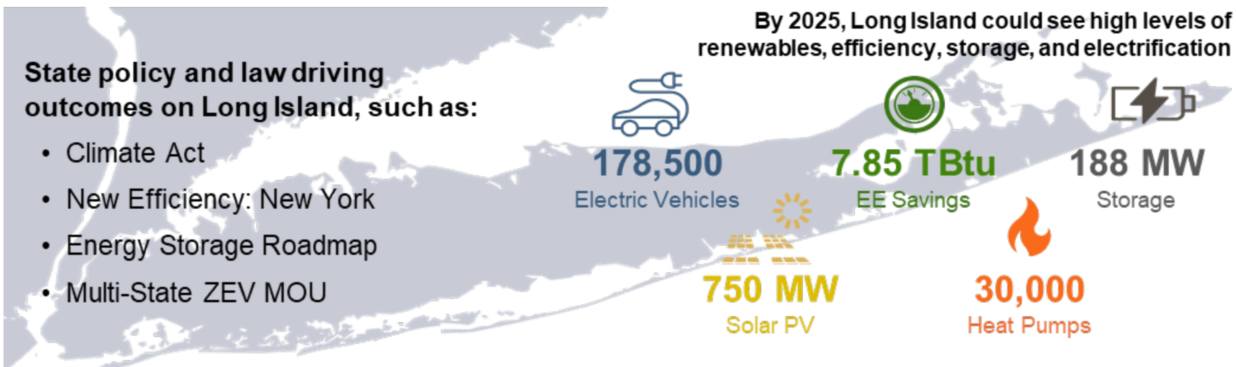



Figure 1-5 shows Long Island's share of the statewide clean energy goals for 2025 based on PSEG Long Island's analysis. Long Island's share of the goals is based on the following assumptions.

- **EVs: 178,500 vehicles**

  Based on Long Island's share of vehicle registrations in New York (approximately 21%).
- **EE: 7.85 TBtu of savings between 2020 and 2025**

  Of the incremental target of 31 TBtu of reduction by utilities toward achieving the statewide goal, LIPA was assigned a proportional share of increased EE savings of at least 3 TBtu over the 2019-2025 time period, or 7.85 TBtu when combining base-level electric savings and the incremental amount established in the December 2018 Order. [5]
- **Energy storage: 188 MW installed by 2025**

  Based on Long Island's share of statewide peak load (approximately 12.5%).
- **Heat pumps: 30,000 new heat pumps installed (approximately 1.15 TBtu of savings) between 2020 and 2025**

  The basis for this was the 2020 annual EEDR Plan for that year's heat pump categories, with a reasonable growth rate across categories.

[4] 2014 Multi-State Zero Emission Vehicle (ZEV) Memorandum of Understanding (MOU)

[5] Order Adopting Accelerated Energy Efficiency Targets, CASE 18-M-0084 In the Matter of a Comprehensive Energy Efficiency Initiative, December 13, 2018.

- **Solar PV: 750 MW of solar PV installed by 2025**
  Based on Long Island's share of statewide peak load (approximately 12.5%).

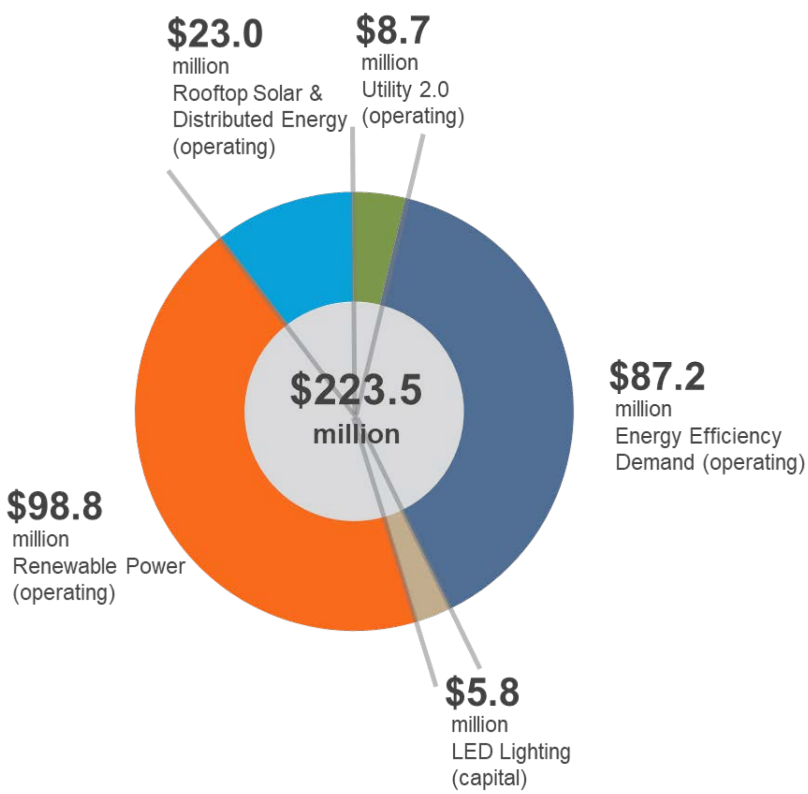
Utility 2.0 initiatives that are either underway or planned for the future will directly contribute to the achievement of goals in areas such as EE, energy storage, beneficial electrification (heating and transport), and renewable energy. Table 1-1 illustrates the initiatives that will contribute to each major clean energy goal. This table includes ongoing initiatives, initiatives proposed in this year's Utility 2.0 Plan, and planned initiatives that will be included in future Utility 2.0 Plans.

## 1.5 Supporting Clean Energy Goals Outside the Utility 2.0 Plan

As Figure 1-6 illustrates, the Utility 2.0 Plan is only part of LIPA's overall budget for clean energy programs and DER on Long Island.

PSEG Long Island has a number of long running EE programs, with an annual investment around $89 million for 2022. Further details around the EE programs PSEG Long Island is offering its customers are included in the EEDR Plan (Appendix A).

**Figure 1-6. LIPA's 2021 Budget Breakdown for Clean Energy Programs and DER**




*Source: LIPA, 2021 Budget*

Furthermore, LIPA and PSEG Long Island are supporting state clean energy goals in a number of ways that go beyond the initiatives included in the Utility 2.0 and EEDR Plans. The following list highlights some of these initiatives and summarizes LIPA's budget for clean energy programs and DER.

- PSEG Long Island's Power Markets group issued a solicitation for bulk energy storage on April 30, 2021. The goal is to procure between 155 MW and 175 MW of storage to achieve the New York State clean energy initiatives.
- Renewable energy:
    - In the summer of 2019, the New York State Energy Research and Development Authority (NYSERDA) selected two offshore wind projects, totaling approximately 1.7 GW, as a result of a NYSERDA solicitation. One of the two, the 880 MW Sunrise Wind project, will be interconnected to the Holbrook substation with a scheduled in-service date of May 2024.
    - In 2020, NYSERDA has selected two additional offshore wind projects as part of state's second comprehensive solicitation of offshore wind, totaling an additional 2,490 MW. The two projects are Empire Wind 2 and Beacon Wind, both from Equinor Wind US LLC (Equinor). Empire Wind 2 project is proposed to be interconnected at Barrett substation of Long Island with an injection of 1,260 MW.
    - LIPA and PSEG Long Island launched a new feed-in tariff (FIT) program in May 2020, termed Solar Communities, with the first awards made in the fourth quarter of 2020. Solar Communities aims to deliver affordable clean energy to income-eligible households, which have traditionally been underserved in the solar market. The new 20 MW Solar Communities Program will nearly double the community solar market on Long Island.
    - LIPA is investing $99 million per year for utility-scale renewable purchases, including energy from solar farms in Calverton, Kings Park, Riverhead, Shoreham, and Upton.
- In 2015, LIPA requested proposals from developers to meet growing demand for electricity on Long Island's South Fork. After a yearlong process, LIPA and PSEG Long Island selected a package of projects that included:
    - The South Fork Wind Farm with an anticipated capacity of 130 MW
    - Two energy storage systems with a total capacity of 10 MW/80 MWh
    - A combination of EE and demand response (DR) projects achieving approximately 9.8 MW of load relief

**Table 1-1. PSEG Long Island Initiatives Contributing to New York State Clean Energy Goals**

| Category | Energy Efficiency | Heat Pumps | Energy Storage | Electric Vehicles | Solar PV |
|---|---|---|---|---|---|
| **Statewide Goal for 2025** | 185 TBtu | 5 TBtu | 1,500 MW | 850,000 | 6,000 MW |
| **Long Island Portion of 2025 Goals** | 7.85 TBtu | 30,000 installations (1.15 TBtu) | 188 MW | 178,500 | 750 MW |
| **Current Level on Long Island (through 2020)** | 1.98 TBtu | 5,973 installations (~0.2 TBtu) | ~14 MW (3.78 MW queued) | ~20,000 | ~650 MW |
| **Approved Initiatives through 2021** | • EE Programs (EEDR Plan)<br>• Super Savers NWS<br>• On-Bill Financing Pilot<br>• Enhanced Marketplace | • EE Programs (EEDR Plan)<br>• On-Bill Financing Pilot<br>• Enhanced Marketplace | • BTM Storage with Solar<br>• Utility Storage – Miller Place<br>• Energy Storage Bulk Solicitation<br>• Enhanced Marketplace<br>• Rate Modernization | • EV Program<br>• Electric School Bus V2G Pilot<br>• Enhanced Marketplace<br>• EV Make-Ready Program<br>• Rate Modernization | • BTM Storage with Solar<br>• Hosting Capacity Maps Stages 1-3<br>• Interconnection Online Application Portal (IOAP)<br>• DER Visibility Platform |
| **Proposed New Initiatives (2022 Start)** | • EE Programs (EEDR Plan)<br>• Connected Buildings Pilot | • EE Programs (EEDR Plan)<br>• Connected Buildings Pilot | • Connected Buildings Pilot | • EV Make-Ready Program (expansion)<br>• Suffolk County Bus Make-Ready Pilot<br>• Connected Buildings Pilot | • Increasing Hosting Capacity Study<br>• Connected Buildings Pilot |
| **Potential Future Initiatives (2023-2025 Start)** | • EE Programs (EEDR Plan)<br>• Multifamily/Low-to-Moderate Income (LMI) Financing | • EE Programs (EEDR Plan)<br>• Multifamily/LMI Financing | • Utility Storage (Further Locations)<br>• Microgrid | • Fleet Electrification<br>• Light Duty V2G | • DER Transactive Market<br>• Enhanced Distribution Modeling |

# 2. Empower Customers through AMI and Data Analytics

PSEG Long Island is committed to providing customers with more information and data, enabling them to better manage their energy use and supporting them in transitioning to green energy options. Foundational to this vision is the deployment of AMI technology and systems. Despite challenges from the COVID-19 pandemic, the Utility expects to achieve 95% deployment of smart meters by September 2021.

Using the data provided by the AMI system, PSEG Long Island is in the process of implementing customer-facing and internal capabilities to empower customers to take control of their energy usage more effectively and support efficient management of the electricity grid.

This chapter is organized in six subsections, each representing a theme area (shown as follows). The first four subsections provide an update on the progress PSEG Long Island has made with the AMI rollout and the implementation of AMI-enabled capabilities, data analytics, and program implementation support. The last two subsections discuss ongoing initiatives proposed and approved in past Utility 2.0 Plans in the areas of Customer Experience and Engagement, and Rate Modernization and Billing Solutions; the last subsection also includes the proposal for adding Green Rates under the umbrella of the ongoing Rate Modernization program.

### Chapter Contents

## 2.1 AMI Technology and Systems

| | |
|---|---|
| **Type** | Asset |
| **Start Year** | 2018 |
| **Funding Approved Through** | 2022 |
| **Status** | Ongoing |
| **Description and Impact** | PSEG Long Island's plan to deploy smart meters across its service territory by 2022 continues to be ahead of schedule despite the impact of the COVID-19 pandemic. As of the first quarter in 2021, 870,000 meters have been installed. |

AMI is a foundational technology that empowers customers with data, tools, and pricing plans to inform and offer smarter energy choices. Smart meters with AMI offer increased accuracy and enable new capabilities, like remote meter reading, automated and on-demand remote start-and-stop service requests, interval-based pricing plans like Time of Use (TOU) rates, and proactive bill and budget alerts. Implementing these capabilities helps unlock the full benefit of AMI.

### *2.1.1 Implementation Update*

PSEG Long Island launched full-scale deployment of 1.1 million smart meters across its service territory in 2018, with the goal to complete the deployment by 2022.

The Utility continued its deployment of AMI meters through the challenges posed by the COVID-19 pandemic. These challenges included the temporary suspension of indoor meter installations, new COVID-19 safety protocols, and some customer reluctance to allow installers on their property due to health and safety concerns. PSEG Long Island was able to successfully redeploy a large portion of its field collectors to support AMI deployment activities when field collections activities were suspended across New York State considering financial concerns for customers during the pandemic.

**Continuity during COVID-19**

PSEG Long Island accelerated the deployment of AMI meters despite challenges with the COVID-19 pandemic.

The Utility successfully installed 870,000 meters as of the first quarter in 2021 and is on track to 95% deployment by September 2021.

In the first quarter of 2020, PSEG Long Island enabled the AMI remote connect-and-disconnect capability. This capability automates customers' move-in and move-out process. The launch of this capability included a process to address situations when communication with the meter requires troubleshooting, known as exception handling. The remote connect-and-disconnect capability delivers savings by avoiding onsite visits and advanced consumption (meaning the meter continues to register usage when there is no customer signed up for service, resulting in unbilled usage and loss of revenue to the utility).

***Scope Update***

The scope of the program remains as originally proposed.

### *Schedule Update*

Meter deployment progressed in 2020 ahead of schedule when compared to the planned number of installations despite challenges due to the COVID-19 pandemic. Additional field collectors were trained to perform smart meter installations due to COVID-19 restrictions on collections activities. PSEG Long Island expects to continue to install smart meters ahead of schedule, with 95% deployment projected to be complete by September 2021, approximately 15 months ahead of the original deployment plan.

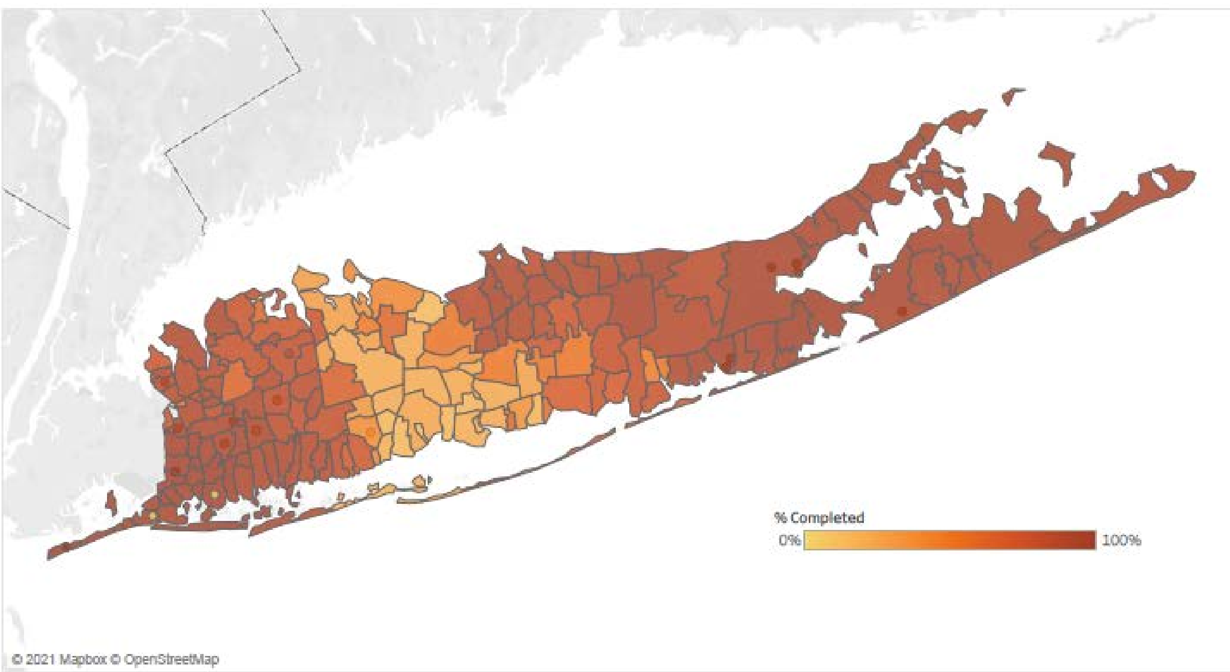
**Accelerating Progress in 2021**

In preparation for further program acceleration in 2021, the AMI team procured vehicles and tablets, trained additional employees, and engaged IT required for support in under 30 days.

Smart meter deployment of the remaining 4.5% (0.53% opt out) will occur within the first half of 2022. These include field refusals, where customers initially refused access to their property due to COVID-19 concerns, customers requiring appointments, indoor meter locations skipped during the COVID-19 Pandemic, and specialty meter installations changes scattered across Long Island.

Figure 2-1 shows PSEG Long Island's meter deployment progress by ZIP code through the first quarter of 2021. The Utility’s plan was to begin smart meter installations at scale on the eastern and western ends of the island, moving inward over time. Due to this strategy, the ZIP codes with the remaining lower levels of smart meter deployment, shown in the figure in lighter orange, remain in the middle of the island.

**Figure 2-1. Smart Meter Installations by ZIP Code**




*Source: Q1 2021 Utility 2.0 Outcomes Dashboard*

### *2.1.2 Funding Reconciliation*

The acceleration of meter deployment led to capital spend beyond what was planned for 2020. This spend was approved by PSEG Long Island’s Utility Review Board per the revised deployment targets.

The forecast for capital expenditure in 2021 and 2022 includes AMI network enhancements, such as a solar-plus-battery-system-backup-power source, advanced security system and server management upgrades, and fiber optics communications to enable data redundancy. The forecast is lower than the previously reported budget due to the accelerated deployment in 2020, a more informed forecast given the team's experience with the deployment economics, and lower anticipated overall capital costs due to installation efficiencies.

Operations and maintenance (O&M) costs remained on budget in 2020; they are forecasted to increase for 2021 and 2022 due to the accelerated meter deployment, advanced security system and server management upgrades, and plans to convert AMI from wireless to fiber optic communications (see Table 2-1). Overall, the updated total forecasted spend is roughly in line with the approved budget.

**Table 2-1. AMI Technology and Systems Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2018-2020 | Approved Budget | 104.89 | 3.22 |
| | Actual | 113.25 | 3.04 |
| | **Variance** | **(8.35)** | **0.18** |
| Forecasted Spend 2021-2022 | Approved Budget | 89.10 | 6.28 |
| | Updated Forecast | 75.48 | 6.87 |
| | **Variance** | **13.62** | **(0.59)** |
| **Total Forecasted Spend 2018-2022** | **Approved Budget** | **193.99** | **9.50** |
| | **Updated Forecast** | **188.72** | **9.91** |
| | **Variance** | **5.26** | **(0.41)** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

### *2.1.3 Performance Reporting*

PSEG Long Island completed 65% of the planned AMI meter installations through the end of 2020, which is ahead of the original deployment schedule. Specifically, the Utility installed more than 630,000 meters through 2020 (Table 2-2). An additional 112,000 were installed in the first quarter of 2021, bringing the system total to 870,000 at the end of the first quarter of 2021. Customer opt-out rates continue to decline and are 0.53% (end of 2020), down from 0.77% at the beginning of 2019.

Meter reading, including off-cycle readings, is now performed remotely for all AMI metered customers, which reduces the need for manual meter reading and metering vehicle travel. AMI deployment also enabled remote connection and disconnection of meters (Remote Connect Switch) for customer move-ins and move-outs, reducing the need to deploy meter services to customer sites.

Reductions in labor (full-time equivalents, or FTEs) through 2020 remain on target despite a temporary slowdown in worker attrition during the pandemic. PSEG Long Island chose to slow attrition given there were limited opportunities for meter readers to transition to new jobs internally or externally because training for new roles also was also disrupted by the pandemic. This was counterbalanced to some extent by PSEG Long Island's accelerated AMI deployment, which created the opportunity for some meter readers to transition to new roles supporting AMI meter installation.

FTE attrition resumed toward the end of 2020, leading to savings that will largely be realized in 2021 and beyond. The impact of the pandemic, in combination with the further accelerated program, have condensed the original targeted timeframe allotted for attrition of the meter readers and AMI installers. This condensed timeline is leading to challenges in finding permanent job placements for affected personnel in line with the new program timeline. Efforts are underway to address these challenges.

Vehicle reduction in 2020 also slowed due to the COVID-19 pandemic and the correlating slower rate of meter reader attrition. Similar to FTE reductions, vehicle reductions were concentrated at the end of 2020, leading to benefits that will primarily be reflected in 2021 and onward. The pandemic also affected vehicle attrition given the inability to retire all vehicles, as COVID-19 health and safety protocols required single occupancy, leading to the retention of certain vehicles that could have otherwise been retired.

**Table 2-2. AMI Technology and Systems Performance Key Performance Indicators (KPIs)**

| Metric | Plan through 2020* | Actual through 2020† | Actual %‡ |
|---|---|---|---|
| Meters Installed – Residential | 420,000 | 579,065 | 138% |
| Meters Installed – Commercial | 40,000 | 52,270 | 131% |
| Opt-Out Rate at Year-End | 0.59% | 0.53% | N/A |
| FTE Reduction – Annual Equivalent | 39 | 41 | 105% |
| Vehicle Reduction – Annual Equivalent | 34 | 22 | 65% |

* Cumulative plan up to and including 2020.
† Cumulative metrics actual performance up to and including 2020.
‡ Calculated as actuals realized through 2020 divided by plan through 2020.

The temporary deferral of FTE reductions to the fourth quarter of 2020 resulted in lower -than-target annual labor and vehicle cost reductions but still resulted in over $8.5 million avoided O&M costs (Table 2-3). The savings are expected to be back on target in 2021. $CO_2$ emissions reductions were lower than the target due to the delayed reduction in vehicles and differences in the make and model of vehicles used for meter reading and meter services compared to what was initially expected.

The reduced onsite deployment of the PSEG Long Island Meter Reading and Services team reduces exposure to injury and motor vehicle incidents. PSEG Long Island anticipates a decline in the number of Occupational Safety and Health Administration (OSHA)-recordable injuries, motor vehicle incidents, and lost workday cases, resulting in cost benefits for the workers compensation loader applied to meter reading labor. Because AMI was only partially deployed in 2020, safety benefits are expected to materialize in 2021 and beyond. Additionally, the large complement of AMI deployment personnel in the field somewhat counterbalances the safety improvements due to the temporary increased field exposure until installations are complete and the deployment team is dissolved.

**Table 2-3. AMI Technology and Systems Benefit Reporting**

| Benefit | Plan through 2020 ($M) | Actual through 2020 ($M) | Actual % |
|---|---|---|---|
| Avoided O&M Costs | 9.74 | 8.55 | 88% |
| Avoided Carbon Emissions | 0.02 | 0.01 | 43% |
| **Total** | **9.76** | **8.56** | **88%** |

## 2.2 AMI-Enabled Capabilities

| | |
|---|---|
| **Type** | Multiple |
| **Start Year** | 2019 |
| **Funding Approved Through** | 2022 |
| **Status** | Ongoing |
| **Description and Impact** | To capture the full benefits of smart meter deployment, PSEG Long Island is implementing additional capabilities that leverage data made available by AMI. Since 2019, these capabilities have increased meter reading accuracy and mitigated theft and tampering. |

PSEG Long Island's Utility 2.0 roadmap includes the phased implementation of capabilities that use the data from smart meters for data-driven insights. Some examples of PSEG Long Island's AMI-enabled capabilities include the following:

- **Revenue Protection:** Solutions that reduce theft of service and decrease energy losses, including automating disconnect and reconnect capabilities through Remote Connect Switch (RCS).
- **Outage Management:** Assess status of reported outages by "pinging" individual AMI-enabled meters to determine if the customer has been restored. This is done both for storms and non-storm outages to avoid truck rolls.
- **Customer Experience Tools:** Software tools offered to customers, including multiple account energy aggregation, energy-saving tips, energy use benchmarking, and enabling third-party access to customer energy data with customer consent and awareness.

These capabilities are further described in the subsections below.

### *2.2.1 Revenue Protection*

Smart meters are helping PSEG Long Island reduce lost revenue and write-offs in several ways, including:

- Detecting meter tampers[6] in the process of AMI installation that otherwise may have gone unnoticed for longer periods of time.
- Scanning AMI data using analytical algorithms to flag potential cases of electricity theft, meter tamper, billing errors, and other unbilled usage.
- Preventing unbilled consumption by promptly executing service connect or disconnect orders remotely with most AMI meters.
- Preventing lost revenue from inaccurate metering given that AMI meters record customer usage more accurately than legacy mechanical meters.

#### 2.2.1.1 Implementation Update

Remote meter reading, conducted for all AMI metered customers, provides increased meter reading accuracy that has associated revenue protection benefits. As stated in Section 2.1, PSEG Long Island enabled the AMI remote connect and disconnect capability in the first quarter of 2020, automating the

[6] Meter tampering occurs when there is unauthorized removal of a meter, severing of a meter seal, opening of a meter base, altering an entrance cable in any manner, or self-reconnects that are not done by an authorized employee or representative.

move-in and move-out process. The launch of this capability was successful and included a robust process for addressing situations when communication with the meter cannot be established remotely, known as exception handling. RCS is now in a continuous improvement phase.

PSEG Long Island's Data Analytics team implemented algorithms that identify potential cases where revenue loss may occur. These cases are investigated and validated in the field, and findings are used to further refine analytic algorithms for detecting revenue loss from theft and tamper.

***Scope Update***

The scope of activities associated with supporting revenue protection, including continuous improvement for RCS and data analytics to identify theft and tamper, remains as described in the 2020 Utility 2.0 Plan.

***Schedule Update***

The initial implementation of RCS is complete. PSEG Long Island is maintaining this capability and making continuous improvements, as needed. The Data Analytics team is continuing to further refine its algorithms for detecting revenue loss.

**Preventing Revenue Losses and Tampering**

PSEG Long Island has implemented RCS and will continue to leverage this capability to prevent unbilled revenue loss. Results from theft analytics indicate greater potential for savings, especially as the analytical model is improved, with more cases of revenue losses detected and validated in the field. As AMI meter installation continues, PSEG Long Island expects that more instances of tampering will be mitigated, and customer usage accuracy will improve.

#### 2.2.1.2 Performance Reporting

Meter accuracy benefits were ahead of target in 2020 as a result of the accelerated AMI meter deployment (Table 2-4). A side benefit of the AMI meter installation process is the identification of several instances of tamper and theft.

PSEG Long Island estimates that AMI-enabled remote disconnects have prevented unbilled revenue loss. This prevention is attributed to the Utility being able to discontinue service promptly after a requested move-out instead of waiting a day or more for a manual power shut-off. The value of this benefit depends on the number of customers requesting move-out, which varies from year to year, causing variances in the magnitude of the realized benefits.

PSEG Long Island implemented data analytics algorithms that identified several cases of theft and tamper. Further, the Utility used AMI-enabled data analytics to identify billing system inaccuracies and unbilled revenue. In some cases, lost revenue could not be back-billed due to tariff terms, but future losses were prevented.

Approximately 13% of the realized benefits from theft and tamper detection were based on data analytics; the remaining cases of theft were detected during AMI meter installation. Theft and tamper savings were estimated based on two different values:

- **One-time debit benefit:** When revenue loss due to theft or tampering is detected, the back-billed dollar amount is assigned as benefits to the year in which the money was collected. This is a one-time benefit for each instance of detected theft associated with previously consumed electricity that would have otherwise not been paid for.
- **Ongoing avoided theft benefit:** Theft or tampering that is detected using AMI would have continued to persist into the future, resulting in avoided future revenue loss. Before AMI, PSEG Long Island's theft detection capability was solely based on manual processes. It is estimated

that these cases would have otherwise persisted longer into the future if it were not for AMI and data analytics capabilities.

**Table 2-4. Revenue Protection Benefit Reporting**

| Benefit | Plan through 2020 ($M) | Actual through 2020 ($M) | Actual % |
|---|---|---|---|
| Added Revenue from Meter Accuracy | 3.13 | 3.59 | 115% |
| Added Revenue from Theft and Tamper Detection | 3.87 | 2.63 | 68% |
| Added Revenue from Move-in and Move-out | 0.08 | 0.07 | 80% |
| **Total** | **7.08** | **6.29** | **89%** |

### *2.2.2 Outage Management*

During Tropical Storm Isaias, PSEG Long Island was able to pull AMI system data from the Meter Data Management System (MDMS) to assess outages, which were subsequently verified through customer calls. By doing this, PSEG Long Island avoided an estimated 3,366 truck rolls during Tropical Storm Isaias, valued at over $3.4 million. [7] PSEG Long Island also estimates additional savings due to increased economic productivity of $970,000 in 2020. [8]

Overall, the use of AMI system data saved an estimated 1,380 hours from more efficient dispatching, reduced customer callback time, and avoided crew supervisor time from reduced truck rolls; using the data also avoided approximately 12,100 customer hours of interruption.

**Table 2-5. Outage Management Benefit Reporting**

| Benefit | Plan through 2020 ($M) | Actual through 2020 ($M) [9] | | Actual % |
|---|---|---|---|---|
| | | **Isaias** | **Other Storms** | |
| Avoided O&M Costs | 2.54 | 3.61 | 0.21 | **150%** |
| | | **3.82** | | |
| | | **Isaias** | **Other Storms** | |
| Avoided Customer Outage Costs | 3.51 | 0.95 | 0.02 | **28%** |
| | | **0.97** | | |
| **Total** | **6.05** | **4.78** | | **79%** |

### *2.2.3 Customer Experience Tools: C&I Portal and Third-Party Data Access*

PSEG Long Island is enhancing customer experience by providing its customers with a C&I Portal and third-party access to customer energy data with customer consent and awareness via MyAccount.

[7] Estimates are based on PSEG Long Island procurement invoices and records of outage management personnel activated during specific events.

[8] Productivity cost estimates are based on the Department of Energy ICE calculator and the number of crews at work during specific events.

[9] Avoided O&M costs and avoided customer outage costs are deemed benefits relative to a scenario without AMI.

The C&I Portal enables PSEG Long Island to engage commercial customers with personalized energy insights through the web portal and email reports. The portal offers commercial customers new insights, like multiple account energy usage aggregation, energy-saving tips, energy use benchmarking, and more. Customer-facing applications will allow PSEG Long Island to better engage business customers with personalized energy insights through digital channels.

**Figure 2-2. C&I Portal Tools and Capabilities**


### 2.2.3.1 Implementation Update

The C&I Portal includes graphs of cost and usage trends for a single site or across multiple sites (Figure 2-2). The portal enables customers with multiple accounts to compare site costs, understand aggregated costs across their portfolio, and includes custom groupings and other budgeting tools. Other graphical capabilities can summarize usage by end use, show weather and operations schedule impact on usage, and benchmarking against similar facilities.

Business-specific recommendations directly connected to relevant PSEG Long Island products and services are provided to customers on the portal. The C&I Portal also offers the option to create an energy savings plan and targets for each customer.

Figure 2-3 through Figure 2-6 provide screenshot examples of some of the C&I Portal capabilities and third-party data access via MyAccount. A future C&I Portal enhancement not shown in the figures is the introduction of a monthly energy email that customers will receive, comparing current usage to their previous billing period.

**Figure 2-3. C&I Portal Capabilities: Usage and Cost Graphing Example**

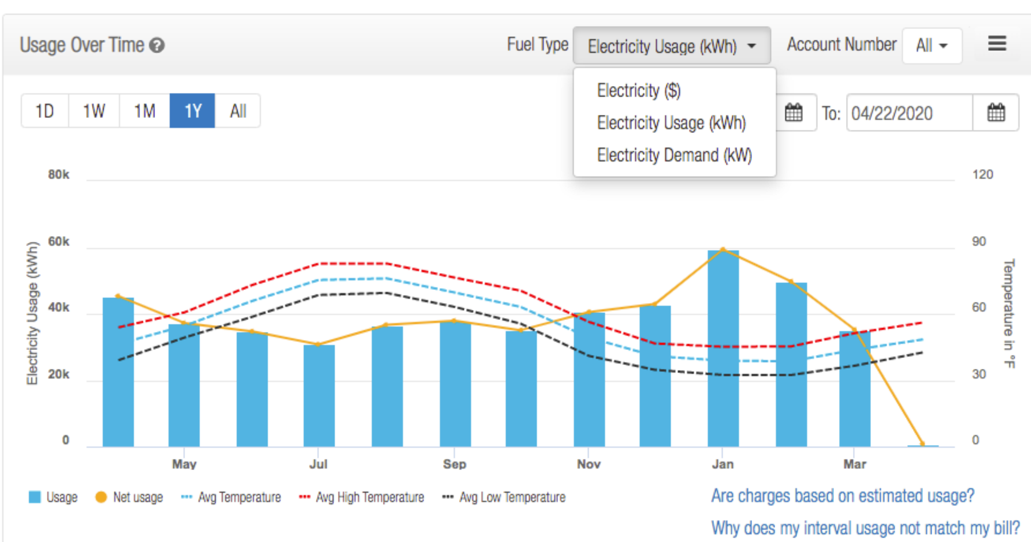


**Figure 2-4. C&I Portal Capabilities: Advanced Graphing Example**

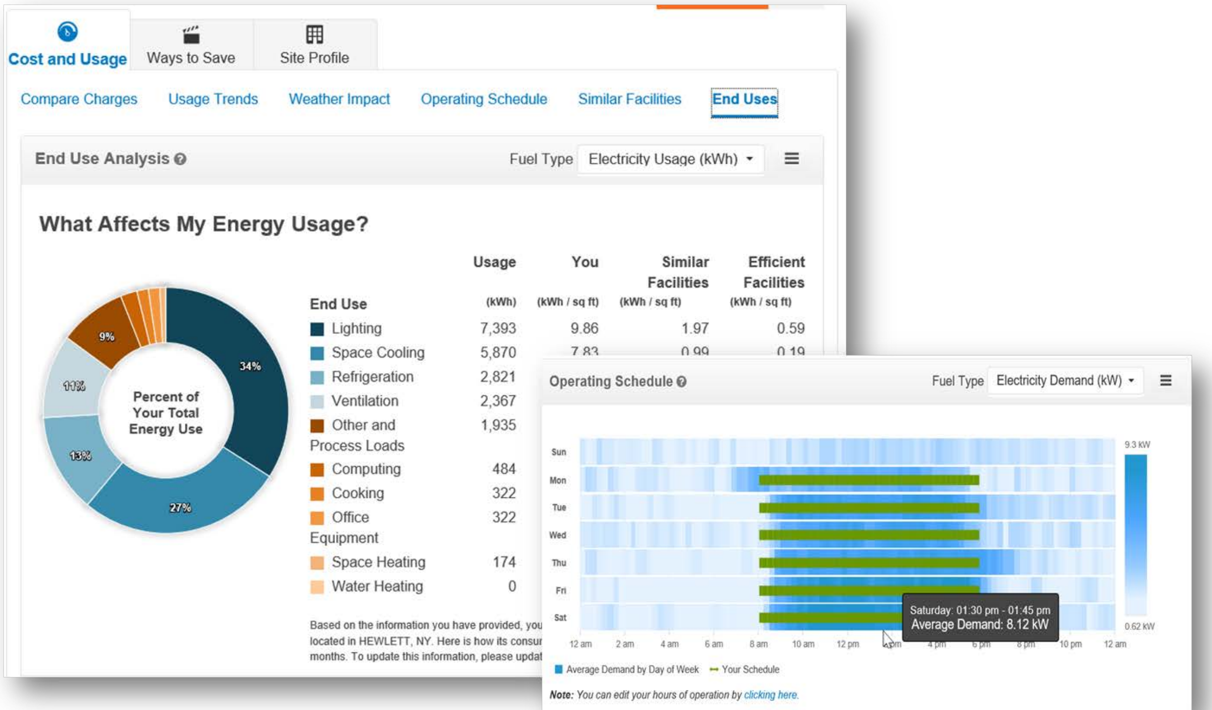



**Figure 2-5. C&I Portal Capabilities: Benchmarking with Similar Sites Example**

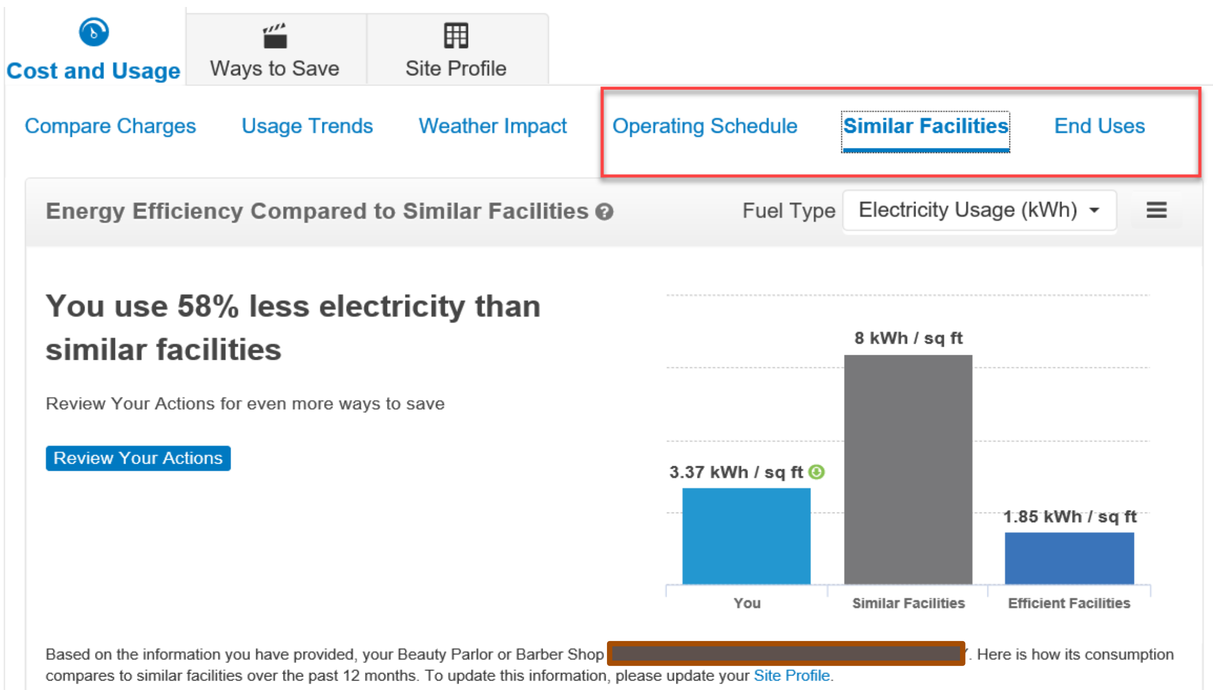
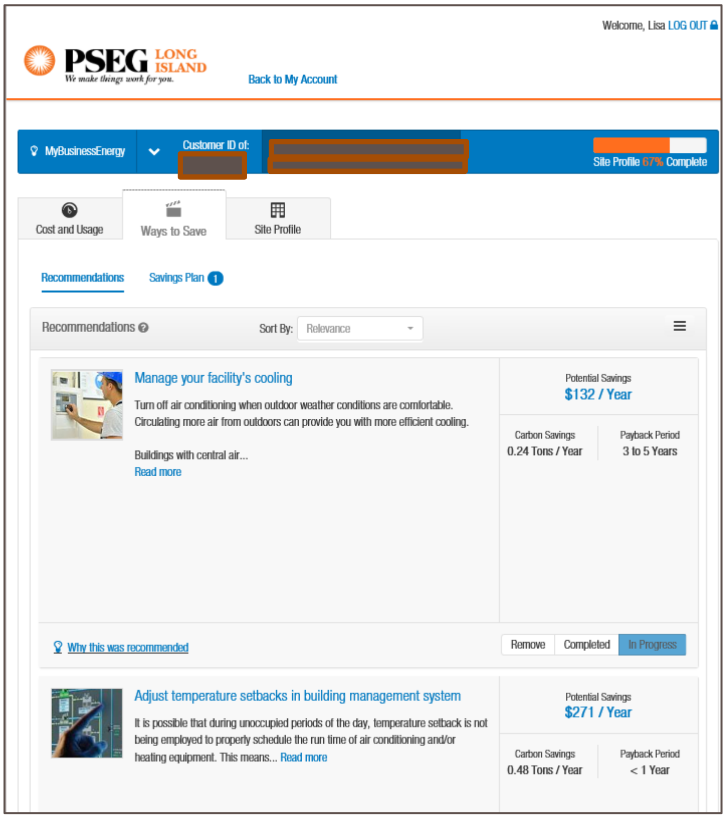


**Figure 2-6. C&I Portal Capabilities: Energy-Saving Tips Example**




PSEG Long Island has incorporated a feature into MyAccount to allow a third party access to a customer's energy data (see Figure 2-7), which aligns with the objectives of Green Button Connect. Customers can authorize third-party solution providers of new data-driven services, programs, and platforms to obtain their AMI data quickly and securely, allowing for an accurate and detailed analysis to inform energy management decision-making, all while ensuring data protection and privacy.

**Figure 2-7. Third-Party Data Access via MyAccount Example**

***Scope Update***

The scope to deliver the C&I Portal and associated capabilities, including enabling customers to give third parties access to energy data, remains as described in the 2020 Utility 2.0 Plan, including the ongoing continuous improvement efforts.

***Schedule Update***

The C&I Portal went live in the second quarter of 2020 after user acceptance testing was complete. Monthly energy report emails to a select group of customers was added in the fourth quarter of 2020. On the C&I Portal, three charts were added for customers to visualize the operating schedule and demand, benchmarking with similar facilities, and end-use disaggregation.

PSEG Long Island will continue to improve the portal's features and expand to a larger group of customers in 2021. Future enhancements include a pilot of monthly energy emails.

Third-party data access to customer energy data via MyAccount has been fully implemented.

#### 2.2.3.2 Performance Reporting

While no direct benefits are projected by customer experience tools, the additional energy insights offered by the C&I Portal are expected to offer indirect benefits, such as increased customer engagement and customer satisfaction.

On average, approximately 28,000 C&I customers logged into our portal on a monthly basis, of which, 6,800 were unique.

### *2.2.4 Funding Reconciliation for All AMI-Enabled Capabilities*

The expenditure and budget for AMI-enabled capabilities include RCS for meter services and revenue protection, outage management, customer experience tools (C&I Portal and enabling third-party data access), and customer engagement IT. The spend and budget for customer engagement IT is intended to support:

- Customer technology channels such as MyAccount, interactive voice response, text/SMS, and the mobile app
- Integrating AMI data with systems
- Current projects and platforms, such as RCS automation, the C&I Portal with third-party data access via MyAccount
- Outage management

PSEG Long Island spent 75% of the planned capital budget and 40% of the planned O&M budget for AMI-enabled capabilities in 2020. The cumulative spend for 2019 and 2020 was below budget, largely due to schedule delays and resource prioritization (see Section 1.2). Given that the overall scope has not materially changed, the delays in implementation mean that the expected spend in future years (2021-2022) will be higher than planned (see Table 2-6).

The budget for 2021-2022 will cover continuous improvements associated with AMI-enabled capabilities discussed above, and integrating AMI data on digital channels (e.g., mobile app and voice assistant). [10] Increased automation, analytics, alerts leveraging AMI, and change management are all part of the continuous improvement efforts for AMI-enabled capabilities. The additional funds also include an alternative data recovery solution for business continuity, which are offset from anticipated AMI deployment savings.

Overall, the updated total forecasted spend is expected to be slightly higher than the approved budget.

**Table 2-6. AMI-Enabled Capabilities Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 7.10 | 1.75 |
| | Actual | 6.19 | 0.86 |
| | **Variance** | **0.91** | **0.89** |
| Forecasted Spend 2021-2022 | Approved Budget | 6.74 | 3.17 |
| | Updated Forecast | 8.24 | 4.51 |
| | **Variance** | **(1.51)** | **(1.35)** |
| **Total Forecasted Spend 2019-2022** | **Approved Budget** | **13.83** | **4.92** |
| | **Updated Forecast** | **14.43** | **5.38** |
| | **Variance** | **(0.60)** | **(0.46)** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

## 2.3 Data Analytics

| | |
|---|---|
| **Type** | Labor |
| **Start Year** | 2019 |
| **Funding Approved Through** | 2022 |
| **Status** | Ongoing |
| **Description and Impact** | The benefits of the Data Analytics Program, which leverages insights from AMI data, have continued to grow as more AMI meters are installed. Business outcomes achieved from analytics includes more engagement and program support for our customers during the pandemic, proactive improvements to the grid, increasing network reliability and enhancing storm processes to better serve our customers, |

PSEG Long Island launched the Data Analytics Program in 2019, creating a new enterprise-wide capability for a data-driven culture. Over the last 2 years, this capability has been embedded in the Utility's business and structured around several AMI-enhanced use cases. Through data collection and analysis, every department has the opportunity to improve operations for the utility and benefit customers.

[10] Continuous improvement is assessed as a part of each technologies' long-term strategy from year-to-year. Possible changes could include improvements to address new customer needs, new security requirements, new technologies available, the opportunity to improve customer satisfaction, the option to integrate with other new PSEG Long Island technologies, and to capture operational efficiencies.

Foundational to the success of data analytics is the cloud-based data analytics platform called the Data Lake. The core platform of the Data Lake was implemented in 2019; it now stores over 8 terabytes of data, with over 850 million AMI meter readings (across all meter channels) processed daily. The Data Lake is growing fast with the ongoing AMI meter deployment and the development of new data analytics use cases.

The Data Analytics team partners with departments across PSEG Long Island to select use cases and deliver value in collaboration with business champions. The Data Analytics Use Case Life Cycle is presented in Figure 2-8.

**Figure 2-8. Data Analytics Use Case Lifecycle**


### *2.3.1 Implementation Update*

PSEG Long Island developed several new data analytics use cases in 2020 and early 2021 that leverage AMI data to provide value to the Utility and its customers. These use cases include a pilot for improved accuracy of estimated time of restoration (ETR), COVID-19 impact trend and discount analyses, a transformer and fuse analysis, and a storm response solution for business continuity planning.

**Pilot for improved accuracy of ETR:** The Data Analytics team developed a pilot to test the hypothesis that advanced analytics modeling could improve the accuracy of the predicted initial ETR under blue-sky conditions. The pilot sought to align ETR accuracy with customer expectations, resulting in a positive impact on customer satisfaction. Based on the pilot's results, more data collection is required to prove a successful result.

AI models developed for the pilot used current and historical restoration data to provide more granular ETRs that consider device classes. Modeling was performed on all blue-sky outages between 2017 and present (over 46,000 outages) to determine the impacts of improving ETR accuracy for mainline restoration and five device subclasses: Service Point, Fuse, Overhead Transformer, Underground Transformer, and Other (user defined).

Scenarios were then used that weighted the accuracy of restoration times with the estimated correlating customer satisfaction outcome (i.e., restoration 2 hours greater later than the estimate are negatively weighted, restoration within 2 hours of estimate are positively weighted). Using this scenario approach, the team identified a proposed approach to ETRs that maximizes customer satisfaction.

The team is now looking into expanding the pilot to deliver the enhanced ETR models beyond blue sky conditions. The solution architecture and datasets developed for the blue-sky pilot will be extended to support the enhancement of our system generated ETR predictions. At the conclusion of the pilot, the team will work with the business to determine if the yielded results will be used for future ETR estimating.

**COVID-19 impact trend and discount analyses:** PSEG Long Island successfully used data analytics to help customers facing economic pressures and navigating the new normal of staying home. The Data Analytics team was able to track how energy use for residential and commercial customers changed due to the pandemic and which industries for commercial customers were resuming operations as the COVID-19 phased lockdowns in New York changed.

Overall, analysis showed lower commercial usage, higher daylight residential usage, and the geographic areas heavily affected by the pandemic across Long Island. Based on the information the team was able to provide, specific programs were developed and implemented for specific customers. For example, for large commercial customers (with electric rate 281), the Data Analytics team was able to analyze customer usage and the impact of the pandemic to enable a discount for approximately 15,000 customers that were adversely affected by the demand charges of that rate during the pandemic and that met the criteria to receive a credit. Through this discount, PSEG Long Island was able to give $2.1 million in relief through monthly discounts to these customers.

As Long Island gradually reopens and the community recovers from the pandemic, PSEG Long Island is closely monitoring customer usage data analytics to observe the pace of recovery. Different industries—restaurants, retail stores, businesses, and heavy industries—are recovering at different and unpredictable rates. Data analytics is allowing PSEG Long Island to be prepared for cash flow fluctuations before they materialize, serve its customers' needs, and ensure the fiscal health of PSEG Long Island and LIPA.

**Transformer and fuse analysis:** PSEG Long Island leveraged AMI data to identify potentially overloaded network devices (i.e., fuses, distribution transformers), enabling appropriate actions to be taken to resolve the situation. To identify transformers and fuses at risk, AMI load data was aggregated and compared against nameplate ratings for the installed asset.

Online dashboards were then used to identify circuits that exceeded the specified overload percentage. Data was accessible daily, allowing engineers to identify specific days with overload conditions. Reliability engineers could act on the information provided, either through additional engineering analysis, inspection actions, or creation of work orders to address the condition of the transformer and fuse.

The solution will continue to undergo usability, performance, and modeling enhancements, potentially adding features such as proactive notifications for high risk conditions, incorporation of additional data sources, and predictive modeling to further refine and improve the accuracy of the analysis.

**Storm Response Solution for Business Continuity*:*** In 2021, PSEG Long Island launched a storm response solution that supports T&D Operations as part of its business continuity plans. Dashboards were developed by the Analytics and T&D business teams to allow operators to view AMI-reported outages that roll up by transformer, fuse, or circuit level so that they can manage the storm restoration effort. The storm dashboard is expected to be particularly useful in cases of contingency planning if the OMS system is not operating as expected, providing business continuity and additional intelligence for outage management personnel. The Data Analytics team is planning to further develop this use case to provide an alternative approach to feeding outage data into the customer outage communication and mapping platform, should the OMS be unavailable.

### *Scope Update*

The function of the Data Analytics team remains as originally proposed, while the list of use cases continues to grow. Data analytics has conducted circuit-level analysis to inform T&D planning and voltage optimization; implemented theft detection algorithms; supported NWS initiatives; identified EV charging locations and grid impact based on customer load patterns; and conducted high bill analyses to identify billing impacts to customers when changing from traditional to AMI meters. The team will continue to build and enhance these use cases developed to date.

New use cases added in 2020 include analyses of energy use impacts of the COVID-19 pandemic, pilot for estimated time of restoration (ETR) accuracy under blue-sky conditions, ETR accuracy, transformer and fuse analysis, and storm response. For 2021, the team will continue to build and enhance the use cases developed to date, including additions to the storm response and ETR use cases as well as analyses on customer load, peak load, and DER.

#### *Schedule Update*

The Data Analytics team remained staffed at three FTEs in 2020. The recruitment and onboarding of two additional FTEs is expected in early 2022 (see Section 1.2 for further description on challenges and external factors related to this). Until resources can be onboarded, consultants will provide support to the Data Analytics team so it can continue to deliver use cases.

The Data Analytics team will work on continuous improvement enhancements for transformer and fuse analytics, enhanced ETR models, revenue integrity, and storm response solution use cases within 2021. Other use cases planned for the remainder of 2021 and 2022 include asset health analytics for circuit breakers and substation transformers, and analyses on customer load, peak load, and DER impact on grid performance.

### *2.3.2 Funding Reconciliation*

Some O&M spend for FTEs expected in 2020 and 2021 has been shifted to 2022 due to delays in recruitment and the resulting FTE costs. Forecasted O&M costs also increased slightly due to updated costs for Amazon Web Services (AWS) and the Data Lake.

Actual capital costs through 2020 and forecasted capital costs in 2021-2022 remain as previously forecasted, with the underspend for internal labor counterbalanced by the cost for consulting support. Overall, the updated total forecasted spend is roughly in line with the approved budget.

**Table 2-7. Data Analytics Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 3.56 | 1.21 |
| | Actual | 3.60 | 0.86 |
| | **Variance** | **(0.04)** | **0.35** |
| Forecasted Spend 2021-2022 | Approved Budget | 1.70 | 3.50 |
| | Updated Forecast | 2.11 | 3.69 |
| | **Variance** | **(0.41)** | **(0.19)** |
| **Total Forecasted Spend 2019-2022** | **Approved Budget** | **5.26** | **4.71** |
| | **Updated Forecast** | **5.71** | **4.55** |
| | **Variance** | **(0.45)** | **0.15** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

### 2.3.3 Performance Reporting

Through the COVID-19 impact and discount analyses, PSEG Long Island provided $2.1 million in relief through monthly discounts to commercial customers. Thus, a direct benefit was provided to customers through data analytics.

Initial trials identified 38 overloaded conditions; proactive work on these conditions will prevent 632 customer interruptions and 107,100 customer minutes, given an average duration of 169 minutes per transformer unplanned outage (Table 2-8). In addition to improvements to reliability, it is estimated that a failure resulting in an unplanned repair will cost twice the cost of a planned repair. Reduced interruptions that customers would have faced due to outages and reduced costs to repair the transformer total more than $0.5 million in benefits (Table 2-9).

**Table 2-8. Data Analytics Performance KPIs**

| Metric | Plan through 2020 | Actual through 2020 | Actual % |
|---|---|---|---|
| Transformer outages avoided by using AMI analytics to proactively detect overloads | N/A | 38 | N/A |
| Customer minutes interrupted avoided using AMI analytics | N/A | 107,100 | N/A |

**Table 2-9. Data Analytics Benefit Reporting**

| Benefit | Plan through 2020 ($M)[11] | Actual through 2020 ($M) | Actual % |
|---|---|---|---|
| Avoided Customer Outage Costs | N/A | 0.14 | N/A |
| Avoided O&M | N/A | 0.37 | N/A |
| **Total** | **N/A** | **0.51** | **N/A** |

## 2.4 Program Implementation Support

| | |
|---|---|
| **Type** | Labor |
| **Start Year** | 2019 |
| **Funding Approved Through** | 2022 |
| **Status** | Ongoing |
| **Description and Impact** | PSEG Long Island established a PMO in 2018 to support and coordinate the implementation and reporting of approved initiatives, primarily AMI. With nearly 30 individual initiatives, the PMO has become critical to the success of the overall Utility 2.0 program. |

PSEG Long Island established a PMO to support and coordinate the implementation and reporting of all approved U2.0 initiatives (see Section 1.3). The PMO is responsible for implementing standardized processes and templates for the portfolio of Utility 2.0 initiatives to manage for progress tracking, internal reporting, and risk mitigation.

[11] Data Analytics use cases are generating benefits not initially projected in the AMI business case in 2018.

The Utility 2.0 Steering Committee is responsible for oversight of the Utility 2.0 initiatives in their entirety; they also oversee program implementation support.

### 2.4.1 Implementation Update

Though the PMO was originally proposed as part of the AMI-related activities, it has expanded to support all Utility 2.0 initiatives, including the initiatives proposed in 2018, 2019, and 2020, as well as any initiatives approved in the 2021 Utility 2.0 Plan. With nearly 30 individual initiatives, the Utility 2.0 program has grown significantly since the PMO was established in 2018, creating the need for standardization and centralized reporting.

The focus for program implementation support in 2020 was on targeted support of high value projects, such as AMI and enabled capabilities, rate modernization, and ongoing progress reporting for key stakeholders. Project support included business process design and change management to launch the Energy Concierge Pilot and new TOU rates.

The PMO will continue to be critical to both individual project and overall Utility 2.0 program success. PSEG Long Island has hired a full-time, dedicated lead to support improved project management across the lifecycle, from proposal through project completion, leveraging new tools, templates, and processes that were developed in 2020 and launched for use in 2021. This standardized support and project-specific targeted support will continue.

#### Scope Update

The scope for the project implementation support, including business process design, change management, and reporting, is as originally proposed. Each year, the needs are assessed across the entire Utility 2.0 program, and the PMO provides support to project owners, as needed.

#### Schedule Update

The schedule remains as proposed; however, program implementation support will be provided for the duration of the ongoing initiatives in the Utility 2.0 Plan.

### 2.4.2 Funding Reconciliation

Capital spend through 2020 was on budget, whereas O&M spend was not required in 2020. Forecasted O&M costs for 2021 and 2022 were reduced in light of the lack of need for O&M spend to date. The forecasted capital costs in 2021 and 2022 increased slightly to reflect actual instead of forecasted third-party vendor costs. Overall, the updated total forecasted spend for O&M is slightly less than the approved budget, while the total forecasted spend for capital is slightly more than the approved budget.

**Table 2-10. Program Implementation Support Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 3.64 | 0.15 |
| | Actual | 3.63 | - |
| | **Variance** | **0.01** | **0.15** |
| Forecasted Spend 2021-2022 | Approved Budget | 4.00 | 0.40 |
| | Updated Forecast | 4.41 | 0.15 |
| | **Variance** | **(0.41)** | **0.25** |
| **Total Forecasted Spend 2019-2022** | **Approved Budget** | **7.64** | **0.55** |
| | **Updated Forecast** | **8.04** | **0.15** |
| | **Variance** | **(0.41)** | **0.40** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

### *2.4.3 Performance Reporting*

While there are no direct projected KPIs or quantifiable benefits for this initiative, it is tied to overall Utility 2.0 program business case success. As such, it supports the overall viability, oversight, and reporting of the program, as well as the development of project-level capabilities through business process design and change management.

## 2.5 Customer Experience and Engagement

A critical initiative to support the deployment of AMI meters on Long Island is the engagement with customers to inform them of the benefits of AMI. PSEG Long Island initiated customer engagement in 2019, in conjunction with the deployment program for smart meters.

PSEG Long Island is also implementing two customer experience pilots: Next Generation Insights and Energy Concierge. These pilots aim to help customers understand the insights they get from their AMI meters and unlock the capabilities and benefits these insights can deliver. Several of the features included in these pilots will ultimately be augmented by customer segmentation, including identifying the next best EE and DER actions for customers, analyzing high bills and advising on rates, and measuring the energy and monetary savings for both the customer and the Utility that result from these solutions.

In addition to the two pilots mentioned above, PSEG Long Island proposed to pilot a C&I Demand Alert functionality as part of the 2020 Utility 2.0 Plan. This functionality, which will be developed in subsequent years, will evaluate whether real-time alerts can help C&I customers reduce demand charges, which constitute 60%-70% of a commercial customer’s bill.

Looking ahead, PSEG Long Island is evaluating the development of Next Best Action, a functionality that enables PSEG Long Island customer service representatives to provide personalized recommendations to customers based on the analysis of backend data. The Utility is also evaluating investment opportunities for customers to choose the date on which they would like to be billed every month (Pick Your Due Date).

### *2.5.1 AMI Customer Engagement Plan*

| | |
|---|---|
| **Type** | Program |
| **Start Year** | 2019 |
| **Funding Approved Through** | 2022 |
| **Status** | Ongoing |
| **Description and Impact** | The AMI Customer Engagement Plan was introduced in 2019 in parallel with AMI deployment to inform and communicate with customers throughout the process. As of 2021, nearly 2.5 million touchpoints have been made, and the meter opt-out rate has remained low. |

The Customer Engagement Plan, introduced in 2019 with the launch of full-scale AMI deployment, informs customers of the installation process for AMI and actively promotes and incorporates feedback from customers. PSEG Long Island engages and informs local communities about smart meter and AMI-enabled benefits through education sessions and marketing materials to ensure customers can access the benefits of AMI, as Figure 2-9 shows. The Utility also designed the My Smart Energy Lab as a tool for customer and employee education on AMI benefits.

Through AMI-related customer engagement, PSEG Long Island provides direct customer, community-based, and media-based outreach, with a focus on pre- and post-installation education to:

- Increase customer knowledge of AMI benefits
- Inform customers of their upcoming AMI installation
- Solicit feedback

**Figure 2-9. Process Flow for AMI Customer Engagement**

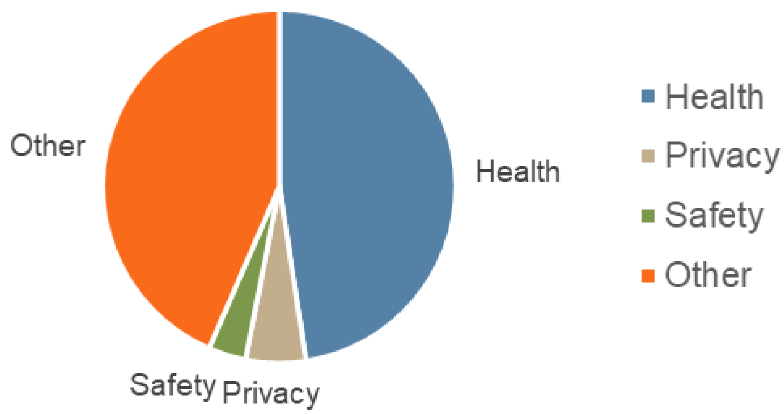

Further, PSEG Long Island notifies town officials of upcoming AMI deployments, organizes status meetings, and is engaging with elected state officials, as appropriate.

#### 2.5.1.1 Implementation Update

The scope of the customer engagement includes customer research through focus groups, interviews, and surveys. PSEG Long Island has incorporated customer feedback into future outreach plans; this feedback includes reducing the amount of communication that is sent and adding more videos explaining how to use the new capabilities and technology.

Outside of research initiatives, most of the customer feedback that PSEG Long Island has received regarding smart meter installation has been communicated by customers that choose to opt out (Figure 2-10). Customer engagement has been successful as the opt-out rate has continued to decline—0.53% at the end of 2020, down from 0.77% at the beginning of 2019.

**Figure 2-10. Reasons for Customer Opt-Out**




*Source: Q1 2021 Utility 2.0 Outcomes Dashboard*

Due to the COVID-19 pandemic, communications have been modified to adhere to new social distancing and Centers for Disease Control and Prevention recommendations that ensure the safety of PSEG Long Island customers, employees, and anyone they interact with.

***Scope Update***

The scope of the Customer Engagement Plan, which includes communication to inform customers about the upcoming activities related to AMI deployment and the associated benefits, remains as originally proposed.

***Schedule Update***

In 2020, use of the My Smart Energy Lab and customer segmentation research were delayed due to the pandemic; this delay has continued into 2021. However, overall customer communications have increased to align with the accelerated smart meter installation schedule.

#### 2.5.1.2 Funding Reconciliation

Customer communication costs were shifted to 2021 due to increased communications to align with the accelerated smart meter installation schedule.

Delays in customer segmentation research and use of the My Smart Energy Lab led to spend below budget in 2020. For 2021 and 2022, forecasted costs increased due to the increased customer communications costs, additional costs for the My Smart Energy Lab, and escalated segmentation research costs (Table 2-11). The My Smart Energy Lab is expected to operate for part of 2021.

Additional costs associated with the My Smart Energy Lab are forecasted to modify the displays and content to reflect the up-to-date capabilities and offerings, as well as unforeseen labor costs for operating the lab. The 2021-2022 updated forecast also increased due to escalated pricing for the vendor to perform the delayed customer segmentation research.

Overall, the updated total forecasted spend is roughly in line with the approved budget.

**Table 2-11. AMI Customer Engagement Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | 4.66 |
| | Actual | - | 3.35 |
| | **Variance** | **-** | **1.31** |
| Forecasted Spend 2021-2022 | Approved Budget | - | 4.07 |
| | Updated Forecast | - | 5.29 |
| | **Variance** | **-** | **(1.23)** |
| **Total Forecasted Spend 2019-2022** | **Approved Budget** | **-** | **8.72** |
| | **Updated Forecast** | **-** | **8.64** |
| | **Variance** | **-** | **0.08** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

### 2.5.1.3 Performance Reporting

Even though no direct benefits were projected in the AMI business case, the Customer Engagement Plan has resulted in nearly 2.5 million touchpoints with customers to inform them of the deployment and benefits of AMI (Figure 2-11). The AMI meter opt-out rate both in-field and post-installation has remained low throughout the deployment process.

**Figure 2-11. AMI Customer Engagement Performance KPIs**


| | Pre Letters | Pre Emails | Post Cards | Post Emails | Post Newsletters |
|---|---|---|---|---|---|
| **Total*** | 791,516 | 459,290 | 564,056 | 315,357 | 364,718 |
| **Critical Facility** | 2,008 | 796 | 1,223 | 599 | 884 |
| **Low Income** | 28,063 | 15,078 | 21,185 | 10,793 | 14,298 |
| **Senior** | 23,085 | 9,781 | 16,750 | 6,949 | 10,614 |
| **Spanish** | 2,879 | 1,220 | 2,437 | 953 | 1,756 |

*Total is the entire count of customers who received the different customer engagement materials. These customers could fall into zero, one or more of the other segments listed in the table.

### *2.5.2 Energy Concierge Pilot*

| | |
|---|---|
| **Type** | Pilot |
| **Start Year** | 2020 |
| **Funding Approved Through** | 2022 |
| **Status** | On hold |
| **Description and Impact** | Energy Concierge is a residential advisory service to increase customer satisfaction and adoption of PSEG Long Island's offerings through an individual consultation. Following the development of a training program and marketing materials, as well as a small launch in the fall of 2020, the Energy Concierge Pilot was put on hold due to the COVID-19 pandemic. A relaunch of an in-person Energy Concierge for customers is planned for mid-2022. |

Energy Concierge is a residential advisory service to increase customer satisfaction and adoption of PSEG Long Island offerings through an individual consultation. It is envisioned that consultations with customers will provide a prime opportunity to introduce a wide variety of products and services that could be accessed through PSEG Long Islands channels, such as MyAccount with all the AMI-enabled, customer-facing data and tools, energy insights capability, rate comparison tool, or through its trade allies and other third-party providers.

Modeled after the existing commercial advisory service group known as Business Customer Advocates, PSEG Long Island is looking to achieve similar customer engagement uplift and customer satisfaction improvements via the residential-equivalent team under Energy Concierge.

#### 2.5.2.1 Implementation Update

PSEG Long Island launched Energy Concierge in the fall of 2020 to friends, family, and some customers through virtual or phone appointments for customers over a span of 6 weeks. PSEG Long Island developed a training program, trained contractors as energy concierges, and developed program marketing and outreach materials and a change management plan.

##### *Scope Update*

The scope for Energy Concierge remains as originally proposed.

##### *Schedule Update*

PSEG Long Island decided to put Energy Concierge on hold due to the COVID-19 pandemic and customers' hesitancy to adopt virtual appointments. However, a relaunch of an in-person Energy Concierge for customers is planned for mid-2022, pending restrictions for conducting home visits (resources will have to be remobilized and trained). The schedule has shifted so the pilot continues to mid-2024, for a total duration of 2 years.

#### 2.5.2.2 Funding Reconciliation

Energy Concierge spent $0.14 million in O&M on defining business requirements, conducting change management training, hiring, training contractors as energy concierges, and developing marketing and outreach content. With the program on hold due to the pandemic, no capital was spent in 2020.

Unspent capital and O&M budget were shifted to the period between 2022 and 2024 to reflect the relaunch, which is planned for mid-2022. The forecast for capital expenditure decreased slightly due to energy audits being deferred to start service in 2023 through mid-2024. The increase in O&M forecast is due to a refined marketing and customer acquisition strategy.

Overall, the updated total forecasted spend is roughly in line with the approved budget.

**Table 2-12. Energy Concierge Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 1.56 | 0.96 |
| | Actual | - | 0.14 |
| | **Variance** | **1.56** | **0.82** |
| Forecasted Spend 2021-2024 | Approved Budget | 0.03 | 1.53 |
| | Updated Forecast | 1.55 | 2.63 |
| | **Variance** | **(1.52)** | **(1.10)** |
| **Total Forecasted Spend 2019-2024** | **Approved Budget** | **1.59** | **2.49** |
| | **Updated Forecast** | **1.55** | **2.77** |
| | **Variance** | **0.04** | **(0.28)** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 2.5.2.3 Performance Reporting

Energy Concierge completed 67 virtual appointments with customers in its 6 weeks of soft launch. A training program was developed to train contractors as energy concierges and to train PSEG Long Island customer-facing employees to promote the program with customers.

As Energy Concierge was not fully launched and is expected to relaunch in mid-2022, PSEG Long Island expects to report on performance metrics against test hypotheses as part of its 2023 Utility 2.0 Plan.

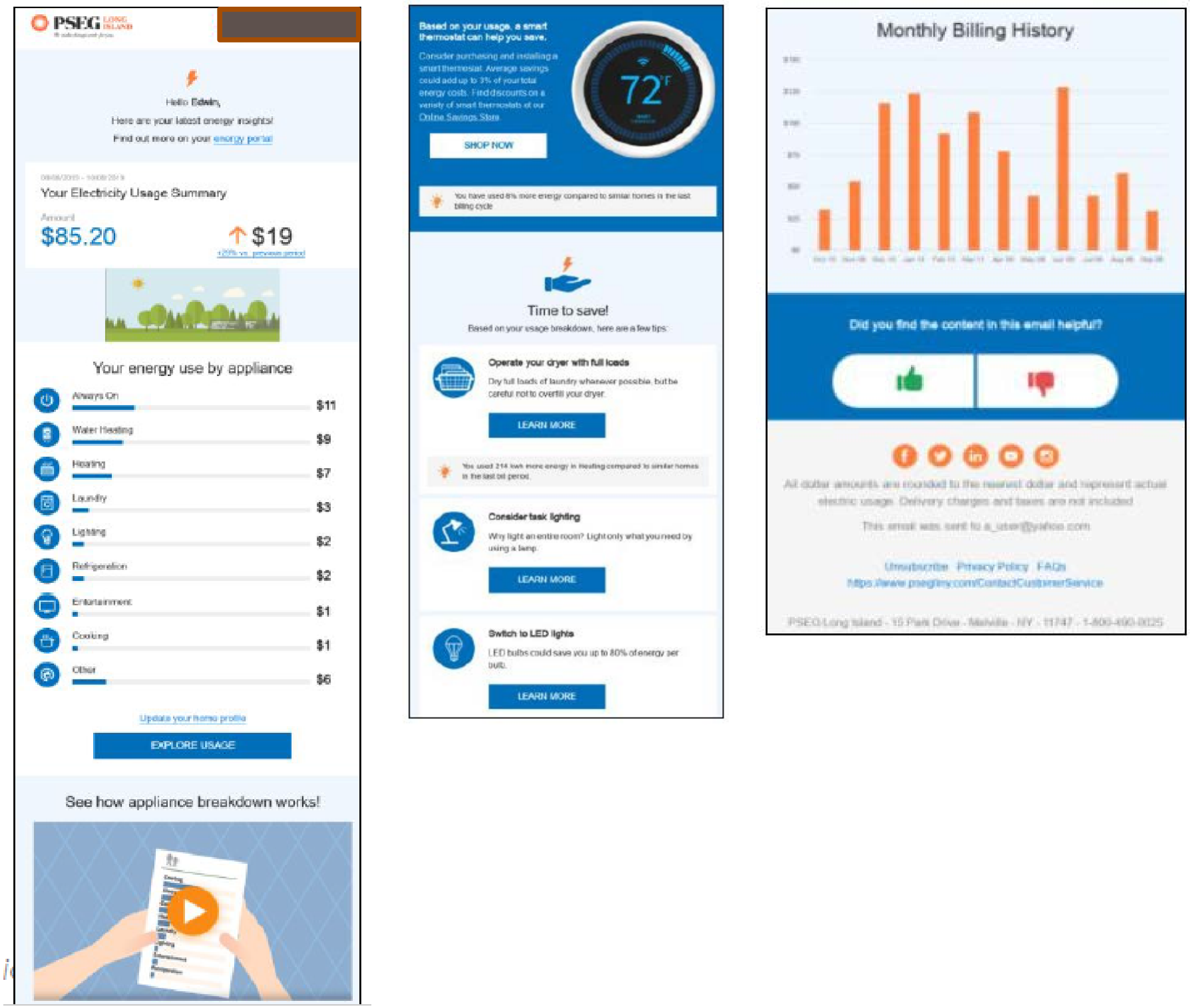
### *2.5.3 Next Generation Insights Pilot*

| | |
|---|---|
| **Type** | Pilot |
| **Start Year** | 2020 |
| **Funding Approved Through** | 2022 |
| **Status** | Ongoing |
| **Description and Impact** | The Next Generation Insights Pilot will test several customer engagement hypotheses via a suite of proactive communications and self-serve and customer service representative (CSR)-enabled energy management tools. More than 100,000 AMI customers received monthly summaries and mid-bill projection emails in late 2020 as part of the initial pilot launch. |

The Next Generation Insights will test several customer engagement hypotheses via a suite of proactive communications and self-serve and CSR-enabled energy management tools. PSEG Long Island believes that an energy disaggregation approach will be the key component to unlocking personalized customer insights based on actual usage of major appliances in the home. Appliances leave fingerprints or signatures on the home energy waveform. This Next Generation Insights service will use market-available pattern recognition and machine learning to extract and classify these appliance “fingerprints”. This foundational disaggregation will then associate the cost of usage throughout the month and associate costs to appliances to provide customers with meaningful relatable insights.

PSEG Long Island launched three types of customer nudges[12] in the fourth quarter of 2020 to over 100,000 customers. The first is a monthly email summarizing electricity usage and cost by appliance category, along with tips to save and a billing history breakdown (Figure 2-12).

**Figure 2-12. Next Generation Insights Pilot: First Nudge**




The second nudge type launched was a mid-bill cycle projection of electricity costs combined with tips to save and a link to the Next Generation Insights portal to view energy usage by appliance category (Figure 2-13).

[12] A nudge is an intervention that steers individuals' behavior toward a desired action. In this case, personalized energy insights, with a breakdown of usage and cost by appliance, are intended to nudge customers toward changing their usage habits.

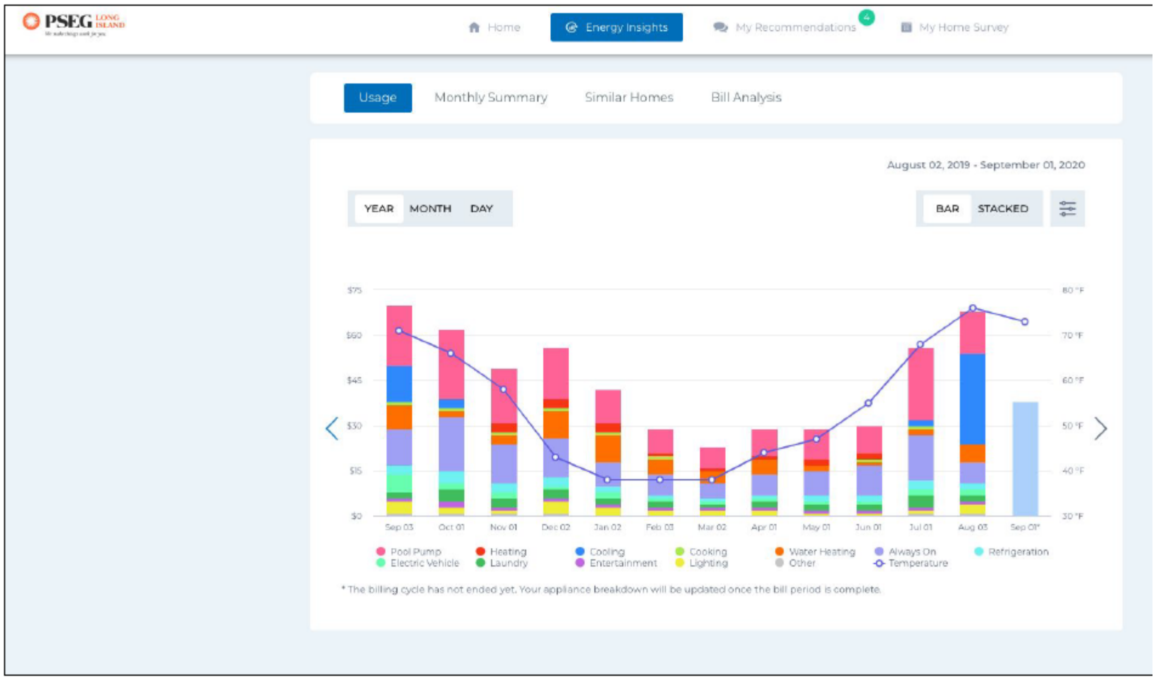
**Figure 2-13. Next Generation Insights Pilot: Second Nudge**


Customers that are part of the pilot may also wish to enroll in budget alert emails. Budget alerts will be triggered when 75% and 100% of a customer's self-defined billing cycle budget threshold are reached (Figure 2-14).

**Figure 2-14. Next Generation Insights Pilot: Third Nudge**


The Next Generation Insights portal provides customers a high level breakdown of usage by appliance category, monthly bill summary and projection, billing history, and insights on actions to bring electricity usage down (Figure 2-15). The appliance breakdown may also be viewed on a daily, monthly, or annual basis, easily showing a customer what their consistent problem areas are and what exactly to address to lower their bill. Customers may drill down to the timeline of their choice and toggle between electricity usage or cost.

**Figure 2-15. Next Generation Insights Portal: Energy Usage Summary**




### 2.5.3.1 Implementation Update

PSEG Long Island completed the procurement of the third-party vendor, the initial rollout to pilot participants, and the integration of the third-party software as a service (SaaS) platform with existing systems. As a next step, PSEG Long Island plans to implement additional features and expand Next Generation Insights to additional customers.

PSEG Long Island is also developing an evaluation plan (to assess energy savings from modified behavior) and is conducting customer and program research (to ensure customer satisfaction) before fully expanding the Next Generation Insights Pilot.

#### *Scope Update*

The scope for Next Generation Insights remains as originally proposed.

#### *Schedule Update*

PSEG Long Island launched the Next Generation Insights Pilot with monthly summaries and mid-bill projection emails to over 100,000 AMI customers in late 2020. This entailed soliciting vendors, refining business requirements, and integrating the third-party SaaS platform with PSEG Long Island's existing customer communication channels.

The Utility plans to include bill or budget alerts and further expand the Next Generation Insights pilot to an additional 100,000 customers in 2021-2022.

The call center module is expected to launch by late-2021. An evaluation plan will also be developed in 2021 to align with DPS recommendations to evaluate EE resulting from Next Generation Insights, along with the reduction in volume and quantity of high bill calls.

#### 2.5.3.2 Funding Reconciliation

Next Generation Insights spending was below the original budget forecast in 2020 due to launch postponement caused by technical resource constraints (see Section 1.2) and the milestone payment structure with the platform vendor, which creates a lagging effect on the spend (licensing costs for the vendor are paid on a milestone basis and were not fully captured as a 2020 expense due to the deferred launch in late 2020).

Unspent 2020 budgets were included in the forecast for 2021, resulting in a variance of $0.20 million and $0.87 million in capital and O&M, respectively, for 2021-2022. The variance in O&M is also a result of an increase in the budget for the call center module and the expansion of Next Generation Insights to an incremental 100,000 customers.

The updated total forecasted spend for O&M is expected to be slightly higher than the approved budget, while the updated forecast for capital is expected to be generally in line with the approved budget.

**Table 2-13. Next Generation Insights Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 0.71 | 0.69 |
| | Actual | 0.57 | 0.23 |
| | **Variance** | **0.14** | **0.46** |
| Forecasted Spend 2021-2022 | Approved Budget | - | 1.87 |
| | Updated Forecast | 0.20 | 2.73 |
| | **Variance** | **(0.20)** | **(0.87)** |
| **Total Forecasted Spend 2019-2022** | **Approved Budget** | **0.71** | **2.56** |
| | **Updated Forecast** | **0.77** | **2.96** |
| | **Variance** | **(0.06)** | **(0.41)** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 2.5.3.3 Performance Reporting

Metrics collected thus far (see following paragraph) are trending toward proving the hypothesis that customers will engage with the Next Generation Insights platform. A customer satisfaction survey is planned for deployment in the third quarter of 2021. Early indicators have been received from some customers that provided feedback through the like or thumbs-up button included in the emails: 84% of the customers who provided feedback have liked or given a thumbs-up.

Since pilot launch, more than 1.34 million emails have been sent across participating customers, with 34.5% of customers opening the emails and 2.4% clicking on the emails to view the Next Generation Insights web portal. Per Questline's 2021 Energy Utility Benchmarks Report,[13] industry email open rates across all utility communications are 28.1% and click-through rates are 1.4%.

[13] 2021 Questline Energy Utility Benchmarks Report, Accelerating Digital Customer Relationships

An evaluation approach is under development, per DPS recommendations, to evaluate EE savings resulting from the pilot, along with a reduction in the volume of high bill calls and the duration of such calls. Because the Next Generation Insights Pilot was launched in late 2020, PSEG Long Island expects to report on these metrics a year after launch as part of the 2022 Utility 2.0 Plan. Progress reported in Table 2-14 reflects metrics for October 2020-May 2021.

**Table 2-14. Next Generation Insights Performance Hypotheses and Metrics**

| Hypothesis | Metrics/Measures of Success Through End of Project | Progress Results to Date | Current Progress Toward Proving Hypothesis |
|---|---|---|---|
| **Customers will engage with the Next Generation Insights platform.** | • Email engagement – 30%-35%<br>• Web portal engagement – 2.0%-5.9%<br>• Remote audit engagement – 5% | • 34.5% of participating customers have opened emails.<br>• 2.4% of participating customers have clicked on the Next Generation Insights web portal link in the emails.<br>• Remote audit capabilities yet to be deployed. | Email and web portal engagement metric results to date are within the target range, proving this hypothesis to be likely true. |
| **Customers are very satisfied with the alerts program.** | • Will deploy a Customer Delight Index survey to gauge the customer sentiment for the alerts program – Perception/CST \| Likes/Satisfied or greater at 70%-80% | Customer satisfaction survey yet to be launched. | Customer satisfaction survey yet to be launched. |
| **There will be a positive impact on the volume of high bill calls and high bill call handling.** | • Percent reduction in high bill calls received – 30% or greater<br>• Percent reduced call duration from call center solution – 5% or greater<br>• Percent reduced high bill field visits – 20% or greater | N/A | Measurement approach under development to evaluate this impact. |
| **Providing Next Generation Insights to customers will result in energy savings.** | • Program energy savings | N/A | Measurement approach under development to evaluate this impact. |

### *2.5.4 C&I Demand Alert Pilot*

| | |
|---|---|
| **Type** | Pilot |
| **Start Year** | 2022 |
| **Funding Approved Through** | 2022 |
| **Status** | On hold |
| **Description and Impact** | The C&I Demand Alert Pilot will test to what extent a real-time demand alert with actionable insights helps commercial customers manage energy costs incurred through demand charges. The pilot will launch in 2023, after PSEG Long Island has completed necessary MDMS and command center upgrades. |

The C&I Demand Alert Pilot aims to test to what extent a real-time demand alert with actionable insights can help commercial customers manage energy costs incurred through demand charges (demand charges constitute 60%-70% of a commercial customer's bill). The solution enables customers to manage their own demand, subsequently controlling their total energy costs, which is likely to result in reduced peak demand on the electricity system.

The proposed solution will leverage an existing Demand Manager application that runs on AMI meters; it can be reconfigured and deployed for this pilot. The application monitors the instantaneous demand and the billing demand register, using this information to forecast the billing demand during a defined time interval. In this case, it would be the 15-minute interval used to determine demand charges. As the billing demand approaches the preset demand (kW) threshold, Demand Manager sends a real-time alert over the AMI network to the utility's headend system. This alert can be converted into a mobile app alert or a text/SMS message sent to the customer's mobile phone, informing them they may reach or exceed their preset demand threshold.

The pilot is intended to test the following scenarios:

- Ability to alert commercial customers on rate 280 that are at risk of exceeding the rate demand threshold (7 kW) and help them avoid being rolled over to rate 281
- Ability to alert customers on rate 281 that are at risk of exceeding current rate-defined demand threshold (145 kW)
- Ability to alert customers that are at risk of exceeding a customer-defined demand threshold (customer may want to manage their demand within a self-imposed target)
- Ability to help customers on rate 281 switch to rate 280 or from rate 285 to rate 281

#### 2.5.4.1 Implementation Update

To test these scenarios, PSEG Long Island is targeting enrollment of up to 1,000 commercial customers. A sampling enrollment strategy will be developed as part of the pilot design phase. PSEG Long Island will leverage existing applications and functionality within its system and through its AMI meter vendor to develop and implement the C&I Demand Alert capability.

#### *Scope Update*

The scope remains as originally proposed.

***Schedule Update***

In its recommendation letter following the submission of the 2020 Utility 2.0 Plan Filing, DPS recommended deferring the C&I Demand Alert Pilot to 2022, after PSEG Long Island has completed the necessary MDMS and command center upgrades.

Following internal planning and considering internal resource constraints (see Section 1.2), PSEG Long Island determined that the launch of the pilot will be delayed to 2023. Should PSEG Long Island be able to procure additional resources, the pilot start date may be accelerated.

#### 2.5.4.2 Funding Reconciliation

The C&I Demand Alert Pilot effort has not yet launched. The deferred implementation will defer the budget and spend accordingly to 2023, but total forecasted spending has not changed.

**Table 2-15. C&I Demand Alert Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | - |
| | Actual | - | - |
| | **Variance** | **-** | **-** |
| Forecasted Spend 2021-2024 | Approved Budget | 1.78 | 0.20 |
| | Updated Forecast | 1.78 | 0.20 |
| | **Variance** | **-** | **-** |
| **Total Forecasted Spend 2019-2024** | **Approved Budget** | **1.78** | **0.20** |
| | **Updated Forecast** | **1.78** | **0.20** |
| | **Variance** | **-** | **-** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 2.5.4.3 Performance Reporting

This effort does not have any projected direct benefits. However, through a combination of real-time alerts and actionable insights for demand management, PSEG Long Island believes the C&I Demand Alert capability will help C&I customers reduce their demand charges.

Over the course of the pilot, PSEG Long Island will measure and report the following metrics:

- **Demand reduction:** Measure the demand of the participating customers on a regular basis and compare expected demand versus actual demand, noting alert events.
- **Customer satisfaction:** Deploy a survey designed to gauge customer sentiment for the customers participating in the pilot.

## 2.6 Rate Modernization and Billing Solutions

PSEG Long Island's objective is to align itself with New York State Climate Act and REV goals, offering customers rate options that are simple to understand, easy to compare, and that meet the Utility's and customers' current and future needs. AMI deployment enables the functionality required to modernize PSEG Long Island's rates and provide customers with a wide variety of options and tools to control electricity usage and make cost-effective choices with increased convenience.

To provide new rates to customers, PSEG Long Island implemented an advanced billing engine that allows the Utility to adapt internal systems to provide simple, easy to understand rate options to Long Island customers. The Utility is also developing a web-based self-service rate platform that allows customers to compare and select from the new rate options.

In 2020, PSEG Long Island proposed implementing On-Bill Financing to promote clean energy products to its customers. The initiative was approved for an initial 2-year pilot offering using $10 million in funding for loans to deploy heat pumps on Long Island; it is planned to launch in 2022.

In this year's Utility 2.0 Plan, PSEG Long Island is proposing to expand the scope of the ongoing Rate Modernization initiative to include the launch of a Green Rate offering (i.e., voluntary supplemental renewable energy).

PSEG Long Island is evaluating the launch of an appliance-level rate modeling functionality in future years; this functionality will be able to model customer bill impacts by analyzing TOU shifts by individual major appliances. It will be offered to customers via CSRs and MyAccount self-service. This solution aligns with the REV objectives to empower customers and enhance their knowledge around energy use.

### *2.6.1 Rate Modernization*

| | |
|---|---|
| **Type** | Program |
| **Start Year** | 2019 |
| **Funding Approved Through** | 2023 |
| **Status** | Ongoing |
| **Description and Impact** | AMI deployment enables the functionality required to modernize PSEG Long Island's rates and provide customers with a wider variety of pricing plans and convenient tools. The implementation of the advanced billing engine enabled the introduction of five new TOU rate options in 2021, and the development of a Green Rates Program proposed for 2023. |

The Rate Modernization Program aims to offer customers rate options that are simple to understand, easy to compare, and that meet the Utility's and customers' current and future needs. AMI deployment enables the functionality required to modernize PSEG Long Island's rates and to provide customers with a wider variety of pricing plan (rate) options as well as tools to better control electricity usage and make cost-effective choices with increased convenience.

#### 2.6.1.1 Implementation Update

PSEG Long Island has implemented an advanced billing engine that enables the Utility to provide simple, easy to understand rate options to Long Island customers. Five new TOU rate options were introduced to customers: three residential 3-block plans, one residential overnight 2-block plan, and one small business 3-block plan.

PSEG Long Island has also further developed its proposed Green Rates Program as another choice to meet customers' desire for an optional renewable energy product and enable customer advocates for New York's clean energy goals.

## Time of Use Rates

### *Scope Update*

The scope remains as originally proposed in the 2018 Utility 2.0 Plan. PSEG Long Island implemented the new advanced billing engine, an enabling core functionality (i.e., allows for configuration and maintenance of the five TOU rates and the billing calculations required for TOU customer billing). Prior to the launch of the TOU pilot, the Utility conducted customer segmentation studies to identify the demographic tranches within the PSEG Long Island customer base most likely to adopt the TOU rates. The results of the segmentation study were used to develop targeted marketing campaigns and to focus CSR recommendations of TOU rate options to customers.

Customer research was also conducted to gather feedback on TOU rate options, resulting in multiple rate options with various start times and a super off-peak rate being included in all rate options for EV charging. Additional customer focus groups and customer research were carried out during the rate design process to garner customer feedback on the clarity and design of the bill visualizations, the online MyAccount self-service rate comparison tool, and customer-facing graphics. The research also informed the key messaging and communication strategy as well as the initial customer engagement collateral including direct mail, email, and website content.

Additional components of the implementation included integration with PSEG Long Island's customer information system (CIS) and customer relationship management (CRM) systems, bill presentation redesign, and transformation of the relevant business processes to support customer enrollment, rate switching, and the overall customer engagement. The Utility also rolled out a rate comparison tool for CSRs, which uses a customer's historical interval consumption to determine which rate plan fits their lifestyle (usage patterns) the best. Similar rate comparison functionality is being added to PSEG Long Island's customer portal (MyAccount), enabling customers with a self-serve rate comparison option and the ability to request TOU rate enrollment directly from MyAccount.

Following an initial launch in the first quarter of 2021, PSEG Long Island is moving forward with the pilot phase of the program using a measured deployment to obtain customer feedback and associated continuous improvement activities, which are expected to continue through 2023. These activities include enhancing the rate selection and TOU MyAccount content, developing a new TOU dashboard in MyAccount to increase functionality for TOU customers, rolling out additional rate options, updating the PSEG Long Island website to have a more dynamic customer experience for enrollment, and customer engagement and education post-enrollment. The Utility is also in the process of developing an impact evaluation plan for TOU with a third-party vendor.

### *Schedule Update*

The schedule for the TOU rates effort remains as reported in the 2020 Utility 2.0 Plan. PSEG Long Island launched the new rates and the CSR tool in the first quarter of 2021 and expects continuous improvement activities to continue through 2023. A web-based rate platform to allow customers to compare and select from the new rate options is expected to launch by the fall 2021. In the future, PSEG Long Island expects to propose new TOU rates for space heating and large commercial customers.

### Green Rates Program

#### *Scope Update*

PSEG Long Island has further refined its Green Rates Program proposal with the goal of providing an on-island[14] option for customers to offset their electricity use with renewable energy that exceeds what LIPA is committed to acquire on behalf of its customers under the PSC's Clean Energy Standard.[15] On an opt-in basis, the Green Rates Program would be offered to customers at an affordable price[16] and would not result in any cost shifts between participating and non-participating customers.[17] Customers that opt in will be able to opt out at any time without penalty. PSEG Long Island will track the payments received during an annual true-up process and only provide Renewable Energy Certificates (RECs) to customers based on what they paid for during the prior year.

PSEG Long Island currently offers a Green Choice Program on behalf of two third-party energy service companies (ESCOs). These ESCOs manage Green Choice customer enrollment, ensure that green power is delivered to the New York State power grid (not necessarily on Long Island), and work with PSEG Long Island to reflect Green Choice charges on customers' monthly electric bills. In contrast, PSEG Long Island's Green Rates Program will be managed by PSEG Long Island using locally sourced RECs already under contract to LIPA. The program would only purchase or retire as many RECs as paid for by customers, avoiding surcharges and bill increases outside of what customers demand. Customers can sign up for Green Rates directly with PSEG Long Island and may choose to opt out at any time. This program would make it easier for customers because they would not have to find and vet a third-party company to opt-in to a renewable power program, removing a barrier to participation in green rates for a segment of customers that is uninterested in ESCO programs.

PSEG Long Island would continue to offer the Green Choice program and would continue to accept and work with new Green Choice ESCOs. The website would list both programs and would include ESCOs' contact information, providing customers with all available options on Long Island. PSEG Long Island's proposed Green Rates Program is designed as a revenue-neutral program positioned to promote renewable energy generation sourced on Long Island and to raise awareness and provide education around renewable energy to PSEG Long Island customers.

PSEG Long Island conducted research on the uptake of green pricing programs across various markets. As shown in Figure 2-16, there is a wide range of participation rates at utilities across the country for green pricing programs. Customer participation has grown over the years in some programs, such as those administered by PGE and Xcel Energy, likely due to the abundance of lower cost renewables. PSEG Long Island expects the number of customers served by 75% of its existing RECs to depend upon customer preferences for subscription level and pricing of Green Rates.

PSEG Long Island conducted initial research with an online panel of its customers to understand the importance of renewable energy to customers and their awareness, interest, and preferences toward a green pricing plan. Of respondents, 67% consider renewable energy to be important, with 62% support surpassing the New York State goals ahead of schedule. However, only 16% are aware of the Utility's current Green Choice Program. The survey found that 33% of customers would be interested in learning about Green Choice options. Of the group interested in learning more about these options:

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[14] All RECs will be from Tier 1 compliant renewable resources under contract to LIPA and located on Long Island.

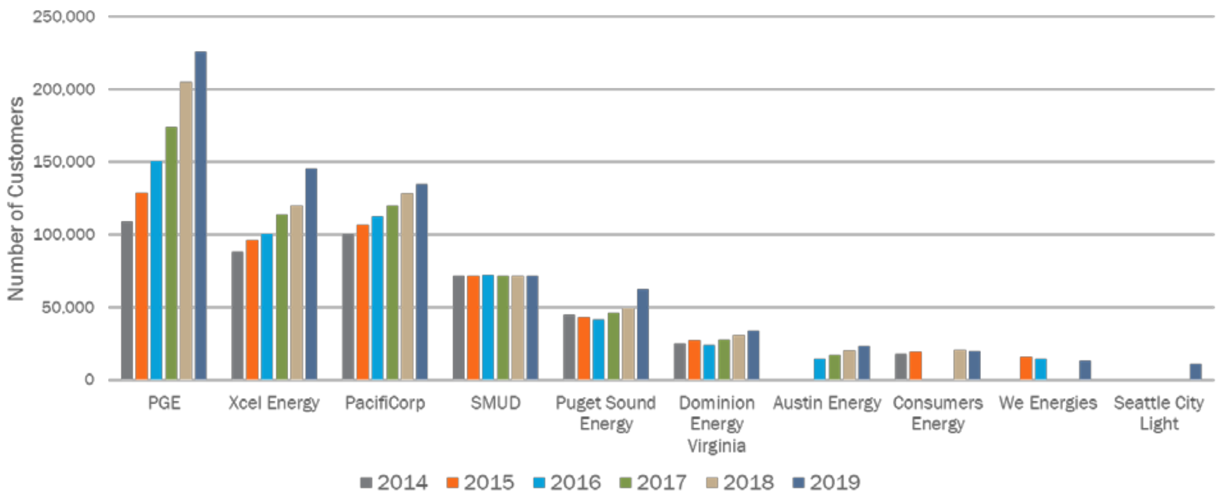
[15] NYS Clean Energy Standard, for more information see here on NYSERDA's website.

[16] Pricing will be based on the current market price of Clean Energy Standard-compliant RECs.

[17] Cost shifts will be avoided because the proposal will provide customers an on-island REC at the replacement price of a Clean Energy Standard-compliant REC rather than the original cost of the REC to LIPA.

- 76% are interested in learning more about options directly offered by PSEG Long Island
- 23% indicated they would likely purchase a green pricing product from PSEG Long Island
- 1% were interested in buying green energy from an ESCO third-party supplier

**Figure 2-16 Customer Participation in Green Pricing Programs**




*Source:* *NREL*

When asked about locational preferences, 1 out of 4 respondents prefer renewable sources located on Long Island, with the remainder accepting a wider range of locations.

PSEG Long Island anticipates the Green Rate would be offered as a voluntary option for a reasonable additional cost to subscribing customers, with subscription levels set to reflect customer preferences. The Utility would use up to 75% of its existing Tier 1 RECs [18] to offset a percentage of Green Rates customers' monthly usage. By dedicating some of its RECs to Green Rate customers, LIPA would need to replace them by setting aside the Green Rates revenue to pay for future REC purchases. PSEG Long Island will track customer enrollment, Green Rates revenue, and the resulting quantity of RECs retired on behalf of Green Rates customers.

Green Rates would increase customer satisfaction by providing access to renewable energy products at a reasonable additional cost to subscribing customers. Enrolled customers would pay an incremental fee per kilowatt-hour to offset a proportion (e.g., 25%, 50%, 75%, or 100%) of their monthly electricity use with renewable power. Additional customer research being conducted in the second half of 2021 will further inform pricing options and the messaging and marketing of Green Rates. Customers will be able to enroll in Green Rates through CSRs or self-serve through MyAccount. Billing will be easy and convenient for customers as the Green Rate would be added to their regular PSEG Long Island electricity bill. All customers may sign up for Green Rates apart from the following:

- Customers that already have solar or are participants of Community Solar (also known as Community Distributed Generation)
- Customers enrolled in the Green Choice Program
- Customers enrolled in the Department of Social Services Direct Payment/Guarantee (Tier 4) of LIPA's Low-Income Program discount

[18] As defined by NYSERDA on its website (link).

### *Schedule Update*

PSEG Long Island expects to offer Green Rates to customers in 2023. The implementation plan for Green Rates is separated into three main phases (Table 2-16):

1. **Preparation and Development:** Continue with customer research and segmentation, developing customer engagement materials, and making key business decisions such as finalizing the Green Rate pricing and identifying customer segments to target. This phase also includes the necessary CAS, billing system, and self-service channel modifications to enable Green Rates as an option to customers.
2. **Training and Outreach:** Implement a change management process involving the Customer Experience team, the call center, and internal PSEG Long Island trainers for a smooth internal rollout of the program and to ensure a seamless customer experience from enrollment to billing. The Utility will also conduct outreach to promote Green Rates awareness and to encourage customer participation in the program.
3. **Ongoing Reporting and Reconciliation:** Integrate monthly tracking of RECs for Green Rates as part of its existing Clean Energy Standard reconciliation process. This process allows PSEG Long Island to manage its renewable resources and fulfill its Clean Energy Standard compliance quota while ensuring sufficient RECs are available to support the program. PSEG Long Island will also track performance metrics, including customer enrollment, Green Rates revenue, and the quantity of RECs retired on behalf of Green Rates customers.

**Table 2-16. Green Rates Project Schedule**

| Workstream | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|
| **Preparation and Development** | | | | | |
| Customer Research and Segmentation | | | | | |
| Billing System Modification | | | | | |
| CAS System Modification | | | | | |
| Marketing Plans and Materials Development | | | | | |
| **Training and Outreach** | | | | | |
| CSR Training | | | | | |
| Customer/Community Outreach | | | | | |
| **Ongoing Reporting and Reconciliation** | | | | | |
| Monthly Reporting of Metrics | | | | | |
| Monthly REC Reconciliation Process | | | | | |

### *Customer Engagement and Communications for Green Rates*

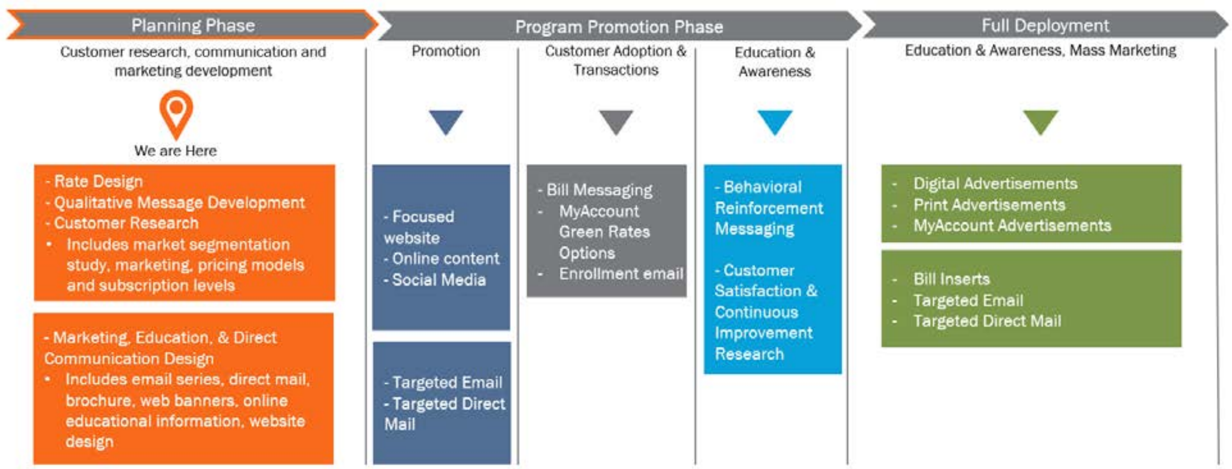
The customer engagement approach for Green Rates will be consistent with the Rate Modernization approach. PSEG Long Island has identified three phases for engaging and attracting customers to adopt Green Rates: Planning, Program Promotion, and Full Deployment (Figure 2-17).

- In the **Planning** phase, initial customer research and segmentation will be used to identify those customer segments within the overall customer base that show inclination to participate in Green Rates. A more focused customer research study will further refine preferred pricing models and subscription levels and test offering's messaging. The study will be used to identify the target population most likely to be interested in the initial green rate offering. PSEG Long Island will also design and plan for customer communication and marketing materials at this stage.

- In the **Program Promotion** phase, PSEG Long Island will use a variety of channels to promote awareness and encourage adoption of Green Rates. The Utility will also develop communication content and materials for the customer journey to enroll in Green Rates. The materials will include confirmation of enrollment emails, bill messages, and adding Green Rates as an option on MyAccount.
- At the **Full Deployment** phase, PSEG Long Island will use a combination of mass marketing and targeted campaigns to further promote Green Rates.

Education and reinforcement are critical to retention. PSEG Long Island plans on communicating with Green Rate customers periodically to reinforce the value of their decision to enroll. Customers will receive specific information about the proportion of electricity use they are offsetting with renewables and information about the facilities from which RECs supporting the program are sourced.

**Figure 2-17. Green Rates Customer Engagement and Communication**




### 2.6.1.2 Funding Reconciliation for Approved Scope: TOU

Rate Modernization incurred a capital variance of $0.24 million due to additional work required in 2020 to implement the advanced billing engine. An underspend of $0.85 million in O&M was due to the delay in program launch.

The overall capital budget for Rate Modernization is expected to exceed the original plan costs for 2019-2023 by 25% based on a better understanding of scope, including detailed business and technical requirements for:

- Enhancing the rate selection tools and TOU MyAccount content
- Providing personalized comparisons on the bill
- Developing a new MyAccount TOU dashboard
- Rolling out additional rate options
- Updating the PSEG Long Island website to have a more dynamic customer experience for enrollment

The overall O&M budget for 2019-2023 is expected to increase by 2% to account for the costs of developing an evaluation plan.

**Table 2-17. Rate Modernization: TOU Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 5.26 | 1.93 |
| | Actual | 5.50 | 1.08 |
| | **Variance** | **(0.24)** | **0.85** |
| Forecasted Spend 2021-2023 | Approved Budget | 4.80 | 14.19 |
| | Updated Forecast | 7.06 | 15.34 |
| | **Variance** | **(2.26)** | **(1.16)** |
| **Total Forecasted Spend 2019-2023** | **Approved Budget** | **10.06** | **16.12** |
| | **Updated Forecast** | **12.56** | **16.42** |
| | **Variance** | **(2.50)** | **(0.31)** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 2.6.1.3 Funding Request for Expanded Scope: Green Rate

Green Rates is estimated to cost $2.51 million, with $1.19 million in capital expense and $1.32 million in O&M expense. These funds will be collected from all of LIPA's customers because additional green power will benefit all Long Islanders. After program maturity or after reaching an enrollment level that could directly support the program costs, LIPA could consider modifying the customer's additional REC price to include the program's administrative costs.

Capital expense includes existing IT labor for CAS, billing system, and MyAccount modifications, as well as a risk and contingency of 40%. O&M expense reflects a multichannel marketing and outreach approach with targeted communication sent to 380,000 customers about the Green Rates Program.

**Table 2-18. Green Rates Capital Expenses**

| Funding Sub-Category | Capital Expenditure ($M) | | | | |
|---|---|---|---|---|---|
| | *4-Year Total* | 2022 | 2023 | 2024 | 2025 |
| IT Labor | 1.19 | 0.85 | 0.34 | - | - |
| **Total** | **1.19** | **0.85** | **0.34** | **-** | **-** |

**Table 2-19. Green Rates Operating Expenses**

| Funding Sub-Category | Operating Expenditure ($M) | | | | |
|---|---|---|---|---|---|
| | *4-Year Total* | 2022 | 2023 | 2024 | 2025 |
| Marketing and Outreach | 1.32 | 0.39 | 0.93 | - | - |
| **Total** | **1.32** | **0.39** | **0.93** | **-** | **-** |

#### 2.6.1.4 Performance Reporting for Approved Scope

No benefits were projected in the business case for 2020. Due to the shift from the originally filed schedule, the Rate Modernization pilot phase benefits will begin accumulating and KPIs will be tracked starting 2021; they will be subsequently reported in the 2022 Utility 2.0 Plan.

To gauge the success of Green Rates, PSEG Long Island will track customer enrollment, Green Rates revenue, and the resulting quantity of RECs retired on behalf of Green Rates customers.

### *2.6.2 FlexPay Planning*

| | |
|---|---|
| **Type** | Study |
| **Start Year** | 2020 |
| **Funding Approved Through** | 2020 |
| **Status** | Complete |
| **Description and Impact** | PSEG Long Island developed and completed an implementation plan to assess the legal, regulatory, operational, and technical feasibility of an enhanced prepay program (FlexPay). The Utility subsequently decided not to pursue the FlexPay Pilot. |

In 2020, PSEG Long Island developed an implementation plan for FlexPay, including review and development of business requirements, Home Energy Fair Practices Act (HEFPA) compliance due diligence, an adapted pilot program design, and best-in-class prepay SaaS providers. The effort was intended to assess the legal, regulatory, operational, and technical feasibility of an enhanced prepay program that would incorporate best practices of the leading mature prepay programs in the country while remaining compliant with the state's HEFPA rules.

#### 2.6.2.1 Implementation Update

A plan for the FlexPay Pilot was developed according to the planned scope and was included in the 2020 Utility 2.0 Plan Filing, though the pilot was ultimately not pursued.

#### 2.6.2.2 Funding Reconciliation

Of the $0.25 million in approved funding, PSEG Long Island spent $82,000 for external vendors. Much of the cost to develop the FlexPay implementation plan were not separated from the overall costs associated with developing the 2020 Utility 2.0 Plan and are not reflected below.

**Table 2-20. FlexPay Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | 0.25 |
| | Actual | - | 0.08 |
| | **Variance** | **-** | **0.17** |
| Forecasted Spend 2021 | Approved Budget | - | - |
| | Updated Forecast | - | - |
| | **Variance** | **-** | **-** |
| **Total Forecasted Spend 2019-2021** | **Approved Budget** | **-** | **0.25** |
| | **Updated Forecast** | **-** | **0.08** |
| | **Variance** | **-** | **0.17** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 2.6.2.3 Performance Reporting

This planning effort has no direct benefits to report. The FlexPay Pilot proposed as a result of this planning effort was not pursued at the recommendation of the DPS.

### *2.6.3 On-Bill Financing Plan and Pilot*

| | |
|---|---|
| **Type** | Pilot |
| **Start Year** | 2021 |
| **Funding Approved Through** | 2025 |
| **Status** | On hold |
| **Description and Impact** | The On-Bill Financing Pilot will provide residential customers with the option to pay for clean energy products (specifically, heat pumps) through charges on their monthly electricity bills. The pilot will launch in 2022. |

PSEG Long Island believes that enabling the adoption of EE products and clean energy technologies can be further enhanced if customers are given more options in the way they can leverage utility incentives. To achieve this, in 2020, the Utility developed an implementation plan for an On-Bill Financing pilot to provide residential customers with the option to pay for clean energy products through charges on their monthly electricity bills. This planning effort allowed PSEG Long Island to subsequently propose the On-Bill Financing Pilot in the 2020 Utility 2.0 Plan.

For this pilot program, PSEG Long Island has opted to focus on heat pumps because the electrification of heating is an area that will require significant uptake to meet New York State's target of 5 TBtu of energy savings from heating electrification by 2025. Depending on the success of the program, PSEG Long Island will consider adding products beyond heat pumps and extending the program beyond the initial 2-year duration.

Customers who participate in the On-Bill Financing Pilot will be able to secure a low interest loan and repay the loan amount over time through their monthly electric bill. This simplifies the overall financing process and provides customers with a convenient method of repayment.

#### 2.6.3.1 Implementation Update

A plan for the On-Bill Financing Pilot was developed according to scope and on schedule in 2020. The scope remains as originally proposed; however, the launch of the pilot has been delayed to 2022 due to internal resource constraints (see Section 1.2). Work requiring IT customer account and billing system modifications is planned for mid-2022. If PSEG Long Island is able to procure additional resources, the pilot start date may be accelerated.

#### 2.6.3.2 Funding Reconciliation

The costs to develop the On-Bill Financing Pilot were not separated from the overall costs associated with developing the 2020 Utility 2.0 Plan and are not reflected below.

**Table 2-21. On-Bill Financing Plan Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | 0.25 |
| | Actual | - | - |
| | **Variance** | **-** | **0.25** |
| Forecasted Spend 2021 | Approved Budget | - | - |
| | Updated Forecast | - | - |
| | **Variance** | **-** | **-** |
| **Total Forecasted Spend 2019-2021** | **Approved Budget** | **-** | **0.25** |
| | **Updated Forecast** | **-** | **-** |
| | **Variance** | **-** | **0.25** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

The capital expenditure expected to enable processes for the On-Bill Financing Pilot is associated with IT-related investments such as upgrades to PSEG Long Island’s customer account and billing systems. These are one-time costs that will not be incurred again if the program is scaled to more customers after the pilot completion.

Operating expenses are associated with labor for program management, market and outreach, third-party support for loan origination and servicing, and post-installation quality assurance/quality control (QA/QC) inspections. The $10 million loan capital is not included in the funding request and will be secured by LIPA.

The timing for the capital and O&M budget for On-Bill Financing Pilot was adjusted to reflect the delay in launch to 2022. The slight variance in O&M cost is a result of capturing 4 years of loan servicing cost from 2022 to 2025, instead of the original 5 years from 2021 to 2025.

Overall, the updated total forecasted spend is expected to be roughly in line with the approved budget

**Table 2-22. On-Bill Financing Pilot Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | - |
| | Actual | - | - |
| | **Variance** | **-** | **-** |
| Forecasted Spend 2021-2025 | Approved Budget | 1.12 | 1.82 |
| | Updated Forecast | 1.12 | 1.68 |
| | **Variance** | **-** | **0.14** |
| **Total Forecasted Spend 2019-2025** | **Approved Budget** | **1.12** | **1.82** |
| | **Updated Forecast** | **1.12** | **1.68** |
| | **Variance** | **-** | **0.14** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 2.6.3.3 Performance Reporting

This planning effort has no direct benefits to report, but it has enabled the design of the On-Bill Financing Pilot. Through the pilot, PSEG Long Island believes that the overall customer uptake of heat pumps through the existing Home Comfort Program (see section A.2.3) will be greater compared to only offering rebates, supporting overall EE efforts.

Due to the shift in schedule, KPIs will be tracked after the expected launch in 2022 and will be reported in the 2023 Utility 2.0 Plan. Participation in the Home Comfort Program beyond the existing baseline forecast will be tracked over the course of the 2-year pilot. An additional 1,000 customers, equivalent to an increase of approximately 13% over the expected participation in Home Comfort, are anticipated. Customer satisfaction among participants in the pilot will also be tracked through a pilot survey.

# 3. Explore New Innovative Offerings

PSEG Long Island has adopted a culture of innovation and exploration by continuously testing new customer and grid-interactive offerings and encouraging the adoption of technologies that support New York State policy goals and LIPA objectives. Through the initiatives proposed in previous Utility 2.0 Plans and the EEDR programs, PSEG Long Island has laid the groundwork for increased adoption of beneficial DER on Long Island. Included in this year's Utility 2.0 Plan is the expansion of the previously approved EV Make-Ready Program to a much larger scale, which supports the state's ambitious transportation electrification goals.

PSEG Long Island will continue to solicit ideas for scalable, market-based solutions from customer feedback, from the market through REV Connect, and from internal ideation and innovation channels. The Utility will also focus on learning from its existing pilots and programs to identify opportunities to scale them up. For example, PSEG Long Island may identify new opportunities with its NWS Planning Tool and EV Program, and leverage learnings from its Pay for Performance pilot to identify scalable models that limit the need for utility incentives yet remain attractive to customers.

This chapter is organized in four subsections, each representing a theme area (shown as follows). The subsections provide an update on ongoing initiatives proposed and approved in past Utility 2.0 Plans, detailed descriptions for three new initiatives and one scope expansion proposed in this year's Utility 2.0 Plan for launch in 2022, and a preview of potential follow-on initiatives being considered for future Utility 2.0 plans.

### Chapter Contents

## 3.1 Energy Efficiency and Heat Electrification

EE is a cornerstone of New York State's national leadership on clean energy and combatting climate change. With the 2018 Order Adopting Accelerated Energy Efficiency Targets, the New York State Public Service Commission set a statewide goal of 185 TBtu of customer-level energy reduction by 2025 and adopted an incremental target of 31 TBtu of reduction by the State's utilities toward the achievement of that goal.

Of the incremental target of 31 TBtu of reduction, LIPA was assigned a proportional share of increased EE savings of at least 3 TBtu over the 2019-2025 time period. When combining the base-level electric savings and the incremental amount established in the December 2018 Order, LIPA's goal is 7.85 TBtu of savings. LIPA has also adopted a target of 1.15 TBtu of savings through heat pump deployment on Long Island.

PSEG Long Island has been actively engaged in rolling out utility-leading residential and commercial savings programs for customers. The 2022 EEDR Plan (Appendix A) focuses on continuing to deliver EE savings programs to residential and commercial customers, while expanding the Utility's efforts to include beneficial electrification initiatives. Adopting fuel-neutral savings targets allows PSEG Long Island to aggregate efficiency achievements across electricity, natural gas, and delivered fuels such as oil and propane, which requires a shift toward investments in non-lighting opportunities, especially an expanded focus on heat pumps and other beneficial electrification opportunities.

In addition to EE programs and beneficial electrification measures, PSEG Long Island is proactively exploring opportunities to test and prove new energy solutions for customers and to invest in foundational tools that can transform the way the Utility interacts with its customers. For example, PSEG Long Island has implemented the Super Savers program, which provides enhanced incentives for demand-side measures to customers in constrained network areas to defer infrastructure investments and yield savings for ratepayers. PSEG Long Island is also proposing to implement a Connected Buildings Pilot with smart panels to yield cost savings for DER installations and gain detailed insights into customer behavior, which can inform future efforts to drive greater DER adoption and customer engagement.

In its continued effort to make EE more accessible to customers, PSEG Long Island is considering the launch of a Multifamily/LMI Financing pilot after 2022. This pilot will aim to make clean energy investments affordable for and accessible to multifamily building owners and LMI customers. It would seek to identify a financing option to help mitigate the upfront cost barrier for energy upgrades as well as the unique issues faced by these customer segments, which may disincentivize clean energy investments for building owners and tenants. The pilot will likely be proposed as an add-on to the On-Bill Financing Pilot, should On-Bill Financing be extended beyond its initial 2-year implementation. This pilot initiative is still at the concept stage and is being evaluated as potential future proposals.

### *3.1.1 EEDR Plan*

PSEG Long Island's EE programs provide a wide array of incentives and rebates to residential and commercial customers to assist them in reducing their energy usage, thereby lowering their bills. PSEG Long Island's proposed 2022 EEDR Plan (included as Appendix A of this document) consists of 11 programs for residential and commercial customers.

### *3.1.2 Heat Pump Controls Pilot*

| | |
|---|---|
| **Type** | Pilot |
| **Start Year** | N/A |
| **Funding Approved Through** | N/A |
| **Status** | Canceled |
| **Description and Impact** | PSEG Long Island will not move forward with the Heat Pump Controls Pilot because the manufacturer of the heat pump control technology is discontinuing the product. |

The Heat Pump Controls Pilot was proposed to demonstrate integrated smart thermostat controls for ductless mini-split heat pumps, targeting customers with central oil-fueled heating systems. The goal of the pilot was for PSEG Long Island to better understand how smart thermostats can be used to support beneficial electrification by optimizing heat pump usage, reducing carbon emissions from winter heating.

#### 3.1.2.1 Implementation Update

PSEG Long Island planned to contract Resideo to provide and deploy smart thermostats to target customers. The pilot faced delays due to contracting and the COVID-19 pandemic and was not able to launch in time for the 2020-2021 heating season.

In April 2021, Resideo discontinued the D6 Wireless Ductless Controller, the technology to be used in the pilot. This product was canceled largely due to lack of market-wide uptake by customers. As a result, Resideo withdrew the proposal to provide the technology for the pilot program. Due to Resideo's withdrawal and given broader market challenges with this type of technology, PSEG Long Island will not move forward with the pilot.

***Scope Update***

Because the technology PSEG Long Island planned to use for the pilot has been discontinued, the scope as originally proposed will not be pursued. Although the pilot will not proceed, PSEG Long Island does not expect the rate of heat pump adoption to be substantially impacted. Outside of this pilot, PSEG Long Island and its customers will continue to realize the benefits of heat pumps.

***Schedule Update***

As described in the 2020 Utility 2.0 Plan, PSEG Long Island planned to install thermostats in fall 2020 for the 2020-2021 heating season. However, due to the impacts of the pandemic and procurement delays, no thermostats were installed. PSEG Long Island planned to shift the installations back 1 year to target installations in fall 2021 for the 2021-2022 heating season. Due to the change in schedule, no thermostats were procured or installed prior to the pilot's cancellation, and PSEG Long Island will not pursue any workstreams related to this pilot.

#### 3.1.2.2 Funding Reconciliation

The original budget was largely allocated toward thermostat incentives for 70 customers. Because no thermostats were installed in fall 2020, no customer incentives were paid. The full budget of $300,000 will not be used for this pilot.

**Table 3-1. Heat Pump Controls Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | 0.20 |
| | Actual | - | 0.00 |
| | **Variance** | **-** | **0.20** |
| Forecasted Spend 2021 | Approved Budget | - | 0.10 |
| | Updated Forecast | - | - |
| | **Variance** | **-** | **0.10** |
| **Total Forecasted Spend 2019-2021** | **Approved Budget** | **-** | **0.30** |
| | **Updated Forecast** | **-** | **0.00** |
| | **Variance** | **-** | **0.30** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 3.1.2.3 Performance Reporting

Given the cancellation of the pilot prior to device deployment, performance reporting is not applicable.

### *3.1.3 Enhanced Marketplace*

| | |
|---|---|
| **Type** | IT |
| **Start Year** | 2021 |
| **Funding Approved Through** | 2025 |
| **Status** | On hold |
| **Description and Impact** | Beginning in 2023, PSEG Long Island is considering implementing an Enhanced Marketplace to expand and modernize its existing online energy marketplace. Enhanced capabilities that may be phased-in over time include a Direct Product Purchase Online Catalog and a Home Services Marketplace. |

The current marketplace offered to PSEG Long Island customers has been improved and offers the sale of EV charging equipment, along with a wide variety of energy efficient products such as LED lighting and smart thermostats. The marketplace has also been successful in providing customers with access to EV smart charging equipment.

The Enhanced Marketplace would have five key components:

- Direct Product Purchase Online Catalog
- Home Services Marketplace
- Point-of-Sale Instant Rebates
- Product Advisor
- Program Enrollment Center

These components will follow a phased-in approach, with the Marketplace expected to be initially launched after completing the Direct Product Purchase Online Catalog and the Home Services Marketplace. The following phase will implement additional enhancements and capabilities.

#### 3.1.3.1 Implementation Update

PSEG Long Island may contract with a third-party vendor to design, develop, and implement the Marketplace platform. A request for proposals (RFP) for the Enhanced Marketplace was released in early 2021, but the procurement was not completed due to IT resource constraints (see Section 1.2). PSEG Long Island's existing marketplace will continue to meet its needs for the next 2 years.

***Scope Update***

The scope of the Enhanced Marketplace may be subject to revision as customer interest in specific functions and enhancements come to light.

***Schedule Update***

The start of the Enhanced Marketplace development will be delayed to 2023 due to internal resource constraints (see Section 1.2). Should PSEG Long Island be able to procure additional resources, the pilot start date may be accelerated.

#### 3.1.3.2 Funding Reconciliation

The overall budget from 2021 to 2025 is expected to be approximately $2.8 million and $1.9 million lower than the approved budget for capital and O&M, respectively. The decrease in budget is largely driven by refined cost estimates for the software platform integration and associated license and management fees. These costs were originally projected to be around $5.2 million and have been revised to about $3.0 million based on updated IT and vendor cost estimates.

Due to the 2-year delay, the expenses originally projected to occur in 2024 and 2025 are no longer captured within the 2021-2025 budget. If no major scope changes are made, PSEG Long Island anticipates approximately $2 million of mostly O&M will be required in 2026 and 2027 to operate the program as originally planned.

**Table 3-2. Enhanced Marketplace Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | - |
| | Actual | - | - |
| | **Variance** | **-** | **-** |
| Forecasted Spend 2021-2025 | Approved Budget | 4.65 | 4.51 |
| | Updated Forecast | 1.81 | 2.61 |
| | **Variance** | **2.83** | **1.90** |
| **Total Forecasted Spend 2019-2025** | **Approved Budget** | **4.65** | **4.51** |
| | **Updated Forecast** | **1.81** | **2.61** |
| | **Variance** | **2.83** | **1.90** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 3.1.3.3 Performance Reporting

The program will not launch until 2023, so there are no metrics or benefits to report for 2021. In the future, the Enhanced Marketplace is expected to yield increased participation in residential EE programs and reduced customer acquisition costs, leading to net non-energy benefits and avoided energy and capacity benefits.

### *3.1.4 Connected Buildings Pilot*

| | |
|---|---|
| **Type** | Pilot |
| **Start Year** | 2022 |
| **Funding Approved Through** | N/A |
| **Status** | Proposed |
| **Description and Impact** | PSEG Long Island is proposing to run a technology pilot that will demonstrate the benefits of integrated controls that enable customer devices to respond directly and autonomously to utility price and dispatch signals. Insight into and control of consumption can lead to more efficient and optimal energy management, providing customers with bill savings, adding grid value through reduced supply and infrastructure costs, and supporting beneficial electrification. |

The proposed pilot seeks to demonstrate a holistic solution that can demonstrate interoperability among a variety of devices from different manufacturers, simplifying communications and control signals between the utility and customer devices. Furthermore, insight into and control of consumption can lead to more efficient and optimal energy management, providing customers with bill savings, adding grid value through reduced supply and infrastructure costs, and supporting beneficial electrification. This pilot will help move PSEG Long Island toward its goal of evolving into a customer-centric DSP (see Chapter 4).

The pilot will use a smart electric panel to integrate and control end-use devices. The pilot will be conducted with PSEG Long Island residential customers (the device is only designed for residential homes), beginning with single-family homes seeking to add significant new DER such as solar, storage, electric vehicle supply equipment (EVSE), and heat pumps. The smart panel enables breaker-level monitoring, better insight into customer loads, and more granular control of certain DER (e.g., storage). In addition to providing value through response to utility price and dispatch signals, the panel can reduce the cost of interconnecting new DER and improve customer and utility understanding of end-use consumption. Lastly, the panel can improve customer resiliency through customized interoperability between the panel, DER's and dynamically designated customer critical loads.

This pilot is expected to create the following value streams for customers, PSEG Long Island, and New York State as a whole:

- Customers:
  - Save money on the installation of new DER
  - Improve resiliency (for those with storage)
  - Realize bill savings for providing flexible loads
- PSEG Long Island
  - Provide significant insights that may inform the design and implementation of a variety of potential future programs
  - Provide a breaker-level understanding of customer loads and DER
  - Use insights to drive customer behavior around load flexibility and energy savings
  - Assess the ability to use breaker-level data for more customized rates and incentives
  - Improve the cost-effectiveness of DER adoption
  - Prepare for future widespread deployment and maximize the grid value of the technology

- New York State
    - Improve system-wide efficiency
    - Support the deployment of DER
    - Provide lessons learned for other New York State utilities

### *Objectives*

A variety of end-devices and control solutions exist to manage load in buildings and homes. These devices, such as smart thermostats and water heater controllers, offer the opportunity of load flexibility. However, each smart device typically requires integration between each manufacturer and the control platform, which makes integrating whole buildings and homes complex and expensive. Adding connectivity and control at the main electrical panel can overcome these challenges by acting as a central gateway to other smart devices in the home or building.

In addition to enabling device monitoring and control, connectivity at the main electric panel allows additional electric loads and DER, such as solar panels, batteries, EV chargers, and heat pumps, to be easily integrated. Improved load management through visibility and control may avoid the need for service upgrades by keeping aggregate load below existing service limits, saving costs, and driving greater adoption. For customers who would otherwise need to upgrade their panel to add new DER, the incremental cost of a smart panel is effectively lower (and may yield net savings for pilot participants). For battery storage, the panel can enable whole home backup with a much smaller battery system by prioritizing and rotating loads during outages. This pilot offers significant learning opportunities to inform future related efforts.

The Connected Buildings Pilot will work with Span to deploy the Span Smart Panel, a UL-certified, fully integrated panel with controls, monitoring, metering, and the ability to integrate with solar and storage. The Span Smart Panel fully replaces the traditional electric panel. Customers with a Span panel can monitor and control their home energy usage at the individual load level through the Span app. The app provides the capability to control and schedule usage at the circuit level. To PSEG Long Island’s knowledge, limited similar products exist, and Span is the only one to demonstrate the technology in partnership with a utility (Green Mountain Power). The unique capabilities of Span’s product will enable PSEG Long Island to maximize the learning value of the pilot, as well as the value offered to pilot participants.

This level of insight and control also provides the opportunity for PSEG Long Island to use the smart panels as a distributed resource. One aim of the pilot is to demonstrate the capability of the smart panels to deliver load flexibility across multiple loads in the home. Event or price signals will be dispatched via the Span portal. Participants can manage participation via the Span app and will be able to manage the amount of load flexibility they are willing to provide.

Span will provide breaker-level load data from the panels to PSEG Long Island. Breaker-level and aggregated data will be analyzed to gain insight into how the smart panels enable reduced energy consumption during event and non-event periods. Analysis of the potential benefits may inform program and incentive design for future PSEG Long Island programs that incorporate smart panels or related technologies.

PSEG Long Island will also compare the Span smart panel data to the onsite AMI meter data and the disaggregated data from the Next Generation Insights Pilot. This comparison will assess the accuracy of the Span device and the potential for this technology to be used for billing purposes—for example for device-level rates and incentives, such as for water heating or EV charging. Comparison of granular load measurements to disaggregated load data will help inform the accuracy and limitations of disaggregated data, informing current and future efforts to use such data.

The insights gained from this pilot can have far-reaching implications that can impact future efforts around DER programs, utility control systems, NWS, hosting capacity management, rate design, customer engagement, and more.

### *Scope*

The pilot program concept and design were initially proposed and further developed through the REV Connect Grid Edge Flexibility Sprint. The Connected Buildings Pilot will target 150 residential single-family customers. PSEG Long Island will work with Span and trade allies to recruit the participants. The Utility will fund all or a substantial portion of the costs of the Span smart panel and installation. PSEG Long Island and Span will work with local installers to complete the installations. Customers will own the panel and can respond to price and dispatch signals, which will be provided by PSEG Long Island and executed by Span. The operation and testing phase of the pilot will occur for about 1 year, after which PSEG Long Island will analyze and evaluate the data from the Span smart panels.

The Connected Buildings Pilot consists of four workstreams:

1. Participant recruitment
2. Panel installation
3. Ongoing operation and testing
4. Evaluation and planning

#### *1. Participant Recruitment*

The pilot will be limited to approximately 150 residential single-family homeowners. PSEG Long Island will seek a variety of customers, particularly those adding new PV, storage, EVSE, and heat pumps. Participant recruitment will focus on customers who would otherwise need to upgrade or replace their electric panel or customers seeking whole home backup with storage. The scope of this phase includes determining the precise breakdown of the target customer makeup, not limited to characteristics such as new or existing solar, storage, EV chargers, heat pumps, and electric water heaters, as well as income-qualified customers.

Following the determination of the target participant pool, PSEG Long Island will work with local developers, installers, and trade allies to launch a small-scale, targeted recruitment effort. Further details on customer engagement are provided in section 3.1.4.1 below.

Participants will receive an incentive covering all or a substantial portion of the installed costs of the panels in exchange for sharing breaker-level data with PSEG Long Island.

#### *2. Panel Installation*

PSEG Long Island will purchase the Span smart panels and work with local contractors to install the panels in the participating homes. Span will certify the contractors through their existing certification program, in which contractors will:

- Sign the Span Certified Installer Agreement
- Attend the 1.5-hour webinar about installing the Span system (occurs weekly)
- Pass an online test regarding proper installation

PSEG Long Island will then coordinate with the certified contractors to complete the participant installations. Span will support customers in setup and enrollment. Throughout the installation process, PSEG Long Island will collect feedback from contractors on the installation process to better understand the benefits or challenges of replacing the existing electric panel with the Span panel.

The participants will have the panel installed in their home at little to no cost to them. In exchange for the new panel, the customers will sign an agreement that allows PSEG Long Island to access the data and manage certain loads within the home. Customers with battery storage will be required to enroll in the DLM tariff (or future similar offering), allowing PSEG Long Island to discharge batteries on critical peak days. Customers will also agree to share overall feedback on the installation process and user experience throughout the pilot. Anonymized customer data will be used for evaluation purposes.

*3. Ongoing Operation and Testing*

After the Span smart panels have been installed, the 12 months of operating and testing will begin. Prior to and during this phase, PSEG Long Island will establish and plan specific tests and events to run to achieve the previously discussed objectives. The Utility will use the Span portal to communicate price or event information to the pilot participants. Events and pricing may be tied to DLM or NWS coincident events.

*4. Evaluation and Planning*

PSEG Long Island will collect the circuit-level data from the Span smart panels in the participating homes on an ongoing basis. Anonymized customer data will be integrated into PSEG Long Island's Data Lake and used to evaluate the pilot results, including assessing if the Span smart panel was able to achieve the objectives of enabling demand flexibility, avoiding service upgrades, and providing customers with circuit-level consumption data. The precise scope and method of the data analysis and evaluation will be determined during the operating and testing phase.

The results of the evaluation and ongoing feedback from contractors and participants will inform the opportunities to expand the pilot into a larger-scale program and inform the design of other related programs. The scope of the evaluation report will include incorporating these recommendations for future programs.

#### 3.1.4.1 Implementation Plan

The implementation plan is divided into four main workstreams:

- **Participant recruitment:** Determine the criteria and target demographics of participants and recruit participants via a targeted marketing and outreach approach.
- **Panel installation:** Work with Span and local contractors to certify contractors to install the Span smart panels in all participating homes.
- **Ongoing operation and testing:** Test the capabilities of the Span smart panels by initiating DR events, running simulations, and monitoring the systems.
- **Evaluation and planning:** Collect data from the Span smart panels and analyze and evaluate the performance and other metrics that support the hypotheses of the pilot.

***Project Schedule***

Table 3-3 lists the projected schedule for the Connected Buildings Pilot.

**Table 3-3. Connected Buildings Project Schedule**

| Workstream | Q2 2022 | Q3 2022 | Q4 2022 | Q1 2023 | Q2 2023 | Q3 2023 | Q4 2023 | Q1 2024 |
|---|---|---|---|---|---|---|---|---|
| **Participant Recruitment** | | | | | | | | |
| Identify customer segments | | | | | | | | |
| Recruit customers | | | | | | | | |
| **Installation** | | | | | | | | |
| Install panels | | | | | | | | |
| **Testing** | | | | | | | | |
| Demand flexibility tests | | | | | | | | |
| Metering tests | | | | | | | | |
| **EM&V** | | | | | | | | |
| Evaluate pilot results | | | | | | | | |

### *Customer Engagement and Communications*

PSEG Long Island will use a targeted customer engagement and communications approach to residential customers that aligns with the criteria for participation; this approach will be established during the initial phase of the pilot. PSEG Long Island will work with PV and storage developers and installers, heat pump installers, and EVSE trade allies to target and recruit pilot participants. Additional outreach will be made in the form of digital or low quantity print flyers and a web landing page produced by PSEG Long Island.

### *Known Risks and Mitigations*

Table 3-4 identifies potential risks and mitigations for the Connected Buildings Pilot.

**Table 3-4. Connected Buildings Risk and Mitigation Assessment**

| Category | Risk | Mitigation |
|---|---|---|
| **Technical** | Vendor technology may not support all desired DER or event types. | Coordinate with vendor to ensure detailed pilot design is compatible with technology capabilities. |
| **Customer Engagement** | Customers may have concerns regarding data privacy or utility control. | Ensure transparency and approval of pilot scope and conditions during customer acquisition and enrollment. |
| **Constraints** | Integration of data into the Data Lake may be more challenging or costly than anticipated. | Gather and evaluate data outside of the Data Lake if barriers are too significant. |

## 3.1.4.2 Funding Request

This section describes the funding requested for the Connected Buildings Pilot.

### *Capital Expenditure*

There are no capital expenditures for this pilot.

### *O&M*

PSEG Long Island will fund all or a significant majority of the costs associated with the purchase and installation of the Span smart panels. Costs associated with other DER are not covered by this pilot.

These funds represent customer incentives. Each system will cost approximately $5,400, including installation labor, amounting to approximately $800,000 for 150 participants. Depending on actual installed costs, PSEG Long Island may modify the number of program participants. All panels are expected to be installed in 2022, and PSEG Long Island does not anticipate additional expenses relating to the hardware after the installations.

Additional operating expenses are budgeted toward customer engagement, data collection, and evaluation. The customer engagement costs are relatively minimal due to the need for only 150 participants, the targeted marketing effort, and the opportunity to collaborate with developers and trade allies. The data collection involves ingesting data into the Data Lake, which represents a routine and relatively minimal effort. Due to the large volume of data and the opportunity to gain many different insights, PSEG Long Island plans to perform a thorough evaluation, which is anticipated to add approximately $250,000 to the budget.

**Table 3-5. Connected Buildings Operating Expenses**

| Funding Sub-Category | Operating Expenditure ($M) | | | | |
|---|---|---|---|---|---|
| | *4-Year Total* | 2022 | 2023 | 2024 | 2025 |
| IT Labor | 0.08 | 0.08 | - | - | - |
| Marketing and Outreach | 0.05 | 0.05 | - | - | - |
| Materials and Equipment | 0.81 | 0.81 | - | - | - |
| Project Management (PM), Labor, and Training | 0.25 | 0.05 | 0.20 | - | - |
| **Total** | **1.19** | **0.99** | **0.20** | **-** | **-** |

### 3.1.4.3 Business Case

Table 3-6 summarizes the hypotheses and the metrics PSEG Long Island will use to evaluate the success of the pilot and to determine whether the Span smart panel technology can be deployed to a broader customer base.

The pilot offers the opportunity to learn about demand and energy savings, DER compatibility, avoided service upgrades, accuracy of smart panel metering data, and potential for increased resiliency. Because the pilot offers significant learning potential to inform future programs, PSEG Long Island is not seeking to achieve a specific magnitude of demand or energy savings from specific devices. Rather, the Utility seeks to understand the degree to which customers may change their consumption for different types of loads or DER based on granular breaker-level data and price or event signals. Additionally, the accuracy of the panel metering data will inform the potential in using such data for device-level rates and incentives.

**Table 3-6. Connected Buildings Hypotheses and Metrics**

| Hypothesis | Metric | Measure of Success | Data, Methodology, and Assumptions |
|---|---|---|---|
| **Smart panels are capable of responding to DR events.** | Demand reduction | The DR events occur at the scheduled time. The end devices respond to the DR events as expected. Customers opt into DR events, | Analysis of communications and consumption data at the time of DR events. |

| Hypothesis | Metric | Measure of Success | Data, Methodology, and Assumptions |
| --- | --- | --- | --- |
| **Participants will realize energy savings as a result of having greater insight into and awareness of consumption.** | Energy savings | Participants with the smart panel consume less energy. | Compare smart panel data to baseline consumption data |
| **Solar and storage installers report lower costs and easier installations when the smart panel is present.** | DER installation cost and simplicity | Installers provide positive feedback about the installation process. | Installer and customer surveys |
| **The panel allows more loads or DER to be added while ensuring that demand is kept below the service limit.** | Avoided service upgrades | Participants that would have otherwise required service upgrades can increase their electric load without upgrades due to the smart panel. | Installer and customer surveys; simulate lower service; analyze and verify using backend data |
| **The smart panel offers revenue-grade meter data.** | Meter data | The monthly data from the smart panel remains within 0.5% of the meter data. | Compare smart panel data to meter data |
| **The panel can increase the amount of resiliency offered to customers with storage.** | Increased backup power duration | The panel curtails loads during outages. | Compare consumption patterns during normal operation and during outages |

### *Pilot Participation*

The pilot will be limited to approximately 150 residential single-family homeowners. PSEG Long Island will seek a variety of customers, particularly those adding new PV, storage, EVSE, and heat pumps. Participant recruitment will focus on customers who would otherwise need to upgrade or replace their electric panel or customers seeking whole home backup with storage. PSEG Long Island will work with local PV, storage, heat pump developers and installers, and EVSE trade allies to recruit the participants. Due to the specific target participant demographics, the participant acquisition will be a targeted effort. PSEG Long Island expects to enroll a large portion of the customers communicated with by the installers, developers, and trade allies.

### *Principles of REV Demonstration Projects*

The Connected Buildings Pilot is mapped to the principles of REV demonstration projects in Table 3-7.

**Table 3-7. Connected Buildings and Principles of REV Demos**

| Principle | Description |
| --- | --- |
| **Includes partnership between utility and third-party service providers** | The pilot will be implemented in partnership with an innovative technology provider offering smart electric service panels. |

| Principle | Description |
|---|---|
| **Demonstrations should delineate how the generated economic value is divided between the customer, utility, and third-party service provider(s)** | The pilot will explore and quantify the value delivered to both PSEG Long Island and participating customers to inform incentive models for related future programs. |
| **Offers competitive markets for grid services** | The pilot will assess how customers respond to price and event signals to provide grid services. |
| **Identifies questions it hopes to answer or problems or situations on the grid and the market should respond with solutions** | See Table 3-6. |
| **Informs rules that will help create competitive markets** | The pilot will help assess the feasibility of device-level rates. |
| **Informs pricing and rate design modifications** | The pilot will assess how customers respond to price and event signals, which may inform the design of future incentives or rates. |
| **Includes various customer participants** | The pilot will seek to incorporate customers with multiple different types of DER and incorporate control of a wide variety of customer loads via breakers. |

### *Performance Measurement and Reporting*

To evaluate the hypothesis of the pilot (see Table 3-6), PSEG Long Island will track the following metrics and KPIs:

- **Peak demand reduction:** Compare the demand (kW) of the participating customers on a regular basis to the demand during DR events. The panel data will be continuously collected and provided to PSEG Long Island to support evaluation and verification of this hypothesis.
- **Energy savings:** Compare the baseline energy consumption (kWh) of the participating customers to the energy consumption using the smart panel. PSEG Long Island will also be able to track the addition or removal of electric loads to determine the specific impact of the smart panel on customers' consumption volumes and patterns.
- **DER installation cost:** Gather data and survey responses from participating customers and DER installers about the cost of installation and compare the costs to those for customers with traditional electric panels to identify the avoided costs to customers installing DER with the smart panel.
- **Avoided service upgrades:** Track the number of service upgrades avoided due to the smart panel.
- **Meter data accuracy:** Compare the data from the smart panel to the smart meter data to determine the percent difference between the data sources. This calculation will determine if the smart panel data may be reliably used for billing purposes (e.g., device-level rates and incentives).
- **Reduction in consumption during outages:** Compare the consumption data of the participating customers with storage on a regular basis to the consumption during outages to determine if the panel adjusted customers' consumption in order to prolong the duration of the storage during an outage.

## 3.2 Transportation Electrification

The transportation sector contributes approximately one-third of New York State's GHG emissions, and the State is taking steps to transform the sector to meet the decarbonization goals set out in the Climate Act. New York State is a signatory to the eight state Zero-Emission Vehicle (ZEV) Memorandum of Understanding (MOU), which pledges participating states to enact policies that will ensure the deployment of 3.3 million ZEVs and support charging infrastructure in participating states by 2025. New York's share of the ZEV MOU commitment is 850,000 ZEVs on state roads by 2025, and Long Island's inferred share is approximately 178,500 vehicles. [19]

PSEG Long Island has two key objectives related to transportation electrification:

- Promote greater adoption of clean, electrified transportation
- Ensure the additional load is managed in a grid-beneficial manner (e.g., via managed charging), thus maximizing the value to customers while minimizing contribution to peak load constraints

In 2018, PSEG Long Island launched its EV program, which consists of outreach and marketing, a Residential Smart Charger Program, a Workplace Charging Program, a Direct Current Fast Charging (DCFC) Program, and a residential Off-Peak Charging Rewards Program. These programs aim to enhance the penetration of EVs on Long Island, align EV customer adoption strategy with reducing GHG emissions, empower customers, animate the EV charging infrastructure market, and deploy smart EV charging systems while minimizing charging of such vehicles during peak load times. The following year, PSEG Long Island proposed an Electric School Bus V2G Pilot.

With the release of the DPS Staff Whitepaper [20] in early 2020, PSEG Long Island decided to launch an EV Make-Ready Program in 2021 that supports the deployment of publicly available EV charging stations on Long Island. In this year's Utility 2.0 Plan, PSEG Long Island is proposing to expand the EV Make-Ready Program through the end of 2025 with an increased scope.

To continue progress toward the State's transportation electrification goals, PSEG Long Island is considering the launch of a fleet electrification program for municipal and commercial customer fleets and the expansion of the ongoing V2G bus pilot project to light duty vehicles.

- **Medium and Heavy Duty Fleet Electrification:** Electrifying municipal and commercial fleets is a great opportunity for transportation electrification. Governor Cuomo announced a task force that will develop a plan for five of the largest upstate and suburban transit systems to electrify 25% of their bus fleets by 2025 and 100% by 2035, including Suffolk County Transit. PSEG Long Island is already speaking with municipalities on Long Island about moving in this direction. In this year's Utility 2.0 Plan, PSEG Long Island is proposing two projects related to medium and heavy duty vehicle electrification, including a make-ready pilot for bus transit electrification and an electrification study of PSEG Long Island's bucket trucks and other fleet vehicles.
- **Light Duty V2G:** PSEG Long Island is developing a V2G pilot project for electric buses. Based on insights from that project and as light duty V2G technology becomes more mature and viable, PSEG Long Island may consider a V2G pilot that focuses on light duty vehicles. The pilot would focus on light duty EVs as an opportunity to reach a broad customer base, improve the value proposition of EVs for customers, and access a broad array of distributed batteries that can provide value to the grid.

[19] Long Island's EV target is based on its 21% share of vehicle registrations in New York State.

[20] Case 18-E-0138, Proceeding on Motion of the Commission Regarding Electric Vehicle Supply Equipment and Infrastructure, *Department of Public Staff Whitepaper Regarding Electric Vehicle Supply Equipment and Infrastructure Deployment* (issued January 13, 2020).

### *3.2.1 EV Program*

| | |
|---|---|
| **Type** | Program |
| **Start Year** | 2019 |
| **Funding Approved Through** | 2025 |
| **Status** | Ongoing |
| **Description and Impact** | The EV program consists of outreach and marketing, a DCFC Program, a Residential Smart Charger Program, and a Smart Charge Rewards Program. Since its launch in 2019, 48 DCFC ports have been energized, 1,448 customers have enrolled in the Smart Charge Rewards Program, and 1,753 Smart Charger (L2) rebates were distributed to customers. Parts of the program will continue through 2025. |

The EV program aims to enhance the penetration of EVs on Long Island, align the EV customer adoption strategy with reducing GHG emissions, empower customers, animate the EV charging infrastructure market, improve system efficiency, and deploy smart EV charging systems to encourage off-peak charging.

#### 3.2.1.1 Implementation Update

PSEG Long Island launched the DCFC program in September 2019. As of the end of 2020, 123 DCFC ports were committed, 48 of which have been energized. The Smart Charge Rewards Program was launched in the third quarter of 2020; by the end of 2020, 1,448 customers were enrolled in the program.

During 2020, PSEG Long Island boosted marketing efforts for the Smart Charger Rebate Program and made the instant Smart Charger rebate available in the online marketplace. Through the end of 2020, 1,753 Smart Charger rebates were distributed to customers.

**Success Snapshot**

Customers can easily access the Smart Charger rebates and sign up for Smart Charge rewards in the online marketplace.

***Scope Update***

The scope of the EV program remains as previously proposed and includes the ongoing DCFC Program, Residential Smart Charging Program, and Smart Charge Rewards Program.

***Schedule Update***

The DCFC Program and Residential Smart Charge Rebate Program will continue through 2025. The Smart Charge Rewards Program will continue to accept enrollment through 2021, and payouts will continue through the end of 2022, after which the program will close and EV owners will be encouraged to sign up for TOU rates.

#### 3.2.1.2 Funding Reconciliation

The Electric Vehicles Program spent approximately $0.9M in O&M in 2020. The spend was higher than planned, largely driven by increased costs for marketing and program participation.

To counteract the impact of the COVID-19 pandemic, additional marketing measures were taken. A $50 enrollment bonus was introduced to enhance Smart Charge Rewards, and digital advertising spend was increased to generate Smart Charge Rebate applications.

The additional marketing measures proved effective. PSEG Long Island anticipated approximately 1,000 Smart Charge Rewards enrollments and 764 Smart Charge Rebates paid. The actual program participation exceeded the forecast by almost 50% for both programs, delivering 1,448 and 1,129 respectively, in 2020.

Overall, the budget through 2025 is roughly in line with the approved budget, as the increased spending in 2020 will be offset by more efficient processes and operation in 2021 and onward.

**Table 3-8. EV Program Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | 1.27 |
| | Actual | - | 1.49 |
| | **Variance** | **-** | **(0.22)** |
| Forecasted Spend 2021-2025 | Approved Budget | - | 11.56 |
| | Updated Forecast | - | 11.54 |
| | **Variance** | **-** | **0.02** |
| **Total Forecasted Spend 2019-2025** | **Approved Budget** | **-** | **12.82** |
| | **Updated Forecast** | **-** | **13.03** |
| | **Variance** | **-** | **(0.20)** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

### 3.2.1.3 Performance Reporting

The metrics for the EV Program track the participation rates in the residential, public, and workplace charging programs. For the residential programs, the number of participants is tracked via the number of Smart Charger rebates paid to customers. The participation in the public and workplace programs is tracked as the number of DCFC and workplace charging ports committed. The take-rate is a key metric that combines the program participation with the total expected number of EVs sold and offers insight into the success of participant acquisition. Despite the challenge of marketing during the pandemic, the take-rate through 2020 exceeded the target of 12% (Table 3-9). Similarly, the total number of participants in the residential programs was slightly higher than expected.

**Table 3-9. EV Program Performance KPIs**

| Metric | Plan through 2020 | Actual through 2020 | Actual % |
|---|---|---|---|
| Program Take-Rate | 12% | 17% | N/A |
| EVs Sold on Long Island | 14,933 | 10,568 | 71% |
| Residential Smart Charge Rebate Program Participants | 1,733 | 1,753 | 101% |
| DCFC Program Ports Committed | 300 | 123 | 41% |

PSEG Long Island assumes that the DCFC Program participation was lower than expected in 2020 due to anticipation of the EV Make-Ready Program beginning in 2021. The Workplace Charging Program was closed prior to 2020 because it was redundant with an offering from NYSERDA; it was removed from the scope of PSEG Long Island's EV Program. At the close of the program, 105 Level 2 ports were deployed, but this metric is no longer being tracked, so it is not included in Table 3-9.

Participation in the Smart Charge Rebate Program exceeded expectations, which resulted in benefits being realized close to target. The benefits realized through the EV Program relative to the targets are shown in Table 3-10.

**Table 3-10. EV Program Benefit Reporting**

| Benefit | Plan through 2020 ($M) | Actual through 2020 ($M) | Actual % |
|---|---|---|---|
| Participant Benefit | 0.97 | 0.86 | 89% |
| Added Revenue | 1.64 | 1.48 | 91% |
| Avoided Fuel Emissions | 0.39 | 0.36 | 94% |
| **Total** | **2.99** | **2.71** | **90%** |

### *3.2.2 Electric School Bus V2G Pilot*

| | |
|---|---|
| **Type** | Pilot |
| **Start Year** | 2020 |
| **Funding Approved Through** | 2022 |
| **Status** | On hold |
| **Description and Impact** | The Electric School Bus V2G Pilot will support the deployment of electric school buses to provide V2G services for PSEG Long Island and backup power to critical loads. Due to challenges such as electric bus design, the COVID-19 pandemic, and school district funds, the pilot was suspended for 2 years but is expected to launch in 2022. |

The Electric School Bus V2G Pilot is expected to support the deployment of electric school buses (e-buses) to provide V2G services for PSEG Long Island and backup power to critical loads. The buses will be used by Suffolk Transportation Services (STS) to transport children during the school year and then will be used by PSEG Long Island during the summer to address specific locational needs on the distribution network.

This pilot will help PSEG Long Island understand how EVs can be better used for the grid, supporting beneficial electrification through new program offerings for customers that improve system efficiency and reduce carbon emissions. The pilot focuses on school buses because of their ability to serve as large mobile batteries and the coincidence between peak load and the summer availability of the buses.

Implementation and operation of e-bus V2G infrastructure will provide valuable lessons learned to inform future V2G investments and offerings that can enhance the value of EVs to customers and the grid. Understanding of e-bus charging patterns will help to inform offerings for bus fleet operators, while use of e-buses for V2G services can inform offerings for other types of EVs as well. Identification of barriers and development of standardized processes during this pilot will support effective future implementation of related activities.

The project can demonstrate several stacked applications, including localized distribution peak reduction, system peak reduction, customer bill savings, backup power, and ancillary services. Furthermore, information obtained about costs and benefits from this pilot will provide insight into potential future business models that will support scalable growth of V2G infrastructure for e-buses and other EVs. For example, future projects or programs could use LIPA financing or employ ownership models with varying ownership between e-buses, e-bus batteries, or EVSE. This pilot will also help to identify target costs for e-buses and related infrastructure to become economical at scale.

#### 3.2.2.1 Implementation Update

The Electric School Bus V2G Pilot was first proposed in the 2019 Utility 2.0 Plan with plans to launch in 2020. However, due to challenges with the electric bus design, concerns from the bus company stemming from the pandemic, and the school district's limited availability of funds, the pilot was suspended in 2020. The same challenges continued into 2021, so the pilot is similarly suspended for 2021. However, PSEG Long Island has recently received indication from the bus manufacturer that these issues are likely to be resolved in time to launch the pilot in 2022.

***Scope Update***

The scope of the Electric School Bus V2G Pilot remains as originally proposed in the 2019 Utility 2.0 Plan.

***Schedule Update***

Due to the aforementioned challenges, the schedule of the pilot will be delayed by 2 years. The stages and durations of each stage will remain the same but will be shifted back to begin in 2022 and end in 2024.

#### 3.2.2.2 Funding Reconciliation

The overall budget is in line with the approved budget but will be shifted to begin in 2022.

**Table 3-11. Electric School Bus V2G Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 0.08 | 0.50 |
| | Actual | - | - |
| | **Variance** | **0.08** | **0.50** |
| Forecasted Spend 2021-2024 | Approved Budget | - | 0.14 |
| | Updated Forecast | 0.08 | 0.64 |
| | **Variance** | **(0.08)** | **(0.50)** |
| **Total Forecasted Spend 2019-2024** | **Approved Budget** | **0.08** | **0.64** |
| | **Updated Forecast** | **0.08** | **0.64** |
| | **Variance** | **-** | **-** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 3.2.2.3 Performance Reporting

The pilot will not launch until 2022, so there are no metrics or benefits to report for 2020. In the future, this pilot is expected to yield benefits derived from avoided capacity and energy, avoided $CO_2$ emissions, and avoided outages.

### *3.2.3 EV Make-Ready Program*

| | |
|---|---|
| **Type** | Program |
| **Start Year** | 2021 |
| **Funding Approved Through** | 2025 |
| **Status** | Ongoing |
| **Description and Impact** | The EV Make-Ready Program was initially proposed in 2020 to support and accelerate EV adoption on Long Island. PSEG Long Island engaged a third-party EV expert consultant to develop an implementation plan that provides guidance on how to scale up the program through 2025. The expanded scope and funding request for the EV Make-Ready Program proposed in this filing is based on the results of the implementation plan and includes additional charging ports and the launch of a fleet electrification advisory service. |

Although access to charging stations is a key component to enable the transition to widespread EV adoption, public charging stations struggle to achieve sufficient returns on upfront costs due, in part, to low utilization rates. This struggle makes it hard to attract the investment of private capital to build the infrastructure required to enable rapid growth in EV adoption. Chargers are expected to become more economically viable as EV adoption increases. Stimulating the development of some core level of charger deployment in the near term may help to accelerate EV adoption and support greater private investment over the longer term. The proposed EV Make-Ready Program will help to incentivize greater deployment of EVSE and will target deployment based on the geographical absence of public charging at areas with greater need and lower costs.

PSEG Long Island proposed an EV Make-Ready (Make-Ready) Program in 2020 to support and accelerate EV adoption on Long Island. The program directly supports New York State goals to achieve a 40% reduction in GHG emissions from 1990 levels by 2030, and to deploy 850,000 ZEVs by 2025. Long Island's share of the State goal is based on the ratio of vehicles registered on Long Island to those in the state, which is approximately 21%. In July 2020, the New York DPS released the Make-Ready Program Order that established statewide goals for a utility-supported EVSE make-ready program (Make-Ready Order).[21] The premise of the Make-Ready Order is that major electric utilities should provide financial contributions for make-ready infrastructure to accelerate EVSE deployment, enabling the more rapid adoption of EVs.

The components of the Make-Ready Program largely address key aspects outlined in the Make-Ready Order. The program is expected to include the following:

- **Make-ready funding:** Funding to support customer-side make-ready costs for Level 2 and DCFC charging stations.
- **Infrastructure:** Installation of utility-owned make-ready infrastructure for Level 2 and DCFC charging stations.
- **Identification of suitable locations for EVSE siting:** Development of load-serving capacity maps that would indicate optimal locations for siting DCFC and Level 2 chargers based on system constraints.
- **Fleet advisory services:** Advising customers on site feasibility, rate analysis, cost savings and bill impacts, and optimized charging strategies.

[21] Order Establishing Electric Vehicle Infrastructure Make-Ready Program and Other Programs, CASE 18-E-0138 Proceeding on Motion of the Commission Regarding Electric Vehicle Supply Equipment and Infrastructure, July 16, 2020.

- **NYSERDA EV Prize:** Contribution to three prizes designed to address emissions, equity, and electrification in communities near high density and congested streets and public highways.
- **Education:** Proactive outreach and education to EVSE developers on site selection, availability, and timing.
- **Process:** Development of a standards and approval process associated with stations receiving support through this program.

This Make-Ready Program builds on PSEG Long Island's ongoing EV program and is structured similarly to the requirements set out in the Order. The program proposed in 2020 focused on building a foundation in 2020 and 2021 to support the development of a broader program that will run through 2025. The foundational investments include developing a program implementation plan, deploying make-ready infrastructure and incentives, and developing an EV Salesforce database.

#### 3.2.3.1 Implementation Update

During 2020 and the first quarter of 2021, PSEG Long Island engaged a third-party EV expert consultant to develop an implementation plan to identify target EVSE infrastructure levels, make-ready costs and associated incentives, business models for make-ready and EVSE infrastructure deployment, and a plan to support identification of optimal locations for siting EVSE. This research and information provided guidance on how to scale up the EV Make-Ready Program through 2025. The implementation plan is included in Appendix B.

The implementation plan was divided into five main components:

- **Identification of target ports:** The target number of ports by charging station type (i.e., DCFC, public Level 2, and workplace Level 2) were specified on a year-by-year basis from 2021 through 2025.
- **Estimation of infrastructure costs:** The cost associated with infrastructure deployment. This includes Long Island-specific costs for overall make-ready infrastructure, and the breakdown between utility-side and customer-side costs.
- **Evaluation of business models:** Business models that incorporate different ownership, financing, or payment structures were assessed. The models evaluated include a rebate model as outlined in the Make-Ready Order and a lease model in which LIPA owns the make-ready infrastructure and leases it to the customer. The lease model could significantly mitigate near-term ratepayer impacts while providing a similar overall incentive to the customer.
- **Design of program funding requirements:** Appropriate funding amounts and the support necessary to achieve the identified target port goal were determined. The design of the funding program was informed by the infrastructure cost estimates and the business model evaluation.
- **Development of siting support approach:** An approach for indicating optimal locations for EVSE siting to customers was developed. This included a plan for allocating Level 2 and DCFC locations to corridors, communities, and towns.

##### *Scope Update*

The expanded scope of the EV Make-Ready Program and the funding necessary to achieve this scope are based on the results of the implementation plan. The key outcomes of each component of the implementation plan are detailed as follows.

### 1. Target Ports

The Long Island target of 178,500 EVs by 2025 (net of existing EVs[22]) and several other assumptions[23] were applied in the National Renewable Energy Laboratory's EVI-Pro Lite tool to determine the 2025 infrastructure targets: 518 DCFC ports, 1,903 public Level 2 ports, and 2,801 workplace Level 2 ports.[24]

Subtracting the existing ports from the total targets results in the program targets of 498 new DCFC ports and 4,247 new Level 2 ports to be constructed through 2025. To meet the 2025 target, construction is spread out between 2021 and 2025, with 5% in 2021, 15% in 2022, 25% in 2023, 25% in 2024, and 30% in 2025.

To quantify the number and distribution of ports, the implementation plan makes a distinction between corridor DCFC and community DCFC locations. Corridor DCFC are located near heavily traveled roadways and cater to long distance and local drivers. Community DCFC are sited near where EV owners live and work; they also consider more closely the needs of low-to-Moderate income (LMI) and Environmental Justice (EJ) communities. Level 2 chargers can occur in a variety of settings; the implementation plan groups all Level 2 chargers (workplace, public, low income and EJ) together.

The infrastructure targets are based on assumptions regarding the amount of infrastructure required to support New York State targets for EV adoption. Recognizing that actual EV adoption may vary from forecasts based on charging infrastructure availability, PSEG Long Island intends to monitor EV registrations in total and by EV type on an annual basis so that any deviations from forecasts can quickly be acknowledged and addressed. Depending on the types of deviation experienced (if any), PSEG Long Island would expect to identify the deviations and any resultant programmatic change to address as part of the annual Utility 2.0 reconciliation process in future years.

### 2. Infrastructure Costs

The Make-Ready costs are divided into two categories: Utility-Side Make-Ready (US-MR) and Customer-Side Make-Ready (CS-MR). PSEG Long Island is responsible for the US-MR, which includes any required upgrades and construction on the utility side of the meter. The Make-Ready costs per port are estimated for each port type, as shown in Table 3-12.

**Table 3-12. EV Make-Ready Infrastructure Costs**

| Port Type | US-MR | CS-MR | Total |
|---|---|---|---|
| Corridor DCFC | $6,000 | $110,330 | **$116,330** |
| Community DCFC | $10,000 | $67,555 | **$77,555** |
| Level 2 | $5,000 | $3,650 | **$8,650** |

[22] As of January 12, 2021, 17,608 existing EVs were registered on Long Island according to EValuate NY.

[23] 77% access to home charging: 77% charge at home fraction is the average of the Con Edison and non-Con Edison cases identified in the Make-Ready Order.

2. Full support for battery EVs (DCFC) and full support for plug-in hybrid EVs (PHEVs) (Level 2). This represents a generous planning assumption and likely results in more Level 2 facilities than necessary; however, the assumption was used to align with the Make-Ready Order.

3. 91% of all electric vehicles are battery electric vehicles (BEVs) and 9% are PHEVs.

[24] The assumptions around market share of BEVs and PHEVs resulted in significantly fewer Level 2 ports needed compared to the Make-Ready Order, which assumed 45% of vehicles are PHEVs. Analysis of the declining fraction of PHEVs over the past several years and extrapolation into the future indicates the market share of PHEVs will be about 9% in 2025. Refer to Appendix B for further explanation.

### *3. Business Model and Program Funding Requirements*

In developing its implementation plan, PSEG Long Island assessed several business models, with the objective of identifying a model that would effectively support New York State electrification objectives and align with guidance from the Make-Ready Order, while also minimizing ratepayer impacts. Due to accounting and financing nuances specific to LIPA's public power model, cash rebates are recovered through operating expenses and impact ratepayers in the year they occur. PSEG Long Island proposes a model that will allow LIPA to capitalize on the CS-MR infrastructure for DCFC, thus avoiding having to recover approximately $66 million in operating expenses (for rebates for CS-MR infrastructure) from ratepayers from 2021 through 2025.

The proposed model strongly aligns with the model recommended by DPS in its Make-Ready Order. In the Make-Ready Order, DPS proposes that utilities would first cover the costs associated with US-MR infrastructure, then issue a rebate for a portion of CS-MR infrastructure, with total utility-side and customer-side incentives capped per site and as a fraction of the total make-ready costs. For Level 2 infrastructure, PSEG Long Island expects the vast majority of make-ready costs to be for US-MR infrastructure, requiring under $1 million in customer rebates for CS-MR infrastructure. Therefore, this rebate model is proposed for Level 2 infrastructure.

An alternative lease model is proposed for DCFC, which is expected to have the majority of make-ready costs incurred for CS-MR infrastructure. In this model, LIPA will own all US-MR and CS-MR infrastructure and lease the CS-MR infrastructure to the customer over a 10-year period, after which the customer would own the CS-MR after the term of the lease. The total incentive for a given site will be computed in a manner consistent with the Make-Ready Order. The lease principal will be equal to the total make-ready infrastructure cost minus the customer incentive.

For both Level 2 and DCFC infrastructure, the incentive strategy is a three-tier structure based on the relative value of a given port to the market. Projects will be eligible for an incentive equal to 100%, 90%, or 50% of costs depending on specific requirements based on power, location, technology, and other factors. The expected allocation of ports per incentive tier is shown in Table 3-13 and is further described in Appendix B.

**Table 3-13. EV Make-Ready Customer Incentive Breakdown**

| Port Type | 100% Incentive | 90% Incentive | 50% Incentive |
|---|---|---|---|
| Corridor DCFC | 135 | 108 | 27 |
| Community DCFC | 46 | 160 | 23 |
| Level 2 | 212 | 637 | 3,398 |

The funding required for Level 2 ports is equal to the total incentive payments. This total amount is first allocated to the US-MR costs (capital), and the remaining incentive is paid in the form of a cash rebate to the customer (operating). The funding required for DCFC is equal to the total US-MR and CS-MR costs, which are capitalized. The costs, net of the incentives, are recovered from customers through the lease payments.

In addition to funding requirements for make-ready infrastructure, funding is also required to support overall program implementation and administration, including:

- **Program management:** General program management includes overall implementation of the program and customer engagement and marketing. PSEG Long Island proposes working with third-party contractors to manage the various components of the Make-Ready Program.

- **Lease management:** The lease model requires additional management aspects, such as contract execution, loan origination and ongoing payments, and procurement. Similar to general program management, PSEG Long Island proposes working with third-party contractors to manage the program aspects pertaining to the lease model.
- **IT investments:** PSEG Long Island proposes investing in an EV Salesforce database, data aggregation, and data collection to gain insight from charging data and support processes for future EV programs, rates, and investments.
- **Fleet advisory services:** PSEG Long Island proposes working with a third-party contractor to advise customers on site feasibility, rate analysis, cost savings and bill impacts, and optimized charging strategies.

Funding is also requested to support NYSERDA's EV Prize. NYSERDA's EV Prize is designed to address emissions, equity, and electrification in communities near high density and congested streets and public highways. PSEG Long Island proposes contributing to the pool of funds designated for the winners of the prize. Funding requirements are described further in Section 3.2.3.3.

#### *4. EV Siting Approach*

The implementation plan primarily focused on the geographic distribution of charging facilities. The study determined the towns and roadways where charging facilities should be built to maximize the impact of the investments, largely through reducing range anxiety and increasing EV adoption. PSEG Long Island will use the results of the siting study to work with developers and guide the location of projects, and to determine the incentive tiers of proposed projects.

### *Schedule Update*

PSEG Long Island finalized the implementation plan, program design, and funding process in 2021. The program launched in June 2021, and PSEG Long Island will begin deploying infrastructure and incentives.

The schedule to deploy infrastructure and incentives remains as originally proposed—from 2021 through 2025—though the assumed amount of infrastructure planned to be deployed in each year varies. All aspects of program management and data collection will span the full duration of infrastructure and incentive deployment.

The preparatory data collection and aggregation work began in 2021 and will continue through the duration of the program. Development of the EV database, originally planned for 2021, will be delayed to 2023. An alternative Captures database will be used until the new Salesforce database is completed.

**Table 3-14. EV Make-Ready Updated Project Schedule**

| Workstream | 2021 | 2022 | 2023 | 2024 | 2025 | 2026+ |
|---|---|---|---|---|---|---|
| **Program Design** | | | | | | |
| Finalize Implementation Plan | | | | | | |
| Establish Funding Process | | | | | | |
| **IT Investments** | | | | | | |
| Data Aggregation and Collection | | | | | | |
| Develop EV Database | | | | | | |
| **Infrastructure and Incentives** | | | | | | |
| Build Make-Ready | | | | | | |

| Workstream | 2021 | 2022 | 2023 | 2024 | 2025 | 2026+ |
|---|---|---|---|---|---|---|
| Deploy Customer-Side Funding | | | | | | |
| **Program Management** | | | | | | |
| General Program Management | | | | | | |
| Lease Management | | | | | | |
| Fleet Advisory Services | | | | | | |
| Customer Engagement | | | | | | |

#### 3.2.3.2 Funding Reconciliation for Approved Scope

The updated total forecasted spend for the previously approved scope is roughly in line with the approved budget. In 2021, the Make-Ready Program will be based on the rebate model, as previously proposed. The number of third-party owned Level 2 and DCFC ports remains at 254 and 20, respectively, resulting in approximately $1.5 million in capital expenses and $1.1 million in operating expenses. The four ports originally planned to be owned and operated by LIPA will no longer be deployed in 2021; these four ports will instead be deployed under the lease model in later years of the program. The original budget of approximately $0.6 million for ownership and operation of the DCFC ports is no longer included in the reconciled budget.

The budget for program management and IT investments was increased to include customer engagement, data aggregation and integration, and user interface development. The total operating cost for these activities is approximately $0.5 million; the details of the budget are discussed further in Section 3.2.3.3.

**Table 3-15. EV Make-Ready Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | - |
| | Actual | - | - |
| | **Variance** | **-** | **-** |
| Forecasted Spend 2021-2025 | Approved Budget | 3.20 | 1.83 |
| | Updated Forecast | 2.67 | 2.30 |
| | **Variance** | **0.52** | **(0.47)** |
| **Total Forecasted Spend 2019-2025** | **Approved Budget** | **3.20** | **1.83** |
| | **Updated Forecast** | **2.67** | **2.30** |
| | **Variance** | **0.52** | **(0.47)** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values. *See detailed breakdown for funding request for new scope in 3.2.3.3.*

#### 3.2.3.3 Funding Request for Expanded Scope

PSEG Long Island is requesting funding to expand the EV Make-Ready Program through 2025. The budget largely consists of the costs associated with the deployment of infrastructure and incentives but also includes the costs of program management, lease management, IT investments, fleet advisory services, and contributions to the NYSERDA EV Prize.

### 1. Infrastructure and Incentives

The cost details for the infrastructure and incentive payments are described in Section 3.2.3.1. At a high level, the capital expenses include all US-MR costs for DCFC and Level 2 chargers and the CS-MR costs for DCFC, which are capitalized and partially reimbursed through the lease payments (lease payments are not accounted for in the budget request, as they will be realized as added utility revenue in later years). The incremental capital funding required from 2022 through 2025 for the make-ready infrastructure is approximately $62 million. Additionally, approximately $4.7 million is required for upfront capital investments in DCFC, but this amount will be repaid by customers through the lease, as discussed previously.

The operating costs include the make-ready incentives and rebates paid to developers to cover the Level 2 CS-MR costs. The incremental O&M funding required is approximately $250,000 spanning 2022-2025.

### 2. Program Management

General program management includes overall implementation of the program and customer engagement and marketing. Responsibilities of program implementation include but are not limited to:

- Developing and reviewing program applications
- Providing support to program applicants and participants
- Assessing make-ready infrastructure requirements and costs
- Managing and monitoring deployment of infrastructure
- Supporting program evaluation and reporting on program progress and outcomes
- Marketing the program to relevant stakeholders

PSEG Long Island proposes working with third-party contractors to manage the many components of the program.

PSEG Long Island developed the budget for program management activities to align with the budget allocation of the EV make-ready programs of peer utilities in New York and New Jersey. Among the peer programs, the program administration costs ranged from 9% to 12% of total program costs. The remaining 88% of program costs were largely allocated to the make-ready infrastructure and incentives, but several utilities also allocated portions of the budget toward IT and data investments.

The total budget for infrastructure and incentives from 2021 through 2025 is $70.0 million. PSEG Long Island estimates the program administration budget to be approximately 10% of the total cost of program management plus infrastructure and incentives, which amounts to approximately $8 million over 5 years. This budget includes the customer engagement and outreach costs as well as the fleet advisory services costs.

Customer outreach and marketing is a key component of program management. Outreach will target commercial real estate developers and large retailers to encourage the development of public EV infrastructure and participation in the incentive program. Outreach channels will include the PSEG Long Island website, social and other digital advertising, local EV advocacy groups, virtual events, and webinars. PSEG Long Island will conduct a majority of the marketing in-house and estimates the budget required for these efforts to be approximately $1.5 million. Customer outreach and marketing represents approximately 19% of the program management budget, which aligns with peer EV make-ready program budgets in which marketing costs range from 13% to 33% of program administration costs.

### 3. *Lease Management*

The make-ready infrastructure for DCFC charging stations will be owned by LIPA, and the customer will make lease payments for 10 years, after which the customer would own the CS-MR after the term of the lease. Several aspects of this model warrant additional program management and support, including:

- Initial loan origination and ongoing processing
- Coordination with municipalities and site hosts to secure property rights and easements to deploy LIPA-owned make-ready infrastructure
- Procuring CS-MR infrastructure
- Developing and executing contracts with EVSE developers, site hosts, and equipment suppliers

PSEG Long Island estimates the budget for lease managment will make up approximately 5%-6% of the total cost of incentives, infrastructure, and program and lease management. PSEG Long Island proposes working with third-party contractors to manage many of the responsibilities described previously.

### 4. *IT Investments*

EV and EVSE adoption is expected to increase as a result of this program, and more data on customer participation, EVSE, and charging patterns is expected to become available. Insights gained from this data would help PSEG Long Island in its planning processes for future EV programs, rates, and investments, leading to improved and more cost-effective customer offerings with the potential to put downward pressure on rates. To gain value from the large amounts of data associated with the program, PSEG Long Island proposes several IT-related investments: EV database, data aggregation, and data collection.

PSEG Long Island originally proposed developing an EV Salesforce database in 2021 to efficiently collect data on EVs and charging stations. The Utility planned to work with its internal IT team to develop and implement the database using a platform provided by Salesforce. However, due to the magnitude of the work required by the internal IT team to develop the database, the development of this EV Salesforce database will be delayed to 2023. The budget of approximately $1.2 million remains as originally proposed.

A third-party contractor will also be responsible for the data aggregation. Through a competitive solicitation process, PSEG Long Island has selected third-party support to aggregate charger data across the various manufacturers and protocols into a single database that will allow efficient usage and analysis of data across all chargers. The budget for the data aggregation is $350,000 per year, with the exception of 2021, which is anticipated to be around $100,000 due to starting partially into the year and limited charger data.

The interval data from the charging stations collected by the data aggregator will be ingested into PSEG Long Island's Data Lake. PSEG Long Island will work with its internal IT team to develop the process for automating data collection and performing basic data cleaning and quality checks. This work is expected to span across 2021 and 2022, for a total cost of approximately $225,000.

### 5. *Fleet Advisory Services*

PSEG Long Island also proposes including fleet advisory services within the scope of the EV Make-Ready Program. These services will be available to advise customers on site feasibility, rate analysis, cost savings and bill impacts, and optimized charging strategies. PSEG Long Island will work with a third-party expert who will provide the fleet advisory service to potential customers. The Utility estimates the cost of fleet advisory services provided by a third-party contractor to be approximately $260,000 in 2022 and increase thereafter to support more complex services. The budget for the fleet advisory services in later years will be evaluated and reconciled based on the uptake and success of these services in the initial years of the program.

### *6. NYSERDA EV Prize*

The NYSERDA EV Prize is designed to address emissions, equity, and electrification in communities near high density and congested streets and public highways. There are three prize areas totaling $85 million: Environmental Justice Community Clean Vehicles Transformation Prize, Clean Personal Mobility Prize, and Clean and Medium- and Heavy-Duty Vehicle Innovation Prize. The prize money will be allocated to selected projects that address the focuses and goals of each prize.

PSEG Long Island customers do not contribute to NYSERDA, so the Utility proposes contributing to the NYSERDA EV Prizes if projects on Long Island are selected for a prize. PSEG Long Island proposes contributing 10% of the total funds, which represents the approximate proportion of New York customers in PSEG Long Island's territory. The $8.5 million in contributions will be spread between 2023 and 2025, starting at $2 million in 2023, then increasing to $3 million in 2024, and $3.5 million in 2025.

**Table 3-16. EV Make-Ready Capital Expenses**

| Funding Sub-Category | Capital Expenditure ($M) | | | | |
|---|---|---|---|---|---|
| | *4-Year Total* | 2022 | 2023 | 2024 | 2025 |
| Materials and Equipment | 62.39 | 9.82 | 16.36 | 16.36 | 19.85 |
| **Total** | **62.39** | **9.82** | **16.36** | **16.36** | **19.85** |

**Table 3-17. EV Make-Ready Operating Expenses**

| Funding Sub-Category | Operating Expenditure ($M) | | | | |
|---|---|---|---|---|---|
| | *4-Year Total* | 2022 | 2023 | 2024 | 2025 |
| Customer Incentives | 0.24 | 0.04 | 0.06 | 0.06 | 0.08 |
| IT Labor | 1.55 | 0.50 | 0.35 | 0.35 | 0.35 |
| Marketing and Outreach | 1.35 | 0.45 | 0.30 | 0.30 | 0.30 |
| Materials and Equipment | 4.68 | 0.73 | 1.22 | 1.22 | 1.51 |
| Ongoing O&M | 8.77 | 0.06 | 2.07 | 3.07 | 3.57 |
| Third-Party Support | 9.12 | 1.06 | 2.47 | 2.47 | 3.13 |
| **Total** | **25.72** | **2.84** | **6.48** | **7.47** | **8.94** |

### 3.2.3.4 Performance Reporting for Approved Scope

The program will not launch until 2021, so there are no metrics or benefits to report for 2020. The metrics and benefits will be reported in future filings, as described in Section 3.2.3.5.

### 3.2.3.5 Business Case with Expanded Scope

The benefit-cost analysis (BCA) includes the expanded scope of the EV Make-Ready Program spanning 2021 through 2025. The BCA was conducted by evaluating the impacts of make-ready infrastructure on EV and EVSE adoption. Cost and benefit streams and associated assumptions used in the BCA were defined by cross-referencing NYSERDA's 2019 *Benefit-Cost Analysis of Electric Vehicle Deployment in New York State*.[25]

Benefit streams considered include net avoided carbon emissions from reduced gasoline and increased electricity consumptions, avoided gasoline consumption, added electricity as a benefit for the utility, vehicle O&M savings, and gasoline security value. The benefits are largely driven by fuel switching, which accounts for avoided gasoline consumption from EV uptake, vehicle O&M savings from lower O&M costs associated with EVs, gasoline security value from a decreased need for imported oil, and federal tax credits for EVs. For the BCA, it was assumed approximately 161,000 additional EVs will be attributable to this investment that will be made from 2021 to 2025.[26]

Program costs include make-ready infrastructure, EVSE and respective ongoing O&M, program management, and IT investments, as described in Section 3.2.3.3. PSEG Long Island's contributions to the NYSERDA EV Prize are also included in the costs. Although some of these costs (e.g., EV Prize) do not necessarily directly relate to the realized benefits captured in the BCA, the overall impact on the BCA is negligible, as societal costs are driven primarily by incremental vehicle costs, which are orders of magnitude greater (nearly $1 billion). Other cost streams considered include added energy from increased electricity usage, added participant DER costs not rebated by the program, incremental vehicle cost, and added capacity costs. Details of societal benefits and costs are described in Figure 3-1.

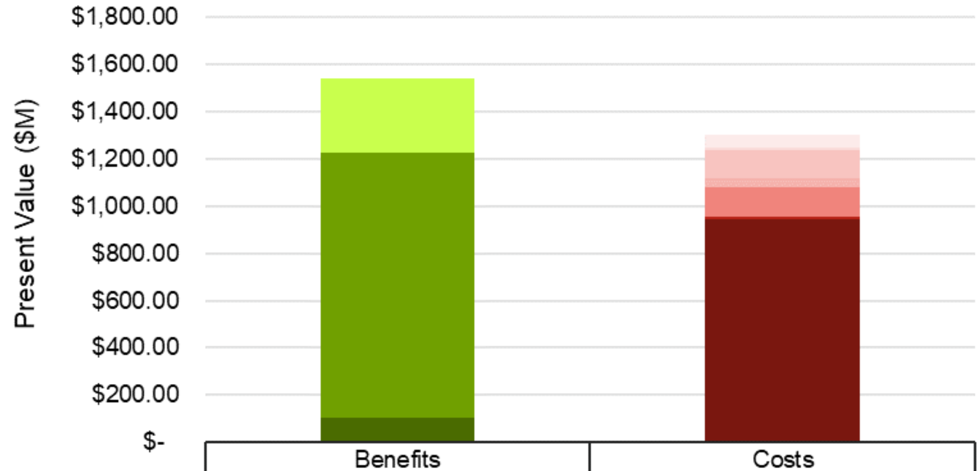
The proposed Make-Ready Program has a societal cost test (SCT) benefit-to-cost ratio of 1.18. This is a significant increase from the previously forecasted SCT benefit-to-cost ratio of 0.59. The difference is primarily driven by two factors: the adjustment of fuel switching costs from a cost to a transfer under the SCT and the addition of federal tax credits. The fuel switching costs are the retail electricity costs paid by customers to charge EVs. These costs were categorized as a cost under the SCT last year but were appropriately adjusted to be a transfer under the SCT. The federal tax credits for EVs were previously excluded due to multiple OEMs having reached the cap on the tax credits. However, most OEMs still have not yet reached their caps. Therefore, federal tax credits are assumed to apply to a portion of vehicles in 2021 and phase out through 2025.[27] It is possible that tax credits may be extended or enhanced, which would further improve the BCA.

[25] While most cost and benefit streams identified in NYSERDA's analysis were also considered in this analysis, some value streams were excluded due to negligible impact. These value streams include ancillary services and criteria pollutants for electricity and gasoline. The benefit stream associated with the state tax credit was excluded because of its lack of applicability to the cost-effectiveness tests employed. Other cost and benefit streams were mostly similar (within ±15% as compared on a per-vehicle basis), with some exceptions. Added carbon and energy costs were notably higher in NYSERDA's analysis (though the amount of gasoline and electricity consumption in both analyses are similar); charging infrastructure costs in this analysis are notably lower, primarily due to a reduced investment in Level 2 infrastructure.

[26] The estimated number of vehicles supported by 2025 is based on the incremental PHEVs and BEVs added relative to current levels, considering attribution of vehicle adoption to this Make-Ready Program. This attribution assumes a net-to-gross factor of 100% for BEVs and 100% for PHEVs, as assumed in the Make-Ready Order. While the number of vehicles attributable to this investment is based on statewide targets, the make-ready infrastructure deployed through this program may support more than the expected vehicles.

[27] The value of the federal tax credit is based on the proportion of vehicles sold to date that are eligible for the federal tax credit. As of 2021, Tesla and GM EVs are no longer eligible for the federal tax credit. These two makes approximately 43% of EVs sold in New York State, resulting in approximately 57% of EVs sold being eligible for the $7,500 federal tax credit in 2021. The percentage of EVs eligible for the tax credit is assumed to phase down to zero by the end of 2025, consistent with the assumptions in the NYSERDA BCA.

**Figure 3-1. EV Make-Ready Present Value Benefits and Costs of SCT**




| | Benefits | Costs |
|---|---|---|
| Incremental T&D and DSP Costs | $- | $55.19 |
| Added O&M | $- | $9.92 |
| Net Non-Energy Benefits | $312.24 | $- |
| Added T&D Capacity Infrastructure | $- | $118.21 |
| Added Generation Capacity Cost | $- | $39.19 |
| Added Energy (LBMP) | $- | $123.18 |
| IT Infrastructure Costs (O&M) | $- | $1.54 |
| IT Infrastructure Costs (Capital) | $- | $1.07 |
| Fuel Switching Benefits | $1,121.70 | $- |
| Net Avoided CO2 | $105.46 | $- |
| Program Administration Costs | $- | $7.76 |
| Participant DER Cost | $- | $946.35 |
| Total | $1,539.40 | $1,302.41 |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 1 | **Fuel Switching Benefits** | Benefits due to avoided gasoline consumption from EV adoption and gasoline security value. Avoided gasoline consumption is based on added EVs, vehicle miles traveled, and avoided gasoline consumption per vehicle as defined by Safer Affordable Fuel Efficient (SAFE) vehicle standards. | 1,121.70 | |
| 2 | **Net Avoided $CO_2$** | Includes reduced carbon emissions from reduced gasoline consumption and increased emissions from increased electricity consumption. | 105.46 | |
| 3 | **Net Non-Energy Benefits** | Includes the federal tax credit for EVs. | 312.24 | |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 4 | **Incremental T&D and DSP Costs** | Includes costs of US-MR under the rebate model for 2021 and US-MR and CS-MR under the lease model for 2022-2025. | | 55.19 |
| 5 | **Added O&M** | Includes costs for customer engagement, loan originator fees, NYSERDA EV Prize incentives, and fleet advisory services. | | 9.92 |
| 6 | **Added T&D Capacity Infrastructure** | Includes cost of added T&D capacity. Based on marginal capacity costs and estimated capacity requirements due to charging during coincident peak. | | 118.21 |
| 7 | **Added Generation Capacity Cost** | Includes cost of added generation capacity. Based on marginal capacity costs and estimated capacity requirements due to charging during coincident peak. | | 39.19 |
| 8 | **Added Energy (Location-Based Marginal Pricing, or LBMP)** | Includes cost of added energy from increased electricity consumption. Based on marginal energy cost and estimated charging volume for added EVs. | | 123.18 |
| 9 | **IT Infrastructure Costs (O&M)** | Includes IT integration costs for aggregating and ingesting data. | | 1.54 |
| 10 | **IT Infrastructure Costs (Capital)** | Includes IT integration costs for developing the Salesforce database. | | 1.07 |
| 11 | **Program Administration Costs** | Includes internal and external labor for program implementation lease management and user interface development. | | 7.76 |
| 12 | **Participant DER Cost** | Accounts for participant cost of make-ready not covered by rebates, cost of EVSE and respective ongoing O&M, incremental vehicle cost of added EVs, and make-ready lease payments. | | 946.35 |
| | **Total Benefits** | | **1,539.40** | |
| | **Total Costs** | | | **1,302.41** |
| | **SCT Ratio** | | **1.18** | |

### *Performance Measurement and Reporting*

To calculate the realized benefits and costs of the EV Make-Ready Program, PSEG Long Island will track the following metrics:

- **Number of ports:** Maintain a database of the number of DCFC community, DCFC corridor, and Level 2 ports deployed through the program. PSEG Long Island will use the number of ports to estimate the number of EVs supported by the Make-Ready Program to derive the direct benefits of the program.

- **Make-ready costs:** Collect data on the total costs of the make-ready infrastructure and the ratio of US-MR costs to CS-MR costs. This data will be used to verify the projected cost estimates or adjust the future cost.
- **Utility funds committed:** Track the funds committed to assess the total program costs and calculate the realized benefit-cost ratio.
- **Overall EV Adoption on Long Island:** Gather data from external sources to track the EV adoption. This data will be used to verify the assumptions about benefits derived from the Make-Ready Program.

### *3.2.4 Bucket Truck Electrification Plan*

| | |
|---|---|
| **Type** | Study |
| **Start Year** | 2022 |
| **Funding Approved Through** | N/A |
| **Status** | Proposed |
| **Description and Impact** | PSEG Long Island proposes developing an implementation plan for purchasing an electric bucket truck to inform future programs aimed at electrifying the broader population of medium and heavy duty vehicles and a long-term fleet electrification plan. Electrifying the full fleet of diesel-powered bucket trucks will be a key contributor to the decarbonization of PSEG Long Island's vehicle fleet. |

PSEG Long Island proposes developing an implementation plan for purchasing electric bucket trucks. Electrifying the fleet of bucket trucks will be a key contributor to the decarbonization of PSEG Long Island's vehicle fleet. Additionally, experience with electrifying bucket trucks may provide PSEG Long Island with insights to inform future programs aimed at electrifying other fleet vehicles and the broader population of medium and heavy duty vehicles.

The electric bucket truck market is nascent and few, if any, off-the-shelf solutions exist. The purpose of the implementation plan is to assess the options for purchasing electric bucket trucks, determine the best one for PSEG Long Island to pursue, and identify the associated costs, funding sources, and infrastructure requirements. The implementation plan will enable PSEG Long Island to request funding in subsequent years for the purchase of electric bucket trucks.

#### *Objectives*

PSEG Long Island plans to convert its fleet of 321 diesel-powered bucket trucks to electric bucket trucks through the typical replacement cycle. The scale of investment and infrastructure required to do so is not well understood, as few utilities have purchased an electric bucket truck and these vehicles require customization due to the lack of standard models. Additionally, utilities have limited experience with heavy duty EV charging infrastructure. PSEG Long Island recognizes the need to develop processes and best practices for medium and heavy duty charging infrastructure and vehicle deployment to meet statewide targets for EV adoption and transportation decarbonization.

PSEG Long Island proposes initiating the process of electrifying the fleet of bucket trucks by developing an implementation plan. PSEG Long Island expects to work with a third-party consultant to research opportunities and develop the implementation plan. The key objectives of the implementation plan are:

- **Identify electric bucket truck manufacturers and models:** The third-party consultant will conduct market research to understand existing manufacturers and models and identify options that best meet PSEG Long Island's requirements and specifications.
- **Establish charging infrastructure requirements:** The third-party consultant will determine the level of investment in infrastructure required to support charging the electric bucket trucks. This analysis will also identify the best locations to site the charging equipment, which will also result in recommendations for which vehicle yards PSEG Long Island should initially focus on.
- **Determine costs and funding sources:** The third-party consultant will identify all costs of the selected manufacturer and model and charging infrastructure as well as potential sources of grant money and external funding to supplement the costs.
- **Draft a long-term electrification plan:** PSEG Long Island will work with the third-party consultant to create a high level, long-term electrification plan. Identifying the schedule for truck replacement will support charging infrastructure planning and long-term budgeting.

***Scope***

The initial scope of the work includes contracting a third-party consultant and developing the implementation plan. The scope of the work to be performed by a third-party consultant is divided into two main components:

- **Research and benchmarking:** In this phase, the third-party consultant will perform a full assessment of the electric bucket truck market. The assessment will include gathering PSEG Long Island's requirements and specifications and identifying existing electric bucket truck manufacturers and models, options for custom-built solutions, and costs. The research will include benchmarking the electric bucket truck-related activities of other utilities and determine if similar solutions may be applicable for PSEG Long Island. This stage will involve interfacing with external vendors and manufacturers to gather the necessary information.
- **Implementation plan**: The third-party consultant will use the information gathered in the research and benchmarking phase to create a plan for PSEG Long Island to purchase, prepare for, and implement the electric bucket truck. The plan will propose the selected vendor(s) that PSEG Long Island will work with to design and purchase the truck. The third-party contractor will work with the selected vendor(s) to understand the magnitude of costs and the manufacturing and delivery timeline. The implementation plan will also include detailed requirements for charging infrastructure, including location, costs, requirements, and schedule.

  In addition to understanding the costs of the electric bucket truck and required charging infrastructure, the implementation plan will identify other potential funding sources. This may include grant money, rebates, and tax credits. This information will inform the total budget to be requested in the 2022 Utility 2.0 Plan.

  Finally, the implementation plan will draft a long-term plan for PSEG Long Island to electrify the fleet of bucket trucks. While the plan will focus a near-term pilot, it will also serve as a roadmap for long-term investment and infrastructure planning. The implementation plan will also consider the long-term needs for electrifying PSEG Long Island's other light and medium duty vehicles, such as service vehicles and passenger vans.

Based on the outcomes of the implementation plan, PSEG Long Island plans to develop a funding request for the 2022 Utility 2.0 Plan. The Utility plans to request the incremental costs for the electric bucket truck pilot relative to base costs for a typical diesel-powered bucket truck.

#### 3.2.4.1 Implementation Plan

This section provides the projected schedule for the bucket truck electrification plan.

### *Schedule*

The project schedule is divided into two main workstreams:

1. **Procurement:** Develop and issue an RFP for the third-party consultant. Once bids have been received, PSEG Long Island will review and select a third-party consultant. After completion of the contract, the third-party consultant will be responsible for developing the implementation plan.
2. **Implementation plan:** The implementation plan has two main stages: researching and benchmarking and developing the implementation plan. The first stage will focus on market assessment and identification of opportunities for PSEG Long Island to purchase an electric bucket truck. In the second phase, the third-party consultant will develop the actual implementation plan for PSEG Long Island to purchase an electric bucket truck, including costs, schedule, infrastructure requirements, and funding sources.

**Table 3-18. Bucket Truck Electrification Plan Project Schedule**

| Workstream | Q4 2021 | Q1 2022 | Q2 2022 |
|---|---|---|---|
| **Procurement** | | | |
| Procure Consultant | | | |
| **Implementation Plan** | | | |
| Research and Benchmarking | | | |
| Develop Implementation Plan | | | |

### *Customer Engagement and Communications*

This implementation plan will not require any customer engagement or communications.

### *Risks and Mitigations*

Potential risks and mitigations for the Bucket Truck Electrification Plan are identified in Table 3-19.

**Table 3-19. Bucket Truck Electrification Risk and Mitigation Assessment**

| Category | Risk | Mitigation |
|---|---|---|
| **Technical** | A suitable technology for electric bucket trucks may not exist at this time. | The relatively small investment in a study will determine if an existing technology is suitable for investment. |
| **Project Management** | Delays in procurement may prohibit the ability to request funding in the 2022 Utility 2.0 Plan. | Begin procurement process 8-10 months prior to the deadline to request funding. |

### 3.2.4.2 Funding Request

This section discusses the funding requested for the bucket truck electrification plan.

### *Capital Expenditure*

The initial scope of developing the implementation plan does not require any capital expenses.

### *O&M*

PSEG Long Island is requesting $100,000 for a third-party consultant to develop the implementation plan in 2022. There are no other funding requirements for 2022.

**Table 3-20. Bucket Truck Electrification Operating Expenses**

| Funding Sub-Category | Operating Expenditure ($M) | | | | |
|---|---|---|---|---|---|
| | *4-Year Total* | 2022 | 2023 | 2024 | 2025 |
| Third-Party Support | 0.10 | 0.10 | - | - | - |
| **Total** | **0.10** | **0.10** | **-** | **-** | **-** |

#### 3.2.4.3 Business Case

PSEG Long Island is seeking to begin electrifying its fleet of utility vehicles (including light duty vehicles) consistent with the availability of suitable technologies and cost-effectiveness. Each year, PSEG Long Island replaces approximately 26 bucket trucks. The bucket trucks are typically in service for about 11 years. Investing in electric bucket trucks early will avoid the need to invest in diesel vehicles, which would otherwise remain in operation for more than a decade.

Electrifying the fleet of bucket trucks is particularly challenging because few solutions exist in the market. Due to the complex requirements of the bucket trucks and the limited existing electric bucket truck market, PSEG Long Island is proposing to complete a study and develop an implementation plan before requesting funding for the purchase of an electric bucket truck. This work, to be completed by a third-party consultant, will establish a clear plan for PSEG Long Island to follow. This plan includes selecting the vendor(s), identifying other EV charging infrastructure requirements, determining the costs of the vehicle, and creating a plan to electrify the fleet over time.

Bucket trucks are large investments with long useful lifetimes. PSEG Long Island wants to ensure the most advantageous and cost-effective investment is made, which is the purpose of the study and implementation plan. This work will allow PSEG Long Island to make a well-researched and informed decision for not only the next 1-2 years but also in the long-term as PSEG Long Island looks to electrify the majority of its fleet of vehicles.

### *3.2.5 Suffolk County Bus Make-Ready Pilot*

| | |
|---|---|
| **Type** | Pilot |
| **Start Year** | 2022 |
| **Funding Approved Through** | N/A |
| **Status** | Proposed |
| **Description and Impact** | PSEG Long Island is proposing to support the EV make-ready infrastructure for Suffolk County's electric buses to better understand the needs, costs, and challenges of electrifying public transit fleets. The lessons learned through this initiative will be used to support and scale up future programs related to electrifying transit fleets, including identifying opportunities to reduce infrastructure requirements through managed charging. |

The proposed pilot goes beyond of the scope of the EV Make-Ready Program, which is focused on light duty vehicle charging infrastructure. Through this pilot, PSEG Long Island will work with Suffolk County to construct and contribute funds to the make-ready infrastructure for two 1.5 MW charging sites. This investment aligns with the state's goals of electrifying medium and heavy duty fleets, specifically public transit fleets. It offers the opportunity for PSEG Long Island to better understand the needs, costs, and challenges of electrifying public transit fleets. The lessons learned through this initiative will be used to support and scale up future programs related to electrifying transit fleets, including identifying opportunities to reduce infrastructure requirements through managed charging. The pilot will also provide insights for future programs related to broader and medium and heavy duty make-ready infrastructure.

The make-ready infrastructure will support the charging requirements of 40 buses. Suffolk County plans to initially purchase 10 buses in 2021 and begin operation in 2022 when the charging equipment is deployed. The subsequent 30 buses will be purchased between 2022 and 2025. The charging infrastructure will be built at two locations: West Babylon and Ronkonkoma. Suffolk County will use the Proterra 1.5 MW charging system. This system is optimal for charging electric buses and can support simultaneous charging on two pantographs. Suffolk County expects each charging site can support 20 electric buses.

### *Objectives*

The Suffolk County Bus Make-Ready Pilot directly aligns with the state's goal of electrifying 25% of the transit fleets of Suffolk County and four other fleets by 2025. The state and PSEG Long Island are prioritizing the electrification of public transit fleets for several reasons:

- Public transit fleet electrification will provide public service and public health benefits, especially for EJ communities, which may be disproportionately affected by the pollution from transit vehicles.
- Medium and heavy duty vehicle electrification, especially for public transit fleets, is particularly challenging but vital to achieving state policy goals. Addressing medium and heavy duty electrification concurrently with light duty vehicle electrification is necessary to achieve the electrification goals over the next 5-10 years. This initiative aims to build and develop core competencies for further supporting make-ready infrastructure for public transit fleets to achieve the state's transit electrification goals.

Supporting Suffolk County's transit electrification efforts is a unique opportunity for PSEG Long Island to learn about electrifying transit fleets. The Utility seeks to better understand the differences in costs, charging patterns, infrastructure requirements, and development process relative to light duty DCFC. The lessons learned from this initiative will provide valuable insights into supporting future public transit electrification.

### *Scope*

PSEG Long Island proposes to support the make-ready infrastructure required for the Suffolk County electric bus charging stations. Suffolk County plans to build two 1.5 MW charging stations to support 40 electric buses. The two Proterra 1.5 MW charging systems will be located at the West Babylon and Ronkonkoma charging sites and will each support 20 buses.

Suffolk County will provide and own the charging equipment, and STS will own the electric buses. Suffolk County and STS are planning to install the charging equipment in early-mid 2022 to begin operation of the first five buses at each location as soon as they are procured. PSEG Long Island will support the construction and funding for the make-ready infrastructure that will support the charging stations.

The make-ready infrastructure includes all equipment, materials, and construction needed to supply power to the charging stations. The requirements of each project vary widely, and typically a site assessment is required to determine the exact needs for infrastructure such as switchgear, new electrical service, meters, conduit, and conductors. The make-ready infrastructure is divided into two components: utility-side (US-MR) and customer-side (CS-MR). LIPA owns the US-MR infrastructure, and PSEG Long Island is responsible for the necessary construction, though is not necessarily responsible for covering the full costs. The CS-MR includes all infrastructure between the meter and the actual charging equipment. The customer is responsible for the construction and financing of the CS-MR infrastructure, though they may receive rebates from the utility to help cover the costs.

Similar to the light duty make-ready program, PSEG Long Island's investment in the make-ready infrastructure for Suffolk County is essential for supporting EV deployment. The partnership between PSEG Long Island and Suffolk County will also provide the opportunity for PSEG Long Island to collect charging and operation data and process feedback. The charging and bus route and operation data will be used to determine if the charging equipment and make-ready infrastructure are sufficient to fully support the EV buses. Surveys and interviews with Suffolk County, STS, and developers will provide insight into the process of development and opportunities to improve future support.

#### 3.2.5.1 Implementation Plan

The implementation plan is divided into three main workstreams:

1. **Finalize cost estimates:** PSEG Long Island will work with Suffolk County to develop more refined and finalized cost estimates for both the US-MR and CS-MR infrastructure. The refined costs will be used to determine PSEG Long Island's contributions to the make-ready costs.
2. **Deploy make-ready:** Beginning in early to mid-2022, the make-ready infrastructure will be deployed at the West Babylon and Ronkonkoma sites. Based on the cost contributions determined in the first stage, PSEG Long Island will deploy capital for the US-MR costs and send rebates for the CS-MR costs, if applicable.
3. **Data collection and evaluation:** After the make-ready infrastructure has been deployed, Suffolk County will begin operation of the electric buses. PSEG Long Island will collect data from Suffolk to understand the charging patterns, schedules, etc. The data will be evaluated to determine the sufficiency of the charging infrastructure and gain insight to apply to future support for public transit electrification.

***Schedule***

The projected schedule for the Suffolk County Bus Make-Ready Pilot is provided in Table 3-21.

**Table 3-21. Suffolk County Bus Make-Ready Pilot Schedule**

| Workstream | 2021 H2 | 2022 H1 | 2022 H2 | 2023 H1 | 2023 H2 |
|---|---|---|---|---|---|
| **Finalize Cost Estimates** | | | | | |
| Finalize Cost Estimates | | | | | |
| **Deploy Make-Ready** | | | | | |
| Deploy Infrastructure | | | | | |
| Issue Rebates | | | | | |
| **Data Collection and Evaluation** | | | | | |
| Data Collection | | | | | |
| Evaluation | | | | | |

***Customer Engagement and Communications***

This initiative heavily relies on engagement with Suffolk County. PSEG Long Island will work with Suffolk County to coordinate project details, such as cost, schedule, roles, and responsibilities.

### *Risks and Mitigations*

Table 3-22 outlines the potential risks and proposed mitigation steps for this initiative.

**Table 3-22. Suffolk County Bus Make-Ready Pilot Risk and Mitigation Assessment**

| Category | Risk | Mitigation |
|---|---|---|
| **Technical** | Charging infrastructure may not be sufficient for the planned bus routes and operation. | Coordinate with Suffolk County to confirm assumptions around charging requirements.<br>An objective of the initiative is to assess this risk and implement learnings in future support. |
| **Project Management** | Significant delays in delivery of the electric buses would lead to project delays and underutilization of the make-ready infrastructure. | Build flexibility into the project schedule to accommodate delays. |
| **Customer Engagement** | STS will be issuing a competitive bid for a bus operating company; there is a risk the new bus operator may underutilize electric buses due to resistance or lack of familiarity. | This will be negotiated with STS as part of the agreement, which conveys the funding for reimbursement of STS costs. |
| **Costs** | The costs may be significantly greater than currently estimated. | Establish contribution caps so PSEG Long Island's costs do not exceed a certain limit. |

### 3.2.5.2 Funding Request

This section describes the funding requested for the Suffolk County Bus Make-Ready Pilot.

### *Capital Expenditure*

PSEG Long Island proposes to contribute up to $500,000 to the make-ready costs of each site, which is comparable to the maximum utility contribution for a DCFC corridor site for the light duty Make-Ready Program. PSEG Long Island expects to contribute both capital and operating expenses to partially fund the make-ready infrastructure at the West Babylon and Ronkonkoma charging sites. The US-MR costs will be capitalized, and contributions toward the CS-MR costs will be operating expenses.

The two sites may differ significantly with respect to the distribution of costs between US-MR and CS-MR infrastructure. The West Babylon site is expected to require relatively little US-MR work, which would largely consist of installing new switches. The current cost estimate for this work is $100,000, and up to $400,000 will be paid to Suffolk County as a rebate for CS-MR costs.

The Ronkonkoma site is expected to require significantly more US-MR work. PSEG Long Island anticipates all $500,000 for this site will be allocated to the US-MR costs.

**Table 3-23. Suffolk County Bus Make-Ready Pilot Capital Expenses**

| | Capital Expenditure ($M) | | | | |
|---|---|---|---|---|---|
| **Funding Sub-Category** | ***4-Year Total*** | **2022** | **2023** | **2024** | **2025** |
| Materials and Equipment | ***0.60*** | 0.60 | | | |
| **Total** | ***0.60*** | **0.60** | | | |

#### *O&M*

PSEG Long Island expects the operating expenses to partially fund the make-ready infrastructure at the West Babylon and Ronkonkoma charging sites will contribute to the CS-MR costs.

**Table 3-24. Suffolk County Bus Make-Ready Pilot Operating Expenses**

| | Operating Expenditure ($M) | | | | |
|---|---|---|---|---|---|
| **Funding Sub-Category** | ***4-Year Total*** | **2022** | **2023** | **2024** | **2025** |
| Customer Incentives | ***0.40*** | 0.40 | - | - | - |
| PM, Labor, and Training | ***0.05*** | 0.01 | 0.04 | - | - |
| **Total** | ***0.45*** | **0.41** | **0.04** | **-** | **-** |

### 3.2.5.3 Business Case

The main objective of the Suffolk County Bus Make-Ready Pilot is to support the state objective of electrifying transit fleets. Supporting the make-ready infrastructure for Suffolk County's buses also provides PSEG Long Island with a unique opportunity to learn about electrifying medium and heavy duty fleets, specifically bus and transit fleets. The hypotheses and metrics of this initiative are largely related to the learning opportunities and the ability to leverage these insights for planning and in broader programs and initiatives.

**Table 3-25. Suffolk County Bus Hypotheses and Metrics**

| Hypothesis | Metric | Measure of Success | Data, Methodology and Assumptions |
|---|---|---|---|
| **PSEG Long Island can support the development of make-ready infrastructure for public transit at scale.** | Scalability of public transit make-ready | Successes and lessons learned from this initiative can be applied to future public transit make-ready support. | Project plans and processes, feedback from STS and contractors, initiative costs |
| **Unit costs for medium and heavy duty infrastructure, specifically for public transit, may vary versus the light duty make-ready program, as well as the allocation between the utility and customer.** | Make-ready cost; Utility contribution | N/A | Comparison of costs on a $/kW and $/site basis for Suffolk County Bus Initiative versus light duty DCFC |
| **Charging infrastructure is sufficient to support the range and route needs of the buses.** | Daily energy requirements | Buses run routes as planned without service issues. | Charging data, route data, process evaluation and survey information |

#### *Pilot Participation*

This pilot will specifically support the electrification of Suffolk County's transit buses by deploying make-ready infrastructure at two charging sites in West Babylon and Ronkonkoma. The make-ready infrastructure will support two 1.5 MW charging sites that will each be used to operate 20 electric buses.

***Performance Measurement and Reporting***

PSEG Long Island will track the following metrics to gain insight into the hypotheses included in Table 3-25:

- **Make-ready costs:** Track the total make-ready costs of each site. This will provide insight into the costs PSEG Long Island transit owners and operators can expect for similar public transit fleet electrification efforts.
- **Ratio of US-MR to CS-MR costs:** Track the portion of the total make-ready costs that are utility-side versus customer-side. This data will support the determination of how public transit make-ready costs are allocated and how they may vary from light duty.
- **Number of battery cycles per day:** Collect charging and operation data from Suffolk County. This data will be analyzed separately for the winter and summer seasons to understand how many battery cycles are needed each day to support the routes and if the charging equipment is sufficient to support the number of battery cycles required.

## 3.3 Customer-Sited Energy Storage

New York State has some of the most aggressive energy and climate goals in the country, and energy storage will play a crucial role in meeting these goals. Energy storage helps integrate clean energy into the grid, increases system efficiency, provides hosting capacity to support integration of more renewables and DER, and provides resiliency to keep critical systems online during an outage.

In 2018, Governor Cuomo announced a nation-leading goal of 1,500 MW of energy storage by 2025. Later that year, the New York Public Service Commission issued a landmark energy storage order establishing a goal of 3,000 MW of energy storage by 2030, and the deployment mechanisms needed to achieve the 2025 and 2030 energy storage targets. Based on the proportion of peak load compared to the entire State, approximately 188 MW should be installed on Long Island by 2025.

PSEG Long Island is using two storage systems with a total capacity of 10 MW/80 MWh on the South Fork, which is the fastest growing region on Long Island with approximately 2.0% annual load growth.

In April 2021, PSEG Long Island's Power Markets team issued a solicitation for 155 MW-175 MW of bulk energy storage to support the electric system on Long Island. PSEG Long Island expects to select proposals and execute contracts in 2022. PSEG Long Island is also procuring a 2.5 MW utility-owned and operated energy storage system in Miller Place, which will be used to defer the need to invest in the local distribution grid.

Beyond utility-scale storage, customer-sited energy storage can support meeting the State's goals. PSEG Long Island completed its Behind-the-Meter Storage with Solar Pilot in 2021 (Section 3.3.1). The pilot incorporates a 10-year tariff incentive to third-party aggregators that allows PSEG Long Island to remotely control customers' energy storage systems to reduce load during called events.

PSEG Long Island utilized REV Connect in 2021 to solicit ideas through the Grid Edge Flexibility Innovation Sprint for innovative business models that would encourage cost-effective distributed storage systems on Long Island, including customer-sited storage and community storage. From this sprint, PSEG Long Island did not identify any ideas that warranted investment in a pilot project specifically focused on distributed storage. Instead, the Utility sees that existing and future programs and projects include distributed storage as an element are likely to be preferable over those that focus exclusively on storage. For example, the Value of Distributed Energy Resources (VDER) tariff has resulted in developers pursuing community storage projects on Long Island, future NWS solicitations may provide an opportunity to deploy distributed storage in constrained network locations, and customer-sited storage is expected to be an important element within the Connected Buildings Pilot.

### *3.3.1 Behind-the-Meter Storage with Solar*

| | |
|---|---|
| **Type** | Program |
| **Start Year** | 2019 |
| **Funding Approved Through** | 2022 |
| **Status** | Ongoing |
| **Description and Impact** | BTM Storage with Solar offers the opportunity for third-party aggregators to install batteries paired with new or existing solar for residential PSEG Long Island customers. Enrollment was encouraged to alleviate overloading in target areas, increase customer engagement and energy literacy, and support state storage goals. |

The program uses a tariff-based incentive through which third-party aggregators and participants are compensated for verifiable load reductions. It is designed to alleviate overloading in target areas, increase customer engagement and energy literacy, and support state storage goals. The program was introduced in 2018, began in 2019, and was ongoing throughout 2020.

#### 3.3.1.1 Implementation Outcome

In 2020, PSEG Long Island saw a slowdown in installations due to the COVID-19 pandemic. The pandemic also impacted the DLM tariff enrollment period, and no enrollment was realized in 2020. Through 2020, there were 495 battery storage installations behind customer meters, but none have enrolled in the DLM tariff. PSEG Long Island is continuing to work with developers and aggregators in 2021 to increase enrollment in the DLM tariff, and enrollments prior to the summer of 2022 are anticipated.

While no systems participated in the DLM program in 2020, customer applications for solar PV paired with battery storage exceeded PSEG Long Island’s expectations. The high rate of adoption is likely due to the incentives offered by NYSERDA, which have resulted in increasing rates of developer interest in and adoption of storage. The success of the NYSERDA program indicates the incentives/rebate model is attractive to customers and developers for battery storage installations; however, unless such storage is discharged on peak days, the utility does not realize any benefits.

Additionally, through constant communication with aggregators, PSEG Long Island learned about the challenges aggregators face in enrolling their systems in the DLM tariff. The costs associated with aggregation and enrollment outweighed the compensation they would receive through the tariff. Under current participation levels, aggregators do not have sufficient capacity to warrant participation. PSEG Long Island is working to overcome these challenges by working closely with aggregators and OEMs and will implement lessons learned through this program in future initiatives.

### *Scope Update*

The scope of the BTM Storage program and the DLM tariff program remain as originally proposed, and the scope will be completed in 2021.

### *Schedule Update*

Enrollment of customers in the DLM program will continue in 2021, though no additional funding will be required. Following the 2021 enrollment period, PSEG Long Island will review the program and lessons learned.

**Communication with Aggregators**

PSEG Long Island learned about the challenges aggregators face in enrolling their systems in the DLM tariff and is working closely with aggregators and OEMs to overcome these challenges. Lessons learned will be implemented in future initiatives.

#### 3.3.1.2 Funding Reconciliation

The overall actual spend tracked closely to the budgeted amount of $0.16 million. The budget for BTM Storage with Solar was solely for incremental marketing and outreach activities and was largely allocated toward the search engine optimizer. Although the DLM tariff will continue to be available to customers, the marketing and outreach efforts that are part of the scope of this initiative were completed in 2020 according to the plan. Future marketing and outreach costs, should they be required, will be incurred, and reported under the EEDR Plan.

**Table 3-26. BTM Storage with Solar Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | 0.16 |
| | Actual | - | 0.14 |
| | **Variance** | **-** | **0.02** |
| Forecasted Spend 2021 | Approved Budget | - | - |
| | Updated Forecast | - | - |
| | **Variance** | **-** | **-** |
| **Total Forecasted Spend 2019-2021** | **Approved Budget** | **-** | **0.16** |
| | **Updated Forecast** | **-** | **0.14** |
| | **Variance** | **-** | **0.02** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 3.3.1.3 Performance Reporting

BTM Storage with Solar program benefits are derived by the number of systems installed—tracked by interconnection applications—and by the average load reduction per customer of these systems.

The delay in enrollment in the DLM tariff in 2020 was a result of several factors. The pandemic had the most significant impact, as it caused restrictions in system installations and the DLM enrollment period. Due to these delays, no aggregators were able to enroll in the 2020 capability period (Table 3-27).

**Table 3-27. BTM Storage with Solar Performance KPIs**

| Metric | Plan through 2020 | Actual through 2020 | Actual % |
|---|---|---|---|
| Interconnection Applications for Solar plus Storage | 330 | 495 | 150% |
| Total Load Reduction/Capacity Enrolled | 1,320 | - | 0% |

The benefits of this program are a function of enrollment in the DLM tariff. Due to the challenges described previously, no aggregators enrolled in the DLM tariff in 2019 or 2020, so no benefits were realized for either year (Table 3-28).

**Table 3-28. BTM Storage with Solar Benefit Reporting**

| Benefit | Plan through 2020 ($M) | Actual through 2020 ($M) | Actual % |
|---|---|---|---|
| Avoided F&PP Costs | 0.06 | - | 0% |
| Avoided Capital Costs (Non-Labor) | 0.12 | - | 0% |
| **Total** | **0.18** | **-** | **0%** |

F&PP: fuel and purchased power

## 3.4 Non-Wires Solutions

In recent years, NWS have become an area of significant focus for utilities, particularly in New York State. This focus in New York State is driven by REV and the opportunities for New York utilities to use NWS to provide greater economic value for the utility and its customers. NWS allow PSEG Long Island to avoid or defer traditional T&D investments by using alternative solutions such as energy storage, distributed generation (DG), EE, and DR. They can deliver cost savings to customers and achieve system-wide and localized benefits (e.g., environmental). NWS are one of the tools envisioned under REV, maximizing the use of cost-effective DER to meet system needs.

PSEG Long Island solicited for its first NWS as part of its South Fork RFP issued in 2015. The Utility first launched the Super Savers program in 2018, a program with various EE and DR measures geographically targeted at residential and commercial customers in constrained areas. In its 2018 Plan, PSEG Long Island proposed developing an NWS Planning Tool to improve the confidence level that screened projects could actually be realized. The Utility worked with a third-party contractor on developing the NWS Planning Tool and it was completed in early 2021 and is operational.

In 2021, PSEG Long Island plans to develop a strong foundation for future NWS procurements through the approved NWS Process Development initiative. This initiative will address the market solicitation process, contracting process, contract management process, and defined funding mechanism. These processes will help the Utility to act on NWS opportunities more quickly, run solicitations more effectively, and procure solutions more cost-effectively, as well as avoid missing any economically beneficial NWS opportunities due to funding uncertainty.

With the establishment of the NWS process playbook as part of the NWS Process Development initiative, PSEG Long Island will have a complete process through which planned capital projects can be screened for NWS and solicited. Through data analytics, PSEG Long Island is also improving its ability to merge and analyze all customer data, which can help improve the output of the NWS Screening Tool and further inform prospective proposals to NWS solicitations from third parties. PSEG Long Island envisions that this process could be further automated to reduce what will still be many weeks of staff time associated with each NWS solicitation.

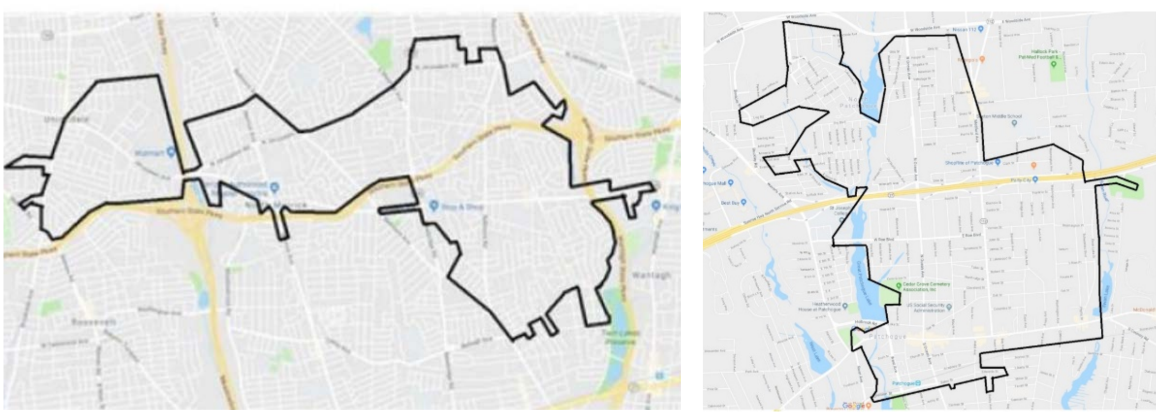
As this process is being developed over the next year, PSEG Long Island may issue a solicitation for opportunities that will be determined as achievable through the NWS Planning Tool.

### *3.4.1 Super Savers: NWS with Targeted EE*

| | |
|---|---|
| **Type** | Program |
| **Start Year** | 2019 |
| **Funding Approved Through** | 2022 |
| **Status** | Ongoing |
| **Description and Impact** | Super Savers is an NWS seeking to reduce peak to defer traditional capital investment. Through the initial pilot in North Bellmore, PSEG Long Island is learning how to encourage the community adoption of EE and DER measures and whether they can shed enough load to defer infrastructure upgrades. The Super Savers program in North Bellmore was extended to 2022 and expanded to Patchogue, which will run through 2023. |

Super Savers is an NWS seeking to reduce peak demand by 4 MW to defer traditional capital investment. The initial offering in North Bellmore serves as a pilot for PSEG Long Island to understand strategies that work to help customers reduce load on the system. Through this pilot, PSEG Long Island is learning how to encourage the community adoption of EE and DER measures and whether they can shed enough load to defer infrastructure upgrades. The Super Savers Program was extended to Patchogue (see Figure 3-2), which was launched in 2020.

**Figure 3-2. North Bellmore (Left) and Patchogue (Right) Super Savers Areas**



Initially, PSEG Long Island learned that customers face barriers to participation such as the out-of-pocket expense and lack of awareness. To combat these barriers, the Utility offered larger incentives and increased its marketing and outreach campaigns. PSEG Long Island learned that increasing the value of rebates and incentives to customers did not increase participation to the degree needed. Even when the value of the incentives resulted in a free or nearly free offer, the participation rate remained lower than expected. The same was true for increased outreach and marketing, which seemed to have little impact on participation

To address this, PSEG Long Island is increasing the variety of its incentive offerings rather than just the value and will look to promote and implement the direct install of pool pump switches. The pool pump switches are controlled over the existing AMI network for additional dispatchable load reduction. For 2021, the Super Savers team has also partnered with another vendor that will provide turnkey services including marketing, EE, direct load control, DR, and DER. The vendor guarantees savings through 2023.

**Success Snapshot**

The Super Savers Program created a Tableau-based tool that uses AMI interval data to identify customers whose load profiles are consistent with pool pump energy consumption and their location via satellite map. This tool will be used for targeted marketing of the pool pump switch pilot.

A key takeaway for NWS programs going forward is how barriers in the Super Savers program area are different than those seen in similar DER incentive programs. Unlike DER incentive program offerings, which are the same for customers regardless of location, incentives in the Super Savers Program were based on being located within a specified circuit. Because customers do not typically associate themselves with a given electrical circuit on the grid, customers may find it challenging to determine if they are eligible for the program. Because of this, PSEG Long Island has learned that the most effective strategy for increasing participation is one-on-one outreach, though that requires more resources than typical outreach and marketing campaigns. PSEG Long Island faced particularly difficult door-to-door and one-on-one marking strategies in 2020 due to the COVID-19 pandemic.

#### 3.4.1.1 Implementation Update

By the end of 2020, the North Bellmore Super Savers Program achieved a 1.8 MW peak demand reduction, 45% of the 4 MW peak reduction goal. The remaining peak reduction of the 4 MW goal is being targeted as the goal for 2021-2022. At this level of reduction, Super Savers is contributing a 4.5% reduction of the approximately 40 MW peak on this circuit. This result is consistent with what PSEG Long Island has seen in other areas, and it provides a reasonable target, of about 4%-5% of the location's peak, for future NWS programs.

##### *Scope Update*

The scope of North Bellmore Super Savers remains as previously proposed. PSEG Long Island continues to refine its tactics to achieve this scope.

The scope of Patchogue Super Savers remains similar to what was originally proposed, but the program will be administered by a third-party contractor through a performance-based contract instead of by PSEG Long Island directly.

##### *Schedule Update*

The schedule for North Bellmore Super Savers was extended through 2022 because the traditional T&D upgrade will not be completed until 2024. PSEG Long Island will evaluate in 2022 whether further extension of the program into 2023 is warranted.

The schedule for Patchogue Super Savers was delayed approximately 1 year. The program was planned to launch at the beginning of 2020 but was delayed to the end of the year due to contracting delays and the impacts of the pandemic. The total duration of 3 years has not changed, and the program is now planned to span from 2021 to 2023.

#### 3.4.1.2 Funding Reconciliation

The actual spending toward the Super Savers North Bellmore Program was slightly less than the approved budget, largely due to the impacts of the pandemic on marketing and installation efforts. As noted previously, Super Savers North Bellmore will be extended through 2022.

Due to the delayed launch of the Super Savers Patchogue Program, the majority of the budget of approximately $500,000 for 2020 was not used. While the overall budget of Super Savers Patchogue is expected to track closely to what was originally planned, the budget will be pushed back by 1 year to span from 2021 to 2023.

Overall, the updated total forecasted spend is expected to be slightly higher than the approved budget.

**Table 3-29. Super Savers Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | 1.46 |
| | Actual | - | 0.77 |
| | **Variance** | **-** | **0.69** |
| Forecasted Spend 2021-2023 | Approved Budget | - | 2.01 |
| | Updated Forecast | - | 2.98 |
| | **Variance** | **-** | **(0.97)** |
| **Total Forecasted Spend 2019-2023** | **Approved Budget** | **-** | **3.46** |
| | **Updated Forecast** | **-** | **3.75** |
| | **Variance** | **-** | **(0.29)** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 3.4.1.3 Performance Reporting

The North Bellmore Super Savers Program achieved 45% of its peak demand reduction target of 4 MW through 2020. The realized savings fell below the targets largely due to the impacts of the pandemic on marketing and installations. The Super Savers Program previously relied heavily on door-to-door marketing to target specific customers, but this marketing strategy was difficult to implement during 2020.

Although the peak demand reduction targets have not been met, all incremental reduction helps in assessing whether capital expenditure deferral is possible. The demand reduction and the insights gained from this program ultimately save or postpone investments that otherwise may have occurred.

Based on the participation through 2020, PSEG Long Island was able to realize a portion of the projected benefits of the North Bellmore Super Savers Program (Table 3-30). The Avoided Generation Capacity Cost, Avoided Transmission Capacity Infrastructure, and Avoided Distribution Capacity Infrastructure benefits are realized through the peak demand reduction. The Avoided Energy and Avoided $CO_2$ benefits are realized through the energy savings.

**Table 3-30. Super Savers North Bellmore Benefit Reporting**

| Benefit | Plan through 2020 ($M)[28] | Actual through 2020 ($M) | Actual % |
|---|---|---|---|
| Avoided F&PP Costs | 0.66 | 0.33 | 50% |
| Avoided Capital Costs (Non-Labor) | 0.17 | 0.09 | 52% |
| Avoided Carbon Emissions | 0.17 | 0.12 | 73% |
| **Total** | **1.01** | **0.54** | **54%** |

Due to the delay in the launch of the Patchogue Super Savers Program, no KPIs or benefits are reported for 2020.

### *3.4.2 Non-Wires Solution Planning Tool*

| | |
|---|---|
| **Type** | Tool |
| **Start Year** | 2020 |
| **Funding Approved Through** | 2020 |
| **Status** | Ongoing |
| **Description and Impact** | The NWS Planning Tool offers PSEG Long Island the ability to assess the feasibility of NWS as an alternative to planned capital investment. In 2020, a vendor was selected, and in the first quarter of 2021, the tool was delivered, along with instructions and documentation. The scope was slightly expanded to convert the final data language and extend the lifetime of the tool, which will be completed in mid-to-late 2021. |

The NWS Planning Tool will offer PSEG Long Island the ability to assess the feasibility of an NWS as an alternative to a planned capital construction project by computing achievable customer penetration percentages of different customer-sited capacity reduction measures based on known customer data for that circuit and price elasticity for the customer percentage of the measure(s) cost.

The tool incorporates data from the Data Lake, leverages outputs from the Locational Value Study (see Section 4.1.2) and other customer inputs (usage data, prior program participation) to forecast whether a solution set could be achievable by a third-party contractor that would meet the savings load shape necessary to defer a planned capital construction project. If PSEG Long Island finds a feasible solution, it will go out with a solicitation for an RFP or RFI and will review submitter's technical proposals to determine if a proposal could reliably defer the planned capital construction project. If a solution was found not to be feasible through either the NWS Screening Tool or RFP/RFI submission, PSEG Long Island would recommend the capital construction project proceed to resolve the load constraint.

#### 3.4.2.1 Implementation Update

A vendor was selected in the first quarter of 2020 and worked with Data Analytics and the T&D organization to develop the tool throughout 2020. A majority of the development work, including a slight change in scope, was completed in the first quarter of 2021, with the tool delivered, along with instructions and documentation.

[28] The BCA submitted in the 2018 Utility 2.0 Plan was based on a peak demand reduction target of 3 MW. Since then, the goal for the initiative has been revised; the planned demand reduction is 4 MW.

***Scope Update***

The scope of the NWS Planning Tool remains mostly as planned with a slight expansion to include a final software language conversion. The original scope of work was completed in Stata, but for PSEG Long Island to be able to update the data table used in the optimization functions of the tool in future years without vendor assistance, it needs to be converted to Python. In the absence of this data language conversion, the tool would begin to lose accuracy in 2022. Though the initial loss of accuracy would be minimal in the first year, it would continue to increase each year. This expanded scope results in an amendment to the existing contract and will require a minimal level of IT involvement.

***Schedule Update***

The NWS Planning Tool was expected to be completed in 2020, but completion was delayed until March 2021 due to internal resource constraints (see Section 1.2). The expanded scope discussed previously will extend the finalization of the tool into mid-to-late 2021.

#### 3.4.2.2 Funding Reconciliation

The approved budget was $200,000, which covers the base costs for the tool development ($160,000) and expected costs for the software language conversion ($40,000). The majority of costs that were expected to occur in 2020 were instead incurred in 2021, due to schedule delays. No net changes to the overall budget are expected, but some costs are shifting from 2020 to 2021.

**Table 3-31. NWS Solution Planning Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | 0.20 |
| | Actual | - | 0.08 |
| | **Variance** | **-** | **0.12** |
| Forecasted Spend 2021 | Approved Budget | - | - |
| | Updated Forecast | - | 0.12 |
| | **Variance** | **-** | **(0.12)** |
| **Total Forecasted Spend 2019-2021** | **Approved Budget** | **-** | **0.20** |
| | **Updated Forecast** | **-** | **0.20** |
| | **Variance** | **-** | **-** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 3.4.2.3 Performance Reporting

Although there are no direct projected KPIs or benefits for the NWS Planning Tool, indirect benefits of the tool include improved information for grid investments, DER, and BTM customer solutions.

### *3.4.3 NWS Process Development*

| | |
|---|---|
| **Type** | Study |
| **Start Year** | 2021 |
| **Funding Approved Through** | 2021 |
| **Status** | Ongoing |
| **Description and Impact** | PSEG Long Island is developing a formalized, replicable, and transparent process for identifying, selecting, procuring, and deploying NWS. Procurement of a third-party consultant to develop an NWS Process Playbook is underway, and the study is expected to be completed in late 2021. |

PSEG Long Island is developing a formalized, replicable, and transparent process for identifying, selecting, procuring, and deploying NWS for T&D-level deferral opportunities. This process includes defining market solicitation principles; developing templates for solicitation, bid screening, and contracting; and developing a funding mechanism that enables PSEG Long Island to properly charge NWS solution costs without lengthy budget reappropriation efforts or postponement to future budget cycles.

#### 3.4.3.1 Implementation Update

PSEG Long Island is in the process of procuring a third-party consultant to develop an NWS Process Playbook that will include detailed guidelines around the following components:

- NWS opportunity identification
- Market solicitation process
- Accounting process
- Contract management process

For each of these components, the third-party consultant is expected to research and benchmark best practices, assess the current state of PSEG Long Island's NWS programs and processes, and develop any necessary tools and processes.

PSEG Long Island expects to use the NWS Process Playbook for all future NWS opportunities.

***Scope Update***

The scope remains as originally proposed.

***Schedule Update***

The schedule remains as originally proposed.

#### 3.4.3.2 Funding Reconciliation

The projected cost of contracting with a third-party consultant to develop the tools and processes remains as originally proposed. The total cost of $0.5 million for this work is operating expenses and will occur during 2021 as originally planned.

**Table 3-32. NWS Process Development Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | - |
| | Actual | - | - |
| | **Variance** | **-** | **-** |
| Forecasted Spend 2021 | Approved Budget | - | 0.50 |
| | Updated Forecast | - | 0.50 |
| | **Variance** | **-** | **-** |
| **Total Forecasted Spend 2019-2021** | **Approved Budget** | **-** | **0.50** |
| | **Updated Forecast** | **-** | **0.50** |
| | **Variance** | **-** | **-** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 3.4.3.3 Performance Reporting

NWS Process Development does not have specific KPIs or benefits. The goals of this work remain the same as originally proposed and are expected to ensure the following for PSEG Long Island's NWS solution implementation:

- Avoid delays in budgeting and approval that may lead to missed NWS opportunities
- Avoid issues associated with limitations in O&M budget that lead to de-prioritization of NWS opportunities
- Procure the most cost-effective solutions to address NWS opportunities
- Improve the alignment of NWS planning and procurement with other New York utilities

# 4. Evolve into a Customer-Centric DSP

As a future DSP, it is expected that PSEG Long Island will plan for and operate a dynamic grid that encompasses distributed energy resources and associated capabilities. Achieving this vision requires enhancements in the platforms, tools, and information that are available to PSEG Long Island's planning engineers and grid operators.

To this end, PSEG Long Island is investing in foundational projects and programs that can deliver such platforms, tools, and information in alignment with the overall Utility 2.0 roadmap. Some of these investments are funded through Utility 2.0 and some as part of regular operations and budgets. In keeping with the customer-centric vision, PSEG Long Island is aiming for DSP investments to have tangible customer benefits, such as reduced customer bills, improved service quality, increased DER penetration, and reduced carbon footprint.

The chapter is organized in four subsections, each representing a theme area (as shown as follows). The subsections provide an update on ongoing initiatives proposed and approved in past Utility 2.0 Plans, detailed descriptions for one new initiative proposed in this year's Utility 2.0 Plan for launch in 2022 (Increasing Hosting Capacity Study), and a preview of planned initiatives that PSEG Long Island is considering for future Utility 2.0 plans.

**Chapter Contents**



## 4.1 Integrated Planning

With the rapid growth in DER interconnections to the electric system, utility planning analyses based on known information will have to evaluate an increasingly complex and dynamic system environment, where the combined behaviors and mutual effects of loads and supply resources can vary significantly. PSEG Long Island continues to integrate DER into its planning and operations to support further DER growth on Long Island and to achieve improved customer satisfaction.

To support effective integrated planning, PSEG Long Island has established the UoF team. The team's responsibilities include developing and implementing PSEG Long Island's DSP vision and functionality to advance the T&D system as envisioned under New York's REV. Ongoing and future Integrated Planning initiatives align with the core functional areas assigned to the UoF team, including but not limited to:

- Develop enhanced applications to advance the distribution system
- Advance distribution planning analysis using AMI—conservation voltage reduction (CVR), volt/VAR optimization (VVO)
- Unlock AMI capabilities to deliver enhanced system reliability
- Promote integration and growth of DER
- Demonstrate and implement projects to support New York REV initiatives
- Support DER market-related functions and initiatives
- Leverage best practices established by the Joint Utilities of New York
- Conduct special studies and provide technical support to implement customer-centric DSP functionalities

The full suite of Integrated Planning capabilities aims to achieve reliable, safe, and efficient planning and design of the electric T&D system under increased penetration of DER. The UoF team drives the development of REV-related capabilities to meet the REV objectives and the State policy goals. The team is also aiming to expand its effort to unlocking future capabilities of AMI data in relation to REV-related initiatives.

At the core of PSEG Long Island's efforts to further enhance its integrated planning processes is the Locational Value Tool that was completed in late 2020. The tool's output will be used to evaluate potential candidate sites for NWS projects. The tool will incorporate load growth, load relief, and financial parameters to determine the cost-effectiveness of implementing DER for potential deferral of capital projects. The tool will work in conjunction with the NWS Planning Tool that is discussed in section 3.4.2.

Looking ahead, the team is working on multiple efforts to increase hosting capacity on the distribution circuit. In 2021, the team will launch Hosting Capacity Stage 3 Maps and is involved in the PSEG Long Island Interconnection Working Group to capture DER industry comments on the development of these maps. In addition, the UoF team conducted analysis of AMI voltages and is working on improving customer voltages as part of the CVR program. Going forward, the team will explore opportunities such as enhanced distribution modeling and other technologies to inform resiliency and interconnection capacity of the grid as needed.

### *4.1.1 Utility of the Future Team*

| | |
|---|---|
| **Type** | Labor |
| **Start Year** | 2019 |
| **Funding Approved Through** | 2022 |
| **Status** | Ongoing |
| **Description and Impact** | The UoF team proactively drives REV-related capabilities and objectives. The team was staffed in the first half of 2019 and has completed several major initiatives such as deploying the Locational Value Tool and Hosting Capacity Maps. |

The UoF team serves one of PSEG Long Island's core business functions and proactively drives REV-related capabilities and objectives. The team is focused on unlocking the capabilities of AMI data and spearheading the utility shift from system-level planning and capital investment to more granular, location-based T&D planning. It also implements demonstration projects, recommends advanced planning and operational capabilities, develops policy, enables DER integration, and paves the way for a customer-centric DSP.

#### 4.1.1.1 Implementation Update

The UoF team was established in the first half of 2019, and has completed several major initiatives such as:

- Deploying the Locational Value Tool
- Issuing a grid storage RFP and selecting a vendor
- Deploying Hosting Capacity Stage 2 Maps
- Engaging with the Data Analytics team and other internal stakeholders
- Unlocking capabilities of AMI to support New York REV and energy policy objectives

The team is building on recently implemented foundational capabilities to further evolve the distributed system platform. Using AMI data, the team is working with operations to optimize distribution voltages. The team is also using AMI data to optimize voltages across the T&D system, creating a framework for the CVR program.

The UoF team engages with the Joint Utilities of New York to participate in the Joint Utilities' hosting capacity stakeholder sessions and to learn about their best practices to develop projects and initiatives envisioned under New York's REV and continued through the Climate Act. The team also participates in the New York State Market Design Working Group to get an understanding of the market rules that the DPS is developing to support the integration of DER; it also participates in the EPRI Drive User Group for future development of hosting capacity maps.

***Scope Update***

The scope to support customer-centric DSP-related initiatives remains the same as originally proposed, with one exception: the removal of the Joint Utilities membership fees because PSEG Long Island will not be joining the Joint Utilities as a full member as originally planned; the Utility will instead join information-sharing meetings as needed and on an ad hoc basis.

***Schedule Update***

The UoF team continues to deliver on its scope without schedule changes.

#### 4.1.1.2 Funding Reconciliation

Capital spend for internal labor was on budget in 2020. Due to updates to labor rates, the capital and O&M budget pertaining to internal labor for the five FTEs that make up the UoF team has increased in 2022.

Also, in place of joining the Joint Utilities, PSEG Long Island and the Joint Utilities will have an information-sharing relationship that does not require Joint Utilities membership fees but does have limited costs based on participation in meetings. This led to reduced O&M spend in 2020 and forecast for 2021 onward.

The updated total forecasted spend for O&M is expected to be lower than the approved budget, while updated total forecasted spend for capital is expected to be slightly higher than the approved budget.

**Table 4-1. UoF Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 0.57 | 1.40 |
| | Actual | 0.56 | 0.49 |
| | **Variance** | **0.01** | **0.91** |
| Forecasted Spend 2021-2022 | Approved Budget | 0.48 | 3.12 |
| | Updated Forecast | 0.62 | 1.99 |
| | **Variance** | **(0.14)** | **1.14** |
| **Total Forecasted Spend 2019-2022** | **Approved Budget** | **1.05** | **4.52** |
| | **Updated Forecast** | **1.18** | **2.48** |
| | **Variance** | **(0.12)** | **2.05** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 4.1.1.3 Performance Reporting

In 2020, the UoF team continued to support DSP-related initiatives. These initiatives will contribute to benefits through the programs and projects the UoF team supports. An example of this is the realization of benefits from the Data Analytics use case of Transformer Load Management (Section 0), for which the UoF team provided support and subject matter expertise.

### *4.1.2 Locational Value Study and Tool*

| | |
|---|---|
| **Type** | Tool |
| **Start Year** | 2019 |
| **Funding Approved Through** | 2022 |
| **Status** | Ongoing |
| **Description and Impact** | The Locational Value Study involves a granular and locational analysis of load information regarding T&D system limitations, which is needed to incentivize DER solutions and evaluate the potential of NWS projects. The Locational Value Study and its associated tool and report were completed in late 2020; output from the tool will serve as an input to the NWS Planning Tool. |

The Locational Value Study involves a granular and locational analysis of load information regarding T&D system limitations. It captures location-specific constraints to calculate the value of interconnecting DER to support effective relief of grid constraints. The Locational Value Study and its associated tool and report were completed in late 2020. The output from the tool will serve as an input to the NWS Planning Tool (see Section 3.4.2).

#### 4.1.2.1 Implementation Update

In 2019, PSEG Long Island selected a consultant and completed the preliminary results of the Locational Value Study. Using a probabilistic load forecasting methodology combined with contingency analysis, the study was independently able to identify T&D constraints. The study also developed a methodology to calculate the deferral value of T&D capital projects. As part of this effort, the study developed load pocket-specific prices ($/kW-year) to capture the true value of adding incremental DER in the future. The study results showed that deferral values are concentrated in a handful of load pockets where capital projects are needed rather than in all load pockets. The study captured the annualized ($/kW-year) value of DER when implemented on the system to defer the capital investment.

The UoF team also developed a Locational Value Tool, building off the study described above, which estimates the value that is used to defer T&D capital investment. Outputs of the tool are used as an input into the NWS Planning Tool, which is being developed to evaluate potential candidates for NWS projects. The Locational Value Tool evaluates parameters such as the load relief required circuit load and growth rates to calculate the value of the DER to the project.

**Customization to Align with Internal Processes**

PSEG Long Island recognized that the Locational Value Study and Tool must be customized to account for differences in the internal process between the distribution and transmission systems.

***Scope Update***

The scope remained as originally proposed through project completion in 2020. PSEG Long Island used the remaining funds from the study to build additional functionality in the form of a Locational Value Tool. The output of the tool will be used to assess and evaluate NWS projects. Existing internal PSEG Long Island labor will be used to support running the Locational Value Tool in the future.

***Schedule Update***

The schedule remained on track through project completion in 2020.

#### 4.1.2.2 Funding Reconciliation

The capital spend in 2020 was slightly higher than the capital budget for this initiative due to additional vendor support needed to run the study analysis a second time. This second run was done to confirm internal alignment of the results and forecast. The updated forecast for O&M spend in 2021 and 2022 is lower than the original budget because the tool is established and will require lower-than-expected ongoing support for changes and updates.

Overall, the updated total forecasted spend for O&M is expected to be slightly lower than the approved budget.

**Table 4-2. Locational Value Study Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 0.50 | - |
| | Actual | 0.52 | - |
| | **Variance** | **(0.02)** | **-** |
| Forecasted Spend 2021-2022 | Approved Budget | - | 0.18 |
| | Updated Forecast | - | 0.05 |
| | **Variance** | **-** | **0.13** |
| **Total Forecasted Spend 2019-2022** | **Approved Budget** | **0.50** | **0.18** |
| | **Updated Forecast** | **0.52** | **0.05** |
| | **Variance** | **(0.02)** | **0.13** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 4.1.2.3 Performance Reporting

Although the Locational Value Study does not have any projected direct KPIs or benefits, the study and tool will be used as an input to evaluate NWS projects that aim to defer the need for capital investments.

## 4.2 DER and Renewables Integration

PSEG Long Island recognizes the importance the electricity grid and its ability to integrate renewable energy projects play in supporting New York State's ambitious clean energy goals, as stated in the Climate Act. This is particularly important for Long Island, which has one of the most vibrant distributed solar markets in New York.

To this end, PSEG Long Island is implementing three efforts that promote growth of DER interconnection while enabling safe and efficient grid operation:

- Streamlining the interconnection application process through investment in an Interconnection Online Application Portal (IOAP), which was launched in early 2021.
- Providing interconnection customers with granular information to allow for faster interconnection to the grid through hosting capacity maps. PSEG Long Island is developing Stage 3 Hosting Capacity Maps, which are expected to go live in late 2021. The Stage 3 maps will provide more location-specific information for interconnecting DER onto the LIPA distribution grid.
- Providing visibility to grid operators to optimize DER operation under different system conditions. The visibility will allow operators to manage the DER interconnecting onto the system. The visibility project is limited to the DER that have SCADA capability. PSEG Long Island will begin implementing a DER Visibility Platform in 2022 to achieve this objective.

PSEG Long Island is proposing to conduct a study in 2022 to identify and prioritize solutions that increases hosting capacity in constrained substations on Long Island.

As DER adoption increases over time, managing the distribution system becomes more complex and requires greater coordination to maintain reliability, manage infrastructure costs, and meet customer demands. New York's REV highlights the need for an evolved DSP that includes market operations with pricing and settlement for DER. This framework would effectively take concepts that exist in wholesale markets and bring them to distribution markets, enabling a more diverse set of transactions between customers, the distribution utility, and the wholesale markets. To prepare for this, PSEG Long Island is an active participant of the DSP Market Design and Integration Working Group. In addition to this, the team also participated in REV Connect meetings to explore platforms for supporting DER.

### *4.2.1 Interconnection Online Application Portal*

| | |
|---|---|
| **Type** | IT |
| **Start Year** | 2020 |
| **Funding Approved Through** | 2020 |
| **Status** | Complete |
| **Description and Impact** | The IOAP ensures timely and efficient processing of applications and associated documents related to the interconnection of DER, improving the service for interconnection customers. The portal was completed and went live for customers in early 2021. |

The IOAP is designed to improve customer service by making it easy for interconnection customers to apply online, upload required documents, and obtain real-time status updates on the interconnection projects. It also provides automated customer communication at various stages of the project. With the portal implemented, interconnection customers have visibility and transparency into the status of their proposed project.

**User Acceptance Testing**

Three stages of internal user acceptance testing allowed PSEG Long Island to provide a portal that can best support developer interconnection needs and PSEG Long Island internal processes. PSEG Long Island continues to evaluate additional functionalities and capabilities that provide enhanced customer experience; these enhancements will be evaluated for future filings.

#### 4.2.1.1 Implementation Update

In the first half of 2020, PSEG Long Island completed the design and discovery phases to develop the IOAP. These phases included defining the scope, capturing data requirements, assigning roles and responsibilities, and determining the IT architecture of the portal. In the last quarter of 2020, the team conducted detailed internal user acceptance testing t and refined the portal. After integrating that feedback, the IOAP went live in early 2021. The team utilized the feedback from the DER industry in the portal design by soliciting feedback from the Interconnection Working Group.

***Scope Update***

The project scope remained as proposed through completion in 2021.

***Schedule Update***

Development of the IOAP was deferred from 2019 to 2020 based on LIPA’s final determination on the 2018 Utility 2.0 Plan and budget. The portal went live slightly later than planned, in February 2021 rather than December 2020. This delay was due to several improvements to the portal that were made in the final round of user acceptance testing.

#### 4.2.1.2 Funding Reconciliation

In its approval of the IOAP, LIPA deferred all funding to 2020. As such, PSEG Long Island had no budget allocations for 2019 and work began in 2020. Some expenses were incurred in 2021 in the lead up to the portal launch in early 2021. Additionally, the originally budgeted licensing expenses were reclassified and expended as capital costs as opposed to O&M after further review

Overall, the total forecasted spend is expected to be slightly lower than the approved budget.

**Table 4-3. IOAP Phase 1 Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 2.27 | 0.10 |
| | Actual | 1.65 | - |
| | **Variance** | **0.62** | **0.10** |
| Forecasted Spend 2021 | Approved Budget | - | - |
| | Updated Forecast | 0.46 | - |
| | **Variance** | **(0.46)** | **-** |
| **Total Forecasted Spend 2019-2021** | **Approved Budget** | **2.27** | **0.10** |
| | **Updated Forecast** | **2.11** | **-** |
| | **Variance** | **0.16** | **0.10** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 4.2.1.3 Performance Reporting

The IOAP supports a streamlined interconnection process for DER, which is critical to PSEG Long Island's vision of a DSP. The portal will also enhance customer experience by providing interconnection customers with more information and visibility into the status of their project's application.

### *4.2.2 Hosting Capacity Maps*

| | |
|---|---|
| **Type** | IT |
| **Start Year** | 2020 |
| **Funding Approved Through** | 2025 |
| **Status** | Ongoing |
| **Description and Impact** | Hosting capacity maps are circuit maps that provide information on the DER capacity that can interconnect at a particular location without resulting in thermal or voltage constraints. PSEG Long Island completed Stage 2 maps in 2020 and is on schedule to complete Stage 3 maps by the end of 2021. |

Hosting capacity maps are a valuable tool to the growth and deployment of DER onto the grid and enable the achievement of New York State's Climate Act goals.

To help guide the development of hosting capacity maps, the New York Joint Utilities adopted a Hosting Capacity Analysis Roadmap. PSEG Long Island shares the Joint Utilities' vision to provide hosting capacity maps to DER developers and is leveraging some of the practices employed by the Joint Utilities to develop its hosting capacity maps. While Stage 2 maps provide relevant hosting capacity information at the feeder level, Stage 3 maps provide granular location-specific information such as the megawatts that can be connected at a particular location on the feeder.

#### 4.2.2.1 Implementation Update

PSEG Long Island completed Stage 2 of its hosting capacity maps in 2020. The Utility began implementation of Stage 3 maps in 2021 to provide customers with hosting capacity data at specific nodes of the feeder. In the beginning of 2021, PSEG Long Island became a member of the EPRI Drive User Group and focused on aligning the Drive tool with internal procedures.

The maps are available on PSEG Long Island's website and are expected to be updated on a quarterly basis. While it is currently outside the scope of this project, PSEG Long Island may continue to explore enhancements to the maps in future phases.

***Scope Update***

The Hosting Capacity Stage 2 Maps were completed according to the original scope. Original plans for ongoing maintenance of Stage 2 maps are no longer necessary due to the development of Stage 3 maps. The scope for the development of Stage 3 maps remains as originally planned in the 2020 Utility 2.0 Plan.

***Schedule Update***

The Stage 3 Hosting Capacity Maps are on schedule to go live by the end of 2021.

**Continuous Improvement**

In developing the Stage 2 maps, PSEG Long Island identified and resolved challenges that now inform Stage 3 map development, such as the required level of accuracy of feeder models, security considerations, and alignment with internal processes and tools.

#### 4.2.2.2 Funding Reconciliation

Overall, the Stage 2 Hosting Capacity Maps were completed slightly under budget. The originally planned O&M funds for the maintenance of the maps are no longer needed due to development of Stage 3 maps.

**Table 4-4. Hosting Capacity Stage 2 Maps Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 1.59 | 0.08 |
| | Actual | 1.45 | 0.00 |
| | **Variance** | **0.14** | **0.07** |
| Forecasted Spend 2021-2022 | Approved Budget | - | 0.15 |
| | Updated Forecast | - | - |
| | **Variance** | **-** | **0.15** |
| **Total Forecasted Spend 2019-2022** | **Approved Budget** | **1.59** | **0.23** |
| | **Updated Forecast** | **1.45** | **0.00** |
| | **Variance** | **0.14** | **0.22** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

The Hosting Capacity Maps Stage 3 initiative was launched in early 2021. The forecast for capital costs remains unchanged. The O&M forecast increased slightly to account for third-party support of the UoF team's ongoing maintenance activities for Stage 3 maps through 2025, instead of through 2024 as originally planned.

Overall, the updated total forecasted spend is roughly in line with the approved budget.

**Table 4-5. Hosting Capacity Maps Stage 3 Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | - |
| | Actual | - | - |
| | **Variance** | **-** | **-** |
| Forecasted Spend 2021-2025 | Approved Budget | 1.70 | 1.84 |
| | Updated Forecast | 1.70 | 1.92 |
| | **Variance** | **-** | **(0.08)** |
| **Total Forecasted Spend 2019-2025** | **Approved Budget** | **1.70** | **1.84** |
| | **Updated Forecast** | **1.70** | **1.92** |
| | **Variance** | **-** | **(0.08)** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 4.2.2.3 Performance Reporting

As a foundational customer-facing tool, hosting capacity maps are expected to provide value to a variety of PSEG Long Island stakeholders. The Stage 3 maps will provide guidance to the interconnection customers of the locations on the circuit for potential cost-effective DER deployment.

The maps are also vital to the growth and deployment of DER onto the LIPA grid and helping Long Island achieve its contribution to Climate Act goals.

### *4.2.3 DER Visibility Platform*

| | |
|---|---|
| **Type** | Tool |
| **Start Year** | 2021 |
| **Funding Approved Through** | 2025 |
| **Status** | On hold |
| **Description and Impact** | The DER Visibility Platform will be an operational platform that enables PSEG Long Island's distribution operators to better manage DER under different system conditions. Development of the platform is scheduled to begin in 2022. |

The DER Visibility Platform will be an operational platform that enables PSEG Long Island's distribution operators to manage DER under different system conditions. It will support the increase of DER penetration and interconnection to the Long Island distribution system. The platform is also envisioned to provide additional capabilities such as controlling the DER status, visualizing the output of the DER, and accommodating any other controls and data that are available through SCADA. This platform will serve as the building block to use monitoring and control capabilities and to optimize DER integration onto the grid. Once it is implemented and the data from all existing sites is migrated, PSEG Long Island will continue to connect all new locations added to the new platform.

#### 4.2.3.1 Implementation Update

The DER Visibility Platform will initially focus on integrating DER locations that have capacity greater than 1 MW; there are 27 such locations on Long Island. Data such as MW and MVAr coming through the

SCADA system will be brought into the operational platform. In addition to the 27 existing locations, PSEG Long Island expects that approximately 30 new large-scale DER sites will be interconnected in each of the first 2 years of implementation, and approximately 50 new sites annually in later years.

***Scope Update***

The scope remains as originally proposed.

***Schedule Update***

The implementation of the DER Visibility Platform has been deferred from its original 2021 start date to 2022 due to constraints with IT resources (see Section 1.2).

#### 4.2.3.2 Funding Reconciliation

The initiative's capital budget includes IT integration costs, such as vendor software design, engineering and implementation services, security assessments, Data Lake, integration services, and product licenses. Ongoing O&M expenditure will be required to cover annual IT maintenance of the platform.

Given the change in the initiative's start date, the budget has been shifted out 1 year. The O&M budget appears slightly reduced in Table 4-6 due to the outer year costs extending beyond 2025; practically, the budget remains unchanged.

**Table 4-6. DER Visibility Platform Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | - |
| | Actual | - | - |
| | **Variance** | **-** | **-** |
| Forecasted Spend 2021-2025 | Approved Budget | 3.95 | 0.29 |
| | Updated Forecast | 3.95 | 0.22 |
| | **Variance** | **-** | **0.07** |
| **Total Forecasted Spend 2019-2025** | **Approved Budget** | **3.95** | **0.29** |
| | **Updated Forecast** | **3.95** | **0.22** |
| | **Variance** | **-** | **0.07** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 4.2.3.3 Performance Reporting

Once implemented, the DER Visibility Platform will:

- Monitor and enable increased DER penetration levels on PSEG Long Island's system
- Help achieve New York State climate and energy goals
- Better inform related projects proposed in the Utility 2.0 Plan and other DSP-related projects

Performance will be reported when the project is operational.

### *4.2.4 Increasing Hosting Capacity Study*

| | |
|---|---|
| **Type** | Study |
| **Start Year** | 2022 |
| **Funding Approved Through** | N/A |
| **Status** | Proposed |
| **Description and Impact** | PSEG Long Island proposes to conduct a system-wide study in 2022 to prioritize the locations and specific projects for increasing hosting capacity limits with respect to the largest need in terms of DER development activities. This study will identify the locations that are highly penetrated and saturated with respect to DER interconnection. Upon identification, the team will prioritize locations and solutions that can be implemented to increase hosting capacity on the system. |

The study will analyze the entire distribution system to identify circuits with thermal, voltage, and protection related constraints and the associated DER penetration ratio on these circuits/substations. In addition to this, the study will also explore and prioritize specific solutions that can be implemented to enable higher penetration of DER at these locations.

#### *Objectives*

The objective of this study is to prioritize the locations that are heavily constrained in terms of DER interconnection and to develop and prioritize cost-effective solutions that can be implemented to increase hosting capacity. As part of this study, thermal, voltage and protection-related assessments will be conducted to assess the extent to which these constraints limit the hosting capacity. Upon identifying the constraints, cost-effective solutions will be studied and prioritized to make a recommendation on the best approaches to increasing hosting capacity on the LIPA system.

Overall, the study is intended to help PSEG Long Island better understand the potential solutions and costs associated with increasing hosting capacity and to inform any next steps for how hosting capacity may be increased more broadly across the grid. This project is also consistent with the recommendations made in the New York Power Grid Study Report published by the New York State DPS. [29]

#### *Scope*

The scope of the project consists of conducting a system-wide evaluation focused on addressing feeder-related constraints to enable a higher level of DER penetration on the feeder. The potential solutions will primarily address limitations such as voltage constraints, protection against ground fault over-voltages and other limitations associated with reverse power flow on the distribution grid. Once the solutions have been identified, they will be prioritized along with the saturated locations in order to recommend the best approach to increasing hosting capacity on the LIPA system. This study will be conducted based on the existing system conditions. The study will include a report describing the approach, findings, and recommendations for increasing hosting capacity.

#### 4.2.4.1 Implementation Plan

The study will be conducted using the EPRI Drive tool and Cymdist load flow module. Both tools will be utilized to identify the constraints and to develop solutions to alleviate the limitations to the hosting capacity. The study will be done in alignment with the internal PSEG Long Island *"Small Generator*

[29] New York Power Grid Study Report published by the New York State Department of Public Service (https://www.nyserda.ny.gov/About/Publications/New-York-Power-Grid-Study)

*Interconnection Procedure"* and will evaluate substations manually to capture their limitations and solutions that can be implemented to increase hosting capacity. PSEG Long Island will use support from a third-party consultant and internal resources to complete the system-wide evaluation.

### *Schedule*

The projected schedule for the Increasing Hosting Capacity Study is provided in Table 4-7. The technical analysis and report will be completed in 2022.

**Table 4-7. Increasing Hosting Capacity Project Schedule**

| Workstream | Q1/Q2 2022 | Q3/Q4 2022 |
|---|---|---|
| **Identify Hosting Capacity Constraints** | ■ | ■ |
| Conduct study and analysis | ■ | ■ |
| Write report | | ■ |

### *Known Risks and Mitigations*

Potential risks and mitigations for the Increasing Hosting Capacity Study are identified in Table 4-8.

**Table 4-8. Increasing Hosting Capacity Risk and Mitigation Assessment**

| Category | Risk | Mitigation |
|---|---|---|
| **Technical** | Future queued DER interconnections during the study may complicate results. | Conduct analysis based on existing system conditions. |
| **Assumptions** | System changes can result in changes to the recommendation. | Identify substations/feeders to be impacted per the Capital Plan. |

#### 4.2.4.2 Funding Request

PSEG Long Island is requesting O&M funds for internal resources and third-party consultant support for the technical analysis that will be conducted in the report.

### *O&M*

**Table 4-9. Increasing Hosting Capacity Operating Expenses**

| | Operating Expenditure ($M) | | | | |
|---|---|---|---|---|---|
| **Funding Sub-Category** | ***4-Year Total*** | **2022** | **2023** | **2024** | **2025** |
| PM, Labor, and Training | ***0.02*** | 0.02 | - | - | - |
| Third-Party Support | ***0.04*** | 0.04 | - | - | - |
| **Total** | ***0.06*** | **0.06** | **-** | **-** | **-** |

#### 4.2.4.3 Business Case

In the 2020 Utility 2.0 Plan, PSEG Long Island outlined a series of programs designed to support climate change and renewable energy goals in the Climate Act and REV. These commitments include meeting aggressive renewable energy targets via the promotion of solar, storage, and wind technologies, including BTM installations by the Utility's customers and third-party developers.

One of the Climate Act's major priorities is to enable greater amounts of renewable generation by increasing hosting capacity, which this proposed study will attempt to capture by prioritizing locations and projects/solutions that can be implemented to increase hosting capacity on the LIPA system. This project will also attempt to address the recommendations that were made in the New York Power Grid study for the distribution system in reference to prioritization of Phase 2 projects.

With the proposed study, PSEG Long Island hypothesizes that by using a subset of technical recommendations, it can increase the hosting capacity in constrained substations, enabling interconnection of renewable energy and DER.

#### *Principles of REV Demo Projects*

The scope and objectives of the proposed Increasing Hosting Capacity Study align with the principles of REV demonstration projects, as shown in Table 4-10.

**Table 4-10. Increasing Hosting Capacity Principles of REV Demos**

| Principle | Description |
|---|---|
| **Includes partnership between utility and third-party service providers** | PSEG Long Island will identify and prioritize locations and cost-effective solutions for an increase in hosting capacity. The study will provide insight into the best approach that can be employed to increasing hosting capacity on LIPA system. |
| **Demonstrations should delineate how the generated economic value is divided between the customer, utility, and third-party service provider(s)** | N/A |
| **Offers competitive markets for grid services** | N/A |
| **Identifies questions it hopes to answer or problems or situations on the grid and the market should respond with solutions** | The market can address the challenge of hosting capacity constraints by introducing strategies that can be employed to increase hosting capacity. |
| **Informs rules that will help create competitive markets** | N/A |
| **Informs pricing and rate design modifications** | N/A |
| **Includes various customer participants** | N/A |

## 4.3 Grid Operations

As the penetration of DER grows and power flows in multiple directions across the grid, performing necessary grid functions becomes more complex. To prepare for more DER on the grid, PSEG Long Island is taking a number of steps to enhance operational capabilities, improve operational efficiency, coordinate with the New York Independent System Operator, and test the interaction of DER technologies with the grid, all of which will support higher levels of DER penetration. The DER Visibility Platform (Section 4.2.3) is an example of these steps.

In 2019, the UoF team successfully established the methodology to implement VVO and CVR across the T&D system. Also, in 2019, the team conducted successful field trials in North Bellmore to capture potential energy savings associated with CVR as part of the wider Super Savers Program. This program was expanded to Patchogue in 2020 where the field trials were conducted to measure the potential energy savings from optimizing voltages. PSEG Long Island intends to expand CVR into a program covering other parts of Long Island to achieve energy savings. In addition, the Utility of the Future team utilized AMI data and developed analysis to identify locations that require improvements to optimize voltages. Looking forward, PSEG Long Island is also considering a microgrid project to increase resiliency of the power system grid.

### *4.3.1 CVR Program*

| | |
|---|---|
| **Type** | Program |
| **Start Year** | 2021 |
| **Funding Approved Through** | 2025 |
| **Status** | Ongoing |
| **Description and Impact** | Building on successful CVR trials in North Bellmore and Patchogue, PSEG Long Island launched the CVR Program in 2021 to reduce the energy consumption of its customers through voltage optimization on distribution circuits. Given the need for voltage optimization in certain locations, PSEG Long Island will focus the CVR Program at one substation (Arverne) in 2021 and 2022. |

Building on successful CVR trials in North Bellmore and Patchogue, PSEG Long Island launched the CVR Program in 2021 to reduce the energy consumption of its customers through voltage optimization on distribution circuits at targeted locations. The targeted locations were those with high AMI penetration and low-to-medium income (LMI). In keeping with the customer-centric nature of its DSP vision, PSEG Long Island intends to reduce customers' energy consumption through the CVR Program without any action needed by PSEG Long Island customers.

PSEG Long Island is using AMI data to optimize voltages. The CVR Program involves upgrading, relocating, and adding new capacitor banks and other equipment to enable voltage control capabilities. The program also involves making upgrades to both the primary and secondary system as needed. The smart capacitor banks, along with modifications to the substation settings, will allow PSEG Long Island to optimize voltages on the three-phase mainline.

#### 4.3.1.1 Implementation Update

In 2020, PSEG Long Island identified 20 substation transformer banks to target for CVR deployment over 5 years. These were selected based on the level of AMI penetration and customer demographics.

PSEG Long Island planned to perform CVR simulations at these target substations, with the simulations expected to yield more refined energy savings projections for each location. However, based on analysis of AMI data extracted for 2020 peak day, many of the areas proposed in the 2020 Utility 2.0 Plan will require voltage optimization before being able to conduct CVR. As a result of this analysis, PSEG Long Island will focus on substations requiring less optimization on both the primary and secondary system. Specifically, PSEG Long Island will modify substation settings and smart capacitor banks, relocate specific capacitor banks on the primary system, and enhance the secondary system to optimize the overall voltage profile of the circuit.

##### *Scope Update*

In the first quarter of 2021, PSEG Long Island conducted load flow studies in Cyme using AMI data to assess the feasibility of CVR in the Valley Stream area. Based on the AMI voltage analysis conducted on a 2020 peak day, it was discovered that areas proposed for CVR in the 2020 Utility 2.0 Plan will require voltage optimizations prior to proceeding further with the CVR Program.

Due to the large number of locations requiring optimization, the CVR Program should be geared toward locations requiring the least amount of voltage optimization. As a result, PSEG Long Island will not be proceeding with Valley Stream, Baldwin, and Far Rockaway, but will instead focus on the Arverne substation (Table 4-11). Because AMI data is available for most areas, the focus will be on system-wide voltage optimizations before moving ahead with more locations for CVR. Additional areas will be added as applicable following the system-wide voltage evaluation.

**Table 4-11. CVR Program Near-Term Deployment Plan**

| Year | Substation | Capacitor Bank Controller Upgrades | Capacitor Bank Relocations | New Capacitor Bank Installations |
|---|---|---|---|---|
| 2022 | Arverne | 2 | 3 | 6 |

***Schedule Update***

PSEG Long Island will not be conducting CVR in Valley Stream, Baldwin, or Far Rockaway due to the need for greater grid optimization. The focus will be turned toward the substation with the fewest number of locations where optimization is required to conduct the CVR program, the Arverne substation. PSEG Long Island will also conduct system-wide voltage evaluations to identify locations where CVR would require minimum voltage optimization. This evaluation, as well as resource constraints for the UoF team, will determine CVR deployment for years beyond 2022.

#### 4.3.1.2 Funding Reconciliation

Given the need for voltage optimization prior to the use of CVR, there is more uncertainty around the costs for the CVR Program. PSEG Long Island has identified that Arverne has relatively low grid optimization requirements and is proposing Arverne as an initial location for CVR. Based on lessons learned from Arverne, the Utility will fine-tune the costs and benefits for the deployment of CVR at other substations, with the potential for broader CVR deployment in the future.

**Table 4-12. CVR Program Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | - | - |
| | Actual | - | - |
| | **Variance** | **-** | **-** |
| Forecasted Spend 2021-2022 | Approved Budget | 0.94 | 0.09 |
| | Updated Forecast | 0.65 | 0.03 |
| | **Variance** | **0.29** | **0.06** |
| **Total Forecasted Spend 2019-2022** | **Approved Budget** | **0.94** | **0.09** |
| | **Updated Forecast** | **0.65** | **0.03** |
| | **Variance** | **0.29** | **0.06** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

The original budget for the CVR Program includes costs for deploying CVR to three substations in 2021. The revised cost reflects one substation in 2022, resulting in approximately one-third of the original capital and O&M budget being shifted from 2021 to 2022. Capital funds have also been added to address voltage optimization needed when deploying CVR at Arverne.

Overall, the updated total forecasted spend is expected to be slightly lower than the approved budget.

#### 4.3.1.3 Performance Reporting

With the program being launched in 2021, there are no benefits to report in 2020. In the future, the CVR Program is expected to yield benefits including avoided energy, avoided generation, increased T&D capacities, and avoided carbon emissions.

Because the substation being pursued has been reassessed, PSEG Long Island revised the BCA associated with the CVR Program to reflect implementation at the Arverne Substation in s2022, including the costs for needed grid optimization to perform CVR. Due to increased costs for grid optimization and lower peak load observed at Arverne, the updated benefit-cost ratio is 0.66. While the benefit-cost ratio for implementing CVR at this substation is less than one, by pursuing Arverne, the team can refine its understanding of potential system opportunities for CVR and its associated benefits.

## 4.4 Utility Storage

Energy storage will play a crucial role in meeting New York’s ambitious clean energy goals. In 2018, Governor Cuomo announced a nation-leading goal of 1,500 MW of energy storage by 2025. Later that year, the New York Public Service Commission issued a landmark energy storage order establishing a goal of 3,000 MW of energy storage by 2030, and deployment mechanisms to achieve the 2025 and 2030 energy storage targets. Based on the proportion of peak load compared to the entire State, approximately 188 MW should be installed on Long Island by 2025.

There is approximately 14 MW of energy storage on Long Island, most of which is located on the South Fork. PSEG Long Island deployed two storage systems with a total capacity of 10 MW/80 MWh on the South Fork in 2018, which is the fastest-growing region on Long Island, with approximately 2.0% annual load growth. In 2021, PSEG Long Island’s Power Markets team issued a solicitation for 155 MW-175 MW of energy storage to achieve the energy storage targets for Long Island.

To increase operational flexibility on the grid and to defer the need for costly grid infrastructure investments, PSEG Long Island’s UoF team is continuously evaluating the need to deploy energy storage systems on the distribution grid. As of today, no suitable locations have been identified beyond Miller Place.

### 4.4.1 Miller Place

| | |
|---|---|
| **Type** | Asset |
| **Start Year** | 2019 |
| **Funding Approved Through** | 2022 |
| **Status** | Ongoing |
| **Description and Impact** | In 2019, PSEG Long Island issued a competitive solicitation for third-party support to deliver a 2.5 MW/12.5 MWh system at the Miller Place substation that, when delivered, will defer the need for further investment. The bids for the solicitation were evaluated and a vendor has been selected. The battery storage system is scheduled to be operational in 2023. |

The Utility-Scale Storage Program offers an opportunity for third-party developers to develop, procure, install, maintain, and potentially operate utility-scale storage on Long Island. These projects will contribute to the target set by New York State to achieve 1,500 MW of storage installed by 2025 and 3,000 MW by 2030. An example of this is PSEG Long Island's work at Miller Place.

#### 4.4.1.1 Implementation Update

In late 2019, PSEG Long Island issued a competitive solicitation for third-party support to deliver a 2.5 MW/12.5 MWh system that, when delivered, will defer the need for investment on the local substation. The bids for the solicitation have been evaluated and a vendor has been selected.

***Scope Update***

The scope, to develop an energy storage project of 2.5 MW/12.5 MWh at the Miller Place substation, remains as originally proposed.

***Schedule Update***

The timeline for the need of the battery to serve as an NWS was reassessed, and the needed in-service date was updated to 2023 from 2022 due to slower-than-expected load growth in the Miller Place area. Delays in the procurement process will lead to completion of the battery in 2023 instead of 2022. As of this update, the storage project is on track for completion ahead of need despite the procurement delay.

#### 4.4.1.2 Funding Reconciliation

Due to the project's schedule delays, most capital costs expected in 2020 were delayed until 2021, namely the cost of the battery and the associated engineering support. The cost of the procured battery storage system was approximately $3.7 million higher than previously forecasted, including risk and contingency, leading to an increase in the overall capital costs for the project. However, interconnection costs are now forecasted to be $0.9 million lower than previously forecasted due to the distance from the battery to the point of interconnection being shorter than initially estimated. With the actual battery cost from the battery vendor now known, overall capital costs are about $2.8 million higher than the approved budget.

O&M costs remain largely as previously forecasted but delayed by 1 year due to project delays. The increased O&M forecast is to support software upgrades for the battery system required in 2023, and for troubleshooting IT-related issues that may arise.

Overall, the updated total forecasted spend is higher than the approved budget.

**Table 4-13. Utility Storage: Miller Place Capital and Operating Expense Budget and Forecast**

| | | Capital ($M) | O&M ($M) |
|---|---|---|---|
| Actual Spend 2019-2020 | Approved Budget | 0.69 | - |
| | Actual | 0.23 | - |
| | **Variance** | **0.46** | **-** |
| Forecasted Spend 2021-2023 | Approved Budget | 8.81 | 0.86 |
| | Updated Forecast | 12.03 | 1.07 |
| | **Variance** | **(3.22)** | **(0.20)** |
| **Total Forecasted Spend 2019-2023** | **Approved Budget** | **9.50** | **0.86** |
| | **Updated Forecast** | **12.26** | **1.07** |
| | **Variance** | **(2.76)** | **(0.20)** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

#### 4.4.1.3 Performance Reporting

No benefits were expected in 2020 for Utility-Scale Storage. PSEG Long Island will begin tracking KPIs and benefits when the storage system is implemented and operational in 2023. This project is expected to provide direct benefits, such as deferring the need to install a transformer bank at the Miller Place substation.

# 5. Utility 2.0 Portfolio-Level Summary Tables

The following subsections summarize the variances between the expenditure and budgets for approved Utility 2.0 initiatives and the overall funding for all initiatives in the period between 2021 and 2025 (including proposed initiatives starting in 2022). The impact of the overall funding request to residential and commercial rates is also included in Section 5.3.

## 5.1 Reporting for Approved Initiatives

Per reporting requirements requested by DPS in their recommendation letter for the 2018 Utility 2.0 Plan, PSEG Long Island is providing an annual update on the expenditure and performance of approved initiatives. The Utility expects that performance and budget spend will fluctuate year-to-year through the duration of the various initiatives. However, unless otherwise noted in this filing, PSEG Long Island plans to deliver the scope of the approved initiatives within the overall approved funding and schedule.

In addition to this annual progress update and funding reconciliation, PSEG Long Island provides quarterly updates to LIPA and DPS on the progress of the approved Utility 2.0 initiatives through the *Utility 2.0 Outcomes Dashboard.* The dashboard reports key program metrics and qualitative information such as goals and achievements as well as challenges and lessons learned.

### *5.1.1 2020 Realized Benefits*

AMI and AMI-enabled capabilities are the cornerstone of the Utility 2.0 Plan. Remote meter reading and remote metering services, including connect and disconnect, outage management, and revenue protection, were projected to be the biggest sources of AMI benefits. PSEG Long Island continued to accrue benefits in these program areas in 2020, as shown in Table 5-1.

PSEG Long Island's Utility 2.0 Plan also includes innovative customer offerings such as targeted EE under the Super Savers Program, EV Program, and a BTM Storage with Solar program in support of New York State energy policy. In each of these programs, customer outreach and adoption has been a challenge in meeting program benefit targets.

In Super Savers, a pilot approach to NWS, PSEG Long Island continues to learn and pivot its outreach approach and incentive levels in an attempt to meet its goals and deliver value to customers. For the EV Program, enrollment has been close to what was projected; while many factors determine EV growth trends, PSEG Long Island is committed to enabling the advancement of EV adoption on Long Island, as demonstrated by initiatives proposed in this year's and future Utility 2.0 Plans (e.g., EV Make-Ready Program).

Several Utility 2.0 initiatives deliver benefits to customers and society at large that cannot be quantified; this includes DSP-enabling initiatives such as the Locational Value Study and IOAP. As such, these initiatives are not included in Table 5-1. Additionally, the benefits for initiatives still being developed, such as Rate Modernization and Utility-Scale Storage, will be reported as they materialize in future years.

**Table 5-1. Utility 2.0 Projected and Realized Program Benefits**

| Pathway | Initiative | Benefit Category | Plan through 2020 ($M) | Actual through 2020 ($M) | % Realized |
|---|---|---|---|---|---|
| **Empower Customers through AMI and Data Analytics** | AMI Core: Meter Reading and Meter Service | Avoided O&M Costs | 9.74 | 8.55 | 88% |
| | | Avoided Carbon Emissions | 0.02 | 0.01 | 43% |
| | Revenue Protection | Added Revenue from Meter Accuracy | 3.13 | 3.59 | 115% |
| | | Added Revenue from Theft/Tamper Detection | 3.87 | 2.63 | 68% |
| | | Added Revenue from Move-in/Move-out | 0.08 | 0.07 | 80% |
| | Outage Management | Avoided O&M Costs | 2.54 | 3.61 (Isaias)<br>0.21 (Other) | 150% |
| | | Avoided Customer Outage Costs | 3.51 | 0.95 (Isaias)<br>0.02 (Other) | 28% |
| | Data Analytics | Avoided Customer Outage Costs | - | 0.14 | N/A |
| | | Avoided O&M Costs | - | 0.37 | N/A |
| **Explore New Innovative Offerings** | EV Program | Participant Benefit | 0.97 | 0.86 | 89% |
| | | Added Revenue | 1.64 | 1.48 | 91% |
| | | Avoided Fuel Emissions | 0.39 | 0.36 | 94% |
| | BTM Storage with Solar | Avoided FP&P Costs | 0.06 | - | 0% |
| | | Avoided Capital Costs (Non-Labor) | 0.12 | - | 0% |
| | Super Savers – North Bellmore | Avoided F&PP Costs | 0.66 | 0.33 | 50% |
| | | Avoided Capital Costs (Non-Labor) | 0.17 | 0.09 | 52% |
| | | Avoided Carbon Emissions | 0.17 | 0.12 | 73% |
| **Total** | | | **27.07** | **23.40** | **86%** |

### *5.1.2 2019-2025 Expenditure Variance Against Approved Budget*

PSEG Long Island reconciled actual spend in 2020 with the approved budget that was filed for each of the approved initiatives through the 2020 Utility 2.0 Plan. The Utility also re-forecasted the budget for all ongoing initiatives for the period between 2021 and 2025. As illustrated in Table 5-2, future expenditure for both capital and O&M is forecasted to be lower than the budget that was approved as of the 2020 Utility 2.0 Plan. Initiative-level details for the actual spend and the forecast are included in Chapters 2-4.

**Table 5-2. Expenditure Variance vs. Approved Budget (2019-2025) for Approved Initiatives**

| Status | Initiative | Capital ($M) | | | O&M ($M) | | | Total Variance |
|---|---|---|---|---|---|---|---|---|
| | | 2019-25 Budget | Updated Forecast | 2019-25 Variance | 2019-25 Budget | Updated Forecast | 2019-25 Variance | |
| Complete | FlexPay Planning | - | - | - | 0.25 | 0.08 | 0.17 | **0.17** |
| | IOAP | 2.27 | 2.11 | 0.16 | 0.10 | - | 0.10 | **0.26** |
| Canceled | Heat Pump Controls Pilot | - | - | - | 0.30 | 0.00 | 0.30 | **0.30** |
| Ongoing | AMI Customer Engagement Plan | - | - | - | 8.72 | 8.64 | 0.08 | **0.08** |
| | AMI Technology and Systems [30] | 193.99 | 188.72 | 5.26 | 9.50 | 9.91 | (0.41) | **4.85** |
| | AMI-Enabled Capabilities | 13.83 | 14.43 | (0.60) | 4.92 | 5.38 | (0.46) | **(1.05)** |
| | BTM Storage with Solar | - | - | - | 0.16 | 0.14 | 0.02 | **0.02** |
| | CVR Program | 0.94 | 0.65 | 0.29 | 0.09 | 0.03 | 0.06 | **0.35** |
| | Data Analytics | 5.26 | 5.71 | (0.45) | 4.71 | 4.55 | 0.15 | **(0.30)** |
| | EV Make-Ready Program | 3.20 | 2.67 | 0.52 | 1.83 | 2.30 | (0.47) | **0.06** |
| | EV Program | - | - | - | 12.82 | 13.03 | (0.20) | **(0.20)** |
| | Hosting Capacity Maps Stage 2 | 1.59 | 1.45 | 0.14 | 0.23 | 0.00 | 0.22 | **0.36** |
| | Hosting Capacity Maps Stage 3 | 1.70 | 1.70 | - | 1.84 | 1.92 | (0.08) | **(0.08)** |
| | Locational Value Study and Tool | 0.50 | 0.52 | (0.02) | 0.18 | 0.05 | 0.13 | **0.11** |

[30] Budget for AMI Technology and Systems includes costs incurred in 2018.

| Status | Initiative | Capital ($M) | | | O&M ($M) | | | Total Variance |
|---|---|---|---|---|---|---|---|---|
| | | 2019-25 Budget | Updated Forecast | 2019-25 Variance | 2019-25 Budget | Updated Forecast | 2019-25 Variance | |
| Ongoing (cont'd) | Next Generation Insights Pilot | 0.71 | 0.77 | (0.06) | 2.56 | 2.96 | (0.41) | **(0.47)** |
| | NWS Planning Tool | - | - | - | 0.20 | 0.20 | - | **-** |
| | NWS Process Development | - | - | - | 0.50 | 0.50 | - | **-** |
| | On-Bill Financing Plan | - | - | - | 0.25 | - | 0.25 | **0.25** |
| | Program Implementation Support | 7.64 | 8.04 | (0.41) | 0.55 | 0.15 | 0.40 | **(0.01)** |
| | Rate Modernization | 10.06 | 12.56 | (2.50) | 16.12 | 16.42 | (0.31) | **(2.81)** |
| | Super Savers | - | - | - | 3.46 | 3.75 | (0.29) | **(0.29)** |
| | UoF Team | 1.05 | 1.18 | (0.12) | 4.52 | 2.48 | 2.05 | **1.92** |
| | Utility Storage: Miller Place | 9.50 | 12.26 | (2.76) | 0.86 | 1.07 | (0.20) | **(2.97)** |
| On hold | C&I Demand Alert Pilot | 1.78 | 1.78 | - | 0.20 | 0.20 | - | **-** |
| | DER Visibility Platform | 3.95 | 3.95 | - | 0.29 | 0.22 | 0.07 | **0.07** |
| | Electric School Bus V2G Pilot | 0.08 | 0.08 | - | 0.64 | 0.64 | - | **-** |
| | Energy Concierge Pilot | 1.59 | 1.55 | 0.04 | 2.49 | 2.77 | (0.28) | **(0.24)** |
| | Enhanced Marketplace | 4.65 | 1.81 | 2.83 | 4.51 | 2.61 | 1.90 | **4.73** |
| | On-Bill Financing Pilot | 1.12 | 1.12 | - | 1.82 | 1.68 | 0.14 | **0.14** |
| **Total** | | **265.38** | **263.06** | **2.32** | **84.62** | **81.68** | **2.94** | **5.26** |

Note: Funding reconciliation variances are calculated as budget minus spend. As such, projects that underspent compared to plan are shown as positive values.

## 5.2 Updated Budget for Utility 2.0 Program

Table 5-3. summarizes the overall capital and O&M budget forecast for the all Utility 2.0 initiatives in the period between 2019 and 2025, even though not all initiatives have approved budgets through 2025.[31] This includes reconciliation reported in this year's Utility 2.0 Plan for previously approved initiatives.

Specifically, the table includes the following:

- Reconciled budget for previously approved initiatives
- Budget extensions for two of the previously approved initiatives (Rate Modernization, EV Make-Ready Program)
- New budget for four new initiatives proposed in this year's plan for implementation starting in 2022 (Connected Buildings Pilot, Bucket Truck Electrification Plan, Suffolk County Bus Make-Ready Pilot, Increasing Hosting Capacity Study)

[31] Initiatives proposed in the 2018 and 2019 Utility 2.0 Plan were approved by default through 2022. A subset of these initiatives may be extended after their originally approved period in future Utility 2.0 Plans.

**Table 5-3. Updated Budget for Utility 2.0 Initiatives, 2019-2025**

| Status | Initiative | Capital ($M) | | | | | | | | O&M ($M) | | | | | | | | GRAND TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | *SUM* | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | *SUM* | |
| Complete | FlexPay Planning | - | - | - | - | - | - | - | - | - | 0.08 | - | - | - | - | - | 0.08 | 0.08 |
| | IOAP | - | 1.65 | 0.46 | - | - | - | - | 2.11 | - | - | - | - | - | - | - | - | 2.11 |
| Canceled | Heat Pump Controls Pilot | - | - | - | - | - | - | - | - | - | 0.00 | - | - | - | - | - | 0.00 | 0.00 |
| Ongoing | AMI Customer Engagement Plan | - | - | - | - | - | - | - | - | 1.01 | 2.34 | 2.82 | 2.48 | - | - | - | 8.64 | 8.64 |
| | AMI Technology and Systems [32] | 57.11 | 56.14 | 65.27 | 10.21 | - | - | - | 188.72 | 1.18 | 1.87 | 3.04 | 3.83 | - | - | - | 9.91 | 198.64 |
| | AMI-Enabled Capabilities | 3.52 | 2.67 | 4.21 | 4.03 | - | - | - | 14.43 | 0.26 | 0.61 | 1.87 | 2.64 | - | - | - | 5.38 | 19.81 |
| | BTM Storage with Solar | - | - | - | - | - | - | - | - | 0.06 | 0.08 | - | - | - | - | - | 0.14 | 0.14 |
| | CVR Program | - | - | 0.06 | 0.59 | - | - | - | 0.65 | - | - | - | 0.03 | - | - | - | 0.03 | 0.68 |
| | Data Analytics | 2.08 | 1.53 | 0.89 | 1.23 | - | - | - | 5.71 | 0.09 | 0.78 | 1.62 | 2.08 | - | - | - | 4.55 | 10.27 |

[32] The budget for AMI Technology and Systems includes costs that were incurred in 2018 in 2019.

| Status | Initiative | Capital ($M) | | | | | | | | O&M ($M) | | | | | | | | GRAND TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | *SUM* | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | *SUM* | |
| Ongoing (cont'd) | EV Make-Ready Program | - | - | 1.45 | 0.03 | 1.20 | - | - | 2.67 | - | - | 1.70 | 0.14 | 0.15 | 0.15 | 0.16 | 2.30 | 4.97 |
| | EV Program | - | - | - | - | - | - | - | - | 0.63 | 0.86 | 1.67 | 2.19 | 2.14 | 2.51 | 3.02 | 13.03 | 13.03 |
| | Hosting Capacity Maps Stage 2 | - | 1.45 | - | - | - | - | - | 1.45 | - | 0.00 | - | - | - | - | - | 0.00 | 1.45 |
| | Hosting Capacity Maps Stage 3 | - | - | 1.70 | - | - | - | - | 1.70 | - | - | 0.49 | 0.43 | 0.34 | 0.32 | 0.32 | 1.92 | 3.62 |
| | Locational Value Study and Tool | 0.20 | 0.32 | - | - | - | - | - | 0.52 | - | - | 0.03 | 0.03 | - | - | - | 0.05 | 0.57 |
| | Next Generation Insights Pilot | - | 0.57 | 0.20 | - | - | - | - | 0.77 | - | 0.23 | 1.65 | 1.08 | - | - | - | 2.96 | 3.73 |
| | NWS Planning Tool | - | - | - | - | - | - | - | - | - | 0.08 | 0.12 | - | - | - | - | 0.20 | 0.20 |
| | NWS Process Development | - | - | - | - | - | - | - | - | - | - | 0.50 | - | - | - | - | 0.50 | 0.50 |
| | On-Bill Financing Plan | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Program Implementation Support | 1.64 | 1.99 | 2.04 | 2.37 | - | - | - | 8.04 | - | - | 0.10 | 0.05 | - | - | - | 0.15 | 8.19 |

| Status | Initiative | Capital ($M) | | | | | | | | O&M ($M) | | | | | | | | GRAND TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | *SUM* | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | *SUM* | |
| Ongoing (cont'd) | Rate Modernization | 1.59 | 3.92 | 2.18 | 2.18 | 2.69 | - | - | 12.56 | 0.57 | 0.51 | 4.29 | 4.98 | 6.08 | - | - | 16.42 | 28.98 |
| | Super Savers | - | - | - | - | - | - | - | - | 0.48 | 0.29 | 1.20 | 1.03 | 0.75 | - | - | 3.75 | 3.75 |
| | UoF Team | 0.26 | 0.30 | 0.24 | 0.38 | - | - | - | 1.18 | 0.16 | 0.33 | 0.78 | 1.21 | - | - | - | 2.48 | 3.65 |
| | Utility Storage: Miller Place | 0.09 | 0.14 | 3.78 | 5.44 | 2.81 | - | - | 12.26 | - | - | - | 0.05 | 1.02 | - | - | 1.07 | 13.33 |
| On hold | C&I Demand Alert Pilot | - | - | - | - | 1.77 | 0.00 | - | 1.78 | - | - | - | - | 0.09 | 0.10 | - | 0.20 | 1.97 |
| | DER Visibility Platform | - | - | - | 3.95 | - | - | - | 3.95 | - | - | - | 0.07 | 0.04 | 0.05 | 0.06 | 0.22 | 4.16 |
| | Electric School Bus V2G Pilot | - | - | - | 0.08 | - | - | - | 0.08 | - | - | - | 0.50 | 0.07 | 0.07 | - | 0.64 | 0.73 |
| | Energy Concierge Pilot | - | - | - | 0.03 | 0.98 | 0.54 | - | 1.55 | - | 0.14 | - | 0.86 | 1.16 | 0.62 | - | 2.77 | 4.32 |
| | Enhanced Marketplace | - | - | - | - | 1.41 | 0.40 | 0.00 | 1.81 | - | - | - | - | 0.69 | 0.95 | 0.98 | 2.61 | 4.43 |
| | On-Bill Financing Pilot | - | - | - | 1.06 | 0.05 | 0.01 | - | 1.12 | - | - | - | 0.41 | 0.77 | 0.39 | 0.10 | 1.68 | 2.79 |

| Status | Initiative | Capital ($M) | | | | | | | | O&M ($M) | | | | | | | | GRAND TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | *SUM* | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | *SUM* | |
| Proposed | Bucket Truck Electrification Plan | - | - | - | - | - | - | - | - | - | - | - | 0.10 | - | - | - | 0.10 | 0.10 |
| | Connected Buildings Pilot | - | - | - | - | - | - | - | - | - | - | - | 0.99 | 0.20 | - | - | 1.19 | 1.19 |
| | EV Make-Ready Program (exp. scope) | - | - | - | 9.82 | 16.36 | 16.36 | 19.85 | 62.39 | - | - | - | 2.84 | 6.48 | 7.47 | 8.94 | 25.72 | 88.11 |
| | Increasing Hosting Capacity | - | - | - | - | - | - | - | - | - | - | - | 0.06 | - | - | - | 0.06 | 0.06 |
| | Rate Modernization (exp. scope) | - | - | - | 0.85 | 0.34 | - | - | 1.19 | - | - | - | 0.39 | 0.93 | - | - | 1.32 | 2.51 |
| | Suffolk County Bus Make-Ready Pilot | - | - | - | 0.60 | - | - | - | 0.60 | - | - | - | 0.41 | 0.04 | - | - | 0.45 | 1.05 |
| **Total** | | **66.47** | **70.67** | **82.49** | **42.83** | **27.60** | **17.32** | **19.85** | **327.23** | **4.42** | **8.19** | **21.87** | **28.85** | **20.96** | **12.64** | **13.58** | **110.51** | **437.74** |

## 5.3 Rate Impact Analysis

The rate impact on residential customers from both ongoing Utility 2.0 initiatives and the initiatives proposed for funding in the 2021 Utility 2.0 Plan is illustrated in Figure 5-1. PSEG Long Island expects on average a net reduction in residential bills through 2025 as a result of Utility 2.0 initiatives. A key driver for this net reduction is the savings expected to be realized through the implementation of the EV Make-Ready Program. [33]

**Figure 5-1. Residential Customer Bill Impacts from Utility 2.0 Initiatives**

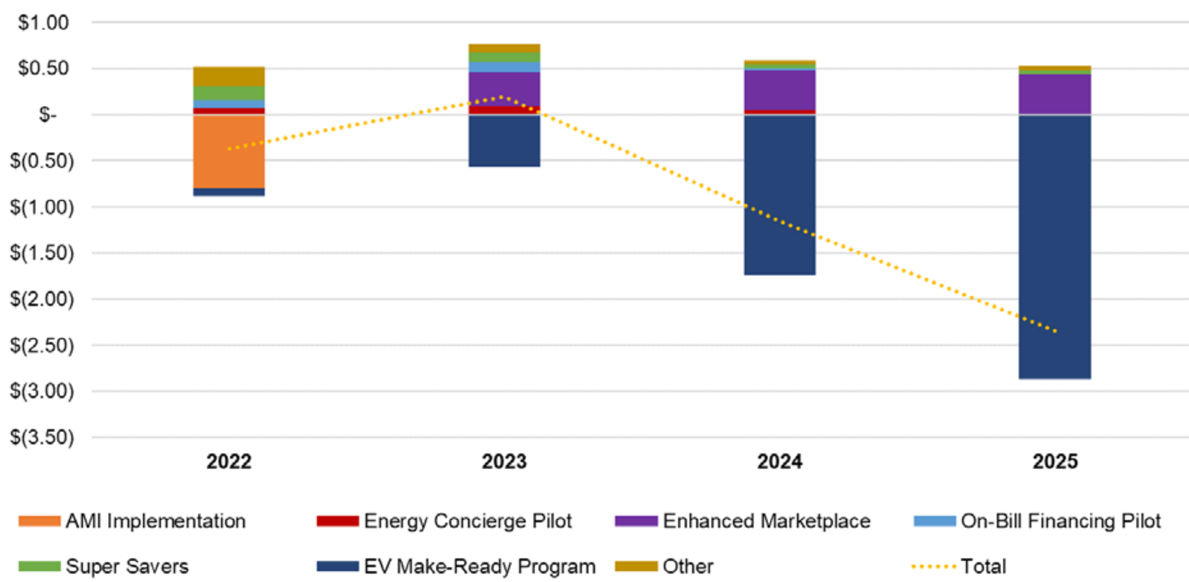



Table 5-4 and Table 5-5 illustrate the estimated rate impact on residential and commercial customers, respectively. These rate impacts reflect the capital, O&M, net revenue change, and power supply costs for each program, initiative and project included in the 2021 Utility 2.0 Plan's funding requirements, including both ongoing initiatives and new initiatives proposed in the 2021 Plan. Initiatives with no impact on rates have been omitted from the tables. Positive impact indicates an increase and negative impact a decrease in the rates.

**Table 5-4. Residential Rate Impacts**

| Initiative | 2022 ($) | 2023 ($) | 2024 ($) | 2025 ($) |
|---|---|---|---|---|
| AMI Implementation | (0.79) | - | - | - |
| CVR Program | 0.00 | 0.00 | 0.00 | 0.00 |
| EV Program | 0.00 | 0.00 | 0.00 | 0.00 |
| Utility Storage - Miller Place | 0.00 | 0.04 | 0.01 | 0.01 |
| Hosting Capacity Maps Stage 3 | 0.02 | 0.01 | 0.01 | 0.01 |
| Locational Value Study and Tool | 0.00 | - | - | - |

[33] The amount of revenue indicated in the benefits for EV Make-Ready Program (approximately $152 million in 2022-2025) will not be collected and instead will be passed through due to the nature of power supply costs. This amount is, however, expected to benefit all customers as it averages down the power supply charge.

| | | | | |
|---|---|---|---|---|
| Next Generation Insights Pilot | 0.09 | - | - | - |
| Super Savers | 0.16 | 0.11 | 0.05 | 0.05 |
| C&I Demand Alert Pilot | - | 0.00 | 0.00 | 0.00 |
| DER Visibility Platform | 0.00 | 0.01 | 0.01 | 0.01 |
| Electric School Bus V2G Pilot | 0.00 | 0.00 | 0.00 | 0.00 |
| Energy Concierge Pilot | 0.07 | 0.09 | 0.05 | 0.00 |
| Enhanced Marketplace | - | 0.36 | 0.43 | 0.43 |
| On-Bill Financing Pilot | 0.09 | 0.12 | 0.02 | (0.01) |
| Connected Buildings Pilot | 0.08 | 0.02 | - | - |
| Bucket Truck Electrification Plan | 0.00 | - | - | - |
| EV Make-Ready Program | (0.09) | (0.57) | (1.74) | (2.86) |
| Increasing Hosting Capacity | 0.00 | - | - | - |
| Suffolk County Bus Initiative | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total** | **(0.37)** | **0.20** | **(1.15)** | **(2.34)** |

**Table 5-5. Commercial Rate Impacts**

| Initiative | 2022 ($) | 2023 ($) | 2024 ($) | 2025 ($) |
|---|---|---|---|---|
| AMI Implementation | (6.02) | - | - | - |
| CVR Program | 0.02 | 0.07 | 0.07 | 0.07 |
| EV Program | 0.06 | 0.00 | 0.00 | 0.00 |
| Utility Storage - Miller Place | 0.02 | 0.37 | 0.07 | 0.05 |
| Hosting Capacity Maps Stage 3 | 0.15 | 0.12 | 0.11 | 0.11 |
| Locational Value Study and Tool | 0.01 | - | - | - |
| Next Generation Insights Pilot | - | - | - | - |
| Super Savers | 0.08 | 0.04 | 0.00 | (0.00) |
| C&I Demand Alert Pilot | - | 0.07 | 0.11 | 0.03 |
| DER Visibility Platform | 0.02 | 0.09 | 0.09 | 0.10 |
| Electric School Bus V2G Pilot | 0.36 | 0.05 | 0.05 | (0.01) |
| Energy Concierge Pilot | - | 0.00 | 0.02 | 0.03 |
| Enhanced Marketplace | - | - | 0.03 | 0.04 |
| On-Bill Financing Pilot | - | 0.02 | 0.02 | 0.02 |
| Connected Buildings Pilot | - | - | - | - |
| Bucket Truck Electrification Plan | 0.04 | - | - | - |
| EV Make-Ready Program | (0.69) | (4.58) | (13.75) | (23.12) |
| Increasing Hosting Capacity | 0.02 | - | - | - |
| Suffolk County Bus Initiative | 0.31 | 0.04 | 0.01 | 0.01 |
| **Total** | **(5.62)** | **(3.71)** | **(13.17)** | **(22.68)** |

# Appendix A. Energy Efficiency and Demand Response Plan

## 2022 Annual Update

### Contents

## A.1 Introduction

PSEG Long Island (the Utility) is a subsidiary of Public Service Enterprise Group Incorporated (PSEG), a publicly traded diversified energy company with annual revenue of $11 billion and operates the Long Island Power Authority's (LIPA's) transmission and distribution (T&D) system under a 12-year contract.

PSEG Long Island is submitting this Energy Efficiency and Demand Response Plan (EEDR Plan) for review by LIPA and the New York State Department of Public Service (DPS). This submittal is in accordance with Public Authorities Law Section 1020-f(ee) and the Amended and Restated Operations Services Agreement dated December 31, 2013. PSEG Long Island seeks a positive recommendation on the Plan from DPS and funding approval from LIPA for 2022.

### *A.1.1 Portfolio Budget and Target Summary*

PSEG Long Island's energy efficiency (EE), demand response (DR), and beneficial electrification programs make a wide array of incentives, rebates, and programs available to PSEG Long Island residential and commercial customers to assist them in reducing their energy usage, lowering their bills. PSEG Long Island has partnered with TRC Companies (TRC) to deliver the EE programs to the public. The proposed 2022 EE initiatives consist of programs for residential customers and a multifaceted program for commercial customers. Two recently introduced programs will be standalone programs in 2022: All Electric Homes and Multifamily. In addition, the Behavioral Initiative/Home Energy Management (HEM) program will continue. In 2020, in support of broader New York State policy objectives, PSEG Long Island's offerings were expanded to include rebates and incentives for installing EE measures that supply beneficial electrification to the grid and allow customers to save on their fossil fuel-based costs.

As part of its overall goal of reducing greenhouse gas (GHG) emissions by 40% by 2030, New York State set new statewide EE strategy in the New Efficiency: New York Order that was issued in 2018. In the Order, New York State establishes savings targets on an energy basis (Btu) for New York State as a whole and specifically for Long Island and establishes estimated reductions in forecasted sales by 2025 that would be the result of the actions described in the Order. New Efficiency: New York established fuel-neutral targets to accommodate beneficial electrification of buildings because increased electrification in the building and transportation sectors is necessary to achieve the State's carbon reduction goals.

PSEG Long Island has been actively engaged in rolling out utility-leading residential and commercial savings programs for customers. The 2022 EEDR Plan focuses on continuing to deliver EE savings programs to residential and commercial customers, while expanding efforts to include beneficial electrification initiatives. Adopting fuel-neutral savings targets allows PSEG Long Island to aggregate efficiency achievements across electricity, natural gas, and delivered fuels such as oil and propane, which requires a shift toward investments in non-lighting opportunities, especially an expanded focus on heat pumps and other beneficial electrification opportunities.

Early in efficiency program implementation efforts, PSEG Long Island recognized the importance of aligning the business trades with its program offerings. The residential portfolio promotes the ENERGY STAR message through its media campaigns, website, marketing materials, and outreach. In addition, collaboration with trade allies, state agencies, local utilities, and municipalities supports a coordinated effort to reach goals. These stakeholder partnerships facilitate attractive incentives and services to be offered through the residential programs, which make participants' homes energy efficient, safe, and comfortable.

PSEG Long Island's program philosophy and delivery is structured to respond to market changes and cost-effective EE opportunities during any given year. To align with New Efficiency: New York, its 2022 goal is **1,147,670 total MMBtu savings** (which includes 327,049 MWh of EE savings), which are similarly reflected on a gross basis at site.

The proposed 2022 budget of $88.9 million for EEDR remains nearly equal to 2021's budget. PSEG Long Island has budgeted for some initiatives that will not have any MMBtu savings associated with them in 2022—e.g., the Direct Load Management (DLM) Program at $1.3 million.

Given the increased emphasis on advancing energy affordability by developing initiatives focused on energy solutions for low- to-moderate income (LMI) consumers, enhanced heat pump rebates and programmatic changes designed to enhance the Home Performance and Residential Energy Affordability Partnership (REAP) programs will total about $5.4 million in spending in 2022. PSEG Long Island will also continue to monitor Climate Act working groups as the definition and tracking for disadvantaged communities (DACs) gets solidified, which is expected to happen in the fall of 2021 (subsequent to this filing), and then incorporate support of DAC into strategic operations in 2022. Outside of the income-qualified programs, approximately $3.4 million in rebate dollars went to customers in DAC and EJ locations in 2020. When implementation, evaluation, and other indirect program costs are considered, along with payments made through income-qualified programs (such as REAP), approximately 12% of PSEG Long Island's overall energy efficiency rebate spending of $40.1 million resulted in benefits to LMI, DAC, and EJ communities.

PSEG Long Island continues to lead New York State in ongoing solar PV deployments. PSEG Long Island also continues to locally administer the NY-Sun Incentive Program for projects that receive Green Jobs – Green New York financing and Affordable Solar incentives for income-eligible households. Incentives are available for new residential and commercial projects that pair solar PV with energy storage, and those customers are also afforded enrollment opportunities in the DLM tariff to allow for capacity-based payments for system or local relief.

PSEG Long Island monitors program performance and consumer uptake on a continual basis. By doing this, the Utility can respond to changes in market conditions in a timely and efficient manner, which allows for the revision of offerings throughout the year in response to changing market conditions. Depending on the program, PSEG Long Island does an annual, quarterly, or monthly review to help respond to market conditions.

### *A.1.2 Portfolio Summary*

Table A-1 summarizes the expected EE savings (on an MMBtu and MWh basis), along with the associated budgets, for the various residential and commercial components that comprise PSEG Long Island's portfolio of EE, DR, and beneficial electrification programs.

**Table A-1. 2022 EE and Beneficial Electrification Goals**

| Program | Savings (MMBtu) | Savings (MWh) | Program Budget ($M) |
|---|---|---|---|
| Energy Efficient Products | 612,027 | 206,010 | 24.4 |
| Home Comfort | 129,673 | 2,776 | 11.5 |
| REAP (Low-Income) | 5,953 | 2,361 | 1.35 |
| Home Performance | 31,917 | 2,633 | 4.56 |

| Program | Savings (MMBtu) | Savings (MWh) | Program Budget ($M) |
|---|---|---|---|
| Multifamily | 2,423 | 437 | 0.25 |
| All Electric Homes | 560 | 17 | 0.05 |
| Commercial Efficiency | 262,559 | 82,757 | 32.4 |
| HEM (Behavioral) | 101,952 | 29,881 | 2.70 |
| Pay for Performance | 606 | 178 | 0.20 |
| **Total, Budget Components with Programmatic Savings** | **147,670** | **327,049** | **77.43** |
| DLM Program | N/A | N/A | 1.38 |
| Community Solar | N/A | N/A | 0.40 |
| Religious Buildings | N/A | N/A | 0.40 |
| PSEG Long Island Labor, Outside Services, Advertising | N/A | N/A | 10.08 |
| **Total, Budget Components Not Associated with Programmatic Savings** | **-** | **-** | **11.47** |
| **Total** | **1,147,670** | **327,049** | **88.90** |

Table A-2 summarizes the expected budgets, participation, and savings (on an MMBtu basis) for the various residential and commercial heat pumps across PSEG Long Island's portfolio of programs.

**Table A-2. 2022 Heat Pump Goals**

| Program | Savings (MMBtu) | Participation (Units) | Program Budget ($M) |
|---|---|---|---|
| Heat Pump Water Heaters (Energy Efficiency Products only) | 3,243 | 293 | 0.21 |
| Heat Pump Pool Heaters (EEP) | 58,877 | 2,000 | 1.4 |
| Home Comfort Program | 129,673 | 4,942 | 11.5 |
| Heat Pumps (All Electric Homes Program) | 505 | 15 | 0.03 |
| Commercial Heat Pumps (Commercial Efficiency Program and Multifamily) | 1,000 | 200 | 0.10 |
| **Total** | **193,298** | **7,450** | **13.29** |

### *A.1.3 Benefit-Cost Analysis*

While PSEG Long Island's EE planning is done on a gross basis at the customer meter to align with state objectives, the cost-effectiveness screening is still done on a net basis that takes into account potential free riders and spillover effects as a result of the program offerings.

PSEG Long Island has historically used two separate tests to screen each program and for the overall portfolio: the utility cost test (UCT) and the societal cost test (SCT). The tests are similar but consider slightly different benefits and costs in determining the benefit-to-cost ratios.

- The UCT includes the net costs of an EE or renewable program as a resource option based on the costs incurred by the program administrator, including all program costs and any rebate and incentive costs, but excludes costs incurred by the participant.
- The SCT considers costs to the participant but excludes rebate costs because these are viewed as transfer payments at the societal level. The SCT also includes the benefits of non-electric (i.e., gas and fuel oil) energy savings where applicable, resulting in different benefit totals than the UCT test.

To be consistent with the Benefit-Cost Analysis (BCA) Order that was issued in 2016, the rate impact measure (RIM) test is also conducted for each EE and renewable program and for the overall portfolio. The RIM test provides an assessment of the preliminary impact on customer rates and compares utility costs and utility bill reductions with avoided costs and other supply-side resource costs.

PSEG Long Island now uses the SCT as the primary method and has applied the June 2021 BCA Handbook, including the avoided capacity and energy costs from including the carbon costs, to screen its 2022 EE programs and portfolio. The June 2021 Handbook is the same BCA Handbook that is being used for the 2021 Utility 2.0 Plan. The UCT and RIM tests are used as secondary reference points to assess the impact on utility costs and ratepayer bills from the benefits and costs that pass the SCT.

Table A-3 presents the benefit-to-cost ratios for the SCT, UCT, and RIM tests for each program and for the overall EE portfolios.

**Table A-3. BCA for 2022 EE Portfolio**

| Program/Sector | SCT | UCT | RIM |
|---|---|---|---|
| **Commercial Efficiency Program (CEP)** | **1.41** | **1.49** | **0.18** |
| **Multifamily** | **0.73** | **0.75** | **0.22** |
| **Commercial** | **1.40** | **1.49** | **0.18** |
| Efficient Products | 1.87 | 0.84 | 0.16 |
| Home Comfort | 1.69 | -0.18 | 1.72 |
| REAP | 0.66 | 0.41 | 0.13 |
| Home Performance | 0.85 | 0.38 | 0.19 |
| All Electric Homes | 2.05 | -0.28 | 2.30 |
| HEM | 0.93 | 0.61 | 0.20 |
| Pay for Performance | 0.61 | 0.48 | 0.17 |
| **Residential** | **1.60** | **0.51** | **0.28** |
| **Overall Portfolio** | **1.49** | **0.90** | **0.22** |

Table A-4 outlines the levelized costs on an MMBtu-basis for each program.

**Table A-4. Levelized Cost Comparisons for 2022 EE Portfolio**

| Program/Sector | $/MMBtu |
|---|---|
| **Commercial (CEP and Multifamily)** | **$20.78** |
| Efficient Products | $13.39 |
| Home Comfort | $19.18 |
| REAP | $38.43 |
| Home Performance | $37.26 |
| All Electric Homes | $16.61 |
| HEM | $30.67 |
| Pay for Performance | $50.14 |
| **Residential** | **$17.45** |
| **Overall Portfolio** | **$19.25** |

Levelized cost reflects the total incentive divided by the total savings over the measure life.

### *A.1.4 TRC Companies Implementation*

PSEG Long Island has partnered with TRC to deliver the Utility's EE and beneficial electrification programs. This partnership is governed by a master services agreement that has been effective since 2015 with Lockheed Martin, whose Distributed Energy Solutions group was acquired by TRC Companies in November 2019. TRC is a global consulting, engineering, and construction management firm that provides technology-enabled solutions to the power, oil & gas, environmental, and infrastructure markets. The scope of the master services agreement includes design and implementation of residential and commercial EE. TRC implements and manages most of the EE programs offered under the PSEG Long Island brand. PSEG Long Island retains overall planning, budgeting, and advertising functions.

Program implementation includes ongoing analysis and continuous improvement of implementation methods, market conditions, and measure mix. Implementation also includes activities such as qualifying products, qualifying projects, validating project scopes, conducting pre- and post-inspections, processing rebates, issuing payments, engaging contractors, and training stakeholders. TRC provides customer service and technical assistance, including customer consultations, design collaboration, and customer support in developing energy plans and customized engineering studies. TRC is responsible for program analytics, including pipeline, product, and results reporting. TRC works in collaboration with the PSEG Long Island's program planning and evaluation team, participating in annual program evaluation and ensuring best practices are established and followed throughout the programs.

### *A.1.5 New Efficiency: New York*

As part of its overall goal of reducing GHG emissions by 40% by 2030, New York set a new statewide EE target of 185 TBtu by 2025. Of the 185 TBtu goal by 2025, the New Efficiency: New York December 2018 Order established an incremental target of 31 TBtu of reduction by the State's utilities toward the achievement of the goal. Of the incremental target of 31 TBtu, LIPA was assigned a proportional share of increased EE savings of at least 3 TBtu over the 2019-2025 period, or 7.85 TBtu when combining base-level electric savings and the incremental amount established in the December 2018 Order.

Beginning with PSEG Long Island's 2020 EEDR Plan, offerings were expanded to include rebates and incentives for installing EE measures that supply beneficial electrification to the grid and allow customers to save on their fossil fuel-based costs. As such, Long Island became the first region in New York State to convert all electric savings metrics to an MMBtu basis to better conform with the New Efficiency: New York goals. This effort was supported by converting the entire PSEG Long Island Technical Resource Manual to calculate MMBtu for all measures offered.

Adopting fuel-neutral savings targets allows PSEG Long Island to aggregate efficiency achievements across electricity, natural gas, and delivered fuels such as oil and propane, which requires a shift toward investments in heat pumps and other beneficial electrification opportunities. Shifting rebate and incentive opportunities to a fuel-neutral basis de-emphasizes electric (kWh) savings and, by consequence, EE savings as a percentage of overall load in pursuit of the primary target of reducing overall energy use on a TBtu basis. As PSEG Long Island and the market gain greater insights from implementing fuel-neutral programs, programs can be modified to more effectively target Btu savings rather than electric consumption or demand savings, which served as prior metrics.

### *A.1.6 Energy Savings Portfolio of Programs*

Table A-5 lists the programs offered under this Plan that are administered by TRC and PSEG Long Island.

**Table A-5. Summary of EEDR Programs Offered by TRC and PSEG Long Island**

| Programs Administered by TRC | Programs Administered by PSEG Long Island |
|---|---|
| • Energy Efficient Products (EEP) Program<br>• Home Comfort Program<br>• REAP<br>• Home Performance with ENERGY STAR (HPwES)<br>• All Electric Homes<br>• Multifamily<br>• Commercial Efficiency Program (CEP) | • Behavioral Initiative (HEM Program)<br>• DLM Tariffs<br>• Pay for Performance |

### *A.1.7 Evaluation, Measurement, and Verification*

PSEG Long Island typically hires a third-party consulting firm to conduct annual program and portfolio evaluations of the EEDR programs as well as any ad hoc evaluation studies deemed necessary. PSEG Long Island is in the process of seeking a new vendor through a request for proposal (RFP) to evaluate program years 2021-2023.

As part of the annual evaluation cycle, the third-party evaluator produces two volumes: Volumes I and II. Together, these volumes comprise the entire Annual Evaluation report. Volume I provides an overview of evaluation findings, including impact and process results for 2020. Volume II of the 2020 Annual Evaluation Report, the Program Guidance Document, provides detailed program-by-program review of gross and net impacts of the EEDR portfolios along with process evaluation findings and a discussion of data collection and analytic methods. The program guidance document is developed to provide PSEG Long Island and its implementation contractor, TRC, with data-driven planning actions moving forward and full transparency for the methods employed to calculate energy and demand savings. Annual evaluation reports consist of the following three overarching categories:

**Impact Evaluation**

- Determine energy, demand, and environmental impacts achieved from each EE program.
- Conduct cost-effectiveness analysis for each EE program.

**Process Evaluation**

- Assess how efficiently a program is being implemented by evaluating the operational efficiency of program administrators and contractors.
- Gap analysis conducted to identify strengths, opportunities, and improvements in program tracking data collections necessary for savings calculations and other evaluation processes and studies.

**Economic Impact Analysis**

- As part of their annual evaluation efforts, the evaluation team assesses the economic impacts of the EEDR portfolios' investments on the economy of Long Island.
- The third-party evaluator will provide 1-year and 10-year economic impacts estimates associated with the 2022 EEDR portfolio investments, where the 10-year economic impacts accrue from measures installed in 2022 over their remaining measure life.

### *A.1.8 Coordination with National Grid*

The NENY Order that codified the energy efficiency and heat pump goals for New York also allows for greater opportunities for alignment around shared goals between utilities. PSEG Long Island and KeySpan Gas East Corporation d/b/a National Grid ("KEDLI") are in the process of developing a memorandum of understanding to support a more holistic and coordinated approach to deliver energy efficiency and beneficial electrification opportunities to shared customers on Long Island. As KEDLI expands their own offerings to customers, particularly around residential weatherization programs, PSEG Long Island is working with KEDLI to pursue opportunities to align the customer journey where possible. Beyond a smoother customer journey, the benefits to customers may also include the ability to provide coordinated incentives for defined measures or programs. PSEG Long Island and KEDLI may look at expanding this shared approach to savings and rebates for future measures or programs.

### *A.1.9 Marketing and Outreach*

PSEG Long Island markets and advertises its EE programs with the goal of increasing:

- Awareness about the programs offered by PSEG Long Island.
- Participation in PSEG Long Island's EE programs.
- Customer satisfaction, ultimately leading to driving up J.D. Power scores.

Research by J.D. Power suggests that customers who are aware and participate in PSEG Long Island's programs tend to trust and think of the utility more favorably. As part of its strategy to increase awareness of the utility's EE programs, PSEG Long Island uses J.D. Power and its own demographic data to target media messaging through select channels aimed specifically at demographic segments including:

- Mass media (print, radio, TV)
- Tactical (emails, direct mails, newsletters)
- Targeted (digital, social media, Online Energy Analyzer)

These combined tactics help transmit a broad message about EE but also communicate the benefits of EE to niche sectors of the audience, such as age, income level, homeowner versus renter, and those more inclined to embrace green technology.

PSEG Long Island continues to push the message of “save energy and money.” Research conducted by PSEG Long Island indicated that customers want to hear from them most about how to save energy and money on their bill. Explaining to them that they have a choice when it comes to lowering their bill makes customer opinions toward PSEG Long Island more favorable.

PSEG Long Island believes the right media mix and frequency is important to enforce the message of EE. To reach households in Nassau, Suffolk, and the Rockaways, a mix of TV, radio, newsprint, digital banners, and occasional billboards on trains and buses are used. This mix ensures that a broad audience is being reached. When it comes to marketing actual programs such as Home Comfort, Geothermal, or Home Performance, PSEG Long Island uses a more tactical approach with targeted emails, direct mail, and digital ads.

Efforts promoting EE continue to achieve positive results. Customers who are “somewhat familiar” with EE programs/services rank PSEG Long Island 145 points higher in the J.D. Power survey. Over the last 4 years, PSEG Long Island has successfully implemented multiple campaigns into the market on the Home Comfort (formerly Cool Homes) and Geothermal programs, as well as overall EE awareness. These campaigns resulted in two TV commercials, four different radio spots, 12 print ads, dozens of social posts, four train/bus billboards, and 12 digital ads.

#### A.1.9.1 *Disadvantaged Communities*

PSEG Long Island promotes EE outreach and education to residential and business customers year-round with the intent to help customers save energy and lower their utility bill.

Messages such as rebates, incentives, programs, and sustainability efforts are communicated through various communication channels. These channels included television, radio, digital, social, out of home (billboards, train station, busses etc.) and print.

While the advertising messages are intended to reach a broad audience, PSEG Long Island is exploring new ways to segment its customer base to identify those disadvantaged communities with low to moderate income customers and struggling small businesses.

Pending on the outcome of these findings, the Utility would dedicate a portion of its marketing and advertising annual budget to increase the frequency of messaging to disadvantaged communities (mainly through digital and social mediums and local papers) and increase the frequency of messaging, where possible, through broader media outlets such as radio, TV, and organic social media and sponsorships.

Examples of this would be digital geofencing in strategic geographic areas, targeting ZIP codes for social media (Facebook), connected TV (YouTube, Hulu, etc.) and select radio stations and local print where the message can be displayed in more than one language.

As part of the advertising, PSEG Long Island would look to measure the effectiveness of the messaging either quarterly or semiannually (mostly through the digital channels) to ensure the messaging is reaching and resonating with the right customers.

## A.2 Products and Programs

The following sections provide details on the programs that are being offered in 2022. Each section includes an outline of the program delivery channels, the target market, and the list of measures and incentives. Where applicable, details on outreach efforts and the cost-effectiveness of the program are also provided.

### *A.2.1 Energy Efficiency Products*

The objective of the EEP program is to increase the purchase and use of energy efficient appliances, beneficial electrification equipment, and lighting among PSEG Long Island residential customers. The EEP strives for market transformation, increasing the market penetration of efficient products primarily by financially incentivizing consumers. These rebates and incentives are distributed either through direct consumer rebates in a downstream program or to manufacturers or retailers in upstream/midstream models.

The program provides rebates or incentives for energy efficient measures like ENERGY STAR-certified lighting, ENERGY STAR appliances, windows, battery-operated lawn care equipment, heat pump pool heaters, advanced power strips, and water heating equipment. Rebates and incentives are offered through upstream and downstream promotions. ENERGY STAR certified products meet the energy efficiency standards set by the US Environmental Protection Agency and US Department of Energy. ENERGY STAR provides the program an independent third-party review and vetting of measures. As ENERGY STAR specifications change, PSEG Long Island adjusts its program offerings to remain in alignment, ensuring that program offerings meet the latest efficiency standards.

In addition to financial incentives, the program educates customers about the benefits of using energy efficient products and beneficial electrification equipment in their homes and outdoor spaces through a variety of marketing channels. The PSEG Long Island EEP program supports the stocking, sale, and promotion of efficient residential products at retail locations within its service territory. To support New York State's greenhouse gas reduction goals, PSEG Long Island's metrics shifted to MMBTU reduction. Resultantly, in 2020 the EEP began promoting and incentivizing beneficial electrification equipment, along with the more traditional electric energy saving ENERGY STAR offerings. The program uses a variety of mechanisms, most notably financial incentives, to increase the market penetration of these energy efficient products and beneficial electrification equipment in their homes. These incentives are distributed either through direct consumer rebates or upstream/midstream incentives paid directly to manufacturers or retailers.

PSEG Long Island reviews and adjusts EEP program offerings in order to maximize customer engagement, incorporate new technologies trending in the industry, and to retire other measures from the portfolio when the market is saturated.

#### A.2.1.1 *Program Delivery*

The EEP program is delivered through partnerships between TRC, subcontractors, retailers, distributors/installers, and product manufacturers. Customers who purchase qualifying ENERGY STAR appliances and beneficial electrification equipment are eligible for rebates or point-of-sale incentives.

***Upstream Incentives***

Upstream incentives are payments to manufacturers or retailers to stock, promote, and sell ENERGY STAR-certified lighting products. PSEG Long Island is able to buy-down the wholesale price rather than the retail product price by directing the incentive to the retailer or manufacturer. This typically results in a greater reduction of the retail price. Retailer and manufacturer reimbursement is based on the submission and verification of sales data.

Markdowns focus on working directly with manufacturers and retailers to reduce the final retail price of specified products. A markdown is structured to provide a participating retailer a per-unit incentive for all sales of a particular product sold during a specified period.

In order to implement an upstream program, Program Agreements (PA) are required between appropriate parties, including the retailers and manufacturers. Several program agreements have been negotiated with lighting manufacturers and retailers to support the EEP. PA's provide a budget cap and number of products to be sold during a specified period. For each upstream promotion a PA is established that identifies:

- Model numbers and quantity of products to be promoted
- PSEG Long Island per-unit incentive
- Total allocated funding for the promotion
- Retail price for each specific product model during the promotional period
- Promotion duration including start and end dates
- Location of each retail store participating in the promotion
- Sales data reporting requirements
- Frequency of sales data submissions
- Marketing requirements, e.g., placement of PSEG Long Island-branded point of purchase (POP) materials

**Processing Upstream Incentives**

TRC's subcontractor partner is responsible for the following upstream rebate processing procedures:

- Obtaining point-of-sale (POS) data from retailers to confirm appropriate measures were incentivized and to track quantities, etc.
- Maintaining a database that can track sales data. Data must include fields like product name, store/retailer, date/time, promotional PA numbers, manufacturer. Data must be exportable to reports.
- Ensuring that incentives are paid only for eligible products sold through participating stores during an active promotional period
- Standardizing various sales reports supplied by different industry partners and into a central program database and, after reviewing and subjecting inputted data to various quality assurance checks, distribute funds to industry partners
- Issue incentive payment to manufacturers and retailers
    - Payments are issued twice a month
- Host an online catalog or marketplace where customers can purchase energy efficient products through the PSEG Long Island website

Twice monthly sales data is communicated to the EEP team who validates that the sales data accurately reflects program participation and requirements. On validation, the subcontractor is paid the sum of incentives.

***Downstream Rebates***

**Processing Online Application and Mail-In Rebates**

Downstream rebates are payments paid to end-use customers who purchased qualifying equipment and applied for a rebate. TRC processes all rebates but engages with an Implementation Contractor to support the program by developing marketing collateral and promotions and establishing relationships and engaging with a large number of retailers to support the program. That engagement includes providing training to retailer and distributor sales staff on program participation and product eligibility, providing staffing for instore promotions and seeking opportunities for upstream promotion.

**Processing Online Application and Mail-In Rebates**

TRC provides a user-friendly Online Application (OLA) portal that allows customers to complete their rebate applications in a digital format. The OLA is integrated with the ENERGY STAR Qualified Product List which validates product eligibility that the customer is applying for. The OLA is also integrated with the Captures database which allows for the instant verification of a customer's CIS account number. After customer submittal of the OLA, the OLA migrates directly to Captures for review by the TRC processing team.

The EEP model described above is intended to remain in place through 2025.

### A.2.1.2 *Target Market*

All PSEG Long Island residential customers.

### A.2.1.3 *Measures and Incentives*

Table A-6 lists the measures offered in the EEP program. Pool pumps will no longer be incentivized beginning in 2022 because of new DOE regulations that will go into effect in 2021.

**Table A-6. EEP: List of Measures**

| Measure | 2022 Planned Units | Measure Incentives | Measure Rebates |
|---|---|---|---|
| SSL - specialty | 2,400,000 | $2.25 | - |
| SSL - common (A19) | 1,500,000 | $1.00 | - |
| Advanced Power Strips (Tier II) | 500 | $25.00 | - |
| Most Efficient Clothes Washers | 3,500 | - | $50 |
| Heat Pump Water Heater ≤ 55 gallons | 205 | $100.00 | $600 |
| ES Dehumidifiers | 7,500 | $30.00 | - |
| ES Room Air Purifiers (<150 CADR) - Upstream | 1,060 | $40.00 | - |
| ES Room Air Purifiers (>150 CADR) - Upstream | 940 | $50.00 | - |
| ES Dryer - Electric Resistance | 2,500 | - | $50 |
| Advanced Power Strips (Tier I) - Mid-stream/Upstream | 5,000 | $15.00 | - |
| Heat Pump Water Heater > 55 gallons | 88 | $100.00 | $600 |
| Most Efficient Dryers- Heat Pumps | 350 | $300.00 | - |
| LED In-Storage | 1 | - | - |
| Smart Thermostats - Connected (Wi-Fi Enabled)- Midstream | 6000 | - | $70 |
| Smart Thermostats - Learning - Midstream | 10,000 | - | $100 |
| ENERGY STAR Windows (sq. ft.) | 5,000 | - | $1 |

| Measure | 2022 Planned Units | Measure Incentives | Measure Rebates |
|---|---|---|---|
| Instantaneous Water Heater <12kW | 180 | $60.00 | $100 |
| Instantaneous Water Heater >12kW | 90 | $100.00 | $300 |
| Heat Pump Pool Heaters | 2,000 | $100.00 | $600 |
| Electric Lawn Mowers <4Ah | 50 | - | $20 |
| Electric Lawn Mowers > 5Ah | 1,000 | - | $40 |
| Electric Lawn Mowers 4-5 Ah | 500 | - | $30 |
| Electric Leaf Blowers | 1,500 | - | $20 |
| Electric Weed Trimmers | 1,500 | - | $20 |
| LED Linear Fixtures | 2,000 | $6.00 | - |
| Solar Pool Cover | 200 | | $75.00 |

#### A.2.1.4 *Outreach*

The EEP program for PSEG Long Island employs a variety of outreach strategies to ensure that customers are aware of the rebates/incentives available for ENERGY STAR appliances and beneficial electrification equipment and provides informative collateral on them. Strategies include broad brush and marketing via:

- Limited-time offer e-blast promotions
- Bill inserts
- Digital display ads
- Social media posts
- Point-of-purchase material at retailers
- Online Application
- PSEG Long Island website
- Online Marketplace

In addition, the program employs in-person outreach strategies including:

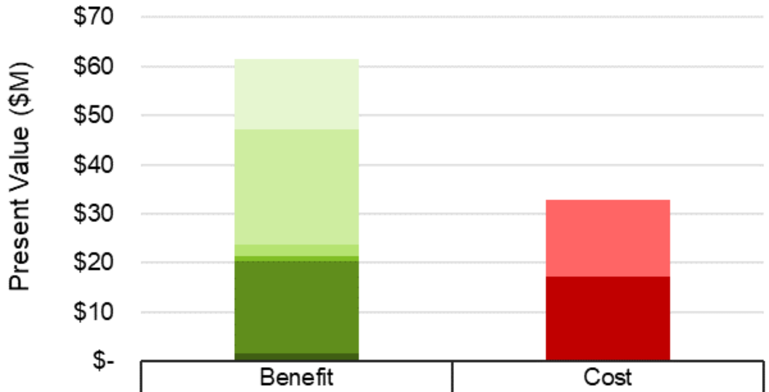
- Corporate lighting fairs
- In-store presentations
- Community partner outreach events
- Home shows in Nassau and Suffolk counties

These outreach strategies have proven effective in engaging and educating customers on the benefits of adopting ENERGY STAR and beneficial electrification products and they are planned to continue through 2025. Understanding the importance of digital transformation, the EEP program intends to increase social media presence to engage customers and promote the program.

#### A.2.1.5 *Business Case*

The EEP program has a SCT benefit-to-cost ratio of 1.87 and RIM benefit-to-cost ratio of 0.16. A list of the value streams considered in the BCA is detailed in Figure A-1.

**Figure A-1. Present Value Benefits and Costs of SCT – Efficient Products**




| | Benefit | Cost |
|---|---|---|
| Fuel Switching Benefits | 14.16 | - |
| Net Avoided SO2 and NOx | 0.0001 | - |
| Net Avoided CO2 | 23.40 | - |
| Avoided Distribution Capacity Infrastructure | 2.50 | - |
| Avoided Transmission Capacity Infrastructure | 1.06 | - |
| Avoided Energy (LBMP) | 18.55 | - |
| Avoided Generation Capacity Cost (AGCC) | 1.71 | - |
| Participant DER Cost | - | 15.58 |
| Program Administration Costs | - | 17.23 |
| Total | 61.38 | 32.81 |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 1 | **Fuel Switching Benefits** | Considers participant fuel cost savings associated with switching from oil, gas, and propane to electricity. | 14.16 | |
| 2 | **Net Avoided $SO_2$ and NOx** | Reduced $SO_2$ and NOx from reduced energy consumption. | 0.0001 | |
| 3 | **Net Avoided $CO_2$** | Reduced carbon emissions from reduced energy consumption and beneficial electrification. | 23.40 | |
| 4 | **Avoided Distribution Capacity Infrastructure** | Based on demand savings and marginal distribution capacity cost. | 2.50 | |
| 5 | **Avoided Transmission Capacity Infrastructure** | Based on demand savings and marginal transmission capacity cost. | 1.06 | |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| **6** | **Avoided Energy (LBMP)** | Energy savings based on both on-peak and off-peak periods. | 18.55 | |
| **7** | **Avoided Generation Capacity Cost (AGCC)** | Based on demand savings and marginal capacity cost. | 1.71 | |
| **8** | **Participant Distributed Energy Resources (DER) Cost** | Includes cost of incremental equipment and installation. | | 15.58 |
| **9** | **Program Administration Costs** | Includes contractors fee, labor, evaluation, and advertising costs. | | 17.23 |
| | **Total Benefits** | | **61.38** | |
| | **Total Costs** | | | **32.81** |
| | **SCT Ratio** | | **1.87** | |

NPV = Net present value
LBMP = Location-based marginal pricing

## *A.2.2 Residential Appliance Recycling*

Under the umbrella of the EEP program, PSEG Long Island offers an Appliance Recycling program that is planned to continue through 2025. The goal of the program is to promote the removal of older, but operable and in use, inefficient appliances from the customer home/business. The program provides checks to residential and commercial customers who participate in the refrigerator/freezer recycling program, and vouchers for customers who participate in the dehumidifier and room air conditioning recycling program. Vouchers can be used on the PSEG Long Island marketplace (Online Energy Efficient Products Catalog). The EEP program engages an appliance recycling subcontractor who is responsible for the removal and proper disposal of the recycled equipment.

Customers receive a $50 incentive for each refrigerator or freezer recycled. Customers can also earn an additional $35 voucher per unit for recycling up to three working room air conditioners or dehumidifiers in conjunction with a qualifying refrigerator or freezer pickup.

### A.2.2.1 *Program Delivery*

On behalf of PSEG Long Island, TRC subcontracts appliance recycling. Subcontractors have been vetted to ensure that they have experience providing the services offered and responsibly disposing of the appliances. Responsibilities include:

- Scheduling pickups from customer homes or businesses
- Verifying appliance qualifies for program
- Appliance removal from customer homes or businesses
- Rebate processing and payment (check/voucher)
- Program tracking and reporting against goals
- Identifying opportunities for improvement

The Program Manager engages the subcontractor to develop innovative and creative marketing strategies and materials. Marketing may include, but not be limited to, mailers, bill inserts, direct mail, eblasts, flyers, website, print ads, and giveaway promotions.

#### A.2.2.2 *Target Market*

All residential and small/mid-sized commercial customers.

#### A.2.2.3 *Measures and Incentives*

Table A-7 lists the measures offered in the Residential Appliance Recycling program.

**Table A-7. Residential Appliance Recycling: List of Measures**

| Measure | 2022 Planned Units | Measure Incentives | Measure Rebates |
|---|---|---|---|
| Dehumidifier Recycle | 150 | - | $35 |
| Refrigerator & Freezer Recycle Post 2001 & Pre 2010 | 2,000 | - | $50 |
| Refrigerator & Freezer Recycle Pre 2001 | 800 | - | $50 |

#### A.2.2.4 *Outreach*

The TRC Program Manager works with the appliance recycling subcontractor to develop marketing collateral. The program uses palm cards to promote the program. They contain program details for TRC to distribute to customers at all public events and through other residential programs, such as REAP and Home Performance.

TRC and PSEG Long Island collaborate on social media posts and postcard mailings that educate the customer on proper recycling methods. TRC may also launch giveaway promotions to effectively increase participation.

### *A.2.3 Residential Home Comfort Program*

PSEG Long Island’s Home Comfort Residential Heating and Cooling Program provides PSEG Long Island residential customers rebates for the purchase and installation of efficient and clean Air Source Heat Pumps (ASHP). ASHPs are typically two to three times more efficient than traditional fossil fuel space heating. The Home Comfort Program rebates efficient cold climate and non-cold climate ducted and ductless systems. In addition, the program offers rebates for system controls to ensure the ASHP is operating as the primary heating source.

Since 2019, the Home Comfort program has evolved each year to align more closely with New York State’s aggressive greenhouse gas reduction goals, found in the Climate Leadership Community Protection Act (Climate Act). The Climate Act calls for an 85% reduction of GHG emissions by 2050. In the spring of 2019, PSEG Long Island rebranded the Cool Homes program to the Home Comfort program. The rebranding of the program was coincident with shifting the focus from cooling systems, like central air conditioning systems, to ASHPs and the proper use of them as a combined primary heating and cooling system. To promote ASHP technology, the Home Comfort Program launched an ASHP Pilot program that targeted electric resistance heating communities. The pilot boasted impressive engagement and installation results and laid the foundation for the Whole House ASHP offering, which hit the market in 2020. The whole house rebate offering was available to new construction customers and customers with existing fossil fuel heating systems. In 2020, central air conditioning systems were removed from the Home Comfort program offering. This program change increased the promotion of whole house and partial house ASHP solutions and better aligned the Home Comfort program with New York State's goals.

A whole house installation occurs when a customer sizes the ASHP to meet the heating and cooling needs of their entire home. A partial house installation occurs when a customer sizes the ASHP to meet a portion of the heating and cooling needs of their home. Customers with existing fossil-fuel heating who participate in the whole house offering are permitted to keep the existing system as a secondary heating source. To ensure the ASHP is the primary heating source, the Home Comfort program rebates, and requires, the installation of integrated controls. Integrated controls connect to both the ASHP and fossil fuel system and are programmed to default to the ASHP unless the temperature dips below a certain temperature, causing engagement of the fossil fuel heating system.

The Home Comfort program provides a participation pathway for all customers by offering whole house solutions, partial house solutions, and low-income solutions. To ease the path to participation for the public, the Home Comfort and Home Performance with Energy Star weatherization program are offered in one application. Customers can participate in Home Comfort, Home Performance with Energy Star or both programs at once. For low to moderate income participants, there is an enhanced rebate offer. Enhanced rebates are available for eligible low-income customers who install whole-house heat pumps and weatherization measures. PSEG Long Island works with Energy Finance Solutions (EFS) to qualify low-income customers based on the NYSERDA Empower Income Eligibility Guidelines. The NYSERDA Empower Income Eligible Guidelines are based on the 60% state median income and verification documents like letters from the Home Energy Assistance Program (HEAP) or Social Security. EFS also provides low-interest on-bill recovery loans and smart energy loans for qualified non-low-income and low-income customers.

From initial program inception, and legacy Cool Homes program, the Home Comfort team has worked directly with partners, distributors, and manufacturers to educate and train them on program offerings and requirements. This level of engagement and collaboration ensures that all customers who interact with a member of the Home Comfort team or a trusted partner are educated on the benefits of ASHP technology and have the support to make energy efficient decisions for their home and family. ASHP technology can provide clean heating and cooling in a customer's home for 10-25 years. Because of this, it is critical for members of the Home Comfort team and the partners to positively influence the customer on the benefits of program participation.

In 2022-2025, to continue supporting New York State initiatives, the Home Comfort program will update program requirements to remain in alignment with the state and NYSERDA. As the requirements around heat pumps are rapidly evolving as the market adjusts, rebate values, contractor incentives, and program guidelines will be re-evaluated quarterly to ensure offerings remain engaging and promote state objectives and program participation.

#### A.2.3.1 *Notable Changes*

In 2022, the Home Comfort application continues to offer rebates for heat pumps, controls, and Home Performance with ENERGY STAR weatherization measures. New in 2021, rebates were also available for ducted air source heat pump tune-ups, central air conditioner tune-ups, and electric hot water heating equipment (heat pump water heaters and tankless water heaters. Electric hot water heating equipment has typically been offered through the EEP program but including it in the Home Comfort application allows the partner and participant to consider all-electric solutions to meet their heating and water heating needs through one central application. These measures all remain a part of the 2022 offering.

The Home Comfort program's per-ton rebate structure remained consistent between 2020 and the beginning of program year 2021, with the exception of an update in rebate calculation methodology and a second quarter rebate adjustment. Because PSEG Long Island and the Home Comfort Program are promoting ASHPs as a primary heating rather than cooling source, rebate calculations utilized the 17°F rated heating capacity instead of the 95°F cooling capacity found on the AHRI certificate. In April 2021 PSEG Long Island adjusted rebates for all cold climate ASHPs so that the rebate would be close to the legacy 95°F cooling capacity rebate. Through 2022, PSEG Long Island will continue to monitor market feedback and rebate values and adjust as needed.

The installation of integrated controls expanded in 2021 and 2022. Integrated controls are required for all whole house and partial house cold climate systems where supplemental fossil fuel heating exists. The requirement for Manual J load calculations also expanded to include partial house cold climate ASHPs. A Manual J is required to ensure all equipment is properly sized for the home. These additional program requirements were included to better align the Home Comfort program with the rest of New York State.

An Equipment Only offering was launched in 2021 and continues to be available in 2022. TRC built a digital Equipment Only participation method through the already established Residential Online Application. Customers who wish to use a non-participating Home Comfort partner or who installed their own equipment, can apply for up to two per system rebates for eligible non-cold climate ductless mini-split ASHPs. Through this equipment-only style offering, customers are not required to install smart thermostats, integrated controls, or provide a Manual J. The customer must provide an invoice and an AHRI certificate.

The Home Comfort program's low-income offering continues to be available in 2022. Eligible customers can receive enhanced rebates for installing whole house cold climate ASHPs and weatherization measures. In April 2021, the program launched the Home Comfort Plus component of the low-income ASHP offering. PSEG Long Island received $4.5M in additional funding that was applied to the existing Low-Income whole house rebates. The per ton rebate values became so generous that eligible low-income customers would pay little, if any, out of pocket costs for the whole house system. The $4.5M in additional funding applies to whole house cold climate ASHPs only.

Extending into subsequent years, PSEG Long Island plans to increase the adoption of heat pumps (along with home performance projects) in the single-family residential sector by establishing a partnership with Sealed, a New York-based company that finances key home improvements using the money homeowners currently waste on energy. For more details on the Sealed Partnership, see Section A.2.5.1.

#### A.2.3.2 *Program Delivery*

Home Comfort program participation is primarily driven through partnerships with installation contractors who, with vetting and training, become Home Comfort partners. Home Comfort partners promote the benefits of participation in the Home Comfort program and have positively impacted the ASHP market by adhering to PSEG Long Island's quality installation verification (QIV) of ASHP equipment. Home Comfort partners are given the opportunity to collaborate with the Home Comfort team and receive education and training on program requirements regularly. TRC also hosts weekly contractor meetings to assist partners with all aspects of program participation through initial application review, equipment review, and technical requirements.

To further assist and engage with partners, PSEG Long Island provides Home Comfort partners with incentives to offset costs associated with equipment testing, like Manual J Load Calculation software. Providing incentives for equipment like software ensures partners will properly perform QIV installations and continue to participate in the Home Comfort program.

A Manual J is necessary for a QIV installation. Contractors perform Manual J calculations to ensure appropriately sized energy efficient units are installed. In addition to right-sizing equipment, the Home Comfort partners will ensure that the refrigerant charge and airflow are checked using prescribed tests. In 2022-2025, all heat pump projects will require installation by a QIV Home Comfort partner, with the exception of the equipment only offering.

Geothermal heat pumps are a component of the Home Comfort Program; however, geothermal projects are completed on the standalone Geothermal Rebate Application. The standalone application accommodates both Residential and Commercial projects. This is because most often, geothermal market partners service both residential and commercial customers. Rebate levels and contractor incentives are the same for both project types, but savings are driven by the selection of a residential or commercial installation. When an application is received, the customer type is validated by rate code and a site inspection. In 2021, geothermal water heating was added to the program offering. This allows a customer to install a whole house or whole site geothermal space heating and water heating system solution.

#### A.2.3.3 *Target Market*

The Home Comfort program is offered to all residential customers in the PSEG Long Island service territory. Geothermal is offered to all customers. Enhanced LMI rebates are offered to all eligible customers.

#### A.2.3.4 *Measures and Incentives*

The list of measures that are offered in the Residential Home Comfort program are included in Table A-8.

**Table A-8. Residential Home Comfort Program: List of Measures**

| Measure | 2022 Planned Units | Measure Incentives | Measure Rebates |
|---|---|---|---|
| Smart Thermostats - Learning - ASHP | 65 | - | $100 |
| Smart Thermostats (Connected WI-FI enabled) – ASHP | 65 | - | $70 |
| Integrated Controls | 1,134 | - | $500 |
| Integrated Controls - LMI | 180 | - | $750 |
| ASHP (QI) New/EOL ≥15 SEER, ≥8.5 HSPF | 100 | $200 | $750 |
| ASHP (QI) New/EOL ≥16 SEER, ≥8.5 HSPF | 350 | $200 | $813 |
| ASHP (QI) New ≥16 SEER, ≥8.5 HSPF - Electric Resistance | 50 | $500 | $2,000 |
| CAC Tune Up | 700 | - | $40 |
| ASHP Tune Up | 300 | - | $50 |
| ccASHP (QI) New >17 SEER, ≥10 HSPF - NC Whole House | 150 | $500 | $3,100 |
| ccASHP (QI) New >17 SEER, ≥10 HSPF - NC Whole House – LMI | 26 | $500 | $4,650 |
| ccASHP (QI) New >17 SEER, ≥10 HSPF - Whole House All Others | 534 | $500 | $2,640 |

| Measure | 2022 Planned Units | Measure Incentives | Measure Rebates |
|---|---|---|---|
| ccASHP (QI) New >17 SEER, ≥10 HSPF - Whole House All Others - LMI | 77 | $500 | $3,960 |
| ccASHP (QI) New >17 SEER, ≥10 HSPF - Whole House Existing Oil w/No CAC | 450 | $500 | $2,900 |
| ccASHP (QI) New >17 SEER, ≥10 HSPF - Whole House Existing Oil w/No CAC - LMI | 77 | $500 | $4,350 |
| ccASHP (QI) New ≥17 SEER, ≥10 HSPF - Electric Resistance | 50 | $500 | $2,500 |
| ccASHP (QI) New ≥17 SEER, ≥10 HSPF - Electric Resistance – LMI | 15 | $500 | $3,750 |
| ccASHP (QI) New/EOL ≥17 SEER, ≥10 HSPF | 60 | $250 | $938 |
| ccDuctless Minisplit HP New/EOL >18 SEER, ≥10 HSPF | 1,400 | $250 | $630 |
| Ductless Minisplit HP New/EOL ≥18 SEER, ≥8.5 HSPF | 1,200 | $200 | $413 |
| GSHP EER ≥ 25 EER | 66 | $200 | $6,000 |
| GSHP EER 19 to < 25 EER | 44 | $200 | $3,000 |
| PTHP-Packaged Terminal Heat Pump ≥ 11.4 EER, 3.3 COP | 3 | - | $100 |
| Heat Pump Water Heater ≤ 55 Gallons | 30 | $100 | $600 |
| Heat Pump Water Heater > 55 Gallons | 20 | $100 | $600 |

#### A.2.3.5 *Outreach*

The Home Comfort program outreach strategy, aside from contractor word of mouth, includes a variety of public platforms:

- Internet keyword searches
- Banners on high traffic webpages, such as Newsday.com, Facebook.com, etc.
- Radio advertisements
- Newspaper advertisements
- Industry networking events and speaking engagements, such as AIA Peconic, AIA Long Island, Passive House New York
- Partnering with New York State’s Clean Heat marketing and advertising
- Promotion on the PSEG Long Island webpage

In 2022-2025, the Home Comfort team will continue to implement the above listed outreach strategies and work with participating contractors on tools to promote the installation of efficient heat pumps. In addition, the Home Comfort team will develop more educational material to provide contractors and customers a better understanding heat pump technology and the benefits associated with the equipment.

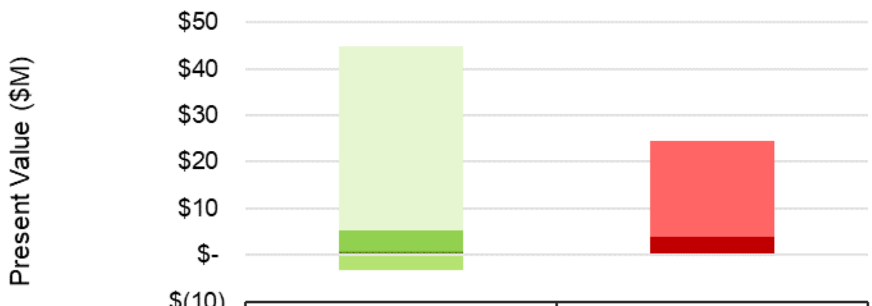
It should be noted that during the 2020 pandemic period, the Home Comfort team, along with the Home Performance team, began offering virtual training sessions to maintain contractor engagement. The Home Comfort subject matter experts provided a platform for contractors to learn more about important program components such as the methodologies behind Manual J Load Calculation and best practices.

These types of trainings maintain high level of contractor engagement and ensure the contractors have the tools necessary to reach and engage customers. Due to very positive response from the market and partners, these virtual methods of engagement were conducted throughout the 2021 program year and will likely continue through 2022.

### A.2.3.6 *Business Case*

The Home Comfort program has a SCT benefit-to-cost ratio of 1.63 and RIM benefit-to-cost ratio of 1.72. A list of the value streams considered in the BCA is detailed in Figure A-2.

**Figure A-2. Present Value Benefits and Costs of SCT – Home Comfort**




| | Benefit | Cost |
|---|---|---|
| Fuel Switching Benefits | 39.34 | - |
| Net Avoided SO2 and NOx | 0.00 | - |
| Net Avoided CO2 | 4.37 | - |
| Avoided Distribution Capacity Infrastructure | 0.53 | - |
| Avoided Transmission Capacity Infrastructure | 0.22 | - |
| Avoided Energy (LBMP) | (3.25) | - |
| Avoided Generation Capacity Cost (AGCC) | 0.28 | - |
| Participant DER Cost | - | 20.59 |
| Program Administration Costs | - | 3.97 |
| Total | 41.49 | 24.55 |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 1 | **Fuel Switching Benefits** | Considers participant fuel cost savings associated with switching from oil, gas, and propane to electricity. | 39.34 | |
| 2 | **Net Avoided $SO_2$ and NOx** | Reduced $SO_2$ and NOx from reduced energy consumption. | 0.0004 | |
| 3 | **Net Avoided $CO_2$** | Reduced carbon emissions from reduced energy consumption and beneficial electrification. | 4.37 | |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 4 | **Avoided Distribution Capacity Infrastructure** | Based on demand savings and marginal distribution capacity cost. | 0.53 | |
| 5 | **Avoided Transmission Capacity Infrastructure** | Based on demand savings and marginal transmission capacity cost. | 0.22 | |
| 6 | **Avoided Energy (LBMP)** | Energy savings based on both on-peak and off-peak periods. | (3.25) | |
| 7 | **Avoided Generation Capacity Cost (AGCC)** | Based on demand savings and marginal capacity cost. | 0.28 | |
| 8 | **Participant Distributed Energy Resources (DER) Cost** | Includes cost of incremental equipment and installation. | | 2.59 |
| 9 | **Program Administration Costs** | Includes contractors fee, labor, evaluation, and advertising costs. | | 3.97 |
| | **Total Benefits** | | **41.49** | |
| | **Total Costs** | | | **24.55** |
| | **SCT Ratio** | | **1.69** | |

NPV = Net present value
LBMP = Location-based marginal pricing

### A.2.4 *Residential Energy Affordability Partnership Program*

The Residential Energy Affordability Partnership (REAP) program is a free program for income-eligible customers that includes a home energy survey conducted by a certified Building Performance Institute (BPI) field technician, energy savings education and tips, and the direct install of energy efficiency measures. The REAP program encourages whole house improvements and provides customer support throughout the entire energy efficiency journey. Homeowners and renters are eligible for the REAP program.

Key components of the REAP program are:

- Achieving persistent energy savings
- Encouraging energy saving behavior and whole house improvements
- Helping residential customers reduce their electricity bills
- Developing partnerships with contractors to bring efficient systems to market
- Marketing and cross-promoting other PSEG Long Island program offerings

#### A.2.4.1 *Notable Changes*

There are no notable changes for program year 2022.

#### A.2.4.2 *Program Delivery*

PSEG Long Island and TRC engage a third-party implementation contractor to work with the REAP program team and eligible customers to efficiently meet energy saving goals while adhering to the program's budget. The REAP team and implementation contractor develop a targeted marketing plan for specific homes and areas. Factors included in identifying these customers are, high intensity usage, underserved regions or populations and specific need profiles such as low-income. Customers who are identified through these efforts are offered a free comprehensive home energy survey and energy savings educational materials. These materials and free energy survey are intended to influence the customer in REAP program participation.

Customers who are interested in REAP participation can work with the dedicated REAP customer call center. The representatives in the call center are responsible for scheduling home energy surveys directly with the customers. Prior to the date of the scheduled survey, customers receive an email notification and pre-survey communications to highlight the key characteristics of the home.

On REAP program enrollment, the implementation contractor conducts a comprehensive home energy survey, performs health and safety tests, installs energy efficiency measures, and has a kitchen table talk with the customer. The kitchen table talk allows the customer to speak one on one with a program representative about energy savings behaviors and their monthly electric bills. The implementation contractor also provides the customer a folder that contains information about other PSEG Long Island programs, neighboring utility assistance programs, and PSEG Long Island brochures that contain information aiming to increase energy education and awareness on managing energy usage.

In 2020 and 2021, in response to the pandemic, the REAP program pivoted traditional in-person participation methods to virtual. Customers were offered remote energy surveys and a curbside delivery option for direct install measures. In 2022, remote energy surveys are still offered to customers who feel more comfortable participating virtually.

The REAP implementation contractor is responsible for:

- Hiring local staff to perform home energy surveys and direct measure installation
- Engaging with customers to schedule home energy survey appointments
- Providing customer service and support
- Tracking program performance, including customer participation as well as quality assurance/quality control (QA/QC)
- Reporting monthly on progress toward program goals

PSEG Long Island and the implementation contractor work together to market REAP using the following approaches:

- Utilizing bill inserts to raise awareness of the REAP program
- Delivering targeted direct mail pieces to further inform the customer of program benefits, home energy survey, and call center information
- Calling and door to door canvassing for potential REAP participants
    - Participant is provided opportunity to schedule survey over the phone or in-person during site visit
- Emailing program information to eligible customers
- Hosting open houses at community central locations, like Town Hall offices

To increase referrals and productivity, Program management coordinates with different populations:

- Nonprofit, non-governmental organizations
- Government
- Senior citizens
- Financial/debt counseling organizations
- Faith-based institutions
- Apartment and multifamily dwellings
- Public libraries

#### *Energy Education*

A fundamental precept of the REAP program design is extensive customer energy education and support throughout the customer's energy efficiency journey. Education and support for the customer are critical to ensure the customer uses the installed energy efficiency measures appropriately. This is achieved by creating a partnership between the REAP program and the customer. The partnership allows the REAP team member to work with their new partner in identifying energy savings behaviors that will lead to lower monthly electric bills and maximize the benefits of the newly installed energy efficiency measures. Once the energy savings behaviors are identified, they become the partners' Action Commitments and the partner agrees to implement the identified behaviors. Some examples of the energy savings behaviors are lowering the water heater temperature, checking furnace filters, turning off lamps, and utilizing energy saving settings on clothes washers and other appliances.

The partnership concept puts the customer in charge of their energy savings and their experience. Customers who participate in REAP, should agree to become partners, and accept their responsibility through the Action Commitments. The Action Commitments, once agreed on, are included in a formal written agreement, and signed by the new partner and a REAP representative.

Other key focuses of energy education include:

- Use and value of installed high efficiency lighting retrofits
- Set-back thermostat operation and management
- Appliance use and management
- Water conservation measures
- Water heater temperature setting

#### *Referrals*

During a home energy survey, the field technician provides the customer, either verbally or tangibly, information about other appropriate energy efficiency programs and assistance programs implemented by PSEG Long Island or other organizations, per PSEG Long Island approval. This is known as a referral. Providing the customer with information about other programs allows them to explore participation in other programs that will benefit them. The field technician is educated on the other programs to assist the customer.

Some of the assistance programs are:

- PSEG Long Island Home Performance Program
- New York State Home Energy Assistance Program

- New York State Weatherization Assistance Program
- Other relevant programs including town- or county-specific programs and social support programs to meet special needs

The field technician also leaves behind a REAP customer folder that includes informative PSEG Long Island brochures and information such as the Energy Saving Guide, "PSEG Long Island 66 Ways to Save On Your Electric Bill, "Household Assistance Rate," and "Financial Assistance."

***Lead Generation***

PSEG Long Island participates in residential events throughout the year to distribute brochures that promote the benefits of the REAP program.

***Energy Forum for Advocates***

PSEG Long Island hosts an annual Energy Forum for Advocates, which is organized and hosted by the REAP program manager. The Energy Forum provides a platform for advocates to learn about services that can positively impact the lives of the low-income families they work with. The REAP program manager invites a number of speakers from different assistance programs to speak to the advocates and answer any questions the advocate may have.

Speakers invited to the Energy Forum represent assistance programs including, but not limited to:

- PSEG Long Island's Household Assistance Rate
- Consumer Advocates from PSEG Long Island
- CDC Long Island's Weatherization Assistance Program
- National Grid Home Energy Affordability (HEAT) Program and Energy Affordability Program (EAP)
- Home Energy Assistance Program (HEAP)
- United Way of Long Island's Project Warmth
- DSS Emergency Energy Assistance

The Energy Forum is typically held in the fall prior to the heating season. This ensures the advocates are receiving the latest information on programs that help with heating for their clients. In 2020, the Energy Forum was held virtually and boasted over 240 attendees.

#### A.2.4.3 *Target Market*

The program is offered to all residential customers who:

- Have a PSEG Long Island account
- Own or rent in the service territory
- Comply with income guidelines and size of household and meet the qualifying criteria below. Income guidelines are updated in the March-April timeframe

**Table A-9. 2021-2022 REAP Income Guidelines**

| Size of Family | Annual Income | Monthly Income |
|---|---|---|
| 1 | $66,450 or less | $5,537 or less |
| 2 | $75,950 or less | $6,329 or less |
| 3 | $85,450 or less | $7,120 or less |
| 4 | $94,900 or less | $7,908 or less |
| 5 | $102,500 or less | $8,541 or less |
| 6 | $110,100 or less | $9,175 or less |
| 7 | $117,700 or less | $9,808 or less |
| 8 | $125,300 or less | $10,441 or less |

*For each additional person, add $7,600 to Annual Income/$633 to Monthly Income

### *Customer Qualification*

Verification of REAP program income eligibility for each PSEG Long Island customer is initially performed by the TRC's customer call center during the initial intake call. The customer must provide proof of income documentation prior to the start of the home energy survey. REAP eligibility is based on number of persons living in the home, total household income, and the inclusion of income from alternate sources.

The implementation contractor's field technician is responsible for the review of customer documentation to ensure eligibility for participation. In addition, the field technician is responsible for the recording of household member's name, annual income, source(s) of income and verification code of documents (VCD) code on the participation agreement form.

**Verification Codes for Documents**

- CSO – Child Support/Court Order
- DPW – Department of Public Welfare
- EVL – Employer Verification Letter
- PS2 – Pay Stubs, previous two months
- SSD – Social Security Disability
- SSI – Supplemental Security Income Award Letter
- SSR – Social Security Retirement
- SSS – Social Security Survivor's Benefit
- UAL – Unemployment Award Letter
- VBA – Veteran's Benefits Award Letter
- W-2 – Previous Year W-2 or 1040 SSE Form
- WCA – Workman's Compensation Award Letter
- Other ______________________________

#### A.2.4.4 *Measures and Incentives*

The REAP program offers the following measures:

**Table A-10. Residential Energy Affordability Partnerships Program: List of Measures**

| Measure | 2022 Planned Units | Measure Incentives | Measure Rebates |
|---|---|---|---|
| 16 cf Refrigerator | 60 | - | - |
| 18 cf Refrigerator | 60 | - | - |
| 21 cf Refrigerator | 60 | - | - |
| Advanced Power Strips (Tier II) | 2,000 | - | - |
| Dehumidifiers 30 Pints/Day | 130 | - | - |
| Dehumidifiers 50 Pints/Day | 170 | - | - |
| ES Room Air Purifiers (<200 CADR) | 150 | - | - |
| ES Room Air Purifiers (>200 CADR) | 100 | - | - |
| Water Temperature Turndown/HH | 60 | - | - |
| Faucet Aerators/unit | 320 | - | - |
| Low Flow Showerheads/unit | 200 | - | - |
| Thermostatic Valve | 200 | - | - |
| 10,000 Btu RAC 1 Unit/HH | 60 | - | - |
| 12,000 Btu RAC 1 Unit/HH | 60 | - | - |
| 6,000 Btu RAC 1 Unit/HH | 450 | - | - |
| 8,000 Btu RAC 1 Unit/HH | 200 | - | - |
| Pipe Insulation/ln ft | 300 | - | - |
| Nightlight | 1,800 | - | - |
| LED Bulbs | 30,000 | - | - |

It is estimated that 2,000 REAP visits will be conducted in the 2022 program year. The numbers of visits per year is expected to remain constant through the 2025 program year. A variety of the above-mentioned energy saving measures will be installed during the visit.

Offered measures are divided into core measures and major efficiency measures.

- **Core Measures:** Measures that are typically directly installed regardless of the heating fuel used by the PSEG Long Island residential customer.
- **Major Efficiency Measures:** Those measures that will cost-effectively reduce the energy consumption of high-use or seasonal appliances but typically require more extensive treatment. All energy-efficient measures are installed at no cost to the customer or building owner, if cost-effective, given site specifics. In the case of partners who occupy rental property, core efficiency measures involving building owner property, such as non-tenant-owned appliances, may not be installed without the prior written approval of the building owner.

**Table A-11. Core and Major Efficiency Measures Offered through REAP**

| Typical Core Measures | Major Efficiency Measures |
|---|---|
| • Installation of high-efficiency lighting<br>• Pipe Insulation<br>• High-efficiency showerheads<br>• Faucet Aerators<br>• Reducing electric water heater temperature settings<br>• Thermostatic Shower Valves<br>• Smart Strips | • Replacement of inefficient room air conditioners (RACs), dehumidifiers, room air purifiers<br>• Replacement of inefficient refrigerators |

* Pipe insulation, low flow shower heads, faucet aerators, water temp turndown and thermostatic shower valve are provided to customers with electric domestic hot water heaters only.

At the completion of a REAP survey, follow up work may be identified in which the customer can utilize income eligible enhanced incentives through the Home Comfort and Home Performance with ENERGY STAR program.

#### A.2.4.5 *Outreach*

The REAP program reaches customers and advocates in a variety of ways. The program coordinator and/or program manager communicates directly with PSEG Long Island customers, homeowners, and renters, and indirectly through related social agencies.

In the 2019-2020 calendar year, the REAP team attended over 100 events at central community locations, such as libraries, churches, fairs. At these events, the REAP program coordinator and/or program manager conducted presentations, distributed program information, and made connections with customers and advocates.

The REAP program also focuses on building relationships with other organizations that can serve REAP-eligible customers. The goal is to not only collaborate with other organizations but to build even larger referral potentials and relationships with community liaisons, community councils and board members, housing authorities, departments of social services, and other government organizations that serve low-income and senior citizen communities. To build these relationships, the REAP program provides workshops and presentations for agency staff meetings, support/consumer groups, and large-scale community events.

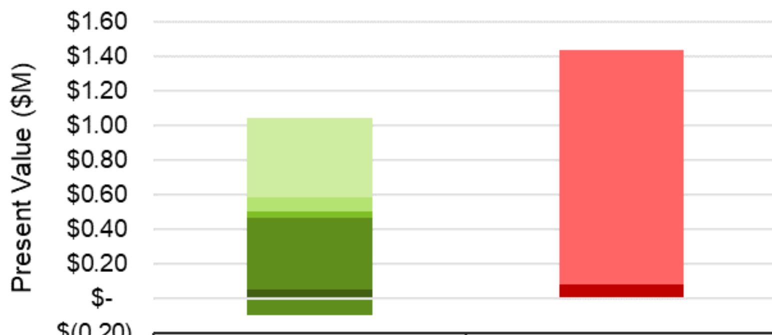
Customers can also reach the REAP program directly through the PSEG Long Island website or through E-blasts that are sent out periodically. Both avenues refer the customer to a REAP mini-application that is sent directly to the REAP team once completed. The E-blast response to the mini-app has resulted in a 24% scheduling rate.

Other forms of outreach used by the REAP team are monthly post-card mailings targeting low-income areas, door hangers, and brochures delivered to foodbanks. In 2022-2025, these effective and engaging outreach strategies will continue to be implemented.

#### A.2.4.6 *Business Case*

REAP has a SCT benefit-to-cost ratio of 0.66 and RIM benefit-to-cost ratio of 0.13. A list of the value streams considered in the BCA is detailed in Figure A-3.

**Figure A-3. Present Value Benefits and Costs of SCT – REAP**




| | Benefit | Cost |
|---|---|---|
| Fuel Switching Benefits | (0.09) | - |
| Net Avoided SO2 and NOx | (0.000002) | - |
| Net Avoided CO2 | 0.46 | - |
| Avoided Distribution Capacity Infrastructure | 0.08 | - |
| Avoided Transmission Capacity Infrastructure | 0.03 | - |
| Avoided Energy (LBMP) | 0.42 | - |
| Avoided Generation Capacity Cost (AGCC) | 0.05 | - |
| Participant DER Cost | - | 1.35 |
| Program Administration Costs | - | 0.09 |
| Total | 0.95 | 1.44 |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 1 | **Fuel Switching Benefits** | Considers participant fuel cost savings associated with switching from oil, gas, and propane to electricity. | (0.09) | |
| 2 | **Net Avoided $SO_2$ and NOx** | Reduced $SO_2$ and NOx from reduced energy consumption. | (0.000002) | |
| 3 | **Net Avoided $CO_2$** | Reduced carbon emissions from reduced energy consumption and beneficial electrification. | 0.46 | |
| 4 | **Avoided Distribution Capacity Infrastructure** | Based on demand savings and marginal distribution capacity cost. | 0.08 | |
| 5 | **Avoided Transmission Capacity Infrastructure** | Based on demand savings and marginal transmission capacity cost. | 0.03 | |
| 6 | **Avoided Energy (LBMP)** | Energy savings based on both on-peak and off-peak periods. | 0.42 | |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 7 | **Avoided Generation Capacity Cost (AGCC)** | Based on demand savings and marginal capacity cost. | 0.05 | |
| 8 | **Participant Distributed Energy Resources (DER) Cost** | Includes cost of incremental equipment and installation. | | 1.35 |
| 9 | **Program Administration Costs** | Includes labor, evaluation, and advertising costs. | | 0.09 |
| | **Total Benefits** | | **0.95** | |
| | **Total Costs** | | | **1.44** |
| | **SCT Ratio** | | **0.66** | |

NPV = Net present value
LBMP = Location-based marginal pricing

### *A.2.5 Home Performance with ENERGY STAR*

The primary objective of the Home Performance with ENERGY STAR program is to support residential customers in making high efficiency choices when considering updates to their homes envelope heating systems. This is achieved through the utilizing a comprehensive whole house approach that identifies areas for improved efficiency, safety, and comfort of the home. Newly installed weatherization measures and heating equipment operate in a customer's home for 10 to 25 years. It is paramount to reach customers and influence their choices to ensure their decisions are energy efficient. This objective aligns with the overall goal of reducing the carbon footprint of customers who utilize electric, oil, or propane as their primary heating source.

The HPwES program provides a participation pathway for all customers by offering whole house solutions to low-income and non-low-income customers. Enhanced rebates are available for eligible low-income customers for whole-house heat pumps and weatherization measures. PSEG Long Island works with Energy Finance Solutions (EFS) to qualify low-income customers based on the NYSERDA Empower Income Eligibility Guidelines. The NYSERDA Empower Income Eligible Guidelines are based on the 60% state median income and verification documents like letters from the Home Energy Assistance Program (HEAP) or Social Security. EFS also provides low-interest on-bill recovery loans and smart energy loans for qualified non-low-income and low-income customers.

The US Department of Energy (DOE) administers the Home Performance with ENERGY STAR (HPwES) Program and works in conjunction with the US Environmental Protection Agency (EPA) to support local program sponsors. PSEG Long Island administers the HPwES Program on behalf of the sponsor, LIPA. TRC administers the program and provides support to PSEG Long Island, HPwES partners (trained and vetted contractors), and customers. TRC's provides design and implementation strategies through innovative program design and management, quality assurance and quality control, technical training for HPwES partners, and HPwES partner support to ensure the promotion of quality installation of energy efficient measures.

The HPwES program has built a robust partner network. The program has built strong working business partnerships with the existing PSEG Long Island HPwES contractor base, as well as various trade allies and constituent-based organizations like NYSERDA, Long Island Green Homes, BPI, BPCA, and Efficiency First.

**Program Leads**

1. **PSEG Long Island Home Energy Assessments:** PSEG Long Island Home Energy Assessments (HEA) are free energy audits available to eligible single-family homeowners in the PSEG Long Island service territory. Customers who are interested in receiving a free HEA complete a Home Energy Assessment Online Application, found on the PSEG Long Island website. The customer answers questions about their home, like heating and cooling equipment type and the age of the home and selects a qualified contractor to conduct the HEA. The selected contractor is notified of the HEA, through a Captures system generated email and the Lead Partner Portal, and promptly schedules the audit with the customer. During the HEA, the contractor conducts a comprehensive audit of the home, utilizing a PSEG Long Island branded audit tool built by TRC, and educates the homeowner on the different energy savings opportunities offered by PSEG Long Island, ranging from duct sealing to air source heat pumps. At the conclusion of the HEA the customer will receive a PDF of the completed audit and recommendations. The PDF is also stored in the Captures database.
2. **Home Performance Direct Install:** The Home Performance Direct Install (HPDI) program is a free program available to eligible PSEG Long Island electric heat residential customers. The HPDI program includes a free Home Energy Assessment, the direct installation of free energy efficiency measures like LED bulbs, duct sealing, smart strips, and low flow domestic hot water devices. Customers who participate in the HPDI program can also participate in HPwES and are informed of the HPwES offerings.

#### A.2.5.1 *Notable Changes*

In 2022, the HPwES rebate offerings are available through the Home Comfort application. Rebates are available for heat pumps, controls, and Home Performance with ENERGY STAR weatherization measures. New in 2021, rebates were also available for ducted air source heat pump tune-ups, central air conditioner tune-ups, and electric hot water heating equipment (heat pump water heaters and tankless water heaters. Electric hot water heating equipment has typically been offered through the EEP program but including it in the program offering allows the HPwES partner and participant to consider going all-electric to meet their heating and water heating needs through one central application. These measures all remain a part of the 2022 offering.

The HPwES program's low-income offering continues to be available in 2022. Eligible customers can receive enhanced rebates for installing weatherization measures and whole house cold climate air-source heat pumps. The enhanced rebates ensure that customers who qualify can participate in the HPwES offering with little to no out of pocket costs and realize significant electric savings and monthly bill savings through program participation.

As discussed in the Home Comfort section, PSEG Long Island plans to explore increasing the adoption of home energy retrofits and residential heat pumps in the single-family residential sector through a partnership with a company that can help customers finance key home improvements using the money homeowners currently spend on wasted energy. PSEG Long Island will continue to offer smart energy loans and On-Bill Financing options for weatherization, heat pumps, and geothermal projects.

In April 2021, PSEG Long Island launched a partnership with Sealed, a New York-based company that finances key home improvements using the money homeowners currently waste on energy. The goal of the partnership is to increase the adoption of home energy retrofits and potentially residential heat pumps in the single-family residential sector by allowing for those customers to pay for energy-saving home improvements with the value of their expected energy savings. Sealed invests in home improvements that save energy and customers pay back based on the actual energy that is saved. If customers don't save energy, Sealed does not get paid back. This partnership is market-based relationship and does not require any dedicated program budget from PSEG Long Island. Sealed provides all the necessary capital for customer acquisition, operations, and project finance. In addition, Sealed provides upfront education and engagement on comfort and other non-energy customer pain points, and provides customers with a proposal and/or recommendations on how they can solve these problems. Customers will receive this education and engagement over phone and web and will be connected to local contractors once they have determined the project that will best meet their needs.

#### A.2.5.2 *Program Delivery*

PSEG Long Island's HPwES program provides customer rebates and contractor incentives for the installation of weatherization measures and building shell upgrades like insulation, air sealing, and duct sealing. Customers and HPwES partners must meet the minimum efficiency requirements for each measure installed to qualify for the rebates and incentives.

All HPwES projects are reviewed for quality control and accuracy, however, not all projects require pre-approval. Projects requiring pre-approval are projects where a loan is provided by EFS or projects that include Home Comfort ASHPs and weatherization measures.

A significant amount of the HPwES program participation is driven by the partnership between the HPwES program and HPwES partners. Prospective HPwES contractors must submit a signed PSEG Long Island HPwES Contractor Participation Agreement and provide documentation showing proof of business identification, financial condition, insurance, licensing, satisfactory customer relationships, and Building Performance Institute (BPI) accreditation. On approval, the contractor is deemed a Provisional Participating Contractor until they successfully complete five HPwES projects. As of April 2021, there are currently 23 participating HPwES partners enrolled in the program. On a monthly basis all electric (kW and kWh) savings are reported to PSEG Long Island. Fossil fuel (oil/propane, other non-natural gas heating fuels) savings are converted to MMBtu and reported to PSEG Long Island; PSEG Long Island reports the necessary savings metrics to LIPA and NYSERDA.

#### A.2.5.3 *Target Market*

The Home Performance Home Energy Assessment (HEA) is available to all eligible PSEG Long Island single-family home residential customers. Based on historical data collected from the Home Energy Assessment Tool and Online Application, 7% of customers utilize electric heat, 39% of customers utilize natural gas heat, 51% of customers utilize oil heat, and 3% of customers utilize propane heat. The Home Performance Direct Install program is available to eligible residential customers with electric heat.

Home Performance with ENERGY STAR rebates are available to all customers, except those who heat their homes primarily with gas and do not have a central air conditioning system. Enhanced rebates are available for customers who qualify as low income. The HPwES program utilizes the New York State EmPower guidelines to qualify homeowners is income eligible. Loans are available from EFS for both market and income eligible projects.

It is estimated that 7,000 HEAs, 200 Home Performance Direct Installs, and 1,000 Home Performance with ENERGY STAR projects will be completed in the 2022 program year.

PSEG Long Island intends to offer the 2022 program in keeping with prior years, though modifications to eligibility of customers for audits or other measures may be revised depending on the final structure of the partnership with National Grid.

#### A.2.5.4 *Measures and Incentives*

The list of measures that are offered in the Home Performance with ENERGY STAR program are included in the following tables.

**Table A-12. PSEG Long Island Home Performance with ENERGY STAR-Eligible Measures List**

| Eligible Measure | | Minimum Efficiency Requirements |
|---|---|---|
| Duct Sealing | | UL 181B mastic or tape; use of duct tape is disallowed |
| Duct Insulation | | Installed in accordance with all applicable state and local codes |
| Building Shell | Insulation (attic, wall, floor, band joist, basement, crawl space) | Must be accompanied by blower door assisted air sealing per BPI standards |
| | Air Sealing | Blower door assisted per BPI standards |

**Table A-13. Home Performance with ENERGY STAR: List of Measures**

| Measure | 2022 Planned Units | Measure Incentives | Measure Rebates |
|---|---|---|---|
| DI - Smart Strips – Tier II (75% of projects) | 263 | - | - |
| DI - Water Temperature Turndown/HH (25% of projects) | 88 | - | - |
| DI - Faucet Aerators/unit (25% of projects) | 88 | - | - |
| DI - Low Flow Showerheads/unit (25% of projects) | 88 | - | - |
| DI - Thermostatic Valve (25% of projects) | 88 | - | - |
| DI - Duct Sealing (50% of projects) | 175 | - | - |
| DI - Pipe Insulation/ln ft (0% of Projects) | | - | - |
| DI - LED Bulbs (100% of projects; 8/HH) | 2,800 | - | - |
| DI - Nightlight (75% of projects) | 263 | - | - |
| HEA Audit Giveaway (A19 LEDs) | 28,000 | - | $5 |
| HEA Audits | 7,000 | - | - |
| LMI Projects | 750 | - | $2,000 |
| Market Projects | 500 | - | $500 |

#### A.2.5.5 *Outreach*

The Home Performance program focuses on promoting the free Home Energy Assessment component of the Program. Home Energy Assessments are available to all eligible PSEG Long Island single-family home residential customers. The Home Energy Assessment (HEA) provides the customer with a comprehensive whole-house energy review including, but not limited to, appliances, insulation, domestic hot water. The Home Energy Assessment is promoted at PSEG Long Island sponsored events, such as home shows and street fairs, in direct mailings, the PSEG Long Island website, and by the HPwES partners.

The HEA is a critical outreach effort, as the HPwES partner has the opportunity to engage directly with the customer about the benefits of participation in the HPwES program. The results of the HEA identify where the customer can make improvements in the home through the HPwES program.

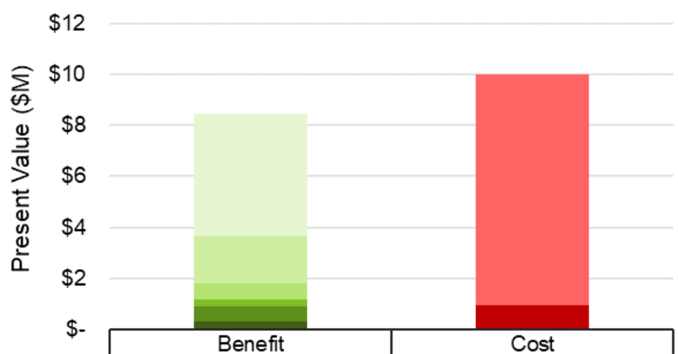
The Home Performance Direct Install Program (HPDI) is promoted through quarterly postcard mailings to single family homes with electric heat rate codes. The Home Performance team has also engaged directly with communities, like communities with electric heat, and conducted informative program presentations.

In 2020, the HPwES Team, along with the Home Comfort team began offering contractors virtual training sessions to maintain contractor engagement levels during the pandemic. These sessions offered contractors the chance to learn more about specific program components, such as training on the “New 0% Finance Offer and Proforma Demonstration for GJGNY Smart Energy Loans” that was launched in June. Contractors have the chance to speak directly with the TRC subject matter experts and prepare to engage more customers with their newfound knowledge and outreach strategies. These virtual methods of engagement were still conducted in the 2021 program year and will continue to be utilized as necessary in 2022.

### A.2.5.6 *Business Case*

Home Performance with ENERGY STAR has a SCT benefit-to-cost ratio of 0.85 and RIM benefit-to-cost ratio of 0.19. A list of the value streams considered in the BCA is detailed in Figure A-4.

**Figure A-4. Present Value Benefits and Costs of SCT – HPwES**




| | Benefit | Cost |
|---|---|---|
| Fuel Switching Benefits | 4.82 | - |
| Net Avoided SO2 and NOx | 0.0001 | - |
| Net Avoided CO2 | 1.84 | - |
| Avoided Distribution Capacity Infrastructure | 0.63 | - |
| Avoided Transmission Capacity Infrastructure | 0.26 | - |
| Avoided Energy (LBMP) | 0.59 | - |
| Avoided Generation Capacity Cost (AGCC) | 0.33 | - |
| Participant DER Cost | - | 9.05 |
| Program Administration Costs | - | 0.94 |
| Total | 8.46 | 9.99 |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 1 | **Fuel Switching Benefits** | Considers participant fuel cost savings associated with switching from oil, gas, and propane to electricity. | 4.82 | |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 2 | **Net Avoided $SO_2$ and NOx** | Reduced $SO_2$ and NOx from reduced energy consumption. | 0.0001 | |
| 3 | **Net Avoided $CO_2$** | Reduced carbon emissions from reduced energy consumption and beneficial electrification. | 1.84 | |
| 4 | **Avoided Distribution Capacity Infrastructure** | Based on demand savings and marginal distribution capacity cost. | 0.63 | |
| 5 | **Avoided Transmission Capacity Infrastructure** | Based on demand savings and marginal transmission capacity cost. | 0.26 | |
| 6 | **Avoided Energy (LBMP)** | Energy savings based on both on-peak and off-peak periods. | 0.59 | |
| 7 | **Avoided Generation Capacity Cost (AGCC)** | Based on demand savings and marginal capacity cost. | 0.33 | |
| 8 | **Participant Distributed Energy Resources (DER) Cost** | Includes cost of incremental equipment and installation. | | 9.05 |
| 9 | **Program Administration Costs** | Includes contractors fee, labor, evaluation, and advertising costs. | | 0.94 |
| | **Total Benefits** | | **8.46** | |
| | **Total Costs** | | | **9.99** |
| | **SCT Ratio** | | **0.85** | |

NPV = Net present value
LBMP = Location-based marginal pricing

### *A.2.6 All Electric Homes Program*

The All Electric Homes program was launched in April 2021 to support residential customers and residential developers who want to build or retrofit a single-family home as “All Electric”. To be eligible for the All Electric Homes program, customers must install electric-end use equipment in a New Construction residence or convert all existing fossil fuel equipment in an existing residence. Customers who wish to convert their existing propane, oil, or natural gas equipment are eligible. A backup fossil fuel connection is not permissible for New Construction. All existing fossil fuel connections, in existing residences, must be disconnected. Although a fossil-fuel connection is not permissible on site, a connection for a backup generator is allowable in the event of a power-outage.

The All Electric Homes program offers two pathways to participation. The “Tier I” pathway includes cold climate air source heat pumps, tankless water heaters, and ENERGY STAR labeled appliances. The “Tier II” pathway includes cold climate air source heat pumps, heat pump water heaters, and ENERGY STAR Most Efficient labeled appliances. All participants who participate in the Tier I offering will receive a 10% bonus on all required rebated measures. All participants who participate in the Tier II offering will receive a 25% bonus on all required rebated measures. The participation bonuses are intended to offset the costs associated with ENERGY STAR and ENERGY STAR Most Efficient appliances, as well as the costs associated with electric cooking equipment. Electric cooking equipment is required in the All Electric Homes program, but it is not rebated.

The All Electric Homes application contains required and optional measures, such as Cold Climate Air Source Heat Pumps, Geothermal Heat Pumps, Water Heating, Electric Appliances, Weatherization measures, and other equipment like Heat Pump Pool Heaters and battery-operated lawn equipment. The measures included in the All Electric Homes application were previously screened for program offerings like Home Comfort, Home Performance with ENERGY STAR, and the EEP Program. In these current offerings, rebates include a contractor incentive. The All Electric Homes program does not offer a contractor incentive, but the Tier I and Tier II bonuses are comparable, in dollars, to the contractor incentive. Additional measure screening, therefore, was not required and equipment rebates, less the contractor incentive, remain constant from the original offering to the All Electric offering.

All measures found in the All Electric Homes application are not required for participation, however a base set of measures must be installed in order to qualify for All Electric Homes rebates and receive participation bonuses. The intent of including non-required measures in the application is to provide the customer a one-stop “all electric” shop for their project. Including all appropriate measures in the application also promotes a whole house solution for the participant. Throughout the application, there are indicators informing the customer which measures are required and which measures are optional.

The following measures are required to be eligible for the All Electric Homes Program:

**Table A-14. Required Measures for All Electric Homes Program Eligibility**

| All Electric Homes – Tier I | All Electric Homes – Tier II |
|---|---|
| Cold Climate Air Source Heat Pump* | Cold Climate Air Source Heat Pump* |
| Smart Thermostat* | Smart Thermostat* |
| Tankless Water Heater* | Heat Pump Water Heater* |
| ENERGY STAR Electric Dryer* | Most Efficient Heat Pump Dryer* |
| ENERGY STAR Clothes Washer | Most Efficient Clothes Washer* |
| ENERGY STAR Dishwasher | Most Efficient Dishwasher |
| ENERGY STAR Refrigerator | Most Efficient Refrigerator |
| ENERGY STAR LED Lighting | ENERGY STAR LED Lighting |
| Standard Electric Cooking Range | Most Efficient Induction Cooktop/Oven |

*Indicates a rebate is available

The following measures are optional for the All Electric Homes Program:

**Table A-15. Optional Measures for All Electric Homes Program Eligibility**

| | |
|---|---|
| Geothermal Ground Source Heat Pump** | ENERGY STAR Dehumidifier |
| Variable Speed Pool Pump | ENERGY STAR Room Air Purifier |
| Heat Pump Pool Heater | Battery Operated Leaf Blower |
| Battery-Operated Lawn Mower | Battery Operated Weed Trimmer |
| Weatherization | |

** Customers can elect to install a Geothermal Ground Source Heat Pump in place of a Cold Climate Air Source Heat Pump and still qualify for the All Electric Homes Program and bonuses

The All Electric Homes program collaborates with developers and PSEG Long Island Lead Partners to promote the All Electric Home offering to the public.

The promotion of the All Electric Homes program will continue in 2022-2025.

#### A.2.6.1 *Notable Changes*

The All Electric Homes program was launched in April 2021. There are no anticipated changes to the program offering for the 2022 program year.

#### A.2.6.2 *Program Delivery*

The All Electric Homes participation will primarily be driven through partnerships with developers and existing relationships with Home Comfort Partners, Home Performance Partners, and Multi-Family Partners and Developers. Leveraging relationships with existing partners and developers, and also promoting the program at industry events will result in creating program awareness and participation.

All partners who will participate in this offering have already been trained and vetted by the PSEG Long Island program. This ensures customers will have a positive “All Electric” participation experience.

TRC also holds weekly open-house meetings for all participating Lead Partners. Interested Lead Partners and developers will have the opportunity to speak one-on-one with a member of the Residential team to learn more about the program and navigate the application.

#### A.2.6.3 *Target Market*

The program is offered to all residential customers in the PSEG Long Island service territory. All qualified Residential developers with eligible projects and previously vetted lead partners may also participate.

#### A.2.6.4 *Measures and Incentives*

The measures available in the All Electric Homes program include equipment found in the current Home Comfort program, Home Performance with ENERGY STAR program (HPwES), and the EEP program. The incentives for the All Electric Homes program are consistent with the rebates offered through Home Comfort, HPwES, and EEP.

The full list of required and optional measures for the All Electric Homes Program are listed in Table A-14 and Table A-15.

#### A.2.6.5 *Outreach*

The All Electric Homes program outreach strategy, aside from developer/lead partner/customer word of mouth, includes a variety of public platforms:

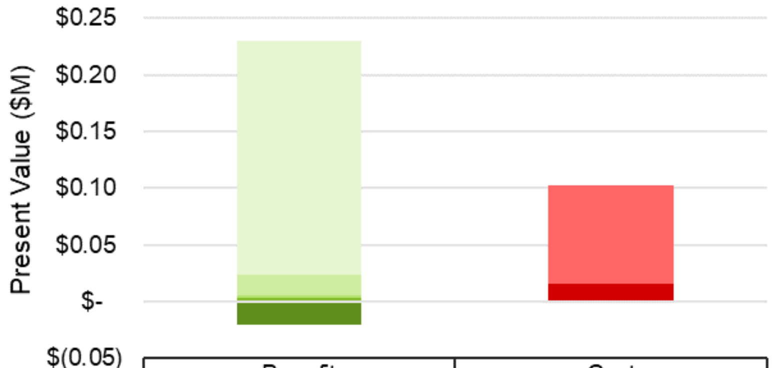
- PSEG Long Island Website page
- Industry networking events and speaking engagements, such as HIA, LIBI, and the United States Green Building Council

In 2022-2025, the Residential team will continue to implement the above listed outreach strategies and work with participating developers and lead partners on tools to promote the installation all electric equipment. In addition, the Residential team will develop educational material to provide developers, lead partners, and customers a better understanding of the energy and non-energy benefits associated with an All Electric Home.

### A.2.6.6 *Business Case*

The All Electric Homes program has a SCT benefit-to-cost ratio of 2.05 and RIM benefit-to-cost ratio of 2.30. A list of the value streams considered in the BCA is detailed in Figure A-5.

**Figure A-5. Present Value Benefits and Costs of All Electric Homes Program**




| | Benefit | Cost |
|---|---|---|
| Fuel Switching Benefits | 0.21 | - |
| Net Avoided SO2 and NOx | 0.000002 | - |
| Net Avoided CO2 | 0.02 | - |
| Avoided Distribution Capacity Infrastructure | 0.003 | - |
| Avoided Transmission Capacity Infrastructure | 0.001 | - |
| Avoided Energy (LBMP) | (0.02) | - |
| Avoided Generation Capacity Cost (AGCC) | 0.001 | - |
| Participant DER Cost | - | 0.09 |
| Program Administration Costs | - | 0.02 |
| Total | 0.21 | 0.10 |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 1 | **Fuel Switching Benefits** | Considers participant fuel cost savings associated with switching from oil, gas, and propane to electricity. | 0.21 | |
| 2 | **Net Avoided $SO_2$ and NOx** | Reduced $SO_2$ and NOx from reduced energy consumption. | 0.000002 | |
| 3 | **Net Avoided $CO_2$** | Reduced carbon emissions from reduced energy consumption and beneficial electrification. | 0.02 | |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 4 | **Avoided Distribution Capacity Infrastructure** | Based on demand savings and marginal distribution capacity cost. | 0.003 | |
| 5 | **Avoided Transmission Capacity Infrastructure** | Based on demand savings and marginal transmission capacity cost. | 0.001 | |
| 6 | **Avoided Energy (LBMP)** | Energy savings based on both on-peak and off-peak periods. | (0.02) | |
| 7 | **Avoided Generation Capacity Cost (AGCC)** | Based on demand savings and marginal capacity cost. | 0.001 | |
| 8 | **Participant Distributed Energy Resources (DER) Cost** | Includes cost of incremental equipment and installation. | | 0.09 |
| 9 | **Program Administration Costs** | Includes contractors fee, labor, and evaluation costs. | | 0.02 |
| | **Total Benefits** | | **0.21** | |
| | **Total Costs** | | | **0.10** |
| | **SCT Ratio** | | **2.05** | |

NPV = Net present value
LBMP = Location-based marginal pricing

### *A.2.7 Multifamily Program*

The Multifamily program was launched in October 2020. The intent of the Multifamily program is to assist New Construction and Existing Building Multifamily Developers and Building Owners in constructing and retrofitting Multifamily buildings to be energy efficient.

At launch, the Multifamily program targeted New Construction Multifamily developments. In 2021, the Multifamily Program expanded to include Existing Building Multifamily properties. All eligible properties must consist of five or more units. High-Rise and Low-Rise buildings both qualify. High-Rise buildings are considered buildings with four or more floors. Low-Rise buildings are considered buildings with three or less floors.

The Multifamily program offers rebates for Common Area Lighting (Indoor and Outdoor), Common Area Heating and Cooling, Common Area Pool Equipment, Common Area VFDs, In-Unit Heating and Cooling, and In-Unit Appliances. The measures included in the Multifamily application were previously screened for other programs like Fast Track Lighting (Common Area Lighting), Commercial HVAC (Common Area Lighting), Home Comfort (In-unit HVAC) and were rescreened as necessary to align with Multifamily specific factors, like operating hours. Rebate levels remained constant between the original program offerings and the Multifamily offering.

The Multifamily program is the only EEDR program that contains both Commercial (Common Area) measures and Residential (In-Unit) measures in one application. The intent of including both Commercial and Residential measures in one application is to provide developers and building owners a “one-stop shop" program experience without the burden of completing multiple equipment applications for one project.

#### A.2.7.1 *Notable Changes*

In 2021, the Multifamily program offering expanded to include Existing Building scenarios. In 2022, an LMI Multifamily program component will be launched.

#### A.2.7.2 *Program Delivery*

The Multifamily program participation is driven through partnerships with developers and industry associations. Developer relationships are an integral part of the growing Multifamily program.

TRC also holds weekly open-house meetings for all participant Lead Partners and Developers. Interested Lead Partners and Developers have the opportunity to speak one-on-one with a member of the Commercial or Residential team to learn more about the program and navigate the application.

#### A.2.7.3 *Target Market*

The Multifamily program is offered to developers and building owners who install efficient equipment in low-rise or high-rise multi-family buildings consisting of five or more units.

#### A.2.7.4 *Measures and Incentives*

The Multifamily program offers rebates for measures found in the following programs:

- Residential Home Comfort Program
  - Partial and Whole Unit Air Source Heat Pumps
  - Smart Thermostats and Integrated Controls
- Residential EEP Program
  - ENERGY STAR Appliances
  - ENERGY START Lamps
  - Water Heating Equipment
  - Advanced Power Strips
  - Smart Thermostats
- Commercial HVAC Program
- Commercial Prescriptive Program
  - VFDs
  - Pool Equipment
- Commercial Lighting Program
  - Interior Lighting
  - Exterior Lighting

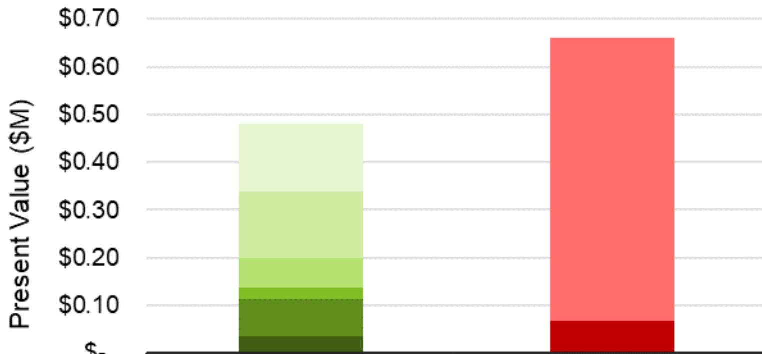
#### A.2.7.5 *Outreach*

The CEP engages with Multifamily developers and building owners by working with PSEG Long Island Major Account Executives (MAEs) to send out email blasts, and meeting with industry associations like the Building Owners and Management Association (BOMA) and the Long Island Building Institute (LIBI).

#### A.2.7.6 *Business Case*

The Multifamily program has a SCT benefit-to-cost ratio of 0.73 and RIM benefit-to-cost ratio of 0.22 A list of the value streams considered in the BCA is detailed in Figure A-6.

**Figure A-6. Present Value Benefits and Costs of Multifamily Program**




| | Benefit | Cost |
|---|---|---|
| Fuel Switching Benefits | 0.14 | - |
| Net Avoided SO2 and NOx | 0.000001 | - |
| Net Avoided CO2 | 0.14 | - |
| Avoided Distribution Capacity Infrastructure | 0.06 | - |
| Avoided Transmission Capacity Infrastructure | 0.03 | - |
| Avoided Energy (LBMP) | 0.08 | - |
| Avoided Generation Capacity Cost (AGCC) | 0.04 | - |
| Participant DER Cost | - | 0.59 |
| Program Administration Costs | - | 0.07 |
| Total | 0.48 | 0.66 |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 1 | **Fuel Switching Benefits** | Considers participant fuel cost savings associated with switching from oil, gas, and propane to electricity. | 0.14 | |
| 2 | **Net Avoided $SO_2$ and NOx** | Reduced $SO_2$ and NOx from reduced energy consumption. | 0.000001 | |
| 3 | **Net Avoided $CO_2$** | Reduced carbon emissions from reduced energy consumption and beneficial electrification. | 0.14 | |
| 4 | **Avoided Distribution Capacity Infrastructure** | Based on demand savings and marginal distribution capacity cost. | 0.06 | |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| **5** | **Avoided Transmission Capacity Infrastructure** | Based on demand savings and marginal transmission capacity cost. | 0.03 | |
| **6** | **Avoided Energy (LBMP)** | Energy savings based on both on-peak and off-peak periods. | 0.08 | |
| **7** | **Avoided Generation Capacity Cost (AGCC)** | Based on demand savings and marginal capacity cost. | 0.04 | |
| **8** | **Participant Distributed Energy Resources (DER) Cost** | Includes cost of incremental equipment and installation. | | 0.59 |
| **9** | **Program Administration Costs** | Includes contractors fee, labor, and evaluation costs. | | 0.02 |
| | **Total Benefits** | | **0.48** | |
| | **Total Costs** | | | **0.66** |
| | **SCT Ratio** | | **0.73** | |

### *A.2.8 Commercial Efficiency Program*

PSEG Long Island's CEP offers eligible nonresidential customers rebates for a number of energy savings conversation measures and engineering and design services. The rebates are intended to offset installation costs and costs associated with projects that go through the Technical Assistance program.

In 2022, and through program year 2025, PSEG Long Island's CEP proposes providing customer rebates for the following EE measures:

- Lighting
  - Indoor Lighting
    - Performed Based
    - Prescriptive (Fast Track)
  - Outdoor Lighting
- HVAC
  - Performance Based
  - Small-Medium-Business (SMB) Air-Source Heat Pump Whole Building Approach
- Geothermal
- Standard Application
  - Variable Frequency Drives
  - Compressed Air
  - Kitchen Equipment
- Refrigeration

- Water Heating and Conservation
- Custom and Custom Retrofit
    - Data Collection forms for Chillers and Data Centers
- Beneficial Electrification
    - Non-Road Electric Vehicles (EVs)
    - Pool Equipment
    - Lawn Care Equipment
- Technical Assistance (TA) Program:
    - LEED Certification and Points
    - ENERGY STAR Labeled Buildings
    - Energy Engineering Study
    - Whole Building (Energy Modeling)

The CEP strives to deliver a positive customer experience through the diverse portfolio of measures and rebates. The CEP also provides participating lead partners with equipment training, program education, and other tools to deliver a first-class participation experience for the customer. Similar to previous years, the CEP continues to implement the Prime Efficiency Partner Program. All lead partners who have been certified as Prime Efficiency Partners (PEPs) are vetted, trained, and tested on CEP guidelines and program requirements. All PEPs must re-apply for certification each year.

#### A.2.8.1 *Notable Changes*

In 2022, the CEP continued to offer the performance based interior lighting program that incentivizes customers and contractors to install the most energy efficient equipment available. In past years, the CEP lighting rebates were more in line with a prescriptive rebate approach and rebated per fixture. The 2022 rebate is based on energy savings. As LED lighting programs begin to phase out between 2022-2025, LED lighting will be rebated using an approach best in line with market conditions.

In 2020, PSEG Long Island's EEDR programs' main goal metric was adjusted from kWh to MMBtu. The adjustment in the program's metric was necessary to better align the portfolio with New York State's GHG reduction goals. Adjusting the metric paved the way for the CEP to develop a fuel agnostic methodology for fuel switching measures like air source heat pumps and variable frequency drives. The adjustment in metric also allowed the CEP to explore other fuel switching, or beneficial electrification, measures. The CEP launched a prescriptive beneficial electrification program to target those necessary MMBtu savings. Equipment offered under this program component includes battery-operated non-road electric vehicles (golf carts and forklifts), heat pump pool heaters and solar covers, kitchen equipment, and battery-operated lawn care equipment.

In 2020, as a result of the pandemic, the CEP developed a Small Business Stimulus, called the Small Business First program. The Small Business First program was available to qualifying small business customers and provided enhanced rebates for lighting projects. PSEG Long Island offered the Small Business First program from June to October 2020 and paid nearly $4 million in rebates for 925 projects.

In 2022-2025, the CEP will continue to incorporate measures and programs that support the MMBtu savings goal.

#### A.2.8.2 *Program Delivery*

The CEP participation is driven through partnerships with installation contractors, or Lead Partners. Customers may opt to participate as a self-install, but participation is primarily driven through lead partners. The CEP collaborates with lead partners and provides a platform for lead partners to work directly with representatives from the CEP at weekly open-house meetings. The weekly open house meetings allow contractors to talk about program requirements, applications, and to provide feedback on the participant experience. The CEP also offers training sessions on new technologies and new programs. In-person contractor meetings and trainings were suspended in 2020 due to the pandemic, however, the EE Programs pivoted traditional meeting methods to virtual. The CEP continues to utilize the virtual meetings to keep the lead partners engaged and supported.

The weekly contractor meetings have had such a tremendous impact, from the initial launch through today, that AESP's National Conference featured the Contractor Meetings in 2016. Speakers from TRC were invited to discuss the successes of the meetings and were scored among the best at the conference. In 2018 and again in 2020 TRC was invited back to AESP to speak at the Summer Conference. At the 2020 conference, TRC speakers discussed how the EE Programs adapted to the pandemic, decarbonization efforts, and integrated demand-side management. AESP also invited TRC to develop an article for its June 2020 issue of "Strategies Monthly" that highlighted the PSEG Long Island Beneficial Electrification programs and fuel agnostic methodologies.

In addition to the weekly contractor meetings and trainings, TRC hosts several contractor breakfasts, new technology expos, and regularly participates in industry events such as USGBC, ASHRAE, HIA, and AIA. TRC, on behalf of PSEG Long Island, coordinates and hosts an Energy Efficiency conference that occurs on an 18-month basis. The conference is open to all customers and contractors and provides networking opportunities, informative seminars with industry leaders, market trends, emerging technologies, and highlights project successes. In 2019, attendance reached over 600, with nearly half attendees being customers. The event is well regarded throughout Long Island as the energy efficiency event of the year. It is an excellent platform for the CEP to build camaraderie with participating lead partners and customers, as well as an opportunity for customers and lead partners to stay abreast on industry trends.

PSEG Long Island continues to promote contractors who have been certified as Prime Efficiency Partners. The PEPs drive small business participation, making it paramount to train, vet, and promote these contractors. The introduction of the Prime Efficiency Partner network in 2017 has enabled the program to touch more small business customers and bring awareness to the programs. Contractors wishing to participate in the Fast Track program and be designated Prime must meet specific business criteria, complete trainings, and meet the strict program requirements. The launch of the Prime Efficiency Partner program has also played a crucial role in maintaining customer satisfaction. Lead partners who wish to achieve the prime designation are able to attend scheduled trainings to learn more about the program and become closer to achieve the designation.

The Fast Track Program is a prescriptive rebate program available to all customers who wish to participate in the CEP lighting program through an engaging and speedy solution. All commercial customers may participate in this offering, regardless of rate code or building size. The total rebate for a Fast Track project may not exceed $5,000. The Fast Track Program is unique in that only Prime Efficiency Partners may participate, and pre-approvals and pre-inspections are not required. Allowing Prime Efficiency Partners only in the Fast Track offering ensures the customer has a positive program experience with a PSEG Long Island trained and vetted contractor.

All lead partners, including PEPs, are subject to Quality Control Evaluation procedures as necessary, in an effort to ensure continued quality installations for commercial customers.

### A.2.8.3 *Target Market*

All nonresidential customers in the PSEG Long Island service territory.

### A.2.8.4 *Measures and Incentives*

Custom and Custom Retrofit project rebates are calculated by the PSEG Long Island CEP Project Screening Tool. Rebates are calculated based on four primary inputs: kW, kWh, incremental cost, and fossil fuel impacts, with overall $/MMBtu and percentage of project cost as caps. The default rebate calculation methodology in the tool is set at $/MMBtu, however, the tool allows $/kW, $/kWh, Simple Payback, %Incremental cost and weighted as selections that require project specific approval. For all other measures, rebates are set per market conditions, and may adjust during the year as the market changes. All measures are subject to cost/benefit screening prior to launch.

### A.2.8.5 *Outreach*

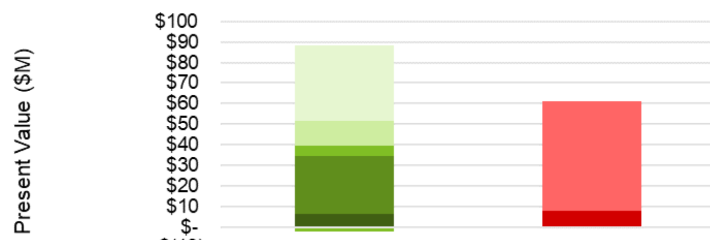
The CEP team offers free energy assessments to all eligible PSEG Long Island commercial customers. Customers who request an assessment are contacted by a CEP Energy Consultant (EC) to arrange a site visit or virtual site visit. During the assessment, the EC conducts an audit of the facility, provides the customer with program information and recommendations, and leaves behind program collateral like a checklist complete with energy saving tips. The checklist covers the four core measure groups Lighting, HVAC, Compressed Air, and Refrigeration.

The CEP team also works closely with participating lead partners to drive program awareness and interacts with customers at Community Partnership Program (CPP) events to promote different program offerings and connect one on one with PSEG Long Island customers.

### A.2.8.6 *Business Case*

The Commercial programs have a SCT benefit-to-cost ratio of 1.41 and RIM benefit-to-cost ratio of 0.18. A list of the value streams considered in the societal benefit-cost analysis is detailed in Figure A-7.

**Figure A-7. Present Value Benefits and Costs of SCT - Commercial**




| | Benefit | Cost |
|---|---|---|
| Fuel Switching Benefits | (2.24) | - |
| Net Avoided SO2 and NOx | (0.00) | - |
| Net Avoided CO2 | 36.94 | - |
| Avoided Distribution Capacity Infrastructure | 11.89 | - |
| Avoided Transmission Capacity Infrastructure | 4.94 | - |
| Avoided Energy (LBMP) | 28.31 | - |
| Avoided Generation Capacity Cost (AGCC) | 6.25 | - |
| Participant DER Cost | - | 53.16 |
| Program Administration Costs | - | 7.81 |
| Total | 86.08 | 60.97 |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 1 | **Fuel Switching Benefits** | Considers participant fuel cost savings associated with switching from oil, gas, and propane to electricity. | (2.24) | |
| 2 | **Net Avoided $SO_2$ and NOx** | Reduced $SO_2$ and NOx from reduced energy consumption. | (0.00003) | |
| 3 | **Net Avoided $CO_2$** | Reduced carbon emissions from reduced energy consumption and beneficial electrification. | 36.94 | |
| 4 | **Avoided Distribution Capacity Infrastructure** | Based on demand savings and marginal distribution capacity cost. | 11.89 | |
| 5 | **Avoided Transmission Capacity Infrastructure** | Based on demand savings and marginal transmission capacity cost. | 4.94 | |
| 6 | **Avoided Energy (LBMP)** | Energy savings based on both on-peak and off-peak periods. | 28.31 | |
| 7 | **Avoided Generation Capacity Cost (AGCC)** | Based on demand savings and marginal capacity cost. | 6.25 | |
| 8 | **Participant Distributed Energy Resources (DER) Cost** | Includes cost of incremental equipment and installation. | | 53.16 |
| 9 | **Program Administration Costs** | Includes contractors fee, labor, evaluation, and advertising costs. | | 7.81 |
| | **Total Benefits** | | **86.08** | |
| | **Total Costs** | | | **60.97** |
| | **SCT Ratio** | | **1.41** | |

NPV = Net present value
LBMP = Location-based marginal pricing

### *A.2.9 Pay for Performance*

PSEG Long Island is collaborating with NYSERDA, EE service providers, and other supporting partners to transform the way they invest in EE through the launch of a Pay for Performance Pilot initiative. These initiatives are emerging nationally as a market-based approach to delivering and paying for EE solutions. Supported by policy reforms, PSEG Long Island's deployment of AMI, and growth in sophisticated data analytics, the pay for performance model shifts the focus away from individual measure savings estimates to whole building metered savings. Payment is restructured to align with realized energy savings. Under this initiative, approximately $300,000 in awards is available for projects that result in 1100 MMBtus of annual reductions in energy use for participating PSEG Long Island customers.

Unlike the existing EE programs that use measure-specific (e.g., light bulbs, appliances, etc.) rebates and incentives, this initiative will compensate service providers over a 3-year period targeted to begin in 2022 for measured EE that accrues from portfolios of residential and commercial customers that undergo EE upgrades and operational improvements. This flexible approach to investing in EE will allow service providers to innovate and provide a more comprehensive approach to meeting customers' energy needs, while fostering a longer-term relationship that can result in additional investments in EE.

#### A.2.9.1 *Notable Changes*

NYSERDA is in the process of launching or supporting pay for performance pilots in other service territories, including Consolidated Edison and National Grid. PSEG Long Island will leverage those learnings by partnering with NYSERDA to issue an RFP to competitively select one or more service providers. These service providers, known as Portfolio Managers, will engage with customers to implement EE solutions. After competitively selecting the winning Portfolio Manager(s), which will be awarded a 5-year contract with PSEG Long Island, comprising of an Implementation Period of up to two years during which Portfolio Managers can enroll customers and implement EE measures, and three years for the completion of Project Performance Periods during which payments will be made for delivered energy and targeted demand savings.

The pay for performance initiative is designed to test an alternative incentive approach that emphasizes energy savings performance at the utility meter and the persistence of energy savings over time. Under this program, a single upfront flat payment, as used in traditional EE rebate programs, is replaced with regularly occurring payments for normalized meter-measured energy savings over a defined period. Portfolio Managers can establish relationships to re-engage with their participating customers to increase the likelihood of continued savings and additional interventions, opening new and exciting options for testing different approaches and business models.

Participating customers' energy savings are measured and aggregated on an ongoing basis to calculate the Portfolio Manager's performance payments that will be paid by PSEG Long Island. Working with NYSERDA, PSEG Long Island will use the CalTRACK methodology to calculate energy savings via an Advanced Measurement and Verification (AMV) platform. After an initial intervention with the customer, Portfolio Managers will have access to individual customer and aggregated portfolio data, providing analytics and insights into realized savings and opportunities.

While only metered electric savings will be compensated under the pilot, all kilowatt-hour savings will be converted to MMBtu in line with the broader planned portfolio. In addition, additional payments will be available for savings that encourage positive electrification and load shifting during peak periods during the summer months.

#### A.2.9.2 *Program Delivery*

This pay for performance initiative will leverage PSEG Long Island's substantial investments today in rolling out AMI meters across Long Island. By the time the RFP for Portfolio Managers is issued, full AMI deployment will have taken place in the Towns of Southold and Riverhead, which comprise the North Fork. Taken together, this will create a geographically defined pool of about 34,000 customers that will be eligible for Portfolio Managers to enroll in the initiative.

Costs in 2022 will consist of license fees related to the platform that utilities and portfolio manager(s) will use, extraction transformation loading costs, and overall pilot evaluation costs. It is expected that some customer interventions will occur in 2022, resulting in ongoing volumetric costs related to enrolled participants in the AMV platform as well as accrued payments for pay for performance savings. The costs are estimated to be $196,670 and are expected to grow proportionally as more customers are enrolled in subsequent years.

Over the following years of the pay for performance initiative, costs are estimated to be as shown in Table A-16. The pay for performance model is still being piloted, and PSEG Long Island expects that experience will help refine the delivery and the scale of this model over time, and potentially improve its cost-effectiveness. Given its pilot nature, the costs shown in the table may not be directly comparable with the costs of PSEG Long Island's more mature EEDR programs.

**Table A-16. PSEG Long Island Pay for Performance Pilot Program**

| Year | Number of Customers Enrolled | Annual Costs |
|---|---|---|
| **2022** | 340 | $196,670 |
| **2023** | 595 | $276,627 |
| **2024** | 595 | $243,107 |
| **2025** | 255 | $185,197 |
| **Total** | **595** | **$901,602** |

For each project, a baseline will be established using individual customers' energy consumption data for the 12 months prior to the initial intervention. Following the initial intervention, the 3-year performance period for that project is triggered. Portfolio Managers can re-intervene and make additional improvements with participating customers at any time during the performance period to achieve greater savings, but the performance payments will not be made beyond three years for any given project. Portfolio Managers must have participating customers provide authorization through Green Button Connect for the AMV Platform to access to their utility consumption data throughout the performance period. Portfolio Managers must also complete a Customer Consent Form by using an e-signature service. Information must be completed correctly to successfully add a Project to a Portfolio and ensure approval to share data has been given.

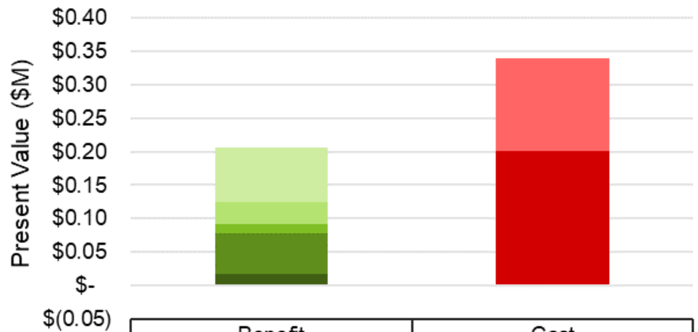
To account for the impacts of COVID19 on energy consumption, a routine adjustment to gross savings will be used to ensure Portfolio Managers are not underpaid/overpaid for achieved savings. This adjustment will utilize a comparison group of non-participating customers from the pilot territories that meet all eligibility requirements for the pilot. Comparison group customers will be selected randomly and will be stratified using characteristics such as location (i.e. county), observed COVID19 impacts, and energy consumption (high vs low). This stratification will be based off the Portfolio Manager's anticipated target customers as reported by the Portfolio Manager at the start of the pilot. The Comparison Group will be evaluated on a quarterly basis to ensure that it is reflective of the acquired portfolio. The use of a Comparison Group will result in additional costs for the pilot, which are reflected in Table A-18 above.

Lessons learned from this implementation of pay for performance will be used as an input to improve and scale the initiative and further encourage innovative, new business models to achieve larger-scale savings, attract additional investment, and encourage deeper EE across a broader range of PSEG Long Island customers.

#### A.2.9.3 *Business Case*

The Pay for Performance program has a SCT benefit-to-cost ratio of 0.61 and RIM benefit-to-cost ratio of 0.17. A list of the value streams considered in the societal benefit-cost analysis is detailed in Figure A-8.

**Figure A-8. Present Value Benefits and Costs of SCT for Pay for Performance**




| | Benefit | Cost |
|---|---|---|
| Fuel Switching Benefits | (0.0001) | - |
| Net Avoided SO2 and NOx | (0.00) | - |
| Net Avoided CO2 | 0.08 | - |
| Avoided Distribution Capacity Infrastructure | 0.03 | - |
| Avoided Transmission Capacity Infrastructure | 0.01 | - |
| Avoided Energy (LBMP) | 0.06 | - |
| Avoided Generation Capacity Cost (AGCC) | 0.02 | - |
| Participant DER Cost | - | 0.14 |
| Program Administration Costs | - | 0.20 |
| Total | 0.21 | 0.34 |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 1 | **Fuel Switching Benefits** | Considers participant fuel cost savings associated with switching from oil, gas, and propane to electricity. | (0.0001) | |
| 2 | **Net Avoided $SO_2$ and NOx** | Reduced $SO_2$ and NOx from reduced energy consumption. | ($1.14 \times 10^{-9}$) | |
| 3 | **Net Avoided $CO_2$** | Reduced carbon emissions from reduced energy consumption and beneficial electrification. | 0.08 | |
| 4 | **Avoided Distribution Capacity Infrastructure** | Based on demand savings and marginal distribution capacity cost. | 0.03 | |
| 5 | **Avoided Transmission Capacity Infrastructure** | Based on demand savings and marginal transmission capacity cost. | 0.01 | |
| 6 | **Avoided Energy (LBMP)** | Energy savings based on both on-peak and off-peak periods. | 0.06 | |
| 7 | **Avoided Generation Capacity Cost (AGCC)** | Based on demand savings and marginal capacity cost. | 0.02 | |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| **8** | **Participant Distributed Energy Resources (DER) Cost** | Includes cost of incremental equipment and installation. | | 0.14 |
| **9** | **Program Administration Costs** | Includes contractors fee, labor, and evaluation costs. | | 0.20 |
| | **Total Benefits** | | **0.21** | |
| | **Total Costs** | | | **0.34** |
| | **SCT Ratio** | | **0.61** | |

### *A.2.10 Dynamic Load Management Programs*

LIPA introduced three DLM programs to the electric tariff effective April 1, 2016. The DLM Tariff was designed to be consistent with the objectives of REV by providing innovative market-based solutions to T&D system needs. The program is effective during the capability period, which is May 1-September 30.

The DLM Tariff consists of a direct load control tariff program and a demand response tariff program. The Bring Your Own Device Smart Savers Program allows residential and small commercial customers who have smart thermostats to provide PSEG Long Island with control of their thermostats during times of high electric demand periods to curtail overall electric demand. In exchange for this control, participating customers will receive a one-time $85 enrollment payment. In subsequent years, the customer will receive an annual $25 performance payment linked to their actual curtailment usage, when customers fully participate in a minimum of 50% of the curtailment events during the capability period.

The second part of the DLM tariff is a more traditional DR tariff, which emulates the New York Independent System Operator’s Emergency Demand Response and Special Case Resource programs. Under this tariff, medium-to-large size commercial customers would sign up and be obligated to the Company to reduce their load by a specified amount when called on either through a day-ahead notification or in reliability need times two hours ahead.

For the Direct Load Control Smart Savers Program, PSEG Long Island will communicate with each participating customer’s individual thermostat; and for the Commercial System Relief Program/ Distribution Load Relief Program, PSEG Long Island will instruct aggregators and/or customers to curtail during a DR event one day or two hours in advance dependent on whether the Commercial System Relief Program or Distribution Load Relief Program is initiated.

#### A.2.10.1 *Notable Changes*

Effective June 1, 2019, LIPA approved the use of battery storage (whether standalone or paired with other distributed energy resources) for both residential and commercial customers as part of the DLM tariff program. Eligible customers enrolled in the DLM tariff program with qualifying battery storage and battery storage systems paired with solar equipment will receive a reservation payment locked in for up to 10 years from the date of initial enrollment.

#### A.2.10.2 *Program Delivery*

To implement the DLM Tariffs, EnergyHub was contracted to administer the tariff requirements and implement the program.

### *Direct Load Control Smart Savers Program*

The Smart Savers Program will pay customers $85 to enroll their smart thermostat in the program. The thermostat will allow PSEG Long Island to curtail usage of central air conditioning systems in the home or small business. In addition, the customer will receive a $25 payment for each subsequent year they remain in the program and fully participate in a minimum of 50% of the curtailment events during the capability period. The customer must utilize an approved thermostat provider and install the device in their home or business. Approved thermostat providers market and promote the program to potential customers, and customers enroll in the Smart Savers Program through the smart thermostat electronic application. The device is an internet-connected thermostat that is registered with the program enrollment administrator and is linked to PSEG Long Island through an enrollment portal. PSEG Long Island initiates a load reduction curtailment day when appropriate, during the program capability period.

### *Commercial System Relief Program*

The Commercial System Relief Program (CSRP) creates the opportunity for market forces to identify and implement load relief measures that would allow PSEG Long Island to avoid building new distribution capacity at specific locations along the T&D system. The goal of the program is to have the market provide such solutions and for PSEG Long Island to spend less on T&D upgrades and projects.

The CSRP offers several features to both individual customers and aggregators of customers in the program. The program scope consists of:

- Monthly reservation payments per kW for commitments to reduce load on 21 hours' notice. The current reservation payment is $5/kW/month.
- Performance payments for each kWh of energy curtailed during a called event, lasting up to 4 hours. The current performance payment is $0.25 per kWh reduced during a curtailment event.

Customers and aggregators may participate by reducing or deferring load, or utilizing dispatchable onsite generation options, to meet the commitment to reduce their load on the system. Generation options must meet strict emissions criteria to be eligible for the program. AMI metering is also required of all customers enrolled in the program. All load reduction provided during a called curtailment event will be quantified using a Customer Base Load methodology, which requires detailed usage information made available on a timely basis.

### *Distribution Load Relief Program*

The Distribution Load Relief Program (DLRP) creates the opportunity to reduce electric load in certain designated zones or "load pockets" on the PSEG Long Island system. These load pockets will be identified, when necessary, by PSEG Long Island and posted to the PSEG Long Island website. The DLRP offers:

- Monthly reservation payments per kW for commitments to reduce load on two-hours' notice. The current reservation payment is $3/kW/month of enrolled load reduction.
- Performance payments for each kWh of energy curtailed during a called event lasting up to 4 hours. The current performance payment for load reduced during a called event is $0.25 per kWh.

Customers and aggregators may participate by reducing or deferring load, or utilizing dispatchable onsite generation options, to meet the commitment to reduce their load on the system. Generation options must meet strict emissions criteria to be eligible for the program. AMI metering is also required of all customers enrolled in the program. All load reduction provided during a called curtailment event will be quantified using a Customer Base Load methodology, which requires detailed usage information made available on a timely basis.

#### A.2.10.3 *Customer Enrollment/Financial Impacts*

The financial impacts of the three proposed programs are expected to be favorable to ratepayers on a net present value basis. Each of the three programs involves payments that are less than the costs that can be avoided from their implementation, producing a net benefit to ratepayers; the Benefit-Cost Analysis is included in the Dynamic Load Management Annual Report. Table A-17 shows the enrollment activity as of January 1, 2021.

**Table A-17. DLM Tariff Customer Enrollment as of January 1, 2021**

| Program | 2020 Cumulative Customers | 2020 MW Reduction | 2020 Curtailment Events | Cumulative Curtailment Events |
|---|---|---|---|---|
| Smart Savers Program | 27,532 | 27.5 | 4 | 17 |
| CSRP/DLRP | 261 | 26.5 | 8 | 23 |
| DLRP Only | 261 | 26.5 | 1 | 4 |

In 2020, all customers enrolled in CSRP are also enrolled in DLRP. The MW reductions shown in Table A-17 reflect the performance from both programs combined and are not additive.

**Table A-18. DLM Tariff Customer Enrollment 5 Year Forecast**

| | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|
| DLC MW Enrolled | 39.5 | 45.5 | 51.5 | 57.5 | 63.5 |
| CSRP MW Enrolled | 35.0 | 40.3 | 46.3 | 53.3 | 61.3 |
| DLRP MW Enrolled | 35.0 | 40.3 | 46.3 | 53.3 | 61.3 |
| **Total MW Enrolled** | **74.6** | **85.8** | **97.9** | **110.8** | **124.8** |
| DLC Customer Payment | $1,348,300 | $1,498,300 | $1,648,300 | $1,798,300 | $1,948,300 |
| CSRP Customer Reservation Payment | $876,156 | $1,007,580 | $1,158,717 | $1,332,524 | $1,532,403 |
| DLRP Customer Reservation Payment | $525,694 | $604,548 | $695,230 | $799,514 | $919,442 |
| CSRP/DLRP Customer Performance Payment | $140,185 | $161,213 | $185,395 | $213,204 | $245,184 |
| **Total Customer Payments** | **$2,750,150** | **$3,110,428** | **$3,502,247** | **$3,930,339** | **$4,400,144** |

*All Customer Payments are collected through the Power Supply Charge and therefore do not impact the operating budget.

### *A.2.11 Behavioral Initiative (HEM)*

This Home Energy Management Program that was launched in the third quarter of 2017 supports statewide goals under REV to create a cleaner, more resilient, and affordable energy system for all New Yorkers. Through regulatory overhaul, REV encourages the cleanest, most advanced and efficient power system operation. State programs supporting clean energy are being redesigned to accelerate market growth and unlock private investment. This program will advance progress toward New York State’s goals of achieving a 40% reduction in GHG levels and a 185 TBtu increase in statewide EE by 2030.

#### A.2.11.1 *Program Delivery*

PSEG Long Island's overarching objective of this program is to motivate and inspire PSEG Long Island customers to increase their understanding of all aspects of their energy needs and take active control of their energy usage. Indications are that this program has resulted in increased customer satisfaction, increased customers' understanding and ability to manage their energy usage, increased customer adoption of existing EE offerings, improved customer access to energy efficient products and clean energy service providers (i.e. EE, residential solar, community solar, demand response and related services), and has fostered the development of marketplace solutions such as smart thermostats which will induce deeper clean energy penetration and leverage greater private investments in such efforts. Outcomes undergoing evaluation include:

- Customer bill savings
- Reduction in GHGs
- Clean energy penetration including increased use of renewable and low carbon sources,
- Demand and capacity reductions
- Greater private sector investment in clean energy solutions,
- Customer satisfaction

This HEM program enables residential customers to realize cost-effective verifiable EE savings, while also increasing awareness and adoption of applicable programs, products and services, and increases customer satisfaction.

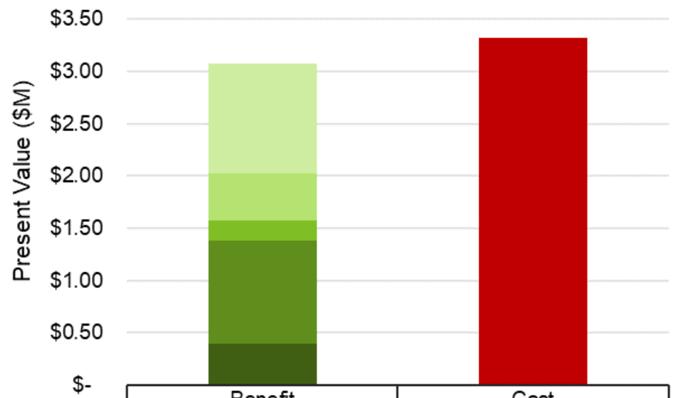
#### A.2.11.2 *Notable Changes*

PSEG Long Island expects the Home Energy Report treatment group to number approximately 450,000 residential customers in 2022. All residential customers will have access to the HEM MyEnergy engagement portal and online Home Energy Assessment function.

#### A.2.11.3 *Business Case*

HEM has a SCT benefit-to-cost ratio of 0.93 and RIM benefit-to-cost ratio of 0.20. A list of the value streams considered in the BCA is detailed in Figure A-9.

**Figure A-9. Present Value Benefits and Costs of SCT – HEM**




| | Benefit | Cost |
|---|---|---|
| Net Avoided CO2 | 1.05 | - |
| Avoided Distribution Capacity Infrastructure | 0.45 | - |
| Avoided Transmission Capacity Infrastructure | 0.19 | - |
| Avoided Energy (LBMP) | 0.98 | - |
| Avoided Generation Capacity Cost (AGCC) | 0.40 | - |
| Program Administration Costs | - | 3.32 |
| Total | 3.08 | 3.32 |

| # | Value Stream | Calculation Methodology | Benefits (NPV, $M) | Costs (NPV, $M) |
|---|---|---|---|---|
| 1 | **Net Avoided $CO_2$** | Reduced carbon emissions from reduced energy consumption and beneficial electrification. | 1.05 | |
| 2 | **Avoided Distribution Capacity Infrastructure** | Based on demand savings and marginal distribution capacity cost. | 0.45 | |
| 3 | **Avoided Transmission Capacity Infrastructure** | Based on demand savings and marginal transmission capacity cost. | 0.19 | |
| 4 | **Avoided Energy (LBMP)** | Energy savings based on both on-peak and off-peak periods. | 0.98 | |
| 5 | **Avoided Generation Capacity Cost (AGCC)** | Based on demand savings and marginal capacity cost. | 0.40 | |
| 6 | **Program Administration Costs** | Includes contractors fee, labor, and evaluation costs. | | 3.32 |
| | **Total Benefits** | | **3.08** | |
| | **Total Costs** | | | **3.32** |
| | **SCT Ratio** | | **0.93** | |

NPV = Net present value
LBMP = Location-based marginal pricing

# Appendix B. Supporting Documentation for EV Make-Ready Program

## B.1 Phase 1 Implementation Plan

### *B.1.1 EV Make-Ready Program Overview*

Although access to charging stations is a key component to enable the transition to widespread EV adoption, public charging stations struggle to achieve sufficient returns on upfront costs due, in part, to low utilization rates. This struggle makes it hard to attract the investment of private capital to build the infrastructure required to enable rapid growth in EV adoption. Chargers are expected to become more economically viable as EV adoption increases. Stimulating the development of some core level of charger deployment in the near term may help to accelerate EV adoption and support greater private investment over the longer term. The proposed EV Make-Ready Program will help to incentivize greater deployment of EV supply equipment (EVSE) and will target deployment based on the geographical absence of public charging at areas with greater need and lower costs.

The program directly supports New York State goals to achieve 40% reduction in greenhouse gas emissions from 1990 levels by 2030, and to deploy 850,000 ZEVs by 2025. Long Island's share of the State goal is based on the ratio of vehicles registered on Long Island to those in the state, which is approximately 21%. In July 2020, the New York DPS released the Make-Ready Program Order that established statewide goals for a utility-supported EVSE make-ready program (Make-Ready Order).[34] The premise of the Make-Ready Order is that major electric utilities should provide financial contributions for make-ready infrastructure to accelerate EVSE deployment, in turn enabling more rapid adoption of EVs.

The utility may define additional details and requirements for the program to ensure consistency with the existing Make-Ready Order, as appropriate.

The scope of this plan applies specifically to Phase 1 of the EV Make-Ready (Make-Ready) Program, except where specifically stated otherwise. Details regarding Phase 2 implementation will be developed during the second half of 2021.

#### Objective

In line with the proposed investments in the Make-Ready Order, PSEG Long Island proposed in its 2020 Utility 2.0 Plan a Phase 1 Make-Ready Program to support investment during 2021 in make-ready infrastructure for new DCFC and Level 2 charging stations. PSEG Long Island is also proposing in its 2021 Utility 2.0 Plan a Phase 2 Make-Ready Program to support EV make-ready investments from 2022 through 2025. The ultimate objective of both of the Make-Ready proposals is to accelerate EV adoption on Long Island. This implementation plan covers the Phase 1 Make Ready Program. The implementation plan for Phase 2 will be developed later in 2021 to support the expected roll-out of Phase 2 in 2022.

This Make-Ready Program builds upon PSEG Long Island's ongoing EV programs and is structured similarly to requirements set out in the Make-Ready Order. The proposed program will roll out in two phases:

[34] Order Establishing Electric Vehicle Infrastructure Make-Ready Program and Other Programs, CASE 18-E-0138 Proceeding on Motion of the Commission Regarding Electric Vehicle Supply Equipment and Infrastructure, July 16, 2020.

- **Phase 1 – 2021:** With the release of the DPS Staff Whitepaper Regarding Electric Vehicle Supply Equipment and Infrastructure Deployment in early 2020, PSEG Long Island proposed an initial investment in Make-Ready Program for 2021. Phase 1 builds the foundation with target EVSE infrastructure levels and funding to support rebate-model initial deployment. Make-ready incentives will cover a portion of make-ready costs, up to certain limits (see Section B.1.2 for details). Available incentives will first apply to utility-side make-ready costs, then any remaining incentive will be provided as a rebate for customer-side make-ready costs.
- **Phase 2 – 2022-2025:** PSEG Long Island/LIPA commissioned Gabel Associates to research make-ready program design options, recommend program sizing and design parameters, and recommend long term strategies that might be used to reduce ratepayer impacts associated with the program (see Make-Ready Program Report in Appendix B.2). Phase 2 leverages the study's findings and defines the terms of the broader program to run through 2025. Incentives for Phase 2 are currently planned to be structured similarly to Phase 1 for Level 2 charging infrastructure. For DCFC infrastructure, the total incentive amount will be structured similarly, but will be offered in the form of a discounted lease instead of a rebate, as LIPA plans to own all utility-side and customer-side make ready infrastructure. The customer-side make-ready infrastructure will be leased to the customer over ten years, and the lease principal will be determined based upon the difference between total make-ready cost and the total customer incentive. All details regarding Phase 2 are preliminary and subject to change. As such, the Phase 2 implementation plan is planned to be developed later once additional details are finalized. See Section 3.2.3 and Appendix B.2 of the 2021 Utility 2.0 Plan for additional details regarding the proposed structure for Phase 2.

### Targets

As stated in the Make-Ready Program Report in "Program Sizing: Number of Chargers Required" (Chapter 6) of Appendix B.2., the 2025 infrastructure targets are based on Long Island's fraction of New York State vehicle registrations (21%), 77% access to home charging, full support for both battery EVs (DCFC) and plug-in hybrid EVs (PHEV) (Level 2). Applying these assumptions with the National Renewable Energy Laboratory's EVI-Pro Lite tool, PSEG Long Island determined tentative 2025 targets for additional infrastructure: 498 DCFC ports and 4,247 public Level 2 ports. See "A Framework for Optimal Geographic Distribution" (Chapter 7) of Appendix B.2 for details on assumptions.

For Phase 1, PSEG Long Island is targeting support for 20 DCFC ports (4% of 2025 target) and 254 Level 2 ports (6% of 2025 target). [35]

**Table B-1. Estimated Ports**

| Port Type | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|
| DCFC | 20 | 75 | 125 | 125 | 154 |
| Level 2 | 254 | 637 | 1,062 | 1,062 | 1,232 |
| **Total** | **274** | **712** | **1,186** | **1,186** | **1,386** |

### Budget

The projected number of ports and the allocation of the incentive budget over time are based on a design target for the number of PEVs registered on Long Island by 2025. If, however, electric vehicle adoption is slower than projected, the incentive program may be extended in time (past 2025) to stay in step with

[35] See 2020 Utility 2.0 Long Range Plan & Energy Efficiency and Demand Response Plan (2020 Utility 2.0 Plan) for details

actual vehicle adoption and real charging capacity requirements. Some level of pre-build should be assumed so that infrastructure development leads vehicle adoption slightly.

Phase 1 of the program will support make-ready costs for approximately 20 DCFC and 254 Level 2 chargers. The total budget for Phase 1 is approximately $2.5 million (see Table B-2). Further details are provided in section 3.2.3.

**Table B-2. Incentive budget by port type – Phase 1**

| Port Type | Total Incentive Budget ($M) |
|---|---|
| DCFC | 1.31 |
| Level 2 | 1.22 |
| **Total** | **2.53** |

### Program Development Milestones

The proposed Phase 1 program development milestones are summarized in Table B-3.

**Table B-3. Development Milestones**

| Milestone | Description | Target Date |
|---|---|---|
| EV Make-Ready Program Participant Guide | Issuance of participation guide for customers of the make-ready program | 7/5/2021 |
| Submission of EV Make-Ready Program Plan | Publish Make-Ready Program implementation plan | 7/5/2021 |
| EV Make-Ready Application | Application to website (see Appendix B.1.7) | 7/5/2021 |
| Customer Application Portal | Customer application for Make-Ready Program through portal | 8/1/2021 |
| Phase 1 Application Window | Deadline for Phase 1 applications | 11/30/2021 |

### Contacts

All questions related to the Make-Ready Program should be directed via email to EVLI@pseg.com.

## *B.1.2 Incentives*

### Location Designations

There are three location types: Corridor DCFC, Community DCFC, and L2 locations. To be eligible for incentives in each category, the project must meet certain minimum requirements. This eligibility screen is binary – either a project is eligible as per the criteria below, or it is not, in addition to additional percentage-tier factors that also apply (as described below). None of these minimum requirements are intended to limit location design – i.e., projects may exceed any of the criteria defined below:

**Corridor DCFC location**, i) the location must be within one mile of an identified travel corridor “as the crow flies” from the point of roadway exit to the location, ii) all DCFC ports at the location must be capable of delivering at least 100KW of power (when power-sharing, if applicable, is active), iii) there must be at least four simultaneously operable ports at the location based on either CCS or CHAdeMO plug types, and iv) all ports covered by the incentive must be exclusively dedicated for public use.

**Community DCFC location**, i) a DCFC location that doesn't qualify as a Corridor location, ii) all DCFC ports at the location must be capable of delivering at least 50KW of power (when power-sharing, if applicable, is active), iii) there must be at least two simultaneously operable ports at the location based on either CCS or CHAdeMO plug types, and iv) all ports covered by the incentive must be exclusively dedicated for public use, or for use by LI/EJ residents if applicable.

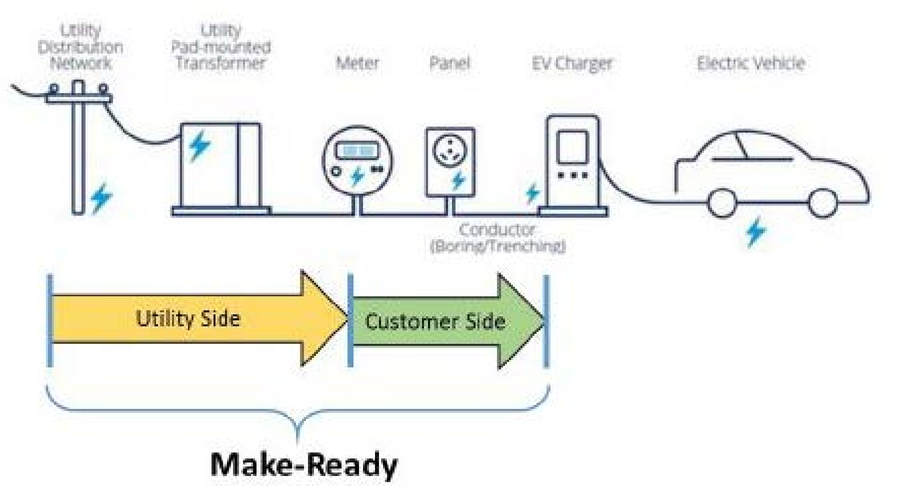
**L2 location**, there must be at least two simultaneously operable ports, and any ports designated "for public use" must be dedicated exclusively for public use (i.e., they can't serve "double duty" as workplace or fleet chargers).

The planned Corridor DCFC ports are targeted to specific identified roadways, while the Community DCFC and L2 ports are allocated to municipal town/city entities. PSEG Long Island may modify the allocation of incentives to roadways and municipal entities based on learning, the identification of under-served areas, and other factors as the program is implemented over time.

## Covered Costs

Utility-owned equipment includes step-down transformers, overhead service lines, utility meters, and other traditional distribution infrastructure. Customer-owned equipment includes conductors, trenching, panels for stations, and other customer-side equipment. Eligible equipment excludes the charging station and ports themselves.[36] Figure B-1 illustrates the key components of the Make-Ready Program.

**Figure B-1. PSEG Long Island EV Make-Ready Program Components**




The utility will build the utility-side make-ready (US-MR), while the customer will arrange for construction of the customer-side make-ready (CS-MR) using utility-approved contractors and equipment. Both the US-MR and CS-MR costs are eligible. In cases where site restoration is required, costs must only cover returning the site to its original condition (concrete, asphalt, and sod), not additional landscaping or beautification. Incentives will apply first to US-MR costs. If US-MR costs exceed the incentive, the

[36] Other project costs, such as the cost of the chargers themselves, other purchases made at the time of construction (data licenses, networking contracts, extended charger warranties), zoning approvals, construction permits, overall engineering and design costs, site testing (including but not limited to geo-testing), communications or networking equipment, or installation (labor and equipment) associated with the chargers, are not considered allowed costs under the incentive program.

customer will be responsible for covering the remainder of the US-MR costs. If the incentive exceeds US-MR costs, the remaining incentive will be applied to CS-MR costs.

A variety of interconnection scenarios are supported by the program, including a) projects that require new service provided by the utility (the US-MR), b) projects that are connected behind an existing meter (and utility account), and which require no service upgrade, and c) projects that are connected behind the meter, but due to the additional load imposed by the chargers, require a service upgrade. Service upgrade costs are considered part of the US-MR, where applicable.

For projects that require new service, that service must be dedicated exclusively to the charging infrastructure and should not support other non-related loads. Small parasitic loads related to the chargers, such as safety lighting, communications equipment, etc., are allowed.

### Eligibility Criteria

PSEG Long Island evaluates individual make-ready projects based on station maturity, accessibility, and equipment.

- **Station Maturity:** To be eligible for any incentive, the proposed station must have started construction after the issuance of the July 16, 2020 Order.
- **Accessibility[37]:** Each proposed station must be publicly accessible and accept universal forms of payment.[38] To qualify for the 90% or 100% tier, the proposed charging stations must be in a public parking area rather than in a private workplace or multiunit dwelling parking area. The parking lot may be a free parking lot or a paid municipal parking lot but must be accessible to all public customers without restriction. A proposed station situated in a private parking lot, including those in multiunit dwellings, workplace parking and private pay-to-park lots, may qualify for the reduced 50% incentive if chargers are open to all building occupants or parking lot users and are not exclusively designated to specific vehicles.
  To ensure maximum accessibility of charging stations to the public, stations eligible for an incentive under the Program must also be usable without requiring a paid membership in a charging station network. This holds for both proprietary and nonproprietary plugs. Networked stations that offer single per-use charging fees payable through a commonly accepted payment method such as cash, credit, or debit will satisfy this criterion. Though payment through a smartphone application is permitted, to qualify as publicly accessible for purposes of the Program, smartphone application may not be the only form of payment a station accepts.
- **Qualified Equipment**: PSEG Long Island requires Make-Ready Program applicants choose from a list of qualified charging equipment and networks. This list is the same as the NYSERDA Charge Ready NY offering to foster easier benefit coordination and to standardize reporting requirements.[39]
  In addition, Make-Ready Program funding recipients must identify and use an approved network provider(s) during the entire 5-year in-service requirement.
  - Network Providers shall provide PSEG Long Island or a designated contractor direct access to an online portal to retrieve station data.

[37] All locations must be within the PSEGLI/LIPA service territory and must draw power from service under a utility account.

[38] All locations that qualify as "public locations" (either DCFC or public-L2) must be physically accessible 24X7, without constraints such as lift-gates or other costs (such as parking costs), must not require the EV driver to be a member or other pre-approved status, and allow common available payment methods such as credit cards.

[39] Qualified charging equipment and networks can be found at: https://www.nyserda.ny.gov/All-Programs/Programs/ChargeNY/Charge-Electric/Charging-Station-Programs/Charge-Ready-NY/Qualified-Charging-Equipment-and-Networks

- Each EVSE owner will be required to demonstrate compliance with the 5-year in-service requirement through EVSE data reporting by a qualified network provider.
- EVSE Owners may change to a different network provider after 1 year, providing notice of a pending change within 30 days of switching to a different network provider.

Additionally, customers who receive incentives through this program must maintain compliance with ongoing program requirements. PSEG Long Island may be entitled to recuperate all, or a portion of incentives granted to a customer (for CS-MR and/or US-MR) as a result of non-compliance with program requirements. Ongoing program requirements include reporting requirements (see Section B.1.5) and minimum performance standards, which include the following:

- 95% up-time (annually) for DCFC plugs.
- 99% up-time (annually) for DCFC stations, with a minimum of 50% of plugs available.
- Station operational lifetime of at least five years.[40]

### Incentive Tiers

Table B-4 summarizes the associated requirements to qualify for a specific incentive tier. Incentive tiers define the maximum percent of total make-ready costs (including US-MR and CS-MR) that may be covered by the program incentives. Additional incentive caps apply, which may result in incentives below the maximum for a given tier. See section on “Program Design Recommendations” (Chapter 8) in the Make-Ready Program Report for details on incentive tier requirements (Appendix B.2.).

A project will be eligible for a Customer Incentive Amount (CIA), which will be based on a percentage of allowed costs within a three-tier program. For a given project, the Customer Incentive Due (CID) to the customer will be the CIA, minus 100% of the US-MR costs. The CID will be paid as a rebate. PSEG Long Island’s obligation to pay any CID to the customer is contingent upon all construction being complete and the location energized and portals capable of charging as designed. Additionally, no rebate will be issued until all required documentation has been remitted by the customer.

**Table B-4. Incentive tier eligibility requirements**

| Port Type | 100% Tier | 90% Tier | 50% Tier |
|---|---|---|---|
| **DCFC Corridor** | • At least four simultaneously operable CCS or CHAdeMO ports can each deliver at least 150kW (when power-sharing is active, if applicable), and all four ports are either CCS or CHAdeMO, and the infrastructure is future-proofed | • Simultaneously operable CCS or CHAdeMO ports are less than 150 kW (when power sharing is active, if applicable)<br>• Proprietary ports which are matched one-for-one with either CCS or CHAdeMO ports of equal power (or higher) | • Proprietary plugs which meet all other requirements, but are not matched one-for-one with either a CCS or CHAdeMO plug |

[40] Changes or upgrades may be made during the five-year term, but the charging capacity and number of plugs may not decrease

| Port Type | 100% Tier | 90% Tier | 50% Tier |
|---|---|---|---|
| **DCFC Community** | • Location is within 1-mile of the geo-boundary defining a LI/EJ community, for ports based on either CCS or CHAdeMO | • Location is not within 1-mile of the geo-boundary defining an LI/EJ community, for ports based on either CCS or CHAdeMO.<br>• Proprietary ports which are matched one-for-one with either CCS or CHAdeMO ports of equal power (or higher) | • Proprietary plugs which meet all other requirements, but are not matched one-for-one with either a CCS or CHAdeMO plug |
| **Level 2** | • Location is within the geo-boundary defining a LI/EJ community, or can be demonstrated to be sufficiently close to an LI/EJ community to directly support the needs of those residents, for ports based on J1772 plugs | • For locations not within the geo-boundary defining an LI/EJ community (or nearby) but which are available exclusively for public use, for ports based on J1772 plugs<br>• Proprietary ports which are matched one-for-one with J1772 ports of equal power (or higher) | • Proprietary plugs which meet all other requirements, but which are not matched one-for-one with a J1772 plug, or J1772 plugs which are not available for public use but are used for a more limited set of authorized users (such as workplace, non-LI/EJ multi-family, or fleet chargers) |

## Incentive Caps

Incentives are capped by four main types: ports per location, incentive per location, power per location, and incentive per entity (see Table B-5). Details on incentive cap calculations are described in the Make-Ready Program Report in “Program Design Recommendations” (Chapter 8) of Appendix B.2.

**Table B-5. Summary of incentive caps by cap type**

| Cap Type | Cap Amount |
|---|---|
| Max ports per location | 10 ports |
| Max incentive per location | • DCFC Corridor: $529,302<br>• DCFC Community: $205,623<br>• L2: $30,366 |
| Max power per location | • DCFC: 2 MW<br>• Level 2: 100 kW |
| Max incentive per entity | No more than 20% of overall program incentive budget |

US-MR costs take precedence over the CS-MR costs and may consume the entire incentive, leaving the CS-MR costs the responsibility of the customer.

In unique cases where charging location needs cannot be met within the program guidelines, Project developers would be allowed to apply to the utility to request a waiver from the location cap on a per project basis. Approval of any waiver will consider the merit of the project, combined with whether extenuating and unavoidable cost circumstances apply. The waiver provision allows for flexibility in cases where it may be beneficial to meet unique charging location deficiencies.

DCFC and L2 ports may be mixed at a given location, in which case the relevant DCFC location cap would be determined based upon the mix of DCFC and Level 2 ports.

Future-proofing includes over-sizing of key infrastructure – especially conduit and interconnection equipment – to support the growth of the location in the future as additional PEVs become active on Long Island. [41] This growth could represent either upgrades in the power delivered by ports at the location, and/or an increase in the number of chargers/ports active at the location, or both. Future-proofing is capped at no more than four times the sizing of the originally installed project (e.g., a location that originally requests 500 kW includes future-proofed infrastructure up to 2 MW).

### *B.1.3 Education and Outreach Plan*

#### Audience

PSEG Long Island's program education and outreach seeks to address project developers and other stakeholders who populate the New York EV charging industry. PSEG Long Island will focus first on its current customers including residential, municipal, small business and large commercial customers. In addition, PSEG Long Island will collaborate with the Joint Utilities to develop materials tailored to EV charging station developers (e.g., ChargePoint, Enel and NYPA) and public incentive administrators (e.g., NYSERDA) and interested parties (e.g., Drive Electric Long Island, Empire Clean Cities, towns and municipalities, Regional Economic Development Councils, and Metropolitan Planning Organizations).

#### Messaging

The primary objective of PSEG Long Island's messaging is education. Communications will explain EV charging infrastructure, and the benefits that offering EV charging can provide to retailers, employers, or residents of multiunit dwellings (depending on customer type). Outreach will also educate potential participants on other available incentives, including the NYSERDA Charge Ready NY program and how to coordinate its benefits with the PSEG Long Island Make Ready Incentive.

The PSEG Long Island website, www.psegliny.com/goelectric serves as the hub for all electric vehicle offerings, and will be updated to include EV Make Ready program materials and resources. New resources may include links to the Electric Vehicle Data Analysis Tool, EvaluateNY, hosted by NYSERDA. This tool catalogs charging facilities within the PSEG Long Island/LIPA service territory. In addition, the tool may soon be updated to include a disadvantaged community (low income, environmental justice) overlay (2021-2022), a valuable resource for potential participants to research location specific opportunities and EVSE saturation.

[41] For purposes of the make-ready program, the "future-proofing" criteria is met when the US-MR, and key components of the CS-MR (particularly conduit and conductor sizing) is suitable for supporting at least twice the power required by the current location design (i.e., the location power can be at least doubled with future expansions). The intention is that higher powered and/or additional chargers can be added without requiring upgrades to the US-MR or re-opening of concrete/asphalt/sod for a new or larger conduit.

In addition, a key resource will be internal and/or consultant partner staffing resources, and information on the number and general location of charging stations that are waiting in the interconnection queue. By providing non-specific information on development activities underway, PSEG Long Island enables developers and other stakeholders to focus their energies efficiently across the region and market rather than inadvertently and redundantly pursuing projects that are preempted by another entity's work.

#### Channels

PSEG Long Island will leverage several broad-based communications channels including social media, community engagement, and press releases. In addition, PSEG Long Island regularly communicates with its customers about EVs directly through a range of channels, including e-newsletters, direct mail, and bill media.

These may include frequently-asked-questions guides, webinars about the application process, or prerecorded videos detailing how the suitability criteria and mapping tools can be used by developers and stakeholders to recruit site hosts. Through these various entry points, PSEG Long Island directs charging station developers and other interested parties to program information on its website and facilitate connections between developers and potential site hosts.

Through these various outreach tactics, PSEG Long Island directs potential site hosts to program information on its website.

### *B.1.4 Customer Journey*

Customers (including site-hosts, managers, owners, or developers) will generally begin the journey through the Make-Ready Program with targeted outreach by PSEG Long Island or the developer, but it could also be customer-initiated. The journey continues through the application, review, and approval process before moving on to equipment installation and inspection and finally the incentive payment.

The customer journey for Phase 1 will be as follows:

- ***Education and Outreach*.** PSEG Long Island conducts targeted outreach to potential site-owners and hosts based on site capacity, EJ and LI community locations and other suitability criteria. PSEG Long Island also conducts outreach to EV site developers to engage their interest in participating in the Make-Ready Program and assisting with site development. (See Section B.1.3 for further education and outreach detail.)
- ***Application Submission*.** Interested participants can apply for the Make-Ready Program through the online application portal on the PSEG Long Island website. The application includes the applicant's name and contact information and a brief project description describing the proposed number of plugs, charging output, plug type, site location, demand management software and hardware (see Appendix B.1.7)
- ***Application Review.*** Within one month of receiving a completed application, PSEG Long Island reviews each application and notifies the applicant of approval or rejection based on the identified suitability criteria and overall program priorities. Upon approval PSEG Long Island drafts a Pre-Approval letter outlining the total incentive levels and relevant location caps.
- Simultaneous to the Make-Ready Program application, the customer/developer will submit a Commercial New Construction request through PSEG Long Islands Building and Renovation Services website. The application includes contact information, account ownership, load requirements, etc. Following acceptance, a PSEG Long Island representative contacts the

applicant for an initial consultation. The BRS team will coordinate any feasibility studies and schedule any calls and/or site visits with the construction and Planning teams.

- During the site visit, a PSEG Long Island representative will assess the viability of the site based on site capacity, planned utility work, and available parking spots. Virtual site assessments may be conducted for simpler sites as deemed appropriate based upon COVID-19 considerations.
- The construction/planning teams will provide a Charge Letter detailing the utility side costs. The EV Make-Ready Team will review and coordinate payment internally.
- ***Equipment Installation.*** PSEG Long Island is responsible for completing the utility-side work for the site. This involves the installation of all necessary equipment up to and including the installation of appropriate meters for data collection. In parallel, the customer works with an approved contractor to complete all necessary work on the customer side of the meter, such as installing panels, conduits, or trenching. While the installation of EV charging plugs may occur during this time, **the cost of EV plugs and installation is not covered under the Program**.
- ***Final inspection.*** Upon completion of all relevant make-ready work, a representative of PSEG Long Island completes a final site assessment to verify that the project is finalized.
- ***Incentive payment.*** Within 60 days of verifying that a project is complete, PSEG Long Island distributes the incentive payments as lump sums as agreed upon in the Project Agreement.

### *B.1.5 Reporting*

As part of the operation of equipment, **the Equipment Owner shall provide all data requested in the Manual to PSEG Long Island on a regular basis.** For networked stations, the Equipment Owner shall set up access to usage data through the network provider, either by providing PSEG Long Island with limited administrative access to the network data (preferred) or by establishing regular recurring data transfers to **PSEG Long Island** for the duration of the five (5) years.

For non-networked stations, the Equipment Owner shall provide reporting establishing regular recurring data transfers to **PSEG Long Island** for the duration of five (5) years.

#### *Station Billing Information*

- 15-minute interval data
- Load profiles for the stations on the top 10 demand days of the year
- Utility bills for each station

#### *Station Financial Information*

- The fee structure for the station
- The total charging revenues for the station for the year
- The operating costs (maintenance and energy costs) for the year

Data provided by station owners to PSEG Long Island will also be made available to DPS on an ongoing basis. A regular reporting cadence will be established for station owners.

#### *Plug and Charging Session Data*

- Daily number of charging sessions for the year

- Start and stop times of each charging session
- Charge time for each vehicle during each charging session
- Peak kW per charging session
- Total kWh discharged per charging session
- Plug outage information (when outages occur)

Additionally, all customer complaints must be reported to PSEG Long Island. These complaints will be used to inform the ongoing improvement of the Make-Ready Program and will not be made public.

***PSEG Long Island Program Reporting***

Throughout the Make-Ready Program, PSEG Long Island will fulfill all necessary reporting requirements, aimed at identifying areas for improvement and potential changes to program guidelines.

Additionally, PSEG Long Island will produce quarterly and annual reports beginning Q1 2022 to review the Make-Ready Program's performance to date. These reports will include data on both program implementation statistics as well as charging station performance collected by station owners.

Program implementation data compiled by the utility includes the following participant and billing information:

- The percent of applications that have been turned into complete stations
- The number of unique station owners participating in the Make-Ready Program
- The number of sites where incentives have been issued
- The number of plugs installed as a result of the Make-Ready Program
- The total Infrastructure costs incurred as part of the Make-Ready Program

### *B.1.6 Definitions*

- **PSEG Long Island EV Make-Ready Program (Make-Ready Program):** The Program that provides incentives for the purchase and installation of equipment associated with preparing a site to install EV chargers within PSEG Long Island's service territory.
- **Customer:** An entity that applies for and receives the incentives available through the EV Make-Ready Program.
- **Customer Incentive Amount (CIA):** Eligible incentive amount for a given customer; will be based on a percentage of allowed costs within a three-tier program.
- **Customer Incentive Due (CID):** Calculated as the CIA, minus 100% of the US-MR costs.
- **Developer:** An entity responsible for designing, constructing, and commissioning an EV charger location. This entity may also be responsible for owning, managing, and operating the chargers.
- **Equipment Owner**: The entity that purchases and owns the EV charging equipment once it is installed.
- **Site Host:** The owner of the site on which the EV charging equipment is installed. The Site Host may or may not be the Equipment Owner.

- **Disadvantaged Community:** New York State has defined the criteria for Disadvantaged Communities, as follows:
    - **Environmental justice community (EJ):** Located within census block groups that meet the HUD 50% AMI threshold that are also located within the DEC Potential Environmental Justice Areas; or
    - **Low income community (LI):** Located within New York State Opportunity Zones
- **Electric vehicle (EV):** A vehicle capable of highway speeds that is powered fully or in part by an electric motor and is rechargeable from an external connection to an off-board electrical source.
- **Future proofing:** The installation of additional or scalable capacity equipment and infrastructure to support the future expansion of an EV charging station and installation of additional charging ports.
- **Installer:** The entity that installs the equipment. The Installer may or may not be the same as the equipment owner.
- **Make-Ready Equipment:**
    - **Utility-Side Make-Ready (US-MR)** includes step-down transformers, overhead service lines, utility meters, and other traditional distribution infrastructure.
    - **Customer-Side Make-Ready (CS-MR)** includes conductors, trenching, panels for stations, and other customer-side equipment.
- **Multi-unit dwellings:** Any dwelling which is either rented, leased, let, or hired out, to be occupied, or is occupied as the residence or home of 5 or more independent units.
- **Per-port cost**: Based upon total allowed make-ready costs divided by the number of ports at the location eligible for incentive
- **Program effective date:** The date after which construction for projects under the Program can begin construction. For the Program, the effective date is July 16, 2020.
- **Project**: The make-ready work at a given location.
- **Proprietary plug:** Any EV charging plug that is limited to support one electric vehicle brand or make exclusively.
- **Publicly accessible:** Locations that allow access without site-specific physical access restrictions, including public, fee-free parking areas and municipality-operated fee-for parking areas. It does not include private or restricted business parking or multi-unit dwelling parking.
- **Universal plug:** Any EV charging plug that is accepted as able to support any EV and is not proprietary or exclusive. For Level 2 chargers, this is the Society of Automotive Engineers Electric Vehicle Conductive Charger Coupler J1772. For DCFCs, this is any non-proprietary plug such as the SAE Combined Charging System (CCS).

### *B.1.7 Appendix: Application Form*

**Electric Vehicle Make Ready Program Application**

**Directions: Send your completed application via email to EVLI@pseg.com.**

| |
|---|
| **Company Name** |
| Address |
| City |
| State |
| Zip |
| Company Contact |
| Name |
| Email |
| Phone 1 |
| **Proposed Facility Street Address, Town, Zip** |
| **Proposed Energize Date** |
| **BRS Notification** # |
| **PSEG Long Island Account** # |
| |
| **Location Accessibility** |
| Public |
| Private: Workplace, Multifamily |
| Disadvantaged Community |
| |
| **Equipment** |
| Charger Level (Level 2 or DCFC) |
| Charger Type (CCS, Chademo, J1772, Tesla) |
| Charger Brand (Electrify America, Chargepoint, EVgo, Juicenet, Tesla, etc), |
| Charger Network |
| Power level –75 kW, 150kW, 350 kW |
| Total Ports/Plugs ( 1-100) |

# PSEG Long Island Make Ready Terms & Conditions

**Station Maturity** To be eligible for any incentive, the proposed station must have started construction after the issuance of the July 16, 2020, Order.

**Accessibility** Each proposed station must be publicly accessible and accept universal forms of payment. To qualify for the maximum incentive, the proposed charging stations must be in a public parking area rather than in a private workplace or multiunit dwelling parking area. The parking lot may be a free parking lot or a paid municipal parking lot but must be accessible to all public customers without restriction. A proposed station situated in a private parking lot, including those in multiunit dwellings, workplace parking and private pay-to-park lots, may qualify for the reduced 50% incentive.

**Process** Simultaneous to the EV Make Ready application, the customer/developer must submit a Commercial New Construction request through PSEG Long Island's Building and Renovation Services website. The application includes contact information, account ownership, load requirements, etc. Further the applicant agrees to cooperate with any feasibility studies, and scheduled calls and/or site visits with the construction and planning teams including inspection and final site assessment upon completion of all relevant make-ready work.

**Equipment Installation** PSEG Long Island is responsible for completing the utility-side work for the site. This involves the installation of all necessary equipment up to and including the installation of appropriate meters. PSEG Long Island will deduct theses costs from the overall approved incentive amount.

The customer works with a contractor to complete all necessary work on the customer side of the meter, such as installing panels, conduits, or trenching. While the installation of EV charging plugs may occur during this time, **the cost of EV plugs and installation is not covered under the Program**.

**Incentive payment** Within 60 days of verifying that a project is complete, PSEG Long Island distributes the remaining incentive payments as lump sums.

**Location Cap** This limit is a cap on incentive levels: locations can be constructed at higher levels, but incentives apply only up to the 2MW or 100KW limits. No entity, on either a site-host or a project developer basis, can be awarded more than 20% of the overall incentive program budget.

Utility side costs take precedence over the customer side costs and may consume the entire incentive, leaving the customer side costs the responsibility of the customer.

Project developers would be allowed to apply to the utility to request a waiver from the location cap on a per project basis. Approval of that waiver should consider the merit of the project, combined with whether extenuating and unavoidable cost circumstances apply. The waiver provision allows for flexibility in cases where it may be beneficial for the PSEG Long Island customer.

**Incentive Levels**

| |
|---|
| **Up to 100%** |
| • Publicly available DCFC projects with standardized plug types located within Disadvantaged Communities. |
| • L2 projects at multi-unit dwellings located within Disadvantaged Communities. |
| **Up to 90%** |
| • Publicly available L2 and DCFC projects with standardized plug types located outside of Disadvantaged Communities. Includes municipal pay-to-park and free parking locations. |
| • Publicly available L2 and DCFC projects including proprietary plugs must have an equal number of standardized plugs of an equal or greater charging capacity to the proprietary plugs (outside of Disadvantaged Communities). |
| **Up to 50%** |
| • Non-public L2 and DCFC projects, such as workplaces with restricted access and privately-owned pay-to-park lots. |
| • Public and non-public L2 and DCFC projects consisting only of proprietary plugs. |

**Reporting**

As part of the operation of equipment, **the Equipment Owner shall provide all data requested to PSEG Long Island on a regular basis.**

For networked stations, the Equipment Owner shall set up access to usage data through the network provider, either by providing PSEG Long Island with limited administrative access to the network data (preferred) or by establishing regular recurring data transfers to **PSEG Long Island** for the duration of the five (5) years.

For non-networked stations, the Equipment Owner shall provide reporting establishing regular recurring data transfers to **PSEG Long Island** for the duration of five (5) years.

**Station Billing Information**

- 15-minute interval data
- Load profiles for the stations on the top 10 demand days of the year
- Utility bills for each station

**Station Financial Information**

- The fee structure for the station
- The total charging revenues for the station for the year
- The operating costs (maintenance and energy costs) for the year

**Plug and Charging Session Data**

- Daily number of charging sessions for the year
- Start and stop times of each charging session
- Charge time for each vehicle during each charging session
- Peak kW per charging session
- Total kWh discharged per charging session

- Plug outage information (when outages occur)

Data provided by station owners to PSEG Long Island will also be made available to DPS Staff on an ongoing basis.

**Applicant Certification**

The Undersigned agrees to the Terms and Conditions of the PSEG Long Island Electric Vehicle Make Ready Incentive program. The Undersigned confirms that the information supplied herein is accurate. Applicant recognizes that any PSEG Long Island decision to award incentives in this program will be based on the information supplied in this application and additional information that PSEG Long Island may request. *The Applicant agrees to provide data and other information in a timely manner both as requested as well as for reporting required by the New York State Public Service Commission, including but not limited to: energy usage data including kWh dispensed, charging session start and stop times, peak kW per charging station, amount of time each vehicle is plugged in, amount of time each vehicle is actually charging, usage fees, and technologies used to manage demand.*

| |
|---|
| *Print Name* |
| *Signature* |
| *Date* |

## B.2 A Make-Ready Program for Light-Duty Vehicles

PSEG LONG ISLAND
*We make things work for you.*

# A Make-Ready Program For Light-Duty Vehicles On Long Island

## A Policy-Driven Approach To Program Optimization

Prepared For PSEG Long Island By Gabel Associates, Inc.

June 29, 2021 (Updated)

## Acknowledgements

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# 1 Executive Summary

To facilitate attainment of New York Plug-In Electric Vehicle (PEV) goals, the Public Service Commission (PSC) has authorized a variety of utility-sponsored programs to enable and encourage the development of the vehicle charging infrastructure required. In particular, on July 18, 2020, the PSC approved programs by which each utility will provide the "make-ready" [42] for vehicle chargers in certain high priority segments (Case 18-E-0138). PSEG Long Island (PSEGLI), who operates the public electric infrastructure under contract to the Long Island Power Authority (LIPA), is exploring the deployment of a similar make-ready program. This study was commissioned by PSEGLI/LIPA to research make-ready program design options, recommend program sizing and design parameters, and evaluate strategies that might be used to reduce ratepayer impacts associated with the program. This report summarizes the results of that study, completed during the first quarter of 2021.

A "Make-Ready" is the infrastructure required to deliver power to vehicle charging infrastructure and includes components on both the utility side of the meter and on the customer premises. The size of the recommended PSEGLI Make-Ready program was determined by projecting the number charging ports required to serve the number of PEVs required to be on the road on Long Island in 2025 using the EVI-Pro Lite tool. Many of the same assumptions used in the PSC Make-Ready order were used as inputs, along with a modified vehicle mix to account for real-world sales trends on Long Island. The EVI-Pro Lite tool estimates the need for the following number of ports on Long Island by 2025:

- **518 Public DCFC Ports (for general use).**
- **2,801 Workplace-L2 (at commercial sites, for use by employees).**
- **1,903 Public-L2, which are assumed to cover "fully public" and "quasi-public settings"**

In addition to estimating the charging capacity required (i.e. number of ports), the study also developed a framework by which the make-ready program would encourage *where* new charger facilities were located to have an optimal impact. This geographic distribution depends on recognizing the distinction between *charging capacity* (number of ports and chargers) and the number and distribution of *locations*. A key driver of this geographic distribution goal is the fact that a primary policy motivation for utility (and ratepayer) investment in the make-ready program is reducing mainstream consumer concerns about range anxiety by increasing access to charging (especially high-power public charging), thereby increasing PEV adoption. Reducing consumer range anxiety is directly related to the geographic distribution of charging locations, not just the amount of charging capacity available in the market.

To quantify the number and distribution of locations, the study recognized a distinction between Corridor DCFC sites (which cater to both long distance drivers and local EV owners), and Community DCFC locations near where EV owners live and work (i.e. local drivers). The geographic distribution framework allocates Corridor locations to the most heavily traveled roadways, while Community locations are allocated to municipal city/town entities. The Community DCFC allocation also considered the needs of LI/EJ communities, and requirements to support certain destination sites that experience unique travel patterns. The L2 locations reflect workplace and "public L2" sites that can occur in a variety of settings, including a carve-out for LI/EJ chargers. After accounting for existing assets, and mapping the required charging capacity using this geographic distribution framework (based on both travel and demographic statistics), the study identified the need for the following port and location requirements:

[42] Make-Ready refers to the electrical infrastructure required to deliver electricity to the point where a vehicle charging station will be installed, as defined further in this study.

**Figure Exec-Sum – 1: New DCFC Needed (net of existing)**

| | Total | Corridor | Com - Gen. Use | Com - LI/EJ | Com - Dest. |
|---|---|---|---|---|---|
| Total New DCFC Locations: | 130 | 54 | 59 | 14 | 3 |
| Total New DCFC Ports: | 498 | 270 | 177 | 42 | 9 |

**Figure Exec-Sum – 2: New L2 Needed (net of existing)**

| | Total | Workplace L2 | Public-L2 | LI/EJ - L2 |
|---|---|---|---|---|
| Total New L2 Locations: | 708 | 467 | 209 | 32 |
| Total New L2 Ports: | 4,247 | 2,803 | 1,254 | 190 |

The geographic allocations are recommended as *targets,* not hard requirements, and may be adjusted by PSEGLI based on program learning, identification of underserved areas, and changing conditions.

The cost factors used in the PSC Make-Ready Order (final determination) were used to develop a budget for the program, as adjusted to reflect conditions on Long Island. The budget is based on a three-tier system under which varying percentages of allowed make-ready costs are used to calculate a per-port incentive. The percentage-tiers reflect the degree of access to the chargers, the use of standard ports, and other factors. Based on that structure, and other program design details identified by the study, the following program incentive budget (not including administrative costs that will apply) is recommended:

**Figure Exec-Sum – 3: Make-Ready Program Budget For PSEGLI/LIPA Territory**

| Port Type | Total Budget | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|
| Corridor DCFC | $28,582,281 | $2,286,582 | $4,287,342 | $7,145,570 | $7,145,570 | $7,717,216 |
| Community DCFC | $15,627,333 | $1,250,187 | $2,344,100 | $3,906,833 | $3,906,833 | $4,219,380 |
| L2 (workplace, public, LI/EJ) | $21,489,195 | $1,074,460 | $3,223,379 | $5,372,299 | $5,372,299 | $6,446,759 |
| | $65,698,809 | $4,611,229 | $9,854,821 | $16,424,702 | $16,424,702 | $18,383,354 |

PSEGLI and LIPA are interested in delivering the incentive program in a way that minimizes impact to ratepayers. The study therefore modeled the ratepayer impacts of four scenarios that represent different strategies for delivering the incentive, and also identified non-economic considerations could impact the business strategy choice. These quantified ratepayer impact differences, along with the qualitative factors identified, can be used to guide selection of an optimal business model for delivering the make-ready program incentives. The following four scenarios were considered:

1. **Cash Rebate:** Incentives are paid to customers in a single lump-sum.

2. **Lease:** The make-ready is constructed and owned by the utility, and the customer leases that make-ready for a fixed term at a rate that is net of incentives due, at the end of which ownership is transferred to the customer.

3. **Purchase:** The make-ready is constructed and owned by the utility, and the customer make a single lump-sum payment equivalent to a lease payment (net of incentives due), and after a fixed term ownership is transferred to the customer.

4. **Hybrid:** A combination program in which simple cash rebates are paid for smaller projects, and the lease program is used for large projects.

Based on an assessment of ratepayer impact for each strategy, along with consideration of other relevant factors, several observations can be made about the trade-offs between these options:

1. Many utilities manage these kinds of incentives through regulatory assets that allow the program to be capitalized and spread out over time. Ratepayers cover profits realized by the utility through that capitalization, but they benefit from distributing the costs out over multiple years.

2. For a not-for-profit such as LIPA, Incentives based on simple cash incentives must be treated as Operating Expense. That results in the ratepayer impacts being concentrated in the year disbursed, which cannot be readily sustained by ratepayers.

3. LIPA can create alternative financing vehicles (such as a lease program) to deliver the same incentive but which minimize the rate impact, but the legal and administrative details will be more complex.

4. These strategies can be combined, with smaller projects (such as L2) being supported through simple cash rebates (Strategy 1), and larger projects (such as DCFC) being supported through lease programs (Strategy 2) where the additional complexity can be absorbed. This approach reduces ratepayer impact while minimizing the amount of administrative complexity.

# 2 Introduction

Plug-In Electric Vehicles (PEVs) are becoming a practical option for many mainstream consumers, making it possible to reduce harmful emissions from the transportation sector, lower vehicle operating expenses by fueling with electricity rather than gasoline, and potentially reducing electricity costs for all ratepayers due to the increased flow-through of electricity on the public grid. In recognition of this trend and the associated benefits, the State of New York has set a goal of having 850,000 zero emission vehicles on the road by the end of 2025. To facilitate attainment of this goal, the Public Service Commission (PSC) has authorized a variety of utility-sponsored programs to enable and encourage the development of the vehicle charging infrastructure required. In particular, on July 18, 2020, the PSC approved programs by which each utility will provide the "make-ready" [43] for vehicle chargers in certain high priority segments (Case 18-E-0138).

PSEG Long Island (PSEGLI), who operates the public electric infrastructure under contract to the Long Island Power Authority (LIPA), is exploring the deployment of a similar make-ready program. This study was commissioned by PSEGLI/LIPA to research make-ready program design options, recommend program sizing and design parameters, and evaluate strategies that might be used to reduce ratepayer impacts associated with the program. This report summarizes the results of that study, completed during the first quarter of 2021. This version of the report includes updates that have been made in the business modeling section which do not materially change the original results or conclusions.

The study was conducted by Gabel Associates, a consulting firm with well-established expertise in energy, environmental, utility, and policy research. The firm has worked extensively with PSEGLI and LIPA on design and development of their PEV programs over the last three years, and also benefits from extensive experience working with nine other utilities on similar PEV programs in four other states.

**A note on terminology:** The focus of this study is on vehicle charging infrastructure for light duty vehicles powered by electricity. This vehicle class includes pure Battery Electric Vehicles (BEVs) that do not have a petroleum fueled engine of any kind, and Plug-In-hybrid vehicles (PHEVs) that make use of both an electric motor and a fueled engine for motive power. Both vehicle types provide for charging of an on-board battery or similar storage device from primary energy sources external to the vehicle and are collectively called Plug-In Electric Vehicles – i.e. all vehicles with a plug. **Throughout this document, the term Plug-In Electric Vehicles (PEVs) and Electric Vehicles (EVs) are used synonymously and interchangeably.** This vehicle group purposefully does not include traditional hybrid vehicles (without a plug for charging), other alternative fuel vehicles such as compressed natural gas (CNG), hydrogen, or liquefied petroleum gas (LPG), or the more specialized needs of medium- and heavy-duty vehicles.

[43] Make-Ready refers to the electrical infrastructure required to deliver electricity to the point where a vehicle charging station will be installed, as defined further in this study.

# 3 Study Goals and Scope

The PSC Make-Ready Order[44] established a broad model for utility make-ready programs that support private investment in vehicle charging infrastructure. PSEGLI and LIPA commissioned this study to build on the foundation established in the order, explore several possible optimizations, and to recommend a program design that is specifically tuned to the needs and characteristics of the Long Island PEV market. Key focus areas for the study include:

1. Develop an updated projection of the PEV adoption necessary to attain the 2025 state goals;

2. Estimate the number of vehicle chargers, of various types, necessary to meet those goals;

3. Define a framework to encourage deployment of the make-ready incentives so that policy goals are met, specifically regarding optimal and equitable geographic distribution of charging infrastructure development;

4. Establish cost parameters, program design details, and budgets for a state-of-the-art make-ready program to meet the projected charging infrastructure needs;

5. Explore multiple strategies for deployment of the incentive program proposed, with a focus on identifying ways that ratepayer impacts due to program costs can be minimized, and;

6. Identify ways in which the recommended program design differs from the details in the PSC make-ready order.

The scope of the study the PSEGLI /LIPA territory, including Nassau and Suffolk County, and the Rockaway district in Queens. The primary focus was on light-duty infrastructure needs through 2025, although there was consideration of likely infrastructure needs thereafter as part of the analysis. Consistent with the precedent established in the PSC Make-Ready Order, infrastructure needs for workplace L2, L2 for Public use (including near Low Income/Environmental Justice (LI/EJ) communities), and DCFC chargers for public use were considered.[45] Wherever possible, analysis was based on data specific to Long Island, including travel statistics, demographic data, utility account information, boundaries on LI/EJ communities, etc.

[44] New York PSC Order dated July 18, 2020, Case 18-E-0138

[45] L2 refers to low-power AC charging supported by all vehicles, typically between 3.3 and 7.2 KW, and high-powered Direct Current Fast Chargers (DCFC) are available on many vehicles (especially BEVs).

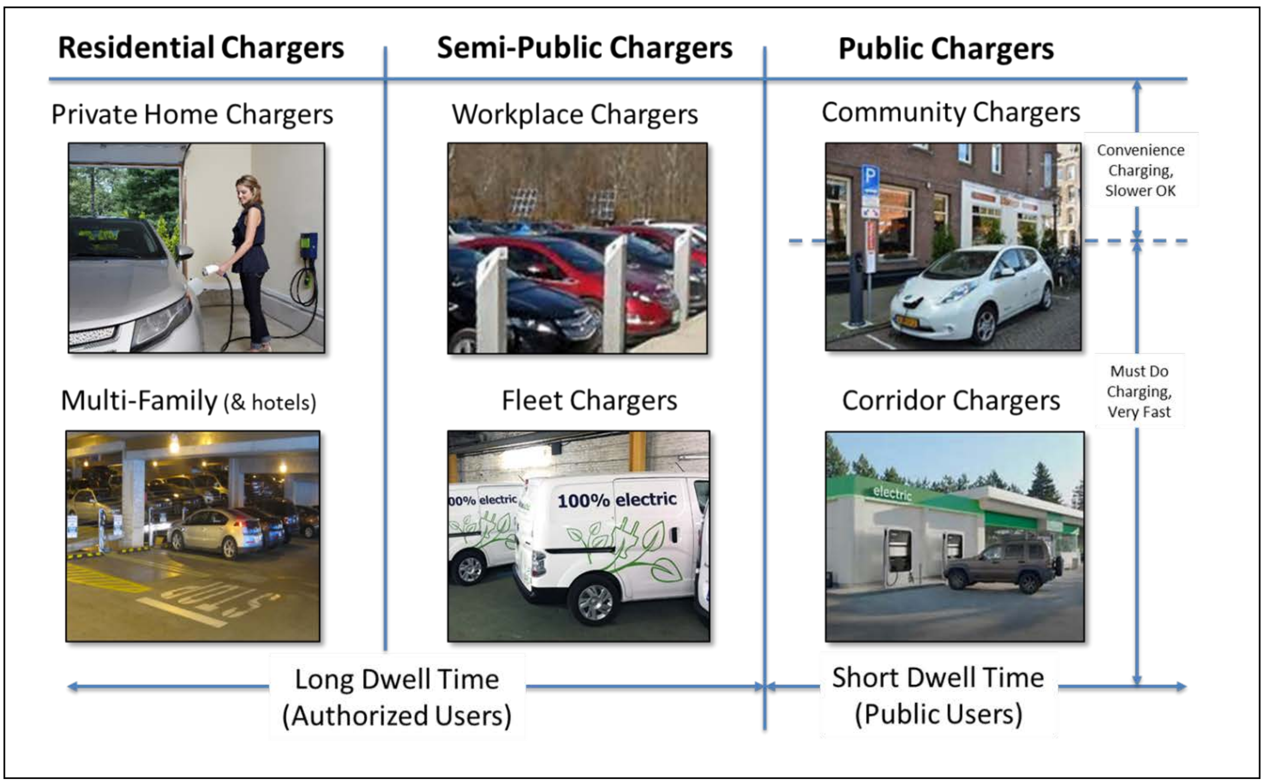
# 4 Key Terms and Concepts

This make-ready study will quantify specific charging infrastructure needs and provide detailed recommendations on program design. It is therefore necessary to make use of precise language in the articulation of these details. In addition, the approach taken in the study is dependent on several key concepts and paradigms that provided the framework on which the program design models were based. This section summarizes those critical terms and key underlying concepts.

## Segmentation of The Charging Ecosystem

Most light duty vehicles don't make use of a single charger. While charging at home may be the dominant method for topping off the battery, other charger technologies, in other settings, may also be used. A given vehicle may charge at home overnight, at work during the day, and at a public charging station while away from either of those locations. It is therefore helpful to consider PEV charging as an infrastructure ecosystem based on multiple segments, with each segment distinguished by the technology types, dwell times, use cases, and settings involved. This study is based on the following ecosystem segmentation:

**Figure 4.1 – 1: Vehicle Charging Segments**




The Light-Duty Vehicle (LDV) charging ecosystem includes six segments organized into three groups (residential, semi-public, and public):

- **Residential: Private Chargers:** L1 and L2 chargers used at home, typically in free-standing (detached) homes, or homes with a dedicated parking area.

- **Residential Shared Chargers (multi-family):** L1, but more typically, networked L2 chargers, that are used in multi-family settings (apartments, condominiums, etc.), either in shared lots, decks, or street-side parking. These chargers may be dedicated to a particular user or shared among multiple residents. Chargers at overnight establishments (hotels, etc.) are included in this segment since they have a very similar operating profile.

- **Workplace Chargers:** L1, but more commonly networked L2 chargers for use by employees while at work. These chargers serve a variety of roles in the ecosystem, including being the primary charging resource for some multi-family residents, but also serving as "back up" for employees that have chargers at home (forgot to charge overnight, need to handle an unplanned trip, etc.). Workplace chargers have also been shown to significantly increase consumer awareness and adoption. Typically, these chargers are located on private commercial property, and only authorized users can make use of them.

- **Fleet Chargers:** L2 chargers that provide the "routine charging" for commercial LDVs, often in a "depot-style" setting. These chargers are usually sited on private commercial property and are often dedicated for use by authorized fleet vehicles only.

- **Corridor Public[46] Chargers:** High-powered DCFC located along major travel corridors, serving the needs of long distance PEV drives, as well as the "must charge" needs of local drivers. The primary consideration for these applications is the shortest possible charge time, and higher-powered chargers are becoming common in these settings.

- **Community Public Chargers:** Medium to high powered chargers for public use, located near where people live and work. Both "public L2" and medium powered (25KW – 50KW) chargers are typical in these installations. These facilities are often located near retail or entertainment sites so that PEV drivers can combine vehicle charging with other activities (e.g., shopping).

Please see the Appendix (Section 11 of this report) for more details on this LDV charging ecosystem framework.

Consistent with the PSC Make-Ready Order, the focus of this study (and the recommended program design) is on charging for public use (including support for LI/EJ communities) and workplace and multi-family charging. Charging for fleet vehicles, or private residential charging, are not considered as part of the make-ready program.

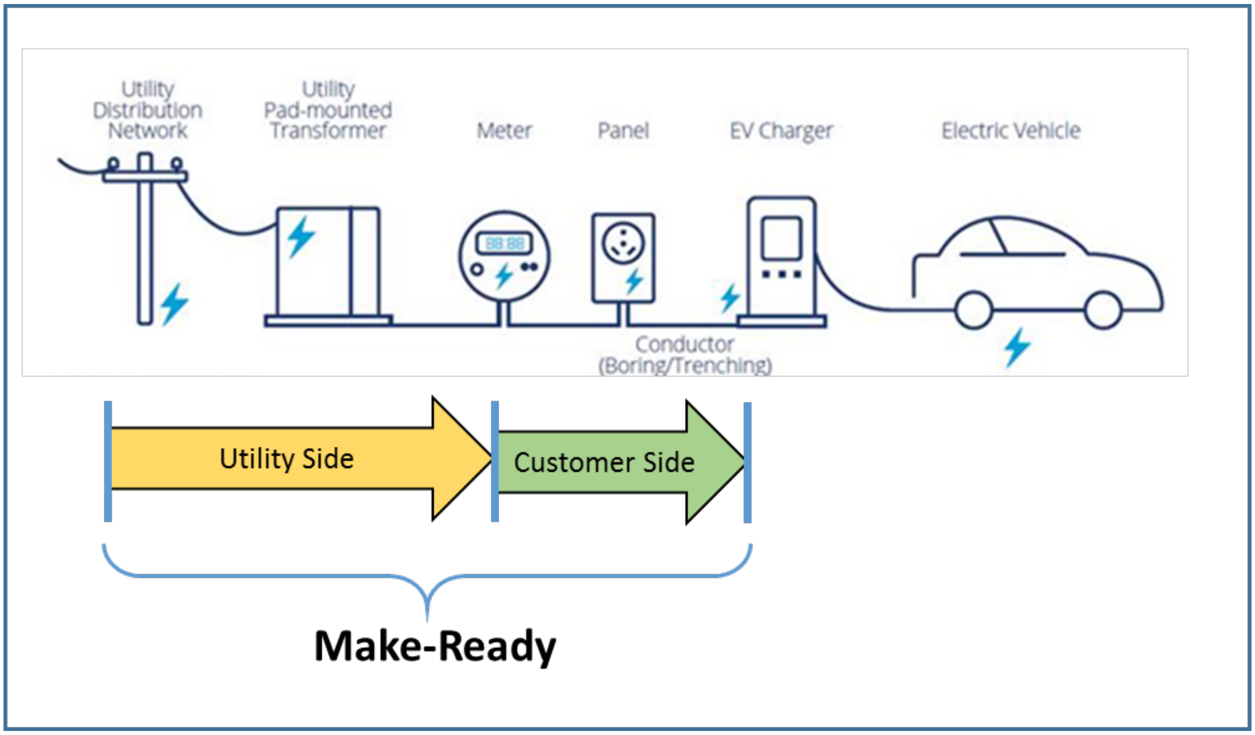
## Scope of Make-Ready

Consistent with the scope established in the PSC Make-Ready Order, the term "make-ready" refers to the specific infrastructure necessary to deliver electrical power to the point where the chargers are physically

[46] The term "public" in this case means "for public use", not a reference to a "public entity" like a municipality.

installed. A clear demarcation of make-ready boundaries is critical to the program definition, and the following info-graphic summarizes the framework used in this study.

**Figure 4.2 – 1: Make-Ready Scope**



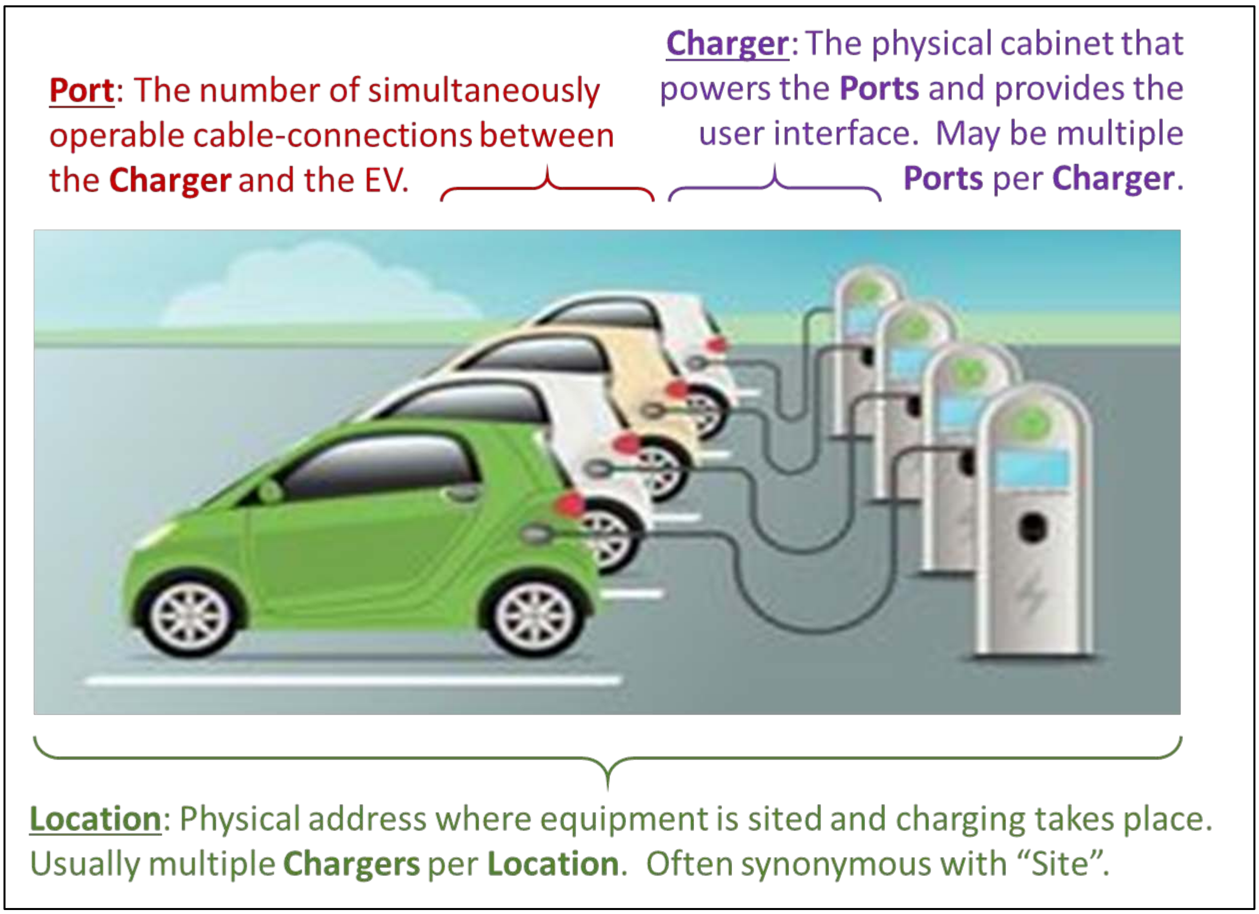

In general, the make-ready includes all equipment, material, and construction/installation labor needed to implement the infrastructure needed to deliver power to the point where chargers will be installed, potentially including (as applicable for each project) new electrical service, interconnect panels, trenching, conduit, conductors, switchgear, meters, protective elements, repair of concrete/asphalt/landscaping associated with the installation, etc. The make-ready does not include the charger itself, the installation of the charger, signage, lighting, networking equipment, etc.

As noted in the diagram, the make-ready may include two domains: the Utility-Side make-ready (US-MR), and the Customer-Side make-ready (CS-MR), with the utility meter being the demarcation between those two domains. The "customer" for the make-ready incentive is typically the owner/operator of the charging equipment, which will also be the "customer of record" for the utility account. Charging equipment installed on dedicated service, as well as behind-the-meter configurations (in which the chargers are part of an overall building load) are supported.

## Important Terminology

Projections of program size, budget levels, and other important design parameters depend on the specifics related to the number of "chargers" and where they are located. Although it is common for colloquial language to be used when discussing charging infrastructure, it is important that precise language be used to avoid confusion. This study, and the resulting program design, depends on specific terminology as summarized in the following info-graphic.

**Figure 4.3 – 1: Vehicle Charging Terminology**




These terms reflect the following considerations:

- The term "charger" is not technically correct when referring to AC (L1 or L2) equipment, since the battery charger that transforms AC power into DC power is in the vehicle itself. However, this term enjoys widespread usage, and is a convenient way to refer to the "box" that provides the vehicle charging services.

- The "simultaneously operable" requirement is key to understanding the concept of "port", and incorporates consideration of how the charger operates. A "port" is an abstracted concept separate from, but related to, the number of connectors and physical plugs (see below). In general, the number of ports on a charger is related to the number of vehicles that can be charged simultaneously. A charger with two cables, only one of which can be used at a time, has one port. A charger with two cables that can each be fully used simultaneously is considered a "dual-port" charger.

- The rating of capacity for a given port or charger is under "simultaneously operable" conditions. For example, if a given charger has two ports (and two cables), and the charger is physically capable of serving 120KW total, but is also able to charge two vehicles simultaneously (i.e. "power sharing" at up to 60 KW each), the ports are considered to be at 60KW (with respect to incentive program eligibility).

- The term "plug" refers to the physical connector and is often used synonymously with "port", but that can be confusing for the reasons noted above. The term "outlet" is also sometimes used, introducing similar uncertainty. For that reason, the terms "plug" and "outlet" are not used in this study.

- The term "station" is widely used but with significant inconsistency, sometimes meaning "location" and sometimes meaning "charger". To avoid that confusion, the term "station" is not used in this study.

- The "public charging capacity" of a given ecosystem – i.e. the number of charging transactions that can be delivered in a given day – is related to the number of ports (and chargers). Separately, public perceptions about the general convenience and accessibility of public chargers is related to how widely distributed locations are geographically, typically percieved as "how far must I go out of my way to charge" when away from home or work. Estimating charging capacity (and ports) and location requirements (to address range anxiety) are separate assessments as defined in more detail below.

The above distinctions are consistent with the terminology used in the PSC Make-Ready Order[47].

[47] Although, the Order also uses the term "station" frequently, and that term is not used in this study for the reasons noted above.

# 5 Vehicle Adoption Forecast

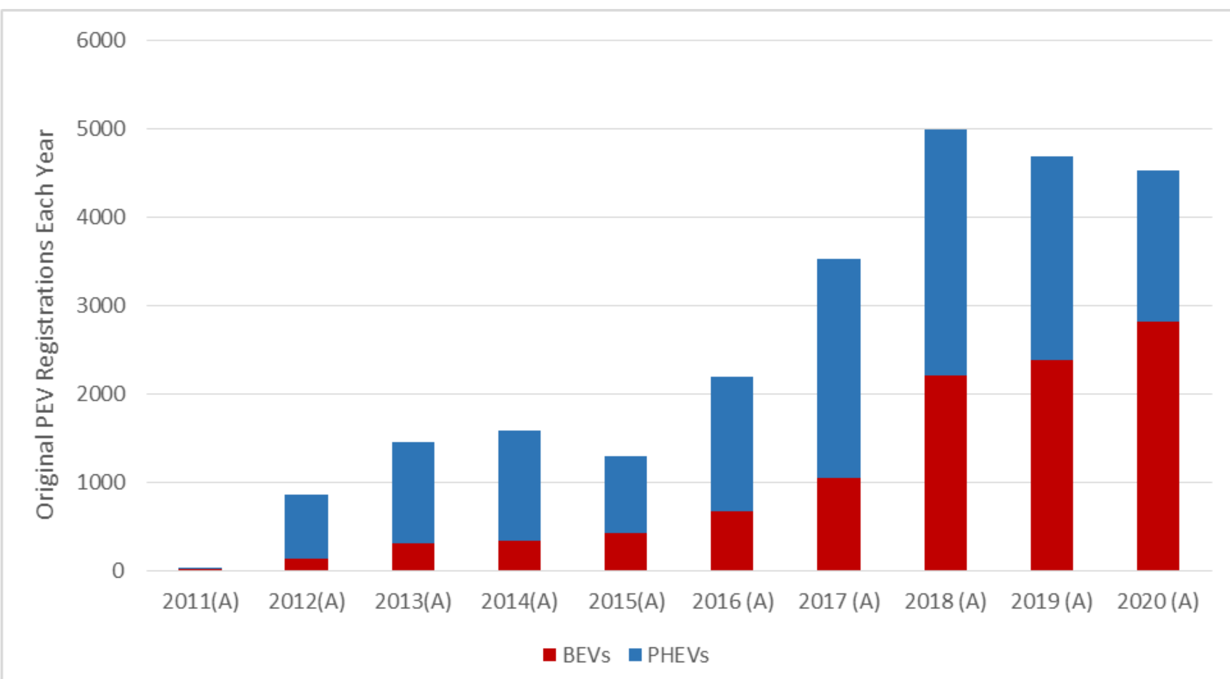
Projecting the number of ports and chargers needed, and the associated size of a utility make-ready program, depends heavily on the number of PEVs expected to be on the road. The "charging capacity" required – especially for public charging – is a direct and linear function of the PEV population. It is important to note, however, that DCFC capacity is a function of the number of expected BEVs, while public L2 is a function of PEVs overall. This is because PHEVs have back-up fueled engines that eliminate the need for a public fast charger, and none of the PHEVs on the market today have DCFC ports. Establishing a view of the number of BEVs and PHEVs on the road is therefore a critical foundation for program design and sizing.

This section summarizes an updated vehicle adoption projection for Long Island, completed as part of this study. These targets are then used to compute the number of ports/chargers required, as summarized in the "Program Sizing: Number of Chargers Required" section.

## Historical PEV Adoption on Long Island

The following vehicle adoption projection reflects both the historical trend in PEV adoption on Long Island and the PEV adoption targets established for New York State. Based on up-to-date information from the EValuateNY website, the following chart summarizes historical PEV sales (in Nassau and Suffolk Counties) through year end (YE) 2020. This data was pulled on February 23, 2021 and represents the "original registrations" which correlate strongly with new vehicle sales.

**Figure 5.1 – 1: Historical PEV Sales on Long Island**

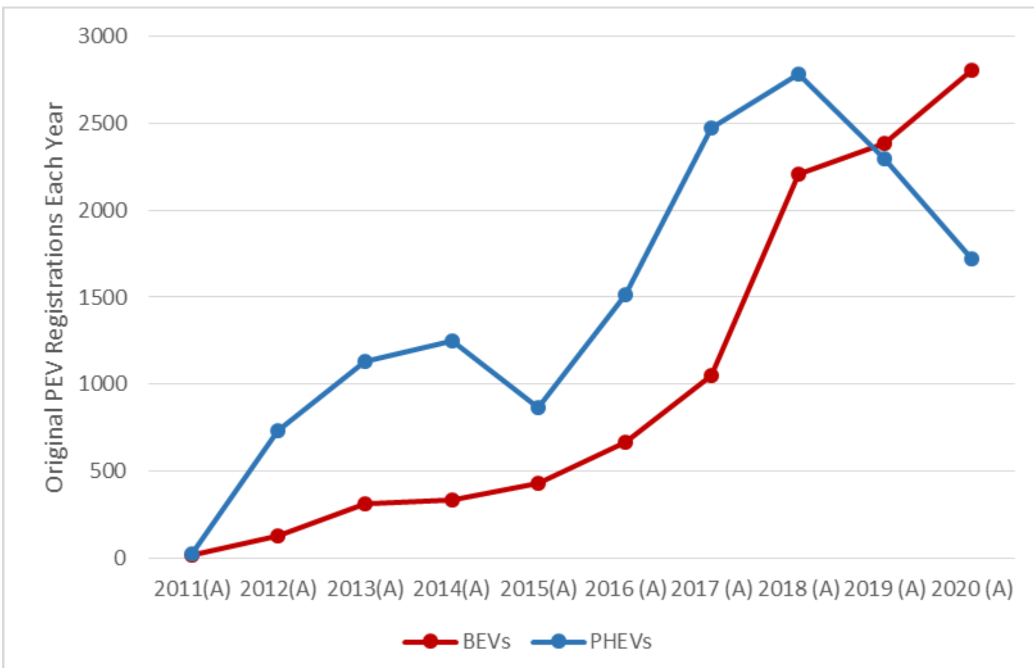



As of January 12, 2021, the EValuateNY website reported that there were 8,422 registered BEVs on the road on Long Island, and 9,186 PHEVs, for a total of 17,608 PEVs.

The trends in this dataset reflect some important dynamics that must be considered when using this information for future projections, especially given the relatively small size of the PEV market at the current time. In 2018, several popular vehicles were pulled from the market, just as another new vehicle (the Tesla Model 3) began ramping up sales. In 2019, those Tesla Model 3 sales dominated the market, but manufacturing began to reach a "steady state" combined with growth in international exports. This means that year/year growth appeared to slow because a) the growth of the previous year was very strong and b) a primary driver of growth for the market declined as Tesla sales became more consistent. Sales in 2020 were strongly affected by the global COVID-19 pandemic, which suppressed all economic activity (including vehicle sales) in the first half of the year, with some strong rebound in the second half of the year. The last three years of sales, especially regarding year/year growth trends, are probably not strongly representative of sales activity over the next few years. In addition, it is also important to note that in 2021 the number of PEVs on the market is expanding significantly, including more options in the CUV/SUV format popular with American buyers, and at more mainstream price-points.

There are also key changes in vehicle mix happening in the PEV market, as illustrated in the chart below. Although PHEVs where popular in early phases of the market, BEVs are becoming the dominant preference for new sales. This dynamic is explored in more detail in the "Vehicle Mix" section.

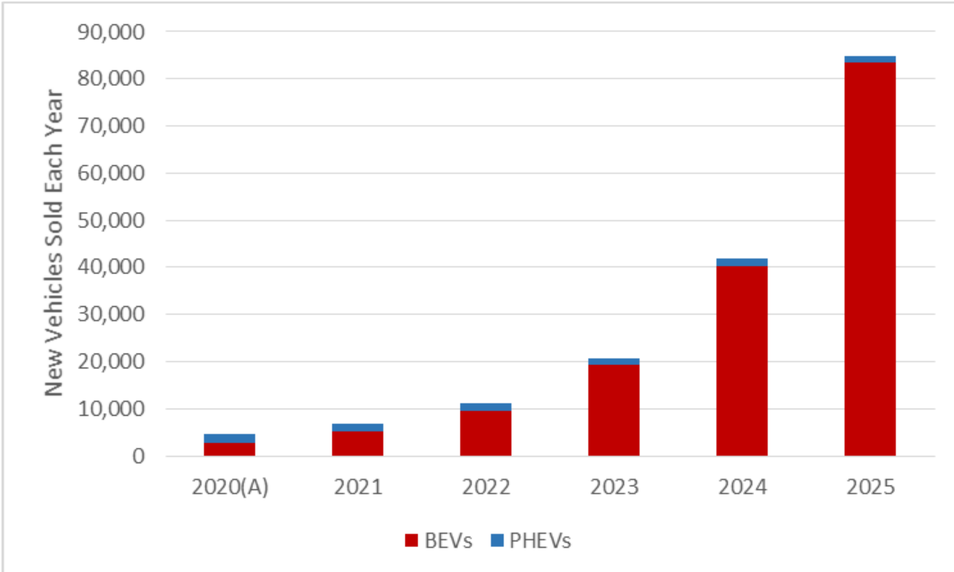
**Figure 5.1 – 2: Historical PEV Sales on Long Island**




## PEV Adoption Projection

The State of New York has established a goal of having 850,000 PEVs on the road by the end of 2025. Long Island typically accounts for approximately 21% of the light-duty vehicles in the state, which implies that if the state goal is achieved, there should be about 178,500 PEVs in operation at the end of 2025. A projection of sales growth for the Long Island market combines recent sales statistics with this targeted end-point (in 2025), as summarized in the following chart.

**Figure 5.2 – 3: Projected PEV Sales on Long Island**

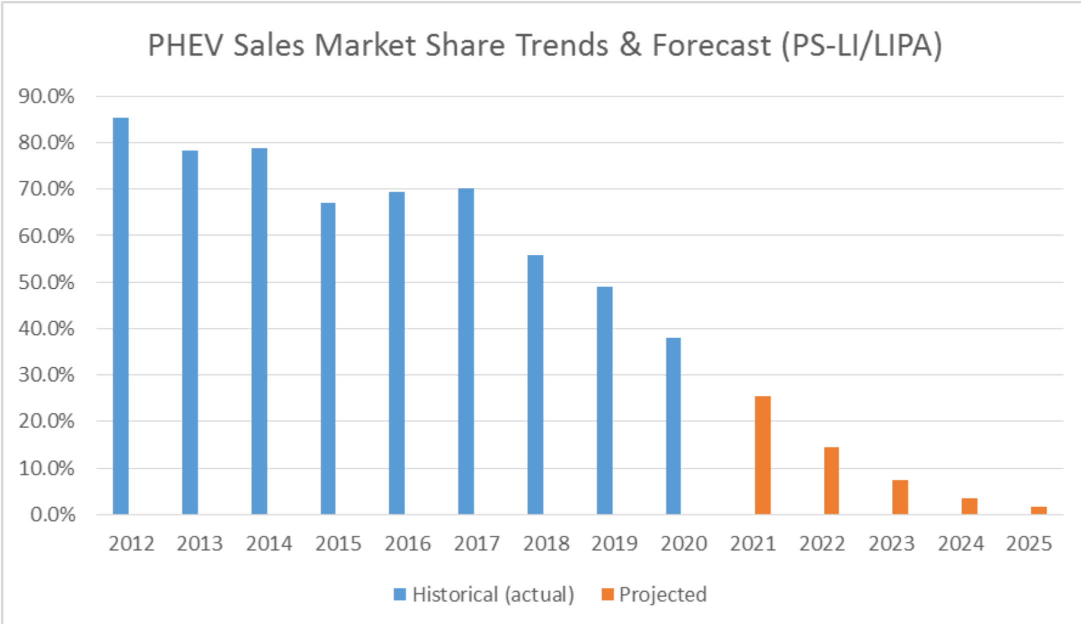



**This projection is not a forecast of expected sales based on demonstrated trends. Instead, it is a projection of the adoption required to achieve Long Island's share of the state goals by 2025, when aligned (short term) with real sales trends on Long Island.** As illustrated in the chart, this will require that PEV sales approximately double each year on a sustained basis. Based on this model, after accounting for natural vehicle attrition, there would be 162,524 registered BEVs on the road on Long Island, and 15,982 PHEVs.

## Vehicle Mix

As indicated above, the sales mix of BEVs vs PHEVs is changing significantly, with BEVs becoming more dominant. The following chart illustrates the historical trend of PHEV sales share (of annual PEV sales), and the assumptions for the continuation of that trend in the projected sales summarized above.

**Figure 5.3 – 1: PHEV Share of Annual Sales**




The vehicle mix is a critical factor in determining charging capacity requirements, as covered in more detail in the "Program Sizing: Number of Chargers Required" section. As seen in the chart above, PHEVs were a large fraction of PEV sales when the market first began to grow, due mostly to the limited number of BEV options. However, the PHEV fraction has consistently declined significantly since 2018. The study team expects the PHEV share to continue to decline based on several factors:

- The majority of the new PEVs being introduced in the market over the last two years have been BEVs, which will likely reinforce continued BEV share dominance.

- While PHEVs enjoy a pricing advantage in the early stages of the market, that gap is shrinking. BEV prices continue to decline as battery costs continue to decline, while PHEV prices have remained relatively stable. PHEV prices are expected to offer little price advantage over BEVs, if any, by 2025 (or earlier).

- Most customers interested in a PEV would prefer a BEV, but only settle for a PHEV due to either vehicle price reasons or concerns about range anxiety (which PHEVs -- due to their fueled back-up engine -- can mitigate). As more public fast chargers become available, and the market becomes more familiar with longer range BEV vehicles, the perceived PHEV advantages will likely continue to diminish – although PHEVs will still be a preferred option for some buyers.

The vehicle projection in the "PEV Adoption Projection" section therefore assumes a continued decline in PHEV annual sales share, resulting in 91% of the PEV population being BEVs by 2025, and 9% being PHEVs. The study team recommends that PSEGLI continue tracking PEV sales on Long Island and should the PHEV fraction trend higher than assumed in this projection, L2 port projections can be updated accordingly.

# 6 Program Sizing: Number of Chargers Required

A primary component of the make-ready study is to project the number of ports/chargers required, across different segments, as a function of the number of PEVs expected to be on the road by the end of 2025 (see the PEV forecast in the "Vehicle Adoption Forecast" section). In general, the required charging capacity scales linearly with vehicle population. Once the charging requirements are known, the number of existing charging facilities can be deducted, resulting in the amount of new charging infrastructure required. Separate calculations are required in each segment (public DCFC, workplace L2, and public L2). This section summarizes that analysis and the associated results.

## Charger Capacity Required

Projecting the charging capacity required (as defined in the "Important Terminology" section) is a function of the number of PEVs on the road, with the BEV population being the input for DCFC capacity, and the more general PEV population being the input for L2 capacity. In general, the number of ports required is a constant multiple of the relevant number of vehicles in operation.[48] The team explored a variety of sources for determining these sizing factors, including the Department of Energy (DOE) National Infrastructure Charging Plan, Gabel Associates' traffic engineering models (which consider typical vehicle charging frequencies and average charging sessions per day per port), and other sources. After an in-depth comparison of those results, the study team decided to use the results from the EVI-Pro Lite tool because:

- The EVI-Pro Lite tool was the basis for estimating port requirements in the PSC Make-Ready Order and using the same tool would allow for consistency between this study and the Order.
- The EVI-Pro Lite tool generated results that were approximately in the mid-range of other sources considered, making it a reasonable planning assumption for the study.

The inputs provided to the tool have a significant impact on the results, especially for the L2 projections. While this study used the EVI-Pro Lite tool, which is consistent with the analysis completed for the PSC Make-Ready Order, the inputs were customized to reflect the most up-to-date information and market details specific to Long Island. Key inputs for the model included (based on tool use in March 2021):

- A total of 178,500 PEVs on the road. The vehicles on the road in 2025 was the primary design point for the study, although a ramp-up of make-ready deployment is expected over time.
- The following vehicle mix[49]: 4% PHEV-20, 5% PHEV-50, 2% BEV-100, 89% BEV-250. The 91% BEV/9% PHEV split is consistent with the forecast noted above.
- Assuming 77% of PEV owners can charge at home.

[48] The sizing factor is not really constant over time, since vehicle battery sizes, charging speeds, and customer charging behaviors are changing over time. For example, higher powered DCFC can serve more "charging transactions" per day than lower powered chargers, which implies the need for fewer ports to service a given number of vehicles on the road. Through 2025, however, those factors are static enough that a constant "sizing factor" is a reasonable planning assumption medium term, which allows for a significant simplification of the market sizing models.

[49] These vehicle categories are used by the EV-Pro Lite tool: PHEV-20 is a PHEV with 20 miles of range, PHEV-50 is a PHEV with 50 miles of range, BEV-100 is a BEV with 100 miles of range and BEV-250 is a BEV with 250 miles of range.

- Of the three "PHEV Coverage" results provided by the tool, the "Full PHEV" results were used as the basis for design. The study team considers this an extremely generous planning assumption, likely resulting in more L2 facilities than are really needed. This is because the "full market" assumptions do not align with real customer behaviors, as was noted extensively in the comments provided during the Make-Ready proceeding. However, to align with the PSC Make-Ready Order on key assumptions to the greatest extent possible, the "full PHEV market" results were used as the basis for design.

The above assumptions align with the PSC Make-Ready Order in several key ways. The 2025 goal of 178,500 vehicles is a primary input and is consistent with the Order (for the Long Island share of the State goal). The 77% "charge at home" fraction is the average of the ConEd and non-ConEd cases used in the Order, which is considered to be representative of the Long Island market. The study team also agrees that BEV-100 vehicles are becoming relatively rare, and the same 2% assumption used in the final Order results were used in this analysis as well. A primary difference with assumptions is the Order is the higher BEV share for reasons noted above, which significantly reduced the projected number of L2 ports needed.

These inputs lead to the following charging capacity projections, in support of the number of PEVs needed on Long Island by 2025, which were used as the basis for projecting the number of ports required.

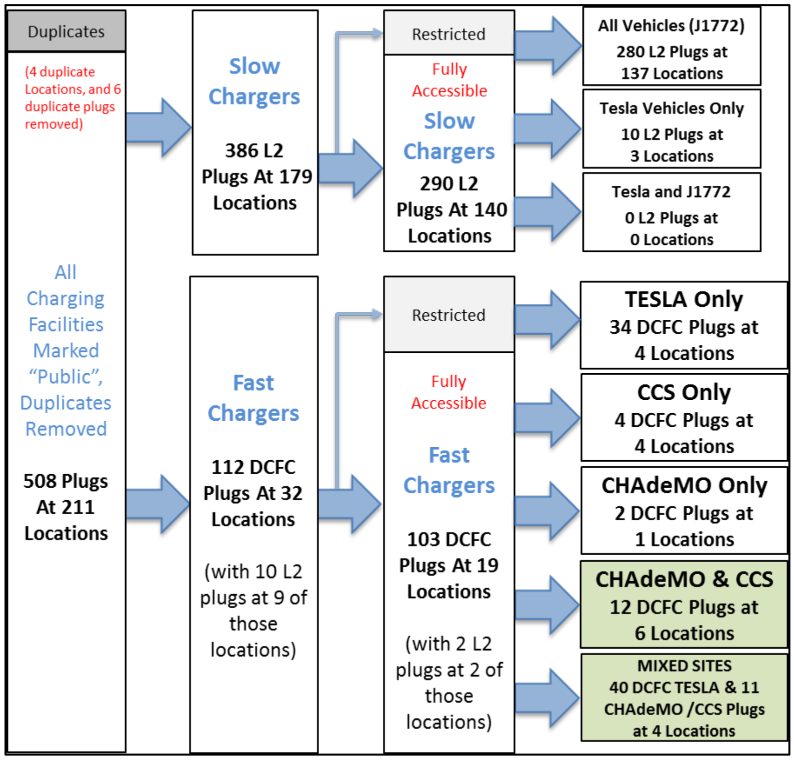
- **518 Public DCFC Ports (for general use).**
- **2,801 Workplace-L2 (at commercial sites, for use by employees).**
- **1,903 Public-L2, which are assumed to cover "fully public" and "quasi-public settings" as outlined in more detail below.**

## Existing Charging Facilities

The charging capacity projected in the "Charger Capacity Required" section represents the total number of ports required given the projected number of PEVs on the road in 2025. There are already charging facilities in place, however, and these assets should be subtracted from the total required to determine the number of new ports that the make-ready program must support.

The DOE Alternative Fuel Data Center (AFDC) database on public chargers was used as a reference to baseline the number of existing facilities, as of February 1, 2021. The AFDC dataset can be problematic, however, given duplications and other data discrepancies, and the fact that some locations listed as available for public use really are not. Gabel Associates has developed a methodology for scrubbing the raw AFDC data to determine the actual number of ports and locations currently operating in the market, as summarized in the following info-graphic.

**Figure 6.2 – 1: Existing Public Charging Facilities on Long Island**




Note: the AFDC dataset covers only ports posted as available for public use, and the number of private workplace chargers is not accounted for. The above information was used to offset the needed number of public DCFC and public L2 ports, but no baseline information is available for a similar offset of workplace port requirements. The study therefore did not offset the projected number of needed workplace-L2 ports to reflect existing installations[50]. The study team does not consider that a significant issue, however, since the number of projected workplace-L2 ports needed is relatively modest, and there is large commercial demand for these facilities.

The make-ready program size is therefore based on the net number of new ports needed, after accounting for existing public facilities. That analysis considered all existing facilities, even though some may not meet the intended make-ready program requirements moving forward (i.e. existing locations were "grandfathered" from future make-ready program requirements). This analysis was conducted on a location basis and therefore accounts for the geographic distribution of new facilities required, as discussed in the "A Framework for Optimal Geographic Distribution" section.

[50] The number of workplace-L2 ports deployed by PSEGLI through the L2-incentive program were not factored in as an offset, since that provides an incomplete view of the existing workplace-L2 base, and it is a relatively small number compared with the number of Workplace-L2 estimated to be required.

# 7 A Framework for Optimal Geographic Distribution

The projection of the make-ready program size is based on an estimate of the charging capacity (number of ports and chargers) required to support a given number of PEVs on the road, after accounting for charging facilities already in place, as summarized in the "Program Sizing: Number of Chargers Required" section. In addition, as outlined in the "Study Goals and Scope" section, PSEGLI /LIPA wanted to take the analysis one step further and identify a framework by which the make-ready incentives would be distributed both equitably and optimally, ensuring realization of the policy goals that motivate the ratepayer investment associated with the program.

The study therefore identified a framework by which the make-ready program would encourage where new charger facilities were located to have an optimal impact. This geographic distribution depends on recognizing the distinction between *charging capacity* (number of ports and chargers) and the number and distribution of *locations*. A primary driver of this geographic distribution goal is the fact that a primary policy motivation for utility (and ratepayer) investment in the make-ready program is reducing mainstream consumer concerns about range anxiety[51] by increasing access to charging (especially high-power public charging), thereby increasing PEV adoption. Reducing consumer range anxiety is directly related to the geographic distribution of charging locations, not just the amount of charging capacity available in the market.

To appreciate this distinction, consider the following thought experiment: for a given PEV population, assume that 100 public DCFC ports are needed. If all those ports were built at the same location, few mainstream consumers would agree that their needs for public charging access had been met – even though there are technically enough ports available. Consumer perceptions about charging access are influenced by where the chargers are, and how widely distributed those locations are.

In addition to encouraging an optimal distribution of charging locations, there are also equity considerations. If all the utility investment was made in a single zip code, as a hypothetical example, but costs were recovered from all ratepayers across the territory, there would be valid concerns that some ratepayers would benefit more than others, even though all are paying to support the investment. The "geographic distribution" framework needs to encourage both optimal and equitable geographic distribution.

The geographic distribution framework builds implicitly on assumed roles between the utility and competitive (typically for-profit) project developers. While the utility will establish targets at a high level (per roadway, or municipal city/town entity) based on policy considerations, project developers (that are applying to the make-ready program for funding) will identify exactly where locations should be developed. This approach therefore establishes goals at a high level, not specific "pins in a map" where development should take place.

The capacity analysis in the "Program Sizing: Number of Chargers Required" section quantifies how many ports/chargers are needed. Mapping between the number of ports and the number of locations is

[51] Although commonly referred to as "range anxiety", the better description of this consumer barrier is "charge anxiety", or concern about convenient access to public charging so that the risk of "running out of charge when away from home" is reduced. At this point in the market, when longer range PEVs are becoming common, the primary consumer concern is related to public charging access.

required to enable the geographic analysis. Based on current market statistics and trends, and reflecting key boundary conditions in the PSC Make-Ready Order, the following assumptions were used:

- **Corridor Chargers**: Typical installations between 4 and 6 ports per location, an average of 5 ports/location.

- **Community Chargers**: Typical installations between 2 and 4 ports per location, and average of 3 ports/location.

- **L2 Chargers** (including public L2, workplace L2, and L2 in multi-family settings or those designed to serve LI/EJ communities): an average of 6 ports per location. Note that for L2 chargers in these non-residential settings, the installation of dual-port chargers is common. The assumption of six ports per location therefore reflects an average of three L2 chargers, consistent with locations that typically install between two and four chargers per site.

- **Corridor vs Community Split:** 60% of the required DCFC ports are assumed to be at corridor locations, while 40% are at community locations. The study explored multiple variations of this allocation balance and settled on the 60/40 split to allow reasonable coverage of the high travel roadways supported by the corridor locations, as summarized in more detail in the "Public DCFC In Corridor Settings" section.

It is important to emphasize that this geographic distribution framework is proposed as a *set of targets, not hard requirements*. While specific geographic allocations are established on a per roadway and per municipal city/town entity, PSEGLI should retain some discretion to account for individual project merit, learning over time, and other nuances related to the attainment of the program's policy goals.

## Public DCFC

Public direct-current fast charging (DCFC) is a primary strategy for reducing consumer range anxiety, since those facilities can provide a quick and convenient "charge up" that is sufficient to meet most consumer needs. Even though most drivers will charge primarily at home, they still need to make use of public charging facilities occasionally – either due to an unplanned event (e.g. forgot to charge, unexpected change in daily travel plans, etc.), weather (since cold weather impacts range), long distance travel, or the relatively rare case (for most drivers) where the daily route exceeds PEV range. A geographic distribution framework for public DCFC is therefore a key part of the make-ready program design, as summarized in this section. Public DCFC is expected to be a relatively "short duration" charging event, compared with public L2, or the long dwell-time charging that takes place at home or work.

Determining the number and distribution of locations required depends on recognizing that there are two important, and slightly different settings for public DCFC: Corridor DCFC and Community DCFC. As summarized in the "Segmentation of The Charging Ecosystem" section, these two public DCFC segments have different use cases, siting characteristics, and methods for determining optimal geographic distribution. Corridor chargers are aligned with major travel arteries, serve the needs of both local- and long-distance drivers, are often slightly larger to handle the increased utilization that comes from nearby roadways, and benefit from short charge intervals (and higher charger power). Community chargers mostly serve the needs of local drivers, may be slightly lower power and tolerant of longer charge duration, and are sited near residential and key commercial areas (especially retail centers). This structure places public DCFC along roadways where EV drivers are most likely to travel (corridor locations), and near where they live and work (community locations).

As further detailed in the sections below, the allocation analysis considers the number of chargers required (from the "Program Sizing: Number of Chargers Required" section), the number of existing locations, and the NET number of new facilities that need to be supported by the make-ready program. The inventory of DCFC locations used for this analysis is summarized below.

**Figure 7.1 – 1: Existing DCFC Locations**

| Designation | Station Name | Street Address | City | County | ZIP | Class. | Serves |
|---|---|---|---|---|---|---|---|
| A | Sam's Club 6428 | 2950 Horseblock Rd | Medford | Suffolk | 11933 | Corridor | I495 |
| B | Simon-Smith Haven Mall | 313 SMITH HAVEN MALL | Lake Grove | Suffolk | 11755 | Corridor | NY25 |
| C | Green Acres Mall | 2034 Green Acres Mall | Valley Stream | Nassau | 11581 | Corridor | NY27 |
| D | Town of East Hampton/Montauk | 70 S Euclid Ave | Montauk | Suffolk | 11954 | Corridor | NY27 |
| E | Riverhead Town Center | 1761 Old Country Rd | Riverhead | Suffolk | 11901 | Community | Riverhead |
| F | Village of Greenport | 310 1st St | Greenport | Suffolk | 11944 | Community | Southold |
| G | Livewire DCFast Hog Out | 2428 Sunrise Hwy | Bellmore | Nassau | 11710 | Community | Hempstead |
| H | College Plaza | 15-109 Middle Country Rd | Selden | Suffolk | 11784 | Community | Brookhaven |
| I | Cumberland Farms | 498 County Road 111 | Manorville | Suffolk | 11949 | Community | Brookhaven |
| J | Sunshine Square | 700 Patchogue Yaphank Rd | Medford | Suffolk | 11763 | Community | Brookhaven |
| K | Habberstad BMW | 959 E Jericho Turnpike | Huntington Station | Suffolk | 11746 | Community | Huntington |
| L | Long Island Welcome Center | I-495 E | Dix Hills | Suffolk | 11746 | Community | Huntington |
| M | Eastern Harley DCFast HOG | 1570 Old Country Rd | Riverhead | Suffolk | 11901 | Community | Riverhead |
| N | Stop N Shop | 194 W Montauk Hwy | Hampton Bays | Suffolk | 11946 | Community | Southampton |
| O | The Mill at Water Mill | 760 Montauk Hwy | Water Mill | Suffolk | 11976 | Community | Southampton |
| P | Country Pointe | 1427 Old Country Road | Plainview | Nassau | 11803 | Proprietary | I495 |
| Q | Islandia Shopping Center | 1750 Veterans Hwy | Islandia | Nassau | 11598 | Proprietary | I495 |
| R | QuickCheck | 1147 Sunrise Highway | Babylon | Suffolk | 11726 | Proprietary | NY27 |
| S | Cafe Crust | 850 County Road 39 | Southampton | Suffolk | 11968 | Proprietary | NY25 |

Rows with green highlight have been mapped as standards-based Corridor locations, dark blue rows represent "full service" Community locations consistent with requirements of the proposed program, light blue rows represent Community locations which do not meet the proposed "full service" requirements proposed for the program (but which have been grandfathered to count as an existing facility), and light red rows represent proprietary locations that have also been grandfathered.

## Public DCFC In Corridor Settings

Corridor locations are allocated on a roadway basis, with the goal of achieving widespread geographic distribution while also ensuring that locations are sited along the roadways that support the majority of miles driven on Long Island, and which would therefore benefit from strong utilization while also providing convenient access for consumers as part of their natural driving pattern. Developing a geographic distribution allocation for corridors therefore requires a two-step process: a) identifying an optimum set of the most heavily used roads that represent an optimal target for corridor development and b) allocating the total number of corridor locations to roads based on optimization criteria. This analysis depended primarily on the analysis of traffic statistics and made use of the New York State Vehicle Miles Traveled (VMT) dataset.

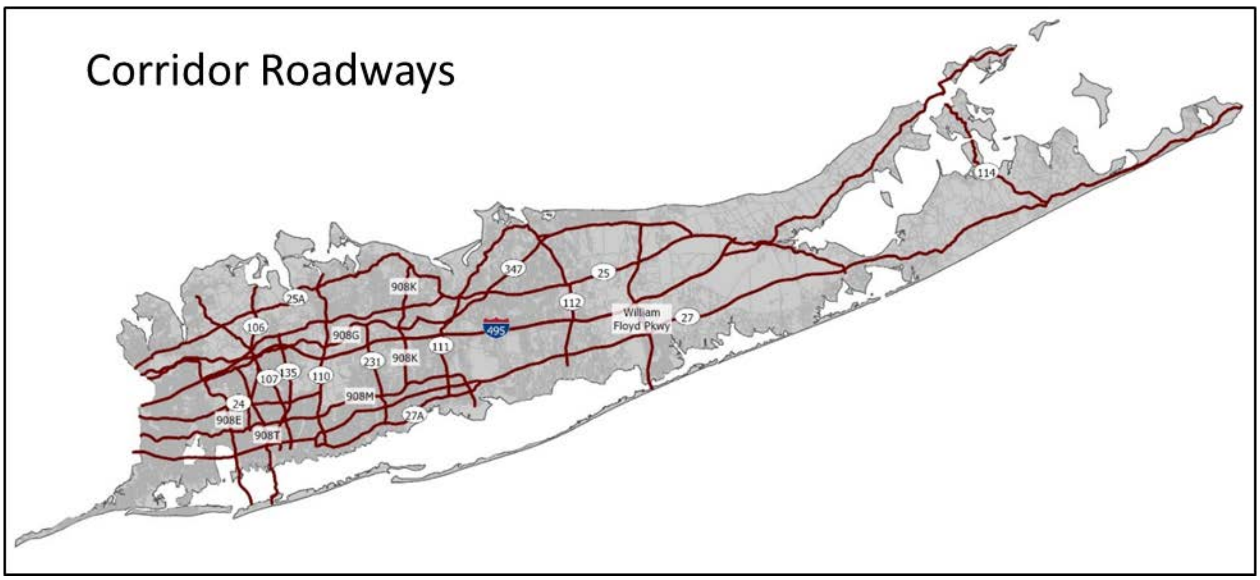
At a high level, the VMT dataset breaks New York roads into sub-segments and measures the number of vehicles that traverse that segment each day (on an annual basis). This statistic – known as AADT (Average

Annual Daily Traffic) – is combined with sub-segment lengths to estimate the vehicle miles traveled.[52] Analyzing the AADT data provides a good profile of where Long Island drivers travel the most, and as might be expected, some roadways carry much more traffic than others.

The study explored a variety of strategies for identifying the set of roadways that would be targeted for support by Corridor DCFC. This analysis was strongly impacted by the unique "long and skinny" geometry of Long Island, and the fact that the territory has a large number of very short roads (the Island is less than 10 miles wide at most points). The most balanced methodology was based on a) selecting the state and federal roads that each account for at least 1% of VMT and b) a set of north-south roads that have particularly high travel intensity (i.e. roads which are heavily travelled, but due to their relatively short length, don't figure strongly in the VMT ranking). This approach resulted in a relatively short list of major roads that account for the majority of VMT, but also a reasonable combination of north/south and east/west roadways that provide a strong "grid like" configuration of roadways.

This analysis identifies approximately 21 major roadways that account for ~62% of measured VMT, and which represent ~595 miles of roadway. These roadways are visualized in the following map.

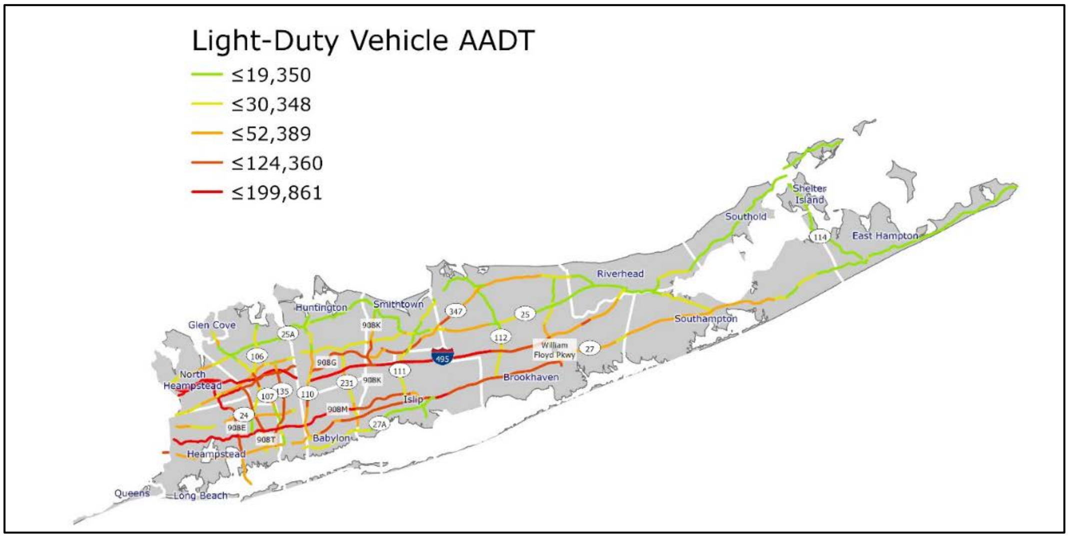
**Figure 7.1.1 – 1: Heavily Traveled Roadways Targeted for Corridor DCFC**




The following map visualizes the travel intensity along these Corridor roadways for light-duty vehicles.

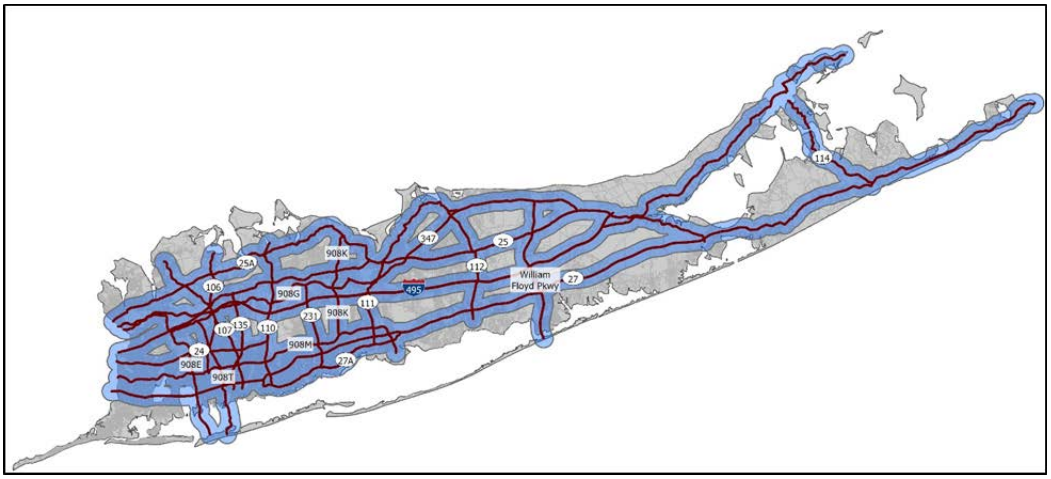
[52] The actual VMT calculation is more complicated than the simplified summary provided here, especially regarding how data for metered roads is applied to un-metered roads.

**Figure 7.1.1 – 2: AADT For Roadways Targeted for Corridor DCFC**




Corridor locations are expected to be within one mile of the roadway being served. The following map visualizes what the 1-mile buffer around the targeted set of roadways represents, indicating strong coverage for most of Long Island, especially in the densest population areas.

**Figure 7.1.1 – 3: One-Mile Coverage Around Corridor Roadways**




The charging capacity analysis in the "Program Sizing: Number of Chargers Required" section, assuming 60% of those ports are in Corridor locations, and an average of 5 ports per location, implies the need for approximately 62 locations along these roadways. These locations were allocated to the Corridor roadways based on a combination of travel intensity (VMT fraction) and roadway length. From that allocation, existing locations already present along these roadways were deducted to provide the NET number of new Corridor locations required, as summarized in the following table. [53]

[53] For purposes of this analysis, the LIE (I-495) and the north and south service roads, are counted collectively as a single roadway. The LIE (and its service roads) is by far the most heavily traveled roadway on Long Island.

**Figure 7.1.1 – 4: Allocation of Corridor Locations to Roadways, Net of Existing**

| Corridor Roads | | Locations Rqd | Existing Locations | New Locations | New Plugs |
|---|---|---|---|---|---|
| Long Island Expressway | I495 | 10 | 3 | 7 | 35 |
| LIE Service Road (North) | 906B | 0 | 0 | 0 | 0 |
| LIE Service Road (South) | 906A | 0 | 0 | 0 | 0 |
| Sunrise Highway (and service roads) | NY27 | 8 | 4 | 4 | 20 |
| Southern State Parkway | 908M | 3 | 0 | 3 | 15 |
| Northern State Parkway | 908G | 3 | 0 | 3 | 15 |
| Jericho Turnpike | NY25 | 8 | 1 | 7 | 35 |
| Northern Boulevard | NY25A | 5 | 0 | 5 | 25 |
| Hempstead Turnpike | NY24 | 2 | 0 | 2 | 10 |
| Merrick Road, Montauk Highway | NY27A | 2 | 0 | 2 | 10 |
| Nesconset Highway | NY347 | 2 | 0 | 2 | 10 |
| Meadowbrook State Parkway | 908E | 2 | 0 | 2 | 10 |
| Wantagh State Parkway | 908T | 2 | 0 | 2 | 10 |
| Seaford–Oyster Bay Expressway | NY135 | 2 | 0 | 2 | 10 |
| NY110 | NY110 | 2 | 0 | 2 | 10 |
| 908K | 908K | 2 | 0 | 2 | 10 |
| NY114 | NY114 | 1 | 0 | 1 | 5 |
| Medford Avenue, Patchogue Road | NY112 | 1 | 0 | 1 | 5 |
| William-Floyd Parkway | CR46 | 1 | 0 | 1 | 5 |
| NY111 | NY111 | 1 | 0 | 1 | 5 |
| Babylon–Northport Expressway, Deer Park Avenue | NY231 | 1 | 0 | 1 | 5 |
| NY106 | NY106 | 2 | 0 | 2 | 10 |
| NY107 | NY107 | 2 | 0 | 2 | 10 |
| **Total** | | **62** | **8** | **54** | **270** |

After accounting for existing Corridor DCFC installations, this analysis projects the need for 270 new DCFC ports at 54 locations, allocated (as targets, not hard requirements) to the most heavily travelled roadways as noted in the chart above.

## Public DCFC In Community Settings

While Corridor locations are organized by roadway, Community locations are sited at the municipal city/town level,[54] with a goal of putting public DCFC "near where PEV drivers live and work". Unlike the Corridor analysis, the Community locations were organized into three "layers":

- **General Purpose Community DCFC:** the DCFC used by all drivers "near where they live and work". Based on the charger capacity analysis in the "Program Sizing: Number Of Chargers Required" section, and assuming 40% are in Community settings and an average of 3 ports per location, there need to be 207 ports at 69 locations (not yet accounting for existing facilities).

- **DCFC For LI/EJ Community**: an "overlay" of additional Community DCFC, beyond those required for general purpose use, to support the needs of EV drivers in LI/EJ communities, many of which are also living in multi-family settings. This overlay is predicated on the expectation that even if L2 is not available in the communities where LI/EJ EV drivers live, if there are high-powered DCFC nearby, that would meet the charging needs for these residents. This DCFC overlay is in addition to a fraction of public L2 allocated for LI/EJ residents (see the "Level 2 Chargers" section). Based on an analysis of defined LI/EJ clusters, a total of 14 sites and 42 ports are required.

[54] The two counties in the PSEGLI/LIPA territory are further divided into smaller municipal entities, some of which are recognized as towns and some of which are cities. This analysis also provided special consideration for the fraction of the territory in Queens (the Rockaways) and the needs of the barrier islands. The barrier islands are legally allocated to several city/town entities, but for purposes of this analysis, are treated as a separate city/town grouping.

- **DCFC for Destination Sites**: an "overlay" of additional Community DCFC targeted to meet the specialized needs of key destination sites on Long Island. This analysis depended heavily on local knowledge, tourist patterns, and traffic conditions. A need for three additional DCFC sites was identified (9 ports total) -- all on the barrier islands near the State Park beaches.

This three-level structure allows the Community distribution framework to reflect a combination of general use, LI/EJ community, and destination-location needs to be considered in a way appropriate for each sub-segment.

A key part of the study was focused on determining an appropriate methodology for allocating the general use Community DCFC. Several levels of granularity (from census block and zip codes, up to the county level) were considered. Given the particular geographic and legal structure on Long Island, allocating Community DCFC per municipal city/town entity provided a reasonable balance.

To allocate the Community DCFC targets to each city/town entity, a scoring system was developed that would reflect the multiple factors that influence the merit of siting locations in those areas. Design of this scoring methodology was informed by the goal of encouraging the development of Community locations "near where PEV drivers live and work", but also other factors like PEV population density and the geographic size of the city/town. The scoring method was therefore based on a combination of demographic and geographic factors, including: a) the fraction of the light duty vehicle population in each city/town, b) the fraction of residential utility accounts in each city/town, c) the fraction of non-residential utility accounts in each city/town, and d) the fraction of Long Island surface area in each city/town.

Note that the light duty vehicle ownership fractions (in each city/town) were used, rather than the *current* PEV ownership fractions. That is because current sales trends of PEVs are starting to resemble light duty vehicle statistics, and therefore, over time, PEV sales will closely resemble light duty ownership distribution. Given that this design analysis is intended to support long term infrastructure investment, the light duty vehicle statistics are expected to be a more realistic factor for Community DCFC allocation (for general use).

These factors were weighted as follows: 15% to light duty vehicle fraction, 25% to residential account fraction, 25% to non-residential account fraction, and 35% to geographic size. This weighting is intended to reflect a multi-part motivation to provide charging infrastructure near where PEVs are located, align investment near where PEV drivers "live and work", and also recognize the "gap filling" value associated with geographic distance.

The following chart summarizes the results of that scoring analysis, and the allocation of the 69 general purpose Corridor DCFC locations required.

**Figure 7.1.2 – 1: Allocation of General Use Community Locations**

| | Queens (in LIPA) | Babylon | Brookhaven | East Hampton | Glen Cove | Hempstead | Huntington | Islip |
|---|---|---|---|---|---|---|---|---|
| Percentage Of LDVs Per City-Town | 1.9% | 8.0% | 17.6% | 1.1% | 1.0% | 21.9% | 7.8% | 11.5% |
| LDV Metric Points | 0.28 | 1.20 | 2.65 | 0.16 | 0.14 | 3.28 | 1.17 | 1.73 |
| | | | | | | | | |
| Percentage Of Res-Accounts Per City-Town | 3.2% | 7.5% | 17.5% | 2.1% | 1.1% | 20.9% | 7.1% | 10.4% |
| Residential Metric Points | 0.79 | 1.87 | 4.37 | 0.53 | 0.27 | 5.23 | 1.78 | 2.6 |
| | | | | | | | | |
| Percentage Of Non-Res-Accounts Per City-Town | 2.2% | 8.7% | 15.9% | 2.7% | 1.1% | 17.8% | 6.7% | 11.5% |
| Non-Residential Metric Points | 0.56 | 2.17 | 3.98 | 0.68 | 0.28 | 4.46 | 1.69 | 2.88 |
| | | | | | | | | |
| Percentage Of Sq-Miles Per City-Town | 0.4% | 4.7% | 23.3% | 6.7% | 0.6% | 10.7% | 0.7% | 9.3% |
| Geographic Size Metric Points | 0.16 | 1.64 | 8.15 | 2.34 | 0.21 | 3.73 | 0.24 | 3.26 |
| | | | | | | | | |
| | | | | | | | | |
| Total Combined Points Per City-Town | 1.79 | 6.88 | 19.15 | 3.71 | 0.90 | 16.70 | 4.88 | 10.47 |
| Percentage Of Total Points (100) | 1.79% | 6.88% | 19.15% | 3.71% | 0.90% | 16.70% | 4.88% | 10.47% |
| Number Of Allocated Locations | 1 | 5 | 13 | 3 | 1 | 12 | 3 | 7 |

| | Long Beach | No. Hempstead | Oyster Bay | Riverhead | Shelter Island | Smithtown | Southampton | Southold |
|---|---|---|---|---|---|---|---|---|
| Percentage Of LDVs Per City-Town | 0.6% | 8.0% | 11.2% | 1.1% | 0.1% | 4.5% | 2.8% | 0.9% |
| LDV Metric Points | 0.08 | 1.20 | 1.68 | 0.17 | 0.02 | 0.68 | 0.42 | 0.14 |
| | | | | | | | | |
| Percentage Of Res-Accounts Per City-Town | 0.8% | 8.0% | 9.8% | 1.3% | 0.3% | 4.1% | 4.5% | 1.4% |
| Residential Metric Points | 0.21 | 2 | 2.45 | 0.34 | 0.07 | 1.01 | 1.13 | 0.34 |
| | | | | | | | | |
| Percentage Of Non-Res-Accounts Per City-Town | 0.5% | 9.3% | 10.3% | 1.7% | 0.3% | 4.1% | 5.6% | 1.5% |
| Non-Residential Metric Points | 0.12 | 2.32 | 2.57 | 0.42 | 0.07 | 1.03 | 1.4 | 0.36 |
| | | | | | | | | |
| Percentage Of Sq-Miles Per City-Town | 0.2% | 4.8% | 9.3% | 6.1% | 1.1% | 4.8% | 12.5% | 4.8% |
| Geographic Size Metric Points | 0.07 | 1.68 | 3.26 | 2.12 | 0.38 | 1.69 | 4.38 | 1.69 |
| | | | | | | | | |
| | | | | | | | | |
| Total Combined Points Per City-Town | 0.48 | 7.20 | 9.96 | 3.05 | 0.54 | 4.41 | 7.33 | 2.53 |
| Percentage Of Total Points (100) | 0.48% | 7.20% | 9.96% | 3.05% | 0.54% | 4.41% | 7.33% | 2.53% |
| Number Of Allocated Locations | 0 | 5 | 7 | 2 | 1 | 3 | 5 | 2 |

Note: Shelter Island is both small in population and geographically, and under this analysis would merit no Community DCFC. It was forced to require at least one location to ensure equitable coverage across all the city/town entities. The Barrier Islands, which are treated as a distinct city/town entity in this analysis, do not rank in the allocation of Community DCFC, however the needs of those communities are treated separately in the LI/EJ and destination overlays.

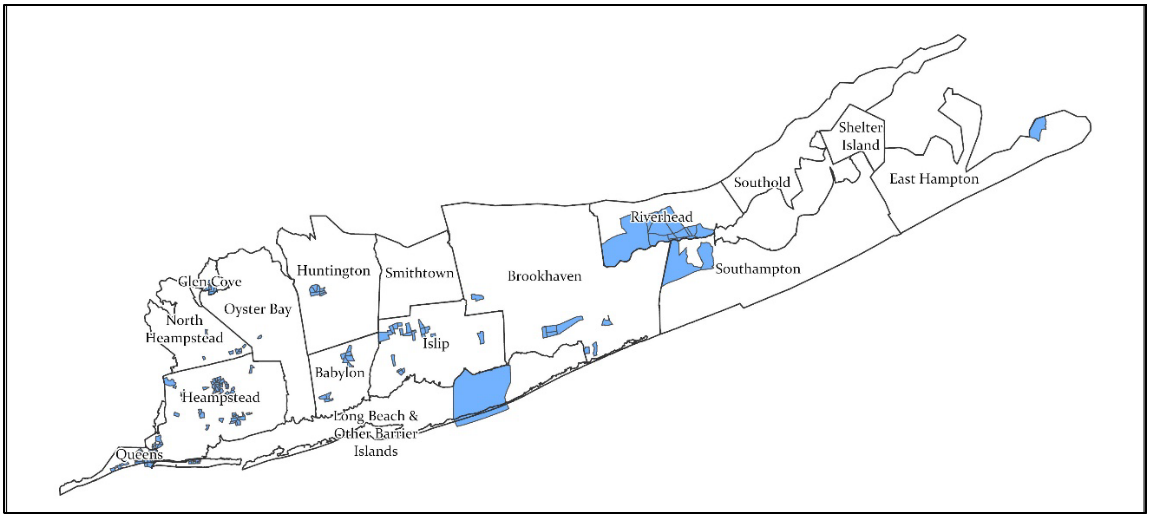
Based on the inventory of existing public DCFC (summarized in the "Public DCFC" section), and assuming all those Community locations are applied as an offset to the "general use" layer of the Community DCFC needs, it results in the following new NET requirements.

**Figure 7.1.2 – 2: Accounting for Existing Community DCFC (General Use)**

| General Use Community DCFC Only | | | |
|---|---|---|---|
| **City/Town** | **Gen-Use Locs Rqd** | **Existing Locations** | **New Locations** |
| Queens | 1 | 0 | 1 |
| Babylon | 5 | 0 | 5 |
| Brookhaven | 13 | 3 | 10 |
| East Hampton | 3 | 0 | 3 |
| Glen Cove | 1 | 0 | 1 |
| Hempstead | 12 | 1 | 11 |
| Huntington | 3 | 2 | 1 |
| Islip | 7 | 0 | 7 |
| Long Beach & Barrier Islands | 0 | 0 | 0 |
| North Hempstead | 5 | 0 | 5 |
| Oyster Bay | 7 | 0 | 7 |
| Riverhead | 2 | 2 | 0 |
| Shelter Island | 1 | 0 | 1 |
| Smithtown | 3 | 0 | 3 |
| Southampton | 5 | 2 | 3 |
| Southold | 2 | 1 | 1 |
| **Total** | **70** | **11** | **59** |

The Community DCFC overlay for the LI/EJ communities was based on consideration of the LI/EJ clusters, as represented in the following map.

**Figure 7.1.2 – 3: LI/EJ Clusters for Community DCFC Overlay**




Combining the three layers of the Community DCFC analysis results in the following summary of new development (net of existing) for each city/town entity, considering both the number of locations and the number of ports[55].

**Figure 7.1.2 – 4: Allocation of Community Locations to City/Towns, Net of Existing**

| Summary - NEW Community LOCATIONS Required | | | | |
|---|---|---|---|---|
| City/Town | New Gen-Use Locs | New LI/EJ Locs | New Dest Locs | Total New Community Locs |
| Queens | 1 | 1 | 0 | 2 |
| Babylon | 5 | 1 | 0 | 6 |
| Brookhaven | 10 | 1 | 0 | 11 |
| East Hampton | 3 | 1 | 0 | 4 |
| Glen Cove | 1 | 1 | 0 | 2 |
| Hempstead | 11 | 1 | 0 | 12 |
| Huntington | 1 | 1 | 0 | 2 |
| Islip | 7 | 1 | 0 | 8 |
| Long Beach & Barrier Islands | 0 | 1 | 3 | 4 |
| North Hempstead | 5 | 1 | 0 | 6 |
| Oyster Bay | 7 | 1 | 0 | 8 |
| Riverhead | 0 | 1 | 0 | 1 |
| Shelter Island | 1 | 0 | 0 | 1 |
| Smithtown | 3 | 1 | 0 | 4 |
| Southampton | 3 | 1 | 0 | 4 |
| Southold | 1 | 0 | 0 | 1 |
| **Total** | **59** | **14** | **3** | **76** |

55 The LI/EJ geo-boundary data was provided by DAC/NYSERDA.

| Summary - NEW Community PORTS Required | | | | |
|---|---|---|---|---|
| City/Town | New Gen-Use Ports | New LI/EJ Ports | New Dest Ports | Total New Community Ports |
| Queens | 3 | 3 | 0 | 6 |
| Babylon | 15 | 3 | 0 | 18 |
| Brookhaven | 30 | 3 | 0 | 33 |
| East Hampton | 9 | 3 | 0 | 12 |
| Glen Cove | 3 | 3 | 0 | 6 |
| Hempstead | 33 | 3 | 0 | 36 |
| Huntington | 3 | 3 | 0 | 6 |
| Islip | 21 | 3 | 0 | 24 |
| Long Beach & Barrier Islands | 0 | 3 | 9 | 12 |
| North Hempstead | 15 | 3 | 0 | 18 |
| Oyster Bay | 21 | 3 | 0 | 24 |
| Riverhead | 0 | 3 | 0 | 3 |
| Shelter Island | 3 | 0 | 0 | 3 |
| Smithtown | 9 | 3 | 0 | 12 |
| Southampton | 9 | 3 | 0 | 12 |
| Southold | 3 | 0 | 0 | 3 |
| **Total** | **177** | **42** | **9** | **228** |

## Public DCFC Summary

Combining the analysis summarized above, and reflecting only the NEW public DCFC facilities needed (after accounting for existing locations), results in the following make-ready program requirements:

**Figure 7.1.3 – 1: New Corridor DCFC Needed (net of existing)**

| Corridor DCFC Locations (NEW) | Road Number | New Locs | New Ports |
|---|---|---|---|
| Long Island Expressway | I495 | 7 | 35 |
| Sunrise Highway (and service roads) | NY27 | 4 | 20 |
| Southern State Parkway | 908M | 3 | 15 |
| Northern State Parkway | 908G | 3 | 15 |
| Jericho Turnpike | NY25 | 7 | 35 |
| Northern Boulevard | NY25A | 5 | 25 |
| Hempstead Turnpike | NY24 | 2 | 10 |
| Merrick Road, Montauk Highway | NY27A | 2 | 10 |
| Nesconset Highway | NY347 | 2 | 10 |
| Meadowbrook State Parkway | 908E | 2 | 10 |
| Wantagh State Parkway | 908T | 2 | 10 |
| Seaford–Oyster Bay Expressway | NY135 | 2 | 10 |
| NY110 | NY110 | 2 | 10 |
| 908K | 908K | 2 | 10 |
| NY114 | NY114 | 1 | 5 |
| Medford Avenue, Patchogue Road | NY112 | 1 | 5 |
| William-Floyd Parkway | CR46 | 1 | 5 |
| NY111 | NY111 | 1 | 5 |
| Babylon–Northport Expway, Deer Park Ave | NY231 | 1 | 5 |
| NY106 | NY106 | 2 | 10 |
| NY107 | NY107 | 2 | 10 |
| **Total** | | **54** | **270** |

**Figure 7.1.3 – 2: New Community DCFC Needed (net of existing)**

| Community DCFC Locations (NEW) | Gen-Use Locs | Gen-Use Ports | LI/EJ Locs | LI/EJ Ports | Dest Locs | Dest Ports | Total Locations | Total Ports |
|---|---|---|---|---|---|---|---|---|
| Queens (in LIPA) | 1 | 3 | 1 | 3 | 0 | 0 | 2 | 6 |
| Babylon | 5 | 15 | 1 | 3 | 0 | 0 | 6 | 18 |
| Brookhaven | 10 | 30 | 1 | 3 | 0 | 0 | 11 | 33 |
| East Hampton | 3 | 9 | 1 | 3 | 0 | 0 | 4 | 12 |
| Glen Cove | 1 | 3 | 1 | 3 | 0 | 0 | 2 | 6 |
| Hempstead | 11 | 33 | 1 | 3 | 0 | 0 | 12 | 36 |
| Huntington | 1 | 3 | 1 | 3 | 0 | 0 | 2 | 6 |
| Islip | 7 | 21 | 1 | 3 | 0 | 0 | 8 | 24 |
| Long Beach & Other Barrier Islands | 0 | 0 | 1 | 3 | 3 | 9 | 4 | 12 |
| No. Hempstead | 5 | 15 | 1 | 3 | 0 | 0 | 6 | 18 |
| Oyster Bay | 7 | 21 | 1 | 3 | 0 | 0 | 8 | 24 |
| Riverhead | 0 | 0 | 1 | 3 | 0 | 0 | 1 | 3 |
| Shelter Island | 1 | 3 | 0 | 0 | 0 | 0 | 1 | 3 |
| Smithtown | 3 | 9 | 1 | 3 | 0 | 0 | 4 | 12 |
| Southampton | 3 | 9 | 1 | 3 | 0 | 0 | 4 | 12 |
| Southold | 1 | 3 | 0 | 0 | 0 | 0 | 1 | 3 |
| **Total** | **59** | **177** | **14** | **42** | **3** | **9** | **76** | **228** |

**Figure 7.1.3 – 3: New DCFC Needed (net of existing)**

| | Total | Corridor | Com - Gen. Use | Com - LI/EJ | Com - Dest. |
|---|---|---|---|---|---|
| **Total New DCFC Locations:** | **130** | 54 | 59 | 14 | 3 |
| **Total New DCFC Ports:** | **498** | 270 | 177 | 42 | 9 |

This "bottoms up" analysis of DCFC requirements aligns fairly closely with the latest estimate by PSC staff on the new requirements for the territory of 476 new DCFC ports (net of existing)[56].

## Level Two Chargers

Analysis was developed for L2 chargers to provide an allocation framework to cities/towns, similar to the methodology used for DCFC, as calibrated to be appropriate for various L2 sub-segments. The EVI-Pro Lite tool, based on the inputs summarized in the "Charger Capacity Required" section, was used to provide estimates of the L2 charging capacity required. That analysis, based on the number of PEVs expected to be on Long Island as of the end of 2025, projected the need for 2,801 workplace L2 chargers (assumed to be used by employees), and 1,903 public L2 ports.

To ensure equitable support of the LI/EJ communities, 10% of the Public L2 ports are assumed to be near the LI/EJ clusters (within 1 mile, consistent with the PSC Make-Ready Order). Establishing an appropriate fraction was difficult, since there are no demographic indicators (such as population, land area, or vehicle ownership) that result in reasonable coverage for the LI/EJ communities. The fraction of 10% was selected as a reasonable balance that provides very strong coverage for the LI/EJ communities, without detracting excessively from the needs of more generalized public L2 use. Note that under this structure, LI/EJ residents can still use any general public L2 facilities – but the 10% carve-out ensures that a fraction of those facilities (in addition to the LI/EJ Community DCFC overlay described above) are near LI/EJ residents.

The AFDC only provides L2 information for public chargers (not workplace). As a result, those existing facilities were assumed to be offsets against the public L2 requirement. Workplace L2 locations were allocated to city/town entities based on the fraction of non-residential utility accounts in each municipality. The Public L2 locations were allocated to city/town entities based on the light duty fraction

[56] As per clarifying email from PSC staff to Dan Zaweski, March 15, 2021.

in each municipality. In several cases, there were already more existing L2 locations than would be required under the allocation strategy, and those city/towns were forced to require at least one additional public L2 location, as summarized in the following chart.

**Figure 7.2 – 1: New Public L2 Facilities Needed (net of existing)**

| Public L2 | | | | |
|---|---|---|---|---|
| Count All The "Existing Locations" As Public L2 Only | | | | |
| City/Town | Pub-L2 Locs Rqd | Existing Locs | New Locs Rqd | New Ports Rqd |
| Queens | 5 | 0 | 5 | 30 |
| Babylon | 23 | 10 | 13 | 78 |
| Brookhaven | 50 | 12 | 38 | 228 |
| East Hampton | 3 | 8 | 1 | 6 |
| Glen Cove | 3 | 1 | 2 | 12 |
| Hempstead | 63 | 9 | 54 | 324 |
| Huntington | 22 | 8 | 14 | 84 |
| Islip | 33 | 11 | 22 | 132 |
| Long Beach & Barrier Islands | 2 | 0 | 2 | 12 |
| North Hempstead | 23 | 2 | 21 | 126 |
| Oyster Bay | 32 | 9 | 23 | 138 |
| Riverhead | 3 | 5 | 1 | 6 |
| Shelter Island | 0 | 1 | 1 | 6 |
| Smithtown | 13 | 6 | 7 | 42 |
| Southampton | 8 | 4 | 4 | 24 |
| Southold | 3 | 3 | 1 | 6 |
| **Total** | **286** | **89** | **209** | **1,254** |

The rows with red-highlight indicate cases where the existing L2 locations exceed the projected requirement. In those cases, the allocation was forced to 1 to allow at least one new location developed in the entity.

There was no meaningful indicator that could be used to allocate the LI/EJ L2 locations, so those were retained as a sub-group (i.e. not allocated per city/town). After combining the above analysis, the L2 allocation framework results are as follows:

**Figure 7.2 – 2: New L2 Ports Needed (net of existing)**

| Summary - NEW L2 Ports Required | | | | |
|---|---|---|---|---|
| City/Town | New WP-L2 Ports | New Pub-L2 Ports | New LI/EJ L2 Ports | New WP & Pub Ports |
| Queens | 63 | 30 | 190 | 93 |
| Babylon | 243 | 78 | | 321 |
| Brookhaven | 446 | 228 | | 674 |
| East Hampton | 77 | 6 | | 83 |
| Glen Cove | 32 | 12 | | 44 |
| Hempstead | 499 | 324 | | 823 |
| Huntington | 189 | 84 | | 273 |
| Islip | 323 | 132 | | 455 |
| Long Beach & Barrier Islands | 14 | 12 | | 26 |
| North Hempstead | 259 | 126 | | 385 |
| Oyster Bay | 289 | 138 | | 427 |
| Riverhead | 47 | 6 | | 53 |
| Shelter Island | 8 | 6 | | 14 |
| Smithtown | 116 | 42 | | 158 |
| Southampton | 157 | 24 | | 181 |
| Southold | 41 | 6 | | 47 |
| **Total** | **2,803** | **1,254** | **190** | **4,057** |

**Figure 7.2 – 3: New L2 Locations Needed (net of existing)**

| Summary - NEW L2 Locations Required | | | | |
|---|---|---|---|---|
| **City/Town** | **New WP-L2 Locs** | **New Pub-L2 Locs** | **New LI/EJ L2 Locs** | **New WP & Pub Locs** |
| Queens | 11 | 5 | 32 | 16 |
| Babylon | 41 | 13 | | 54 |
| Brookhaven | 74 | 38 | | 112 |
| East Hampton | 13 | 1 | | 14 |
| Glen Cove | 5 | 2 | | 7 |
| Hempstead | 83 | 54 | | 137 |
| Huntington | 32 | 14 | | 46 |
| Islip | 54 | 22 | | 76 |
| Long Beach & Barrier Islands | 2 | 2 | | 4 |
| North Hempstead | 43 | 21 | | 64 |
| Oyster Bay | 48 | 23 | | 71 |
| Riverhead | 8 | 1 | | 9 |
| Shelter Island | 1 | 1 | | 2 |
| Smithtown | 19 | 7 | | 26 |
| Southampton | 26 | 4 | | 30 |
| Southold | 7 | 1 | | 8 |
| **Total** | **467** | **209** | **32** | **676** |

**Figure 7.2 – 4: Summary of All New L2 Facilities Needed (net of existing)**

| L2 Facilities (NEW) | Workplace Locs | Workplace Ports | Pub-L2 Locs | Pub-L2 Ports | LI/EJ Locs | LI/EJ Ports |
|---|---|---|---|---|---|---|
| Queens (in LIPA) | 11 | 63 | 5 | 30 | 32 | 190 |
| Babylon | 41 | 243 | 13 | 78 | | |
| Brookhaven | 74 | 446 | 38 | 228 | | |
| East Hampton | 13 | 77 | 1 | 6 | | |
| Glen Cove | 5 | 32 | 2 | 12 | | |
| Hempstead | 83 | 499 | 54 | 324 | | |
| Huntington | 32 | 189 | 14 | 84 | | |
| Islip | 54 | 323 | 22 | 132 | | |
| Long Beach & Other Barrier Islands | 2 | 14 | 2 | 12 | | |
| No. Hempstead | 43 | 259 | 21 | 126 | | |
| Oyster Bay | 48 | 289 | 23 | 138 | | |
| Riverhead | 8 | 47 | 1 | 6 | | |
| Shelter Island | 1 | 8 | 1 | 6 | | |
| Smithtown | 19 | 116 | 7 | 42 | | |
| Southampton | 26 | 157 | 4 | 24 | | |
| Southold | 7 | 41 | 1 | 6 | | |
| **Total** | **467** | **2,803** | **209** | **1,254** | **32** | **190** |

**Figure 7.2 – 5: Summary of All New L2 Facilities Needed (net of existing)**

| | Total | Workplace L2 | Public-L2 | LI/EJ - L2 |
|---|---|---|---|---|
| **Total New L2 Locations:** | **708** | 467 | 209 | 32 |
| **Total New L2 Ports:** | **4,247** | 2,803 | 1,254 | 190 |

# 8 Program Design Recommendations

The "Program Sizing: Number Of Chargers Required" section summarized the projection of basic charging capacity required on Long Island (both DCFC and L2), while the "A Framework For Optimal Geographic Distribution" section outlined a framework for allocating those chargers, net of existing facilities, to either roadways (for Corridor DCFC) or municipal city/town entities (for Community DCFC, workplace L2, public L2, and LI/EJ L2 chargers). This section incorporates cost assumptions to establish overall make-ready program budgets and recommends associated program design and implementation details.

## Cost Factors and Incentive Levels

This study builds upon two key make-ready program strategies to design the program for Long Island: a) base incentives on a percentage of applicable costs (for both the utility-side (US-MR) and customer-side (CS-MR) costs) on a three-tier structure (50%, 90%, and 100% depending on the relative value to the market) and b) the basic cost factors (per port). Consistent with the PSC Make-Ready Order, these per-port cost assumptions were developed for budget planning purposes only – there is no per-plug cap on incentive levels, with the incentive being a percentage fraction (depending on tier) of allowed costs. This approach allows for the wide variation of costs across different locations as addressed in the final determination of the PSC Make-Ready Order.

Cost factors were developed for both make-ready costs overall, and the utility-side component of the make-ready (US-MR). The study team reached out to all charger companies that have developed facilities on Long Island to collect real world data on make-ready costs, but none were willing to share that information since it was considered highly proprietary. As a result, the study team used the overall make-ready costs from the final PSC Make-Ready Order. An average of the urban ConEd numbers and the more sub-urban/rural non-ConEd cost factors were used as a reasonable cost metric for Long Island, which includes both settings (Section VII of the Order, final determination on page 74). Those base cost factors (for the make-ready overall, including both the US-MR and the CS-MR) are as follows:

**Figure 8.1 – 1: Base Make-Ready Cost Factors (per Port)**

| **Base Incentive Levels (Per Plug, @ 100% tier)** | |
|---|---|
| DCFC - Corridor | $116,330 |
| DCFC - Community | $77,555 |
| L2 (all types) | $8,650 |

The cost factor for Community DCFC is the straight average of the per-port cost factors used in the PSC Make-Ready Order ($55,000/port outside of the ConEd territory and $100,109 within ConEd). The Corridor DCFC cost assumption was enhanced to reflect the higher power and other more demanding requirements of the Corridor locations. Specifically, the per-KW assumptions in Appendix B of the Order ($517/KW), and the expectation that Corridor locations will target 150KW compared with an average of 75KW for Community locations. That product (75KW difference, times $517/KW) provides the Corridor baseline costs per port premium ($38,775). See the program design details in the "Program Design Details" section for more information about the difference between Corridor and Community DCFC Ports.

To establish budgets, an allocation of the program size (in ports) was allocated to the three "percentage tiers" (100%, 90%, 50%) based on estimates of how the market will develop projects in each category of eligibility. See the "Program Design Details" section for further definition of the criteria associated with each tier. Those assumptions result in the following overall budget:

**Figure 8.1 – 2: Make-Ready Program Budget For PSEGLI/LIPA Territory**

| | Total | Ports Per Tier | | | Average Cost Per Plug (Each Tier) | | | Total |
|---|---|---|---|---|---|---|---|---|
| Port Type | Ports | 100% | 90% | 50% | 100% | 90% | 50% | Budget |
| Corridor DCFC | 270 | 135 | 108 | 27 | $116,330 | $104,697 | $58,165 | $28,582,281 |
| Community DCFC | 228 | 46 | 160 | 23 | $77,555 | $69,800 | $38,778 | $15,627,333 |
| L2 (workplace, public, LI/EJ) | 4,247 | 212 | 637 | 3,398 | $8,650 | $7,785 | $4,325 | $21,489,195 |
| | | | | | | | Total Budget: | $65,698,809 |

As noted above, the costs/port are calculated for budgeting purposes, but do not reflect per-port limits of the incentive. Projects will be eligible for incentives to cover a percentage of eligible costs (for both the US-MR and CS-MR) up to the percentage limit of each tier, as applicable to each project. Note that the incentives are provided at the location level, based on the characteristics of the ports at that location.

Those budgets were allocated over time in approximately lock-step with the growing PEV population and reflecting some "pre-build" so that the charging infrastructure leads PEV charging requirements slightly. That pre-build is tied to the motivation to develop additional locations that will overcome consumer range-anxiety concerns. The allocation for 2021 is based on current year deployment expectations, and a need to minimize changes of the in-year budget. The resulting annual budgets are as follows:

**Figure 8.1 – 3: Make-Ready Program Budget For PSEGLI/LIPA Territory**

| Port Type | Total Budget | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|
| Corridor DCFC | $28,582,281 | $2,286,582 | $4,287,342 | $7,145,570 | $7,145,570 | $7,717,216 |
| Community DCFC | $15,627,333 | $1,250,187 | $2,344,100 | $3,906,833 | $3,906,833 | $4,219,380 |
| L2 (workplace, public, LI/EJ) | $21,489,195 | $1,074,460 | $3,223,379 | $5,372,299 | $5,372,299 | $6,446,759 |
| | $65,698,809 | $4,611,229 | $9,854,821 | $16,424,702 | $16,424,702 | $18,383,354 |

**Note: these budgets represent only the incentive program costs, and do not reflect budgets for administrative costs that will also be required.**

Although there are no per-plug incentive caps, the study team recommends that there be a per-location cap. This cap is calculated based on the total budget (per charging segment) divided by the number of projected locations. The location cap is appropriate for three reasons:

1. It encourages cost-effectiveness in the projects proposed for development by the market.

2. It reflects the reality that there are "efficiencies of scale" associated with make-ready costs. In particular, a large fraction of most CS-MR costs are trenching, which are approximately the same whether one port is installed or many. These "fixed costs" are diluted for locations with a higher number of ports, which is becoming more common in the market.

3. It ensures that incentive expenditures can align with the projected budgets without compromising the number of locations targeted for development. Without a location cap, a small number of

very large locations could be developed and exhaust the budget, with the result that far fewer locations have been incentivized for development. This outcome would be contrary to the policy goals of establishing an optimal and equitable geographic distribution, as discussed in the "A Framework for Optimal Geographic Distribution" section.

The study team recommends that while location caps be established in the program and respected to the greatest extent possible, project developers would be allowed to apply to the utility to request a waiver from the location cap on a per project basis. Approval of that waiver should consider the merit of the project, combined with whether extenuating and unavoidable cost circumstances apply.

The location incentive cap ensures that the geographic distribution goals can be achieved while establishing overall budget targets -- yet the waiver provision allows for flexibility in cases where it may be beneficial.

## Program Design Details

In addition to the basic sizing of the program (in number of ports) as described in the "Program Sizing: Number Of Chargers Required" section, a geographic distribution framework as described in the "A Framework For Optimal Geographic Distribution" section, and the cost assumptions and budgets summarized in the "Cost Factors and Incentive Levels" section, program design includes details about eligibility, how incentive levels are determined, and various process details. This section summarizes the recommended program design, consistent with the details outlined in the sections above.

1. **Incentive Program Scope:** The incentive program is targeted at offsetting costs for the make-ready component of charging infrastructure development, as defined in the "Key Terms and Concepts" section. Both the utility side of that make-ready (the US-MR) and the customer side of that make-ready (the CS-MR) are eligible.

2. **Interconnection Configurations:** A variety of interconnection scenarios are supported by the program, including a) projects that require new service provided by the utility (the US-MR), b) projects that are connected behind an existing meter (and utility account), and which require no service upgrade, and c) projects that are connected behind the meter, but due to the additional load imposed by the chargers, require a service upgrade. Service upgrade costs are considered part of the US-MR, where applicable.

3. **New Service Restrictions:** For projects that require new service, that service must be dedicated exclusively to the charging infrastructure and should not support other non-related loads. Small parasitic loads related to the chargers, such as safety lighting, communications equipment, etc., are allowed.

4. **Allowed Costs:** The make-ready includes all construction necessary to bring power to the point where the charger will be physically installed, and allowed costs include all US-MR costs (new or upgraded drops, utility meters, safety equipment and switchgear, trenching and site restoration (where applicable), conduit and conductors, pads and transformers (where applicable), and termination points, etc.), and all infrastructure from the point of interconnection (either a utility meter or a customer load center) to the point where the chargers will be installed (including load panel changes or upgrades, trenching and conduit, conductors, site restoration, safety equipment

and switchgear, metering equipment, termination points, and pads for charger installation). In cases where site restoration is required, costs must only cover returning the site to its original condition (concrete, asphalt, sod), not additional landscaping or beautification.

Other project costs, such as the cost of the chargers themselves, other purchases made at the time of construction (data licenses, networking contracts, extended charger warranties), zoning approvals, construction permits, overall engineering and design costs, site testing (including but not limited to geo-testing), communications or networking equipment, or installation (labor and equipment) associated with the chargers, are not considered allowed costs under the incentive program. In cases where new service is required, no CIAC payments from the customer will be required as might normally be required, since the incentive is essentially applied to those costs.

5. **Key Definitions:** Applications for program incentives are made on a per location basis, and the work at each location is considered “a project”. The “customer”, who is the recipient of any applicable incentives, will in most cases be the customer of record for the utility account serving the load. The “per-port” cost used in all the following calculations or determinations are based on the total allowed make-ready costs, divided by the number of ports at the location eligible for incentive. All use of the term “port” is as defined in the “Important Terminology” section, and specifically mean simultaneously operable ports. All references to power levels are determined when power-sharing is active (if applicable). All references to LI/EJ communities are based on definitions (and geo-boundaries) defined by the State of New York.

6. **Minimum Location Requirements:** There are three types of incentives for Corridor DCFC locations, Community DCFC locations, and L2 locations. To be eligible for incentives in each category, the project must meet certain minimum requirements. This eligibility screen is binary – either a project is eligible as per the criteria below, or it is not, in addition to additional percentage-tier factors that also apply (as described below). None of these minimum requirements are intended to limit location design – i.e. projects may exceed any of the criteria defined below:

    a. To be eligible as a **Corridor DCFC location**, i) the location must be within one mile of an identified travel corridor (as identified in the “Public DCFC In Corridor Settings” section) “as the crow flies” from the point of roadway exit to the location, ii) all DCFC ports at the location must be capable of delivering at least 100KW of power (when power-sharing, if applicable, is active), iii) there must be at least four simultaneously operable ports at the location based on either CCS or CHAdeMO plug types, and iv) all ports covered by the incentive must be exclusively dedicated for public use.

    b. To be eligible as a **Community DCFC location**, i) a DCFC location that doesn’t qualify as a Corridor location, ii) all DCFC ports at the location must be capable of delivering at least 50KW of power (when power-sharing, if applicable, is active), iii) there must be at least two simultaneously operable ports at the location based on either CCS or CHAdeMO plug types, and iv) all ports covered by the incentive must be exclusively dedicated for public use, or for use by LI/EJ residents if applicable.

c. To be eligible as an **L2 location**, there must be at least two simultaneously operable ports, and any ports designated “for public use” must be dedicated exclusively for public use (i.e. they can’t serve “double duty” as workplace or fleet chargers).

7. **The Customer Incentive:** A project will be eligible for a “Customer Incentive Amount” (the “CIA”), which will be based on a percentage of allowed costs within a three-tier program as defined in more detail below. For a given project, the Customer Incentive Due (CID) to the customer will be the CIA, minus 100% of the US-MR costs. That incentive due may be paid as a cash payment (such as a rebate) or other structure (like a credit against lease payments) as defined in the “Strategies to Minimize Ratepayer Impact” section.

8. **Percentage Tiers:** In alignment with the PSC’s existing Make-Ready Order, a three-tier structure is defined to grant incentives in proportion to the public benefit. The recommended tier structures are as follows:

    a. **Corridor Locations**: The CIA is a percentage of allowed costs using the following schedule:
        i. **100% of costs:** if at least four simultaneously operable CCS or CHAdeMO ports can each deliver at least 150KW (when power-sharing is active, if applicable), AND all four of those ports are either CCS or CHAdeMO, AND the infrastructure is future-proofed (see the definition of future-proofing below).
        ii. **90% of costs:** for simultaneously operable CCS or CHAdeMO ports less than 150KW (when power sharing is active, if applicable), OR if future-proofing is not incorporated in the design. Proprietary ports which are matched one-for-one with either CCS or CHAdeMO ports of equal power (or higher) can also receive incentives at the 90% level.
        iii. **50% of costs:** proprietary plugs which meet all other requirements but are not matched one-for-one with either a CCS or CHAdeMO plug.

    b. **Community Locations**[57]: The CIA is a percentage of allowed costs using the following schedule:
        i. **100% of costs:** if the location is within 1-mile of the geo-boundary defining a LI/EJ community, for ports based on either CCS or CHAdeMO.
        ii. **90% of costs:** for locations not within 1-mile of the geo-boundary defining an LI/EJ community, for ports based on either CCS or CHAdeMO. Proprietary ports which are matched one-for-one with either CCS or CHAdeMO ports of equal power (or higher) can also receive incentives at the 90% level.
        iii. **50% of costs:** proprietary plugs which meet all other requirements but are not matched one-for-one with either a CCS or CHAdeMO plug.

    c. **L2 Locations**: The CIA is a percentage of allowed costs using the following schedule:
        i. **100% of costs:** if the location is within the geo-boundary defining a LI/EJ community or can be demonstrated to be sufficiently close to an LI/EJ community to directly support the needs of those residents, for ports based on J1772 plugs.

[57] A future-proofing element is not built into the Community DCFC incentive (as it was with Corridor) since it is expected that growth in location size over time will be less likely at Community sites, and inclusion of a future-proofing dimension would make the three-tier structure significantly more complicated. Projects are still free to include future-proofed infrastructure in their Community projects.

   ii. **90% of costs:** for locations NOT within the geo-boundary defining an LI/EJ community (or nearby) but which are available exclusively for public use, for ports based on J1772 plugs. Proprietary ports which are matched one-for-one with J1772 ports of equal power (or higher) can also receive incentives at the 90% level.
   iii. **50% of costs:** proprietary plugs which meet all other requirements, but which are not matched one-for-one with a J1772 plug, OR J177s plugs which are not available for public use but are used for a more limited set of authorized users (such as workplace, non-LI/EJ multi-family, or fleet chargers).

9. **Location Caps:** Although there is no per-port cost limit in the above calculations (i.e. the "real allowed per-port costs" are used in the defined percentage tiers), there is an incentive cap per location, as follows:

   a. **Corridor Locations:** The CIA will be based on the percentage-tier calculation defined above, OR $529,302 for the location, whichever is smaller.

   b. **Community Locations:** The CIA will be based on the percentage-tier calculation defined above, OR $205,623 for the location, whichever is smaller.

   c. **L2 Locations:** The CIA will be based on the percentage-tier calculation defined above, OR $30,366 for the location, whichever is smaller.

10. **Future-proofing:** Future-proofing includes over-sizing of key infrastructure – especially conduit and interconnection equipment – to support the growth of the location in the future as additional PEVs become active on Long Island. This growth could represent either upgrades in the power delivered by ports at the location, and/or an increase in the number of chargers/ports active at the location, or both. For purposes of the make-ready program, the "future-proofing" criteria is met when the US-MR, and key components of the CS-MR (particularly conduit and conductor sizing) is suitable for supporting at least twice the power required by the current location design (i.e. the location power can be at least doubled with future expansions). The intention is that higher powered and/or additional chargers can be added without requiring upgrades to the US-MR or re-opening of concrete/asphalt/sod for a new or larger conduit. Future-proofing is capped at no more than four times the sizing of the originally installed project (e.g. a location that originally request 500KW includes future-proofed infrastructure up to 2MW).

11. **Incentive Limits:** For all three location types, no more than 10 ports may be incentivized, not including future ports that would be enabled by future-proofing. Note – this restriction does not limit the number of ports that may be constructed at a given site, only the number of ports that can be considered for an incentive. The locations overall may not require more than 2MW of power for DCFC, or 100KW of power for L2, including future-proofing that may be included. This limit is a cap on incentive levels: locations can be constructed at higher levels, but incentives apply only up to the 2MW or 100KW limits. DCFC and L2 ports may be mixed at a given location, in which case the relevant DCFC location cap is added to the L2 location cap to serve as a hybrid-port location cap. No entity, on either a site-host or a project developer basis, can be awarded more than 20% of the overall incentive program budget.

12. **Geographic Applications:** As defined in the “A Framework For Optimal Geographic Distribution” section, and realized in the budgets summarized in the “Program Design Recommendations” section, the planned Corridor DCFC ports are targeted to specific identified roadways, while the Community DCFC and L2 ports are allocated to municipal town/city entities. The allocations provide an objective and quantifiable way to measure the extent to which geographic distribution goals are being met. However, these allocation goals are targets, not hard requirements. The utility may modify the allocation of incentives to roadways and municipal entities based on learning, the identification of under-served areas, and other factors as the program is implemented over time.

13. **Budgeting Flexibility:** The projected number of ports (summarized in the “Vehicle Adoption Forecast” section), and the allocation of the incentive budget over time (summarized in the “Cost Factors and Incentive Levels” section), are based on a design target for the number of PEVs registered on Long Island by 2025. The utility will manage the program overall to hit the budget targets established for each year. The incentive program is aligned with the State (and Long Island) attaining the state goals. If, however, PEV adoption is slower than projected, the incentive program may be extended in time (past 2025) to stay in step with actual vehicle adoption and real charging capacity requirements. Some level of pre-build should be assumed so that infrastructure development leads vehicle adoption slightly.

14. **Competitive Solicitations:** The targeted number of project incentives will be awarded based on two competitive solicitations each year. Market participants may prepare program applications and apply to a solicitation in accordance with rules defined for the solicitation process. The utility will assess each tranche of project applications and award incentive commitments on a competitive basis and may consider basic minimum criteria as may be defined by the utility (eligibility, site control, allowed under zoning, etc.). Projects will be scored based on a weighted combination of a) the level of incentive required (i.e. cost-competitiveness), b) project design merit (technical factors, proximity to amenities, use of renewable energy, resiliency features, grid-impact-mitigation features, community awareness building considerations, and other factors as may be deemed relevant by the utility), c) alignment with the geographic allocation framework (e.g. projects on roadways that have already attained the targeted number of locations would score lower than projects on a roadway that has not yet attained its location target), d) satisfaction of LI/EJ equity goals, and e) general gap-filling value (i.e. projects close to existing (or other simultaneously proposed) locations would score lower than projects that fill-in charger-deficient areas). Projects that are not awarded in a given solicitation can be, at the applicant’s request, automatically rolled-over to the next solicitation. The utility reserves the right to not make awards, or to award fewer projects than targeted for the solicitation if the submitted project applications do not demonstrate sufficient merit under the scoring system.

15. **New Construction:** Only newly constructed charging infrastructure is eligible for the incentive program, and all incentivized ports must be put into service after the date of the incentive award. Projects may start construction or incur allowed costs prior to an incentive award but does so at their own risk. This arrangement should be clearly disclosed in program documentation.

16. **General Requirements and Other Details:**

   a. The utility may define additional details and requirements for the program to ensure consistency with the existing PSC Make-Ready Order, as appropriate.

   b. All locations must be within the PSEGLI/LIPA service territory and must draw power from service under a utility account.

   c. All projects that receive an incentive must provide transaction-level data (i.e. information per plug-in/plug-out session) to the utility, in a form and matter defined by the utility.

   d. All locations that qualify as “public locations” (either DCFC or public-L2) must be physically accessible 24X7, without constraints such as lift-gates or other costs (such as parking costs), must not require the EV driver to be a member or other pre-approved status, and allow common available payment methods such as credit cards. These “open access” details will be consistent with the specifics defined in the existing PSC Make-Ready Order.

   e. The utility will build the US-MR. The customer will arrange for construction of the CS-MR using utility-approved contractors and equipment, but that work will be paid for by the utility. The CS-MR must equipment and construction requirements (such as UL certification or equivalent, inspections, etc.) as may be defined by the utility.

   f. New York Power Authority (NYPA) projects are eligible to participate in the program, consistent with the existing PSC Make-Ready Order.

   g. Developers may “bundle” project proposals across multiple locations to attain efficiencies, in which case a) the entire group will be considered under the competitive scoring system and b) the application caps, times the number of locations, will be used as the overall incentive cap. All other details for project bundling will be consistent with the existing PSC Make-Ready Order and may reflect additional details needed to allow bundling within the competitive solicitation framework.

   h. Any Customer Incentive Due (CID) to the customer is payable after construction is complete, and the customer must submit documentation regarding project costs and any other details required by the utility.

# 9 Strategies to Minimize Ratepayer Impact

The above sections define a $65.7M incentive program, disbursed to participants through 2025 and based on cost assumptions and program design details regarding per-project eligibility. As noted in the "Study Goals and Scope" section, PSEGLI/LIPA wanted to explore alternative methods for delivering the make-ready incentive to the market, with the goal of reducing the impact on ratepayers. This analysis is sensitive to the fact that financing nuances unique to LIPA (as a tax-exempt, not-for-profit, public power authority) dictate that cash rebates (similar to those provided by other IOUs) are recovered through utility operating expense (OpEx) rather than in a regulatory asset that can be capitalized, with a concentrated impact to ratepayers in the year disbursed. The study included ratepayer impact modeling to explore how alternative scenarios varied in ratepayer impact.

## Incentive Deployment Strategies

The analysis delivers the same level of incentive to the customer, and only the delivery mechanism is varied. Four strategies were considered, as follows:

a. **Strategy 1 – Cash Rebates:** All Customer Incentives Due (CID) are paid to the customer through cash rebates delivered after construction, consistent with the details defined in the "Program Design Recommendations" section. The customer benefits from a US-MR provided by the utility free of charge, and a cash payment (in the form of a rebate) for the fraction of the CS-MR costs against which the remaining CID applies. The costs of the US-MR are recovered from ratepayers as a capitalized expenditure over 10 years, while the cash rebates impact ratepayers through OpEx in the year disbursed. This strategy is relatively simple to implement (compared to the other strategies), however, this approach concentrates the ratepayer impact in the first five years of the program since it must be recovered through OpEx. By comparison, many investor owned utilities would create a regulatory asset in lieu of operating expense, which can be capitalized over time, thereby spreading ratepayer impact out over multiple years.

b. **Strategy 2 – Lease2Buy:** The utility provides the US-MR at no cost to the customer and pays for development of the CS-MR, and the customer leases the CS-MR from the utility over a 10-year term. At the end of the term, ownership of the CS-MR passes from the utility to the customer. The lease basis (and resulting customer lease payment) is computed based on the costs of the CS-MR, minus the CID, equally distributed over a 10-year period including a lease-financing cost. The customer benefits from the construction of the full make-ready (US-MR and the CS-MR) but pays for that construction through a lease payment NET OF the CID. This strategy is more complicated to implement, requires additional origination tasks, and may create other commercial considerations for both the utility and the customer. But from a ratepayer impact perspective, this strategy creates significant efficiency by capitalizing all make-ready costs and spreading that impact out over 10 years.

c. **Strategy 3 – Direct Purchase:** This strategy is very similar to Strategy 2 (Lease2Buy), but rather than purchasing the make-ready through a lease payment, the customer makes an equivalent payment in one lump sum at the time construction is completed. The utility owns the full make-ready asset (US-MR and CS-MR) for a 10-year term and capitalizes those expenses over that period. The one-time payment is similar to the CIAC payments a customer might normally make for new service (under certain conditions), except as applicable to both the US-MR and CS-MR.

Like Strategy 2, this model reduces ratepayer impact by capitalizing the costs over a 10-year period.

d. **Strategy 4 – Hybrid:** Strategies 2 and 3 depend upon setting up capitalization programs over a 10-year term of utility ownership, for both the 130 new DCFC locations and the 708 L2 locations. The origination effort (and costs) is more manageable for the 130 DCFC locations which are naturally larger and more substantial projects. By contrast, doing capitalization style origination of 708, relatively small, L2 locations is inefficient and unwieldly for both the utility and the customer. This hybrid strategy uses the simple cash payment method (Strategy 1) for all the L2 locations, but the Lease2Buy (Strategy 2) method for the DCFC locations, in an effort to identify the "path of least resistance" to the business model approach.

The study team developed a model which quantified the annual cashflows for each strategy, focusing on different ratepayer impacts (OpEx, principal recovery, cost of debt, etc.). Several key common assumptions applied across each strategy include:

- All capitalized expenses are supported with 100% debt.
- The cost of debt (based on bonds) is assumed to be 4.0% (based on the approximate cost of recent debt issuances provided by LIPA).
- LIPA's Weighted Average Cost of Capital (WACC = 5.66%) was used for making NPV calculations.
- The amount of the 10-yr lease payments, where applicable, were computed using the Excel PMT functions and the WACC. The lease basis is the cost of construction minus the incentive that would have been due to the customer under strategy 1 (i.e. the US-MR and the CID).
- The cost of the US-MR is fully capitalized in all strategies, and all or some of the CS-MR costs are capitalized as well, depending on the strategy. All capitalized costs (including debt principle and interest) are assumed to be recovered over the useful life of the charging stations (estimated to be 10 years).
- The models that include capitalization (strategies 2, 3, and 4) may include more complicated original processes, such as easements, contract negotiation, credit checks, etc., as well as lease payment processing. Those admin costs will be in addition to the incentive budget but are not captured in the business model analysis since they are unknown at this time.
- The model considered low, medium, and high US-MR costs to explore sensitivities to ratepayer impact based on this variation. US-MR costs were based on real-world cost estimates from PSEGLI engineering, as cross-referenced with actual costs realized on recent public charging projects.
- For the cases where the utility is capitalizing the CS-MR, the utility retains ownership of those assets until recovered (10 years), at which point ownership passes to the customer at no additional cost.

**Note that this analysis includes only the incentives delivered, not related administration costs.** The experience of the study team suggests that admin costs for Strategy 1 style programs are typically around 10%. In the case of Strategies 2, 3, and 4, the capitalization programs may impose significant additional origination costs (such as negotiating easements, award contracting, etc.) beyond the cost of the incentives themselves, in which case the admin costs could be 15% or higher. There may also be important non-economic considerations associated with each strategy, as summarized in the "Non-Economic Considerations" section.

It is also important to note that this model does not represent a detailed rate design or recovery plan, an internal financing plan, or implementation budget. Instead, these metrics represent meaningful ratepayer impact indices that allow for comparison between the strategies, all other factors being equal.

## Modeling Results

Based on the model summarized above, the results provide indicators of ratepayer impact per strategy (on an NPV basis), as well as estimates of what the customer outlay would be under each strategy, and the US-MR component of each program.

**Figure 9.1 – 1: Business Model Comparison Indices**

| RATEPAYER IMPACTS | | | |
|---|---|---|---|
| | NPV | Cust Outlay | US-MR $ |
| Strategy 1 - Cash Rebate (Low US-MR Costs) | $53,183,493 | $20,120,732 | $17,591,000 |
| Strategy 1 - Cash Rebate (Medium US-MR Costs) | $52,725,009 | $20,120,732 | $25,130,000 |
| Strategy 1 - Cash Rebate (High US-MR Costs) | $58,085,006 | $12,949,427 | $33,925,500 |
| | | | |
| Strategy 2 - Lease (Low US-MR Costs) | $49,019,338 | $26,898,968 | $17,591,000 |
| Strategy 2 - Lease (Medium US-MR Costs) | $49,019,338 | $26,898,968 | $25,130,000 |
| Strategy 2 - Lease (High US-MR Costs) | $54,914,233 | $17,311,807 | $33,925,500 |
| | | | |
| Strategy 3 - Purchase (Low US-MR Costs) | $49,019,338 | $20,120,732 | $17,591,000 |
| Strategy 3 - Purchase (Medium US-MR Costs) | $49,019,338 | $20,120,732 | $25,130,000 |
| Strategy 3 - Purchase (High US-MR Costs) | $54,914,233 | $12,949,427 | $33,925,500 |
| | | | |
| Strategy 4 - Hybrid (Low US-MR Costs) | $50,347,766 | $21,765,380 | $17,591,000 |
| Strategy 4 - Hybrid (Medium US-MR Costs) | $49,960,845 | $21,765,380 | $25,130,000 |
| Strategy 4 - Hybrid (High US-MR Costs) | $55,404,333 | $14,594,075 | $33,925,500 |

The net present value of Strategy 1 is the most expensive, because the impact of rebates is incurred earlier. Strategies 2 and 3 are lower, and equal, because the rebate costs are replaced by capitalized costs that are amortized over time. Strategy 4 lies in-between those outcomes because the DCFC costs are treated as in Strategy 2 or 3 while the Level 2 costs are treated as in Strategy 1. These strategies also differ in accounting treatment, since the rebates in Strategy 1 are recognized as OpEx, while the investment is capitalized over time in Strategies 2 and 3. The hybrid approach in Strategy 4 represents a mix of OpEx and Capitalized impacts.

The goal is to reduce ratepayer impact while making the customer outlay required as similar as possible (differing only by finance costs that vary in each strategy). From that perspective, the hybrid Strategy 4 provides the best balance: it delivers the lowest NPV burden on ratepayers but keeps the customer outlay very close to what customers would realize under Strategy 1. In addition, as noted in the "Non-Economic Considerations" section, there are other factors – including admin costs and other non-economic considerations – that make the Hybrid Strategy 4 a strong option.

In addition to quantifying these comparison indices, the model computes annual cash flows over a 15 year program (i.e. program deployment over 5 years, with 10 years of recovery). The first five years, when the incentive program is being deployed, is an especially critical window of ratepayer impact as summarized below.

**Figure 9.1 – 2: Ratepayer Impact – First Five Years**

| RATEPAYER IMPACTS | Annual Ratepayer Impact (Years 1 - 5) | | | | |
|---|---|---|---|---|---|
| | 2021 | 2022 | 2023 | 2024 | 2025 |
| Strategy 1 - Cash Rebate (Low US-MR Costs) | $3,649,779 | $7,350,774 | $12,527,120 | $13,128,405 | $14,873,101 |
| Strategy 1 - Cash Rebate (Medium US-MR Costs) | $3,237,729 | $6,277,611 | $10,856,728 | $11,715,706 | $13,368,706 |
| Strategy 1 - Cash Rebate (High US-MR Costs) | $3,115,569 | $6,101,284 | $10,700,763 | $11,860,384 | $13,764,971 |
| | | | | | |
| Strategy 2 - Lease (Low US-MR Costs) | $0 | $652,847 | $2,028,518 | $4,285,181 | $6,456,024 |
| Strategy 2 - Lease (Medium US-MR Costs) | $0 | $652,847 | $2,028,518 | $4,285,181 | $6,456,024 |
| Strategy 2 - Lease (High US-MR Costs) | $0 | $700,783 | $2,220,261 | $4,716,603 | $7,127,126 |
| | | | | | |
| Strategy 3 - Purchase (Low US-MR Costs) | -$1,152,497 | -$2,211,188 | -$2,444,106 | $485,031 | $2,468,773 |
| Strategy 3 - Purchase (Medium US-MR Costs) | -$1,152,497 | -$2,211,188 | -$2,444,106 | $485,031 | $2,468,773 |
| Strategy 3 - Purchase (High US-MR Costs) | -$793,932 | -$1,135,492 | -$651,280 | $2,277,858 | $4,620,165 |
| | | | | | |
| Strategy 4 - Hybrid (Low US-MR Costs) | $331,410 | $1,595,869 | $3,485,113 | $5,503,235 | $7,788,814 |
| Strategy 4 - Hybrid (Medium US-MR Costs) | $12,960 | $685,102 | $2,069,921 | $4,305,863 | $6,484,443 |
| Strategy 4 - Hybrid (High US-MR Costs) | $0 | $698,236 | $2,211,690 | $4,701,755 | $7,114,068 |

All three of the financing approaches (Strategies 2 – 4) have lower annual ratepayer impact than the simple rebate approach in Strategy 1. Note that the cash flow is negative for Strategy 3 in the first few years, which reflects the one-time payments from customers (similar to a CIAC payment). The cash flow in the remaining 10 years is higher, which is why the "average impact" or "NPV" of Strategy 3 is similar to the indices for Strategy 2. Strategy 4 delivers the lowest ratepayer impact on an NPV basis, but also significantly reduced annual impacts to ratepayers in the first five year compared with the rebate-based Strategy 1.

The ratepayer impacts for the remaining 10 years of the program are summarized below.

**Figure 9.1 – 3: Ratepayer Impact – Final Ten Years**

| RATEPAYER IMPACTS | Annual Ratepayer Impact (Years 1 - 5) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 |
| Strategy 1 - Cash Rebate (Low US-MR Costs) | $2,362,920 | $2,292,556 | $2,222,192 | $2,151,828 | $2,081,464 | $2,011,100 | $1,844,591 | $1,514,208 | $1,018,469 | $540,322 |
| Strategy 1 - Cash Rebate (Medium US-MR Costs) | $3,375,600 | $3,275,080 | $3,174,560 | $3,074,040 | $2,973,520 | $2,873,000 | $2,635,130 | $2,163,154 | $1,454,956 | $771,888 |
| Strategy 1 - Cash Rebate (High US-MR Costs) | $4,557,060 | $4,421,358 | $4,285,656 | $4,149,954 | $4,014,252 | $3,878,550 | $3,557,426 | $2,920,258 | $1,964,191 | $1,042,049 |
| | | | | | | | | | | |
| Strategy 2 - Lease (Low US-MR Costs) | $8,820,685 | $8,477,407 | $8,134,129 | $7,790,851 | $7,447,573 | $7,104,295 | $6,338,719 | $5,134,687 | $3,392,941 | $1,737,015 |
| Strategy 2 - Lease (Medium US-MR Costs) | $8,820,685 | $8,477,407 | $8,134,129 | $7,790,851 | $7,447,573 | $7,104,295 | $6,338,719 | $5,134,687 | $3,392,941 | $1,737,015 |
| Strategy 2 - Lease (High US-MR Costs) | $9,779,402 | $9,436,123 | $9,092,845 | $8,749,567 | $8,406,289 | $8,063,011 | $7,249,499 | $5,901,660 | $3,920,235 | $2,024,630 |
| | | | | | | | | | | |
| Strategy 3 - Purchase (Low US-MR Costs) | $11,510,582 | $11,167,304 | $10,824,026 | $10,480,748 | $10,137,470 | $9,794,191 | $8,874,541 | $7,267,024 | $4,852,804 | $2,524,404 |
| Strategy 3 - Purchase (Medium US-MR Costs) | $11,510,582 | $11,167,304 | $10,824,026 | $10,480,748 | $10,137,470 | $9,794,191 | $8,874,541 | $7,267,024 | $4,852,804 | $2,524,404 |
| Strategy 3 - Purchase (High US-MR Costs) | $11,510,582 | $11,167,304 | $10,824,026 | $10,480,748 | $10,137,470 | $9,794,191 | $8,874,541 | $7,267,024 | $4,852,804 | $2,524,404 |
| | | | | | | | | | | |
| Strategy 4 - Hybrid (Low US-MR Costs) | $7,919,003 | $7,663,193 | $7,407,382 | $7,151,572 | $6,895,761 | $6,639,951 | $5,969,315 | $4,870,797 | $3,236,390 | $1,665,936 |
| Strategy 4 - Hybrid (Medium US-MR Costs) | $8,774,997 | $8,493,710 | $8,212,424 | $7,931,137 | $7,649,851 | $7,368,564 | $6,640,608 | $5,422,352 | $3,608,340 | $1,864,649 |
| Strategy 4 - Hybrid (High US-MR Costs) | $9,773,656 | $9,462,648 | $9,151,639 | $8,840,630 | $8,529,622 | $8,218,613 | $7,423,783 | $6,065,833 | $4,042,281 | $2,096,481 |

## Non-Economic Considerations

As summarized in the "Modeling Results" section, the four strategies differ in how the structure of the incentive impacts PSEGLI/LIPA ratepayers. The reason for those differences arises from whether a given method forces recovery from ratepayers through OpEx in the year disbursed, or whether they can be capitalized over a longer period. Beyond those economic impact comparisons, there are other considerations that represent trade-offs between the strategies:

1. As noted above, the capitalization strategies will require significant origination activity, including negotiation of easements, execution of a more complicated contract, consideration of customer credit, etc. These origination activities will impose additional costs, and will require support from multiple departments (legal, real-estate, etc.).

2. In addition to origination complexity, the capitalization strategies depend on utility ownership of the CS-MR *on the customer-side of the meter*. It is unusual for a utility to own assets on customer property, although not un-heard of. This ownership triggers other considerations, such as liability, union work-rules, maintenance cost, rights of access, etc.

3. These origination and ownership considerations differ between the L2 and DCFC projects. The DCFC projects are relatively small in number and are naturally larger and more capital-intensive projects. The L2 locations, in contrast, are large in number and relatively small scale (from a size, cost, or complexity perspective). This difference is also customer impacting, since arranging for a 10-year lease program for a small scale L2 project is typically less feasible than a similar arrangement for a larger scale DCFC project.

4. There may be utility budgeting considerations, especially with Strategy 1, which imposes large increases in OpEx.

## Assessment of Strategic Options

The several strategies assessed in this report differ from each other in significant ways, especially regarding how the incentive structure impacts ratepayers:

5. Many utilities manage these kinds of incentives through regulatory assets that allow the program to be capitalized and spread out over time. Ratepayers cover profits realized by the utility through that capitalization, but they benefit from distributing the costs over multiple years.

6. For a not-for-profit such as LIPA, Incentives based on simple cash incentives must be treated as Operating Expense. That results in the ratepayer impacts being concentrated in the year disbursed, which cannot be readily sustained by ratepayers.

7. LIPA can create alternative financing vehicles (such as a lease program) to deliver the same incentive but which minimize the rate impact, but the legal and administrative details will be more complex.

8. These strategies can be combined, with smaller projects (such as L2) being supported through simple cash rebates (Strategy 1), and larger projects (such as DCFC) being supported through lease programs (Strategy 2) where the additional complexity can be absorbed. This approach reduces ratepayer impact while minimizing the amount of administrative complexity.

# 10 Comparisons with Existing PSC Make-Ready Order

On July 18, 2020, the PSC approved programs by which each utility will provide make-ready incentives for vehicle chargers in certain high priority segments (Case 18-E-0138). The program design recommended in this study intentionally leveraged many of the methodologies and design elements of that Order, including:

1. An "ecosystem" model in which the utility provides incentives to attract and leverage private investment in projects developed by for-profit third-party developers.

2. A make-ready scope that includes multiple specific charging segments, and both the utility-side and customer-side of the make-ready investment.

3. The assumption that Long Island represents 21% of the eventual PEV population in the State of New York, and that 178,500 PEVs will be on Long Island by the end of 2025.

4. The use of the EVI-Pro Lite tool to estimate charging requirements based on PEV population inputs, with projections for workplace L2, public L2, and general use DCFC port requirements.

5. Key assumptions used in the final determination of the Order were used as inputs to the EVI-Pro Lite tool, including a) an assumption that 77% of PEV owners can charge at home and b) a focus on the "full PHEV market support" (which assumes a negligible use of fuel by PHEVs) scenario.

6. Final program sizing was determined based on the charging capacity required (as estimated by the EVI-Pro Lite tool), NET of any existing facilities.

7. A variety of design elements to ensure strong support for LI/EJ communities.

8. Base per-port cost assumptions, in which the Long Island assumptions are the average of the ConEd and "rest of the state" assumptions.

9. A "per port" incentive design, with no upper limit on costs to allow for the wide range of costs realized in the market.

10. A three-tier percentage design, in which various percentages of costs (100%, 90%, 50%) are used in proportion to standards usage, open public access, and other preferable project considerations.

11. Overall program budgeting based on the average per-port cost assumptions and assumed allocation of ports to each tier. The utilities will have some flexibility to manage allocation of incentives, within compliance with the overall budgets. Like the PSC make-ready order, the proposed program includes limits such as no more than 10 incentivized ports per location, location power limits, and limits on the fraction of the program used by a given entity.

12. The PSC make-ready Order recognizes the value of future-proofing, and so does the proposed program design (for Corridor DCFC, where future growth is most likely and valuable). The proposed program also aligns with the PSC Make-Ready Order on multiple program details, such as eligibility for NYPA projects, support for proprietary plugs (when matched with standards-

based plugs), the requirements that incentive recipients share transaction data with the utility, and the ability for project developers to “bundle” projects to gain efficiencies.

Given the study goals established by PSEGLI/LIPA, and the desire that the allocation of the incentives directly support key policy goals – especially reductions in range anxiety through widespread distribution of charging infrastructure – the proposed program design builds upon the PSC Make-Ready Order but differs from it in several key ways:

a) While the study utilized the EVI-Pro Lite tool (similar to the order), the vehicle mix inputs were different. The final determination of the PSC Make-Ready Order assumed that 25% of PEVs in 2025 would be PHEVs. Based on the rapid decline of annual sales for PHEVs (see the “Vehicle Mix” section), 9% of the PEV population in 2025 is projected to be PHEVs. This one change in assumptions (compared with the Order) results in a very similar number of DCFC ports, but a much smaller number of L2 ports.

b) In addition to sizing the program based on a specified number of DCFC and L2 ports, the proposed program includes a framework that encourages the deployment of the incentives according to a geographic distribution allocation. In short, the proposed program considers both a port *and location* target, whereas the Order considers only a targeted number of ports. The geographic allocations are a target, not a hard requirement.

c) A distinction is made between Corridor DCFC and Community DCFC, with Corridor locations allocated to key roadways and Community DCFC allocated to municipal city/town entities. Community DCFC are allocated within three layers: general-use (as projected by the EVI-Pro Lite tool), support for clusters near LI/EJ communities, and the need for key destination locations. L2 chargers are quantified based on workplace and public-use requirements, with a fraction of the public-L2 ports targeted to be in/near LI/EJ communities. The proposed program design distinguishes between Corridor and Community DCFC in that it reflects slightly different use cases, including higher power, more ports/location, and increased focus on future-proofing for Corridor locations.

d) The PSC Make-Ready Order appears to use a 20% fraction of L2 for LI/EJ, whereas the proposed program uses 10% based on consideration of the building stock on Long Island. For the Order, L2 ports could be within 1-mile of LI/EJ housing. The study team does not consider that distance practical for the long-dwell time charging needed at L2 locations, and the proposed framework requires LI/EJ L2 chargers to be in or very near LI/EJ geo-boundaries.

e) The PSC Make-Ready Order allocates a fraction of L2 chargers to support routine charging in LI/EJ communities. The recommended design does as well, as noted above. The proposed program goes a step further, however, by targeting a specific number of public DCFC to be near LI/EJ communities. Nearby access to DCFC may also be an effective way to serve these customers, especially if landlords in multifamily settings (where LI/EJ residents often live) are hesitant to install L2 charging on-site. The recommended program design therefore proposes to address LI/EJ needs through both L2 (in or near the community) and DCFC (within one mile) facilities, and there are specified set-asides for that infrastructure in the program design.

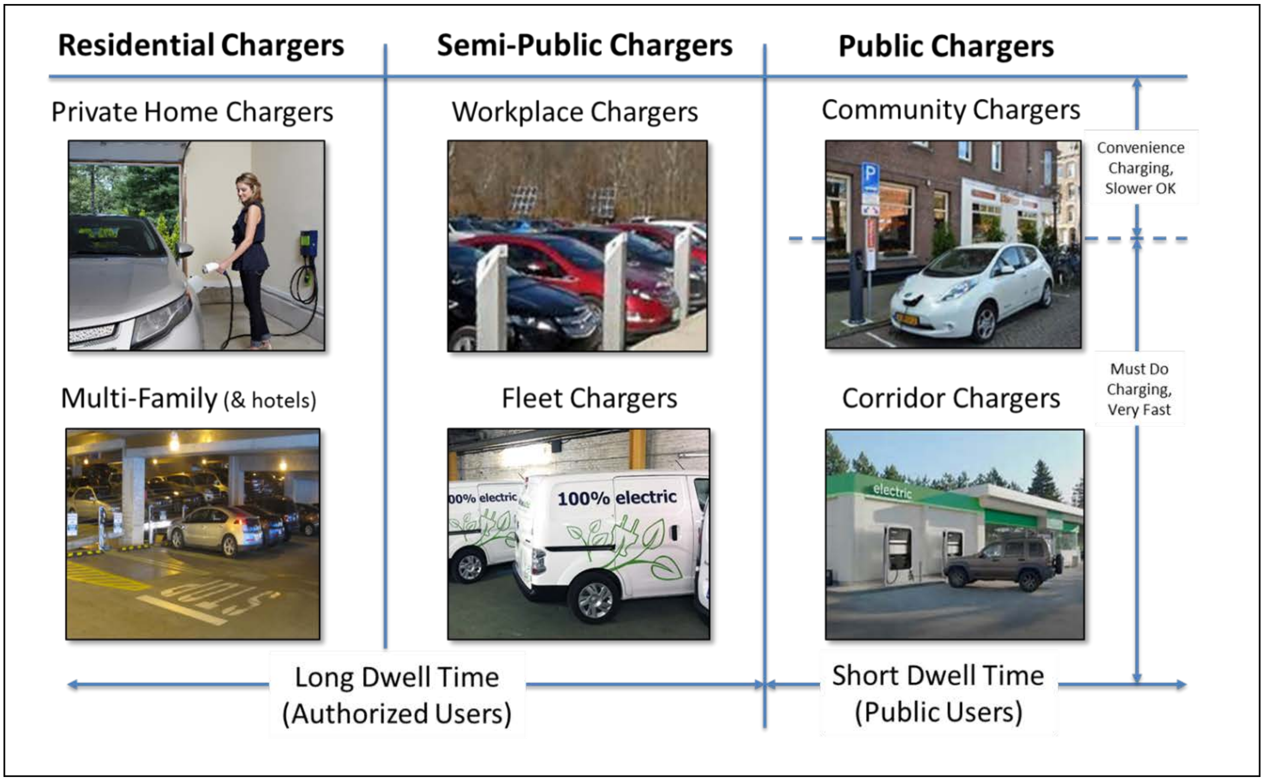
f) The PSC Make-Ready Order applies a per-port cost assumption (for budgeting purposes) but imposes no constraints on cost or incentive level. The proposed program also includes no limit on actual per-port costs (like the Order) but imposes a cap on incentive per location. This approach encourages cost effectiveness, recognizes the efficiencies of scale with locations that have a greater number of ports, and ensures budget alignment with the targeted number of locations. Project developers may apply to the utility for a location cap waiver per project, which the utility will assess based on project merit and extenuating circumstances related to cost.

g) The PSC Make-Ready Order is based on the allocation of the incentives on a rolling, first-come/first-served basis. The proposed program introduces a competitive framework so that the utility can allocate incentives to reflect project merit and cost competitiveness. The proposed program will use twice-annual competitive solicitations, and the utility will score projects competitively to award make-ready incentives.

# 11 Appendix: Vehicle Charging Ecosystem

This section summarizes the segmentation model that defines the ecosystem of charging services for light duty vehicles. LDVs can charge using a variety of technologies, with a range of use cases, across multiple settings. Note that a given PEV could charge in multiple places to meet its charging needs. The following diagram summarizes that ecosystem.

**Figure A – 1: The LDV Charging Ecosystem**




As annotated along the horizontal axis at the bottom, vehicle charging can be conceptualized as long dwell time events, or short dwell time events. Most charging happens where vehicles spend most of their time not moving: parked at home or (to a lesser extent) at work. This convenient fact makes frequent long duration (and lower power) charging of EVs possible. Public chargers support relatively short transactions (by comparison) when the vehicle is away from home or work. These public chargers vary (along the horizontal axis) by whether the public charge is a "must do" charging transaction (i.e. the battery is nearly exhausted, and a quick charge is needed), to more optional charging when it is convenient but not necessarily needed. The six segments capture different vehicle charger settings, each of which has a unique role in the vehicle charging ecosystem, including distinctive user, ownership, business model, and usage profiles, as summarized below:

1) **Privately Owned Home Chargers (with integrated parking):** Located in single family homes, or any residential unit with adjacent and accessible parking where a charger can be easily installed and conveniently used on a daily basis. These chargers are typically Level One or Level Two

equipment, and typically owned by the person that owns the car and/or home. In general, the users of the charging equipment are limited to the vehicle/homeowners. These chargers are simply a load within the building and the energy delivered to the EV is part of the monthly electricity bill. The charge transaction can take place at any time of the day, but typically EVs will be charged overnight.

2) **Multi-Family Residential (with separated parking):** A residential property with less convenient parking arrangements, especially in lease/rent scenarios where charger availability is determined by a building owner or manager that is different from the EV owner. Typical examples include condominium and apartment buildings with common lots or parking garages, buildings with "street-side" parking, or rental/lease free-standing homes or duplexes where the landlord makes charger installation decisions. The usage profile for chargers located at multi-family dwellings is similar to that of the private residential segment (mostly overnight), but there are significant differences in the equipment ownership, vehicle access rights and scheduling, and payment arrangements. In general, the charging equipment must be approved by, and will typically be owned by,[58] the commercial property owner or homeowner association, and the resident will pay for charging services in some form.

   A key aspect of this segment is that the Level One or Level Two chargers are typically neither assigned to a single vehicle/user, nor available for general public use – they are available for use by *authorized users.* The multi-family segment is significant in New Jersey since a substantial portion of building stock is multi-family, and many families rent or lease their homes. Overnight lodging (hotels, etc.) are also modeled as multi-family residential properties since their characteristics are nearly identical. In a hotel setting, most charging will still be done overnight, but the owner of the equipment is different than the owner of the vehicle, and therefore only *authorized users* (registered guests) may use the charging facilities. Vehicle charging privileges will be offered similar to the way WIFI access is offered to guests today.

3) **Workplace Charging:** EV chargers at a non-residential property for use by employees.[59] These chargers are typically Level One or Level Two equipment and are provided as an employee benefit and/or in support of corporate sustainability or $CO_2$ reduction goals. These workplace chargers are especially useful for two usage profiles: those employees that don't have a charging option at home (if they live in an apartment, for example) and for whom charging at work is their primary routine charging option, or as a "back-up" for employees that are able to charge at home but need redundant charging options (to cover extended travel during the day, forgot to charge at home the night before, etc.). In some cases, employees may be using a workplace charger to extend their daily driving range, and if they own a PHEV, to minimize fuel use. Workplace chargers are therefore part of the charging ecosystem that supports EV owners living in a multi-family environment, while also providing greater confidence in charging away from home for all drivers.

   It should be noted that workplace chargers are often effective awareness building mechanisms, and there are examples of workplace chargers stimulating EV purchases, even if many of those

[58] Even in cases where the tenant pays for and owns the charging equipment, the landlord, management company, or homeowner's association retains significant decision-making authority about its installation and its use.

[59] To be more precise, workplace chargers should really be thought of as "chargers used by EV drivers while they are at work". For some employees, this may not be at the workplace itself. In urban settings, in particular, some employees park in a public lot and work in a nearby office. Similarly, an employee may drive to a commuter lot, and park their car there all day while taking the train or bus to and from work. Both of these situations benefit from typical Level Two charging similar to what would be found at the workplace, but in what would normally be considered a more typical "public charging" setting.

employees end up charging at home. Similar to multi-family settings, the chargers are not owned by the vehicle owners, and equipment usage is by authorized users only. These chargers are usually "behind the meter" of the commercial building and the EV charging load is part of the overall building load. Precautions must be taken to avoid EV charging having a negative impact on commercial demand charges. Employers may provide EV charging at no cost, but increasingly, the electricity will be paid for by the employee.

4) **Fleet Chargers:** Chargers at non-residential properties focused on supporting light duty EVs owned by the hosting entity. Functionally, these chargers operate the same as a residential unit, with charging typically happening overnight to support vehicle use during the day – but that can vary depending on the vehicle usage profile. As with workplace chargers, there is only a loose coupling between vehicles and chargers, and only authorized users/vehicles may use the charging facilities. Unlike workplace chargers for employees, the owner of the vehicle and the owner of the charger are typically the same entity, which may simplify (or eliminate) the need for the vehicle driver to pay for charging services.

5) **Public Charger – Corridor Locations:** Chargers, typically with higher power levels that allow open public access to faster charging, located on or near heavily used travel arteries. In New Jersey, these corridor locations can serve BOTH long-distance travelers and local travelers. In either case, these chargers are most frequently used under "must charge" conditions where the battery is nearly exhausted. The recent rapid advancement of DC Fast Chargers (DCFC), which within a few years will be able to charge vehicles to within 80% of full capacity in 15 minutes or less, are ideal applications for corridor public chargers. These charging facilities will typically be owned by an operator that is providing charging as a service available to the public, and charging will be a purchased service. The property owner may own the charger (at a coffee shop or gas station, for example) or the site host may enter into an agreement for a third-party to own and operate the asset.

6) **Public Charger – Community Locations:** Chargers for public use but located away from travel corridors. They will typically be located at public parking areas (sponsored by the municipality), destination locations (entertainment or park facilities), or retail locations – community locations are near where drivers live or work, or near where drivers visit frequently as part of their daily routine. Like corridor chargers, they will be owned and operated for use by the public for a wide variety of reasons. Community chargers will benefit from fast charging equipment similar to corridor chargers, but there may be applications for lower power Level Two chargers as well in some properly matched locations.

These six segments create an ecosystem of charging solutions that cover the majority of charging settings and use cases. Recent research has identified several important modes of interplay and distinction between the segments:

- Most charging energy is delivered through the residential, and to a much lesser extent, the workplace settings. Therefore, ensuring availability of these routine charging solutions is critical to market adoption – **most consumers will not transition to a PEV unless they have access to convenient charging at home and/or work**. Current market statistics indicate that as much as 70% of all EV charging energy is delivered at home and work, and this is expected to increase (due to increasing battery capacity) to at least 90% over time. This is an important fundamental fact about EV charging – most of the energy is delivered at home at night, and there is some flexibility about the scheduling of that charging transaction as long as the vehicle is fully charged by the morning.

- The amount of energy needed for each overnight charge is, on average, NOT a function of the capacity of the battery. It is related to the number of miles driven each day. For most drivers, the overnight charge will average about 10 KWhrs a day.

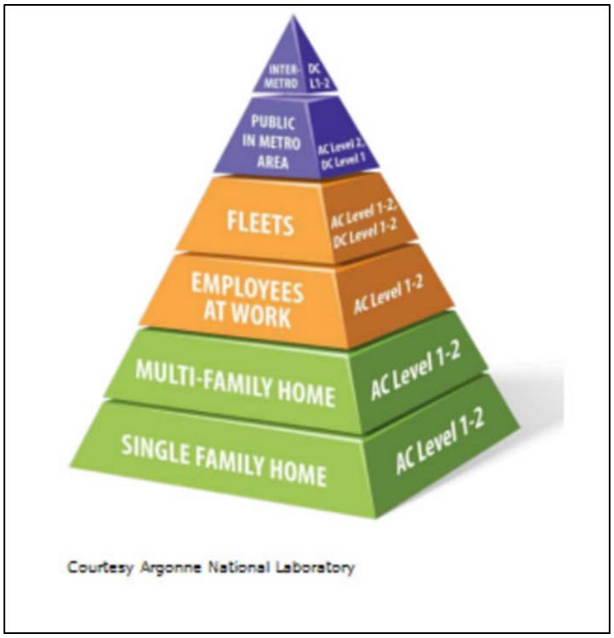
- This residential charging dynamic represents a fundamental departure from the way traditional vehicles are fueled today. **EV drivers will charge their cars similar to the way they charge their cell phones.** Unlike traditional gasoline fueled vehicles – which for most drivers MUST be fueled at a commercial gas station – charging an EV at home is a viable, usually more cost effective, and frequently a preferred option.[60] The role of public chargers is therefore very different than the role of gas stations. While gas stations provide routine fueling of a traditional vehicle, public EV charging transactions happen relatively rarely – only on a long distance trip, or when the driver is outside their normal travel pattern. Comparisons between gas station density and public EV charging requirements are irrelevant since they support fundamentally different roles.

- Although they do not deliver much charging energy on a MWhr basis, public chargers (especially fast chargers), are absolutely critical for market adoption since they address consumer concerns about range anxiety. The amount of energy delivered is not an appropriate metric for the success of a public charging station, since the intended effect is reduced consumer concerns about range anxiety and an associated increase in EV adoption.

- In the early stages of market development, affordable but longer range EVs (which are now becoming available), geographic density of public charging (especially fast chargers), and public awareness of public charging availability, are key factors in reducing consumer range anxiety. The need for sufficient geographic coverage of public chargers (especially DCFC), BEFORE the EV population is large enough to ensure economically viable asset utilization, is a particularly challenging aspect of EV market development. In short, sufficient geographic density is needed BEFORE they can be economically viable on a stand-alone basis, but this effect declines as the size of the EV population grows and utilization of charging infrastructure naturally increases. The essential challenge for addressing range anxiety is therefore supporting public charging economics (especially for DCFC) during the early years when economics are challenging.

- Both the private and multi-family residential, and the workplace employee and fleet chargers, are long dwell time solutions – typically measured in hours. Public chargers tend to be much shorter transactions, and with corridor chargers (and long-distance travelers) especially, the consumer need is for the shortest possible charge time. Matching dwell time characteristics with the location usage profile is critical to application success. In general, the first four segments (residential and commercial for employees and fleets) are Level One or Level Two equipment, while public chargers are best served by DC fast chargers that are capable of faster, high power charge transactions. The following diagram summarizes the "EV Charging Ecosystem" and, as characterized by their respective sizes at each level, illustrates the fraction of energy delivered in each charging segment.

[60] For this reason, especially in the early years of market development when EV ownership is still small, utilization of public charging stations can be relatively low. This naturally stresses the economics of public charging stations, especially the higher power stations preferred by consumers due to the demand rates inherent in typical tariffs.




- Pricing of delivered electricity for both workplace and public chargers has a large impact on how they are used. Recent research at UC-Davis suggests that if workplace or public charging is FREE, it is used by EV drivers that actually do not need the charge. Their research suggests that free workplace charging creates a need for approximately 80 chargers for every 100 EVs on the lot. In instances where the electricity is priced similar to residential costs, that coverage factor reduces to about 60 chargers per 100 EVs. If the workplace charger is double the cost of home charging, only 20 chargers per 100 EVs are needed. Free charging can therefore induce unnecessary demand, force the need for more infrastructure investment, create parking spot usage conflicts, and increase less preferable daytime (on-peak) charging.

## B.3 Fleet Electrification Services

# Fleet Electrification Services for PSEG Long Island

## Market Research and Program Recommendations

Prepared For PSEG Long Island By Gabel Associates, Inc.

June 18, 2021

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# 1 Executive Summary

As the State of New York strives to meet its goal of 850,000 zero emission vehicles on the road by the end of 2025, the Public Service Commission (PSC) has authorized a variety of utility-sponsored programs to enable and encourage the development of vehicle charging infrastructure and electric fleets. On July 18, 2020, the PSC approved programs by which each utility will provide the "make-ready"[61] for vehicle chargers in certain high priority segments (Case 18-E-0138). As a parallel offering, the PSC recognizes in its determination that a crucial factor in advancing the adoption of Plug-In Electric Vehicles will be for utilities to offer fleet assessment services to assist customers in electrifying their fleets.

Specifically, as electric vehicle models become more diverse, available, and affordable, fleet managers will recognize the many benefits electrification provides, making it an attractive alternative. Certain elements of this process will be foreign to these managers and, in this increasingly likely scenario, many will turn to their electricity provider for guidance.

PSEG Long Island (PSEGLI), who operates the public electric infrastructure under contract to the Long Island Power Authority (LIPA), is exploring the deployment of programs that are similar to those outlined in the PSC Order. This study was commissioned by PSEGLI/LIPA to research fleet electrification program design options, recommend program sizing and design parameters, and estimate a program budget. Key goals for the study include: to characterize the fleet market in the PSEGLI territory; to recommend a Fleet Electrification Services Program Design; and to estimate Fleet Electrification Service budget requirements. This report summarizes the results of that study, which was completed during the second quarter of 2021. PSEGLI engaged Gabel Associates (Gabel) to conduct this study.

The study team determined that there are an estimated 290,991 vehicles operating as part of 19,400 fleets within the PSEGLI territory. Hard numbers on fleet vehicles were not available from public sources, so this estimate was developed based on scaling a detailed profile for the PSE&G territory in New Jersey (where detailed information was available) to conditions on Long Island. This "estimate by proxy" resulted in an estimated distribution of vehicles across weight classes and vehicle types. This information is helpful in scoping potential Fleet Electrification Services for Long Island.

Recommendations for Fleet Electrification Services that could be offered by PSEGLI/LIPA were based on an extensive survey of offerings from other utilities, as well as a survey of related planning tools. Utilities currently offer a wide range of services – ranging from very simple, to exhaustively complete. The study team organized these services into three tiers, each representing a more comprehensive scope of service:

1. **Basic Fleet Electrification Service:** Planning services in this Basic tier typically assess electricity service requirements (either new service, or an expansion of existing service, if needed), explore tariff implications and utility bill impacts, and identify applicable incentives.

2. **Mid-Range Fleet Electrification Service:** Programs in this tier will cover the "Basic" tier services defined above but will also help develop a Charging Infrastructure Plan in support of the fleet electrification schedule provided by the customer.

[61] Make-Ready refers to the electrical infrastructure required to deliver electricity to the point where a vehicle charging station will be installed, as defined further in this study.

3. **Advanced Fleet Electrification Service:** Programs in this tier will cover all these services, building on the “Mid-Range” tier to include planning a Vehicle Electrification Schedule.

Gabel recommends that PSEGLI launch its Fleet Electrification Service for the “Basic” level for two years to gain experience and knowledge, then broaden its services to “Mid-Range” to coincide with the Make Ready Program that is currently in development. By focusing on charging infrastructure planning and associated service/tariff/bill impacts, these services align strongly with traditional utility roles and represent a natural extension of support services provided for non-residential customers today. In addition, a customized “tier 3” advance service can be offered to select customers that merit a more tailored approach.

Based on this approach to the deployment of the Fleet Electrification Services, the study team developed an estimated budget that starts in 2022 and ramps up over time as the program grows. The cost for delivering the first year of services is estimated to be $260K, totaling just under $4M for the five year program.

**Figure 1: Fleet Electrification Services, Initial Budget Estimates**

| Year: | 2022 | 2023 | 2024 | 2025 | 2026 |
|---:|---|---|---|---|---|
| General-FES Cust/Year: | 35 | 53 | 79 | 118 | 177 |
| General-FES Cost/Cust: | $6,000 | $5,000 | $10,000 | $9,000 | $7,000 |
| General-FES Scope: | Basic | Basic | Mid-Range | Mid-Range | Mid-Range |
| General-FES Costs/Yr: | $210,000 | $262,500 | $787,500 | $1,063,125 | $1,240,313 |
| | | | | | |
| Select "Tier 3" Advanced: | $50,000 | $75,000 | $100,000 | $100,000 | $100,000 |
| | | | | | |
| Total Cost/Yr: | $260,000 | $337,500 | $887,500 | $1,163,125 | $1,340,313 |

# 2 Introduction

There has been a growing number of Plug-In Electric Vehicles (PEVs) available for mainstream consumers over the last few years[62]. As available models grow increasingly diverse, offer an extended electric range, and become more affordable, barriers to PEV adoption have been diminishing rapidly. The benefits of these vehicles have been well documented when compared to their traditionally fueled counterparts, including a reduction in carbon dioxide and other harmful emissions, lower operating expenses for PEV owners, and the potential to reduce electricity costs for all ratepayers overall due to the increased utilization of the electric grid.

The State of New York, acknowledging these benefits and the growing popularity of PEVs, has set a goal of having 850,000 zero emission vehicles on the road by the end of 2025. The Public Service Commission (PSC) has authorized a variety of utility-sponsored programs to enable and encourage the development of the vehicle charging infrastructure required to meet this goal and, specifically, on July 18, 2020, the PSC approved programs by which each utility will provide the "make-ready" [63] for vehicle chargers in certain high priority segments (Case 18-E-0138). As a parallel offering, the PSC recognized in its final determination that fleets are a critical component of the PEV market, and that utilities could offer fleet assessment services to assist customers in electrifying their fleets.

Fleets are a strategic segment of the PEV market since a relatively small number of decision makers control a large number of vehicles. Fleet operators are strongly motivated by the operational savings made possible by PEVs, and if facilitated properly, rapid fleet electrification could reinforce PEV goal attainment overall, which also contributes directly to significant emission reductions. At the same time, most fleet operators are not familiar with PEV technology or the new considerations that are relevant to electrification decision making. As it becomes more common for PEVs to perform better than traditional vehicles using common metrics like "cost per mile" and Total Cost of Ownership, it's expected that an increasing number of fleet operators will seek assistance in electrifying their fleets.

PSEG Long Island (PSEGLI), who operates the electric grid under contract to the Long Island Power Authority (LIPA), is exploring the deployment of Fleet Electrification Services that are similar to those outlined in the PSC order. This study was commissioned by PSEGLI/LIPA to research fleet electrification program options, recommend program sizing and design parameters, and estimate a program budget. This report summarizes the results of that study, which was completed during the second quarter of 2021.

The study was conducted by Gabel Associates (Gabel), a specialized consulting firm with well-established expertise in energy, environmental, utility, and policy research. The firm has worked extensively with PSEGLI and LIPA on the design and development of their PEV programs over the last three years, and also benefits from extensive experience working with eight other utilities on similar PEV programs in four other states. In addition, Gabel has been providing similar Fleet Advisory Services to clients in both the public and private sector.

[62] For the purposes of this study report, PEVs include any vehicle with a plug, including both battery electric vehicles (BEVs) and plug-in hybrid vehicles (PHEVs), but not including traditional hybrids without a plug.

[63] Make-Ready refers to the electrical infrastructure required to deliver electricity to the point where vehicle charging equipment will be installed.

# 3 Study Goals and Scope

The PSC Make-Ready Order [64] provides a high-level framework for utilities to develop and offer a "Fleet Assessment Service". The initial scope for those services focused on providing a basic Site Feasibility Analysis, including a utility assessment of service requirements to support an electrified fleet that is under consideration, and a determination as to whether reinforcement to the local distribution system might be required. In addition, if the Site Feasibility Assessment is favorable, the utility can provide rate and tariff analysis to quantify the impacts of electrification on the customer's utility bills. The utilities are expected to provide the customer with guidance on best practices for managed charging that might mitigate some of these costs, and a reasonable estimate of electricity costs based on that specific fleet's charging behavior.

PSEGLI and LIPA commissioned this study to build on the foundation established in the Order, explore several possible optimizations, and to recommend a program design that is specifically tuned to the needs and characteristics of the Long Island fleet market. Key focus areas for the study include:

7. Characterize the fleet market in the PSEGLI territory
8. Recommend a Fleet Electrification Services (FES) Program Design:
    a. Conduct market research on Utility FES Programs to inform design options, as well as perform research on other "market analogs" that are currently available
    b. Establish a prioritization of offerings based on alignment with PSEGLI/LIPA priorities
9. Estimate budget requirements for the recommended FES program

The scope of the study focuses on the PSEGLI/LIPA territory, including Nassau and Suffolk County, and the Rockaway district in Queens. Wherever possible, analysis was based on data specific to Long Island, including demographic data, utility account information, detailed fleet statistics, etc. It is assumed that the FES will focus first on light-duty vehicle (LDV) electrification, then shift to focus on medium- and heavy-duty vehicles (MHDV) to complement a potential MHDV Make-Ready Program that may also be developed in the future. FES details in the MHDV segment is also reasonable to consider as a medium-term step since technical charging standards have not yet been established for the ultra-high-power requirements of some MHDV segments.

[64] New York PSC Order dated July 18, 2020, Case 18-E-0138

# 4 The Long Island Fleet Market

As summarized in the previous section, a primary objective for the study was the characterization of the fleet market on Long Island. This information is needed to properly scope the size and targeting of a potential FES offering.

Before exploring the fleet market on Long Island, it is necessary to establish a clear definition of “fleet”. Under typical industry practice, a fleet is generally defined as having 15 or more vehicles in operation or an entity that purchases more than five vehicles in a year. This definition is critical since certain incentives are only available to “fleet customers”. However, from the perspective of a utility customer seeking advisory services, it makes sense for that definition to be more broad to ensure equitable customer support. For the purposes of this study, any non-residential customer that owns or leases more than one vehicle would qualify as a “fleet customer”.

The study team reached out to several state agencies in order to collect basic information such as: how many fleets there are on Long Island, and the typical fleet size. This information was not readily available from public sources. The study team therefore decided to estimate the size and make-up of Long Island fleets by proxy – i.e. scaling the fleet characteristics for Long Island from a representative market analog. Based on extensive work with key state agencies in New Jersey, the study team had previously developed a detailed profile of fleet vehicles in the state. The New Jersey dataset classifies all fleet vehicles in the state by MOVES[65] source type as well as Vehicle Class 1-8. The study team was able to reduce this to just the PSE&G territory in New Jersey, which is similar demographically to Long Island (i.e. a mix of urban, suburban, and rural areas).

The distribution of fleets was assumed to scale by the number of non-residential utility accounts, since (by definition) fleets are owned by non-residential customers. The number of non-residential accounts in the PSE&G NJ territory and the number of non-residential accounts in the PSEGLI territory were used to create a scaling factor. The ratio was then used to scale the detailed fleet demographics from PSE&G NJ to get a representative estimate of fleet vehicles in PSEGLI's territory, as summarized below.

**Figure 2: Estimated Fleet Make-up on Long Island**

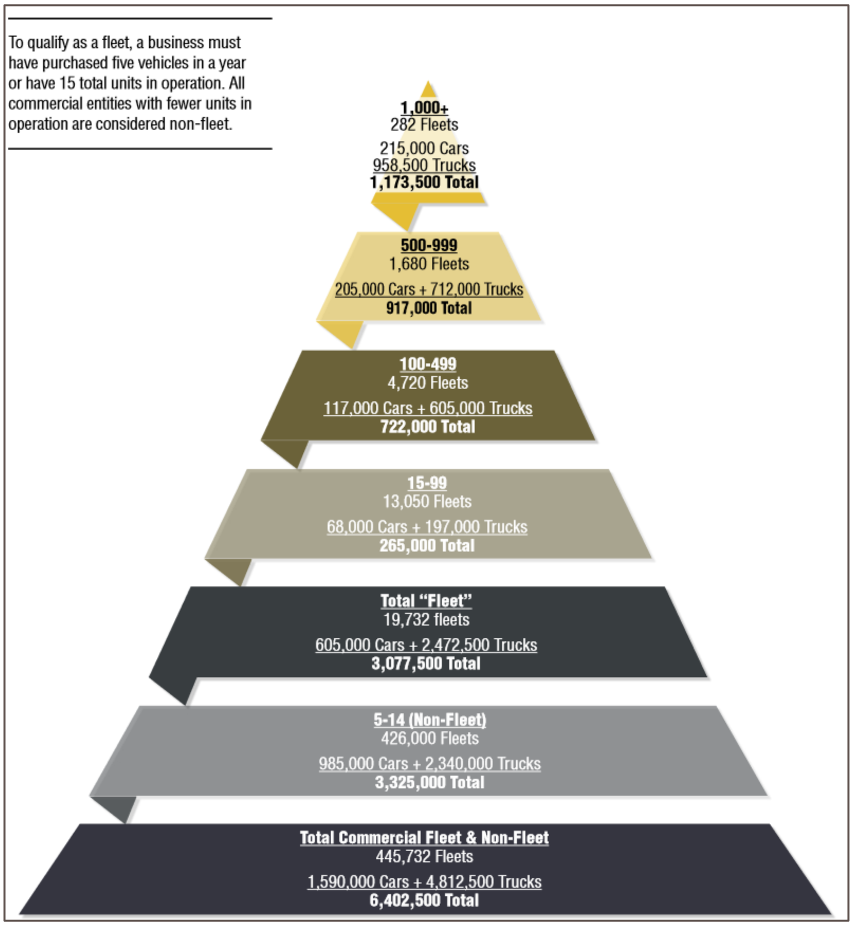
| All Fleet Vehicles (PSEG - Long Island) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Type** | **Class 1 & 2A** | **Class 2b** | **Class 3** | **Class 4** | **Class 5** | **Class 6** | **Class 7** | **Class 8** | **Total** |
| Light Duty Vehicles | 148,384 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 148,384 |
| Passenger Truck | 0 | 5,478 | 51 | 0 | 0 | 0 | 0 | 0 | 5,529 |
| Light Commercial Truck | 0 | 53,311 | 281 | 0 | 0 | 0 | 0 | 0 | 53,593 |
| Intercity Bus | 0 | 0 | 0 | 1 | 4 | 6 | 70 | 406 | 488 |
| Transit Bus | 0 | 121 | 106 | 610 | 78 | 141 | 206 | 1,841 | 3,102 |
| School Bus | 0 | 673 | 1,215 | 505 | 38 | 351 | 2,102 | 5 | 4,888 |
| Refuse Truck | 0 | 0 | 0 | 15 | 19 | 17 | 44 | 1,195 | 1,290 |
| Single Unit Short-Haul Truck | 0 | 2,454 | 16,072 | 6,432 | 7,387 | 9,933 | 509 | 32 | 42,819 |
| Single Unit Long-Haul Truck | 0 | 0 | 27 | 9 | 42 | 281 | 218 | 1 | 579 |
| Motor Home | 0 | 6 | 171 | 314 | 129 | 240 | 129 | 50 | 1,038 |
| Combination Short-haul Truck | 0 | 0 | 0 | 0 | 3 | 14 | 2,976 | 5,980 | 8,973 |
| Combination Long-haul Truck | 0 | 0 | 0 | 1 | 2 | 5 | 1,981 | 18,320 | 20,308 |
| Total | 148,384 | 62,042 | 17,923 | 7,887 | 7,701 | 10,988 | 8,235 | 27,830 | 290,991 |

This estimate-by-proxy projects that there are a total of 290,991 fleet vehicles in the PSEGLI territory. Determining the number of fleet operators on Long Island depends on knowing an average fleet size. As

[65] MOVES is a federal EPA modeling framework that classifies vehicles by type and use.

noted above, detailed information about fleet ownership on Long Island was not available from public sources. However, an average fleet size (after accounting for the revised fleet definition noted above) could be determined based on general industry sources. Specifically, the study team consulted a report published by the Bobit Fleet Group Research Department, an authoritative source on the fleet management market. Their *2020 Automotive Fleet Fact Book* demonstrates how fleet vehicles are typically distributed, as outlined in the infographic below.

**Figure 3: Fleet Size Distributions**




According to the data in their most recent report, the average fleet consists of about 15 vehicles. This includes what they refer to as "non-fleets" that consist of 5 to 14 vehicles. These smaller vehicle groups may not be considered "fleets" by some definitions but, for the purposes of this report, these vehicle owners could still very likely make use of a FES if made available by the utility.

Using the detailed New Jersey fleet data as a proxy and recent data from a fleet industry report, it was estimated that the PSEGLI territory is home to approximately 19,400 fleet operators.

# 5 Market Survey of Fleet Electrification Service Offerings

To better understand the spectrum of Fleet Electrification Service offerings, the study team conducted an extensive survey of services currently offered by utilities, with a focus on states that are leaders in electric vehicle market development. Companies that offer "fleet electrification planning tools" were also surveyed, since they provide relevant insight on the kinds of functions and services associated with fleet electrification planning.

The services offered varied widely. However, the study team developed a framework for characterizing programs based on customer needs. Some customers are at the beginning of their electrification journey and desire a more comprehensive suite of services. Other customers, by contrast, already have certain details of their electrification plan established and therefore need more focused support. The study team established a three "tiered" system for characterizing different offerings based on a "customer needs and aspirations" perspective, as outlined below.

1. **Basic Fleet Electrification Service:** For customers that have a well-defined Vehicle Electrification Schedule and Charging Infrastructure Plan, but that need help understanding the impact of vehicle charging on their electricity consumption. Planning services in this Basic tier typically assess electricity service requirements (either new service, or an expansion of existing service, if needed), explore tariff implications and utility bill impacts, and identify applicable incentives.

2. **Mid-Range Fleet Electrification Service:** For customers with a well-defined Vehicle Electrification Schedule but need help planning for vehicle charging. Programs in this tier will cover the "Basic" tier services defined above but will also help develop a Charging Infrastructure Plan in support of the fleet electrification schedule provided by the customer.

3. **Advanced Fleet Electrification Service:** Some customers will be in the early stages of fleet electrification planning and would benefit from a full range of support services. These customers need help developing a Vehicle Electrification Schedule, defining an associated Charging Infrastructure Plan, and exploring electricity service implications and bill impacts. Programs in this tier will cover all these services, building on the "Mid-Range" tier to include planning a Vehicle Electrification Schedule.

The following table summarizes the collection of services offered by the utilities surveyed. It is important to note that even in relatively well developed EV markets, Fleet Electrification Services are not offered universally. Utilities that provide these services are typically leaders in EV market development, and/or states where medium- and heavy-duty electrification is more mature. There are also numerous utilities that offer incentives (especially for charging) for fleet customers – and those utilities may or may not offer electrification advisory services as well. Only those utilities that offer specific fleet electrification advisory services are included in the summary below.

The other New York utilities have been approved to offer Fleet Electrification Services, but the scope of those offerings is still under development.

**Figure 4: Summary of Electrification Services Survey**

| | Basic | Mid-Range | Advanced | Summary of Advisory Services |
|---|---|---|---|---|
| National Grid (RI) | ✓ | | | Limited fleet advisory service for 12 fleet operators in the RI territory |
| Xcel Energy (Multi-State) | ✓ | | | Evaluation of existing infrastructure and vehile use; feasibility analysis (looks at current vehciles, budget, procurement, maintenance schedules, building/site data) |
| Georgia Power | ✓ | | | Collects data and provides suitability assessment |
| National Grid (MA) | ✓ | | | Analysis of fleet; provides "roadmap to electrification"; closed on Jan. 8, 2020 |
| New York IOU's | ✓ | ??? | | As per NYS Board Order: Includes site feasibillity, rate analysis, dist. system impacts |
| Southern California Edison | ✓ | ✓ | | Several advisory services are available to help fleet managers understand basic technologies and available vehicles; provides tools to assist with fleet conversion; helps managers understand charging technologies and guide through the deployment process. Evaluates availability of financial incentives and best available rates. |
| Portland General Electric | ✓ | ✓ | | Site evaluation, charging infrastructure guidance, cost estimate, overall project guidance/technical assistance |
| Pacific Power (OR) | ✓ | ✓ | ✓ | On-site feasibility of costs and charger options; rate analysis; site design assessment; configurations; management of equipment; preliminary site layout plan; installation evaluation and cost estimate; other programs in development |
| San Diego Gas & Electric | ✓ | ✓ | ✓ | In addition to providing several incentives, the utility works with fleets from the initial infrastructure planning stage through to design, construction, and ongoing site maintenance |
| Pacific Power (CA) | ✓ | ✓ | ✓ | On-site feasibility of costs and charger options; rate analysis; site design assessment; configurations; management of equipment; preliminary site layout plan; installation evaluation and cost estimate; other programs in development |
| Pacific Gas & Electric | ✓ | ✓ | ✓ | Site design and permitting, construction, activation, maintenance and upgrades; goal of working with 700+ organizations by 2024 |
| MapleSim | ✓ | ✓ | | Fleet electrification modeling software, analysis tools and services that provides insights into range needs, number of vehicles needed, charging requipments; provides comparisons to ICE vehciles and environmental impacts; focus is on buses |
| Alphabet | ✓ | ✓ | | Analysies usage patterns to determine feasibility; supports setting up of charging infrastructure |
| Electriphi | ✓ | ✓ | ✓ | Based on a sophisticated algorithm that simulates thousands of scenarios; assists with data collection, compares TCO of EV/ICE; suggests grants/funding; evaluates charging needs and strategies; provides managed charging insight |
| EVOPT (eCAL, NREL, Berkeley Labs) | ✓ | ✓ | ✓ | Estimates TCO, emissions, and energy impacts; informs decisions that lead to advanced charging strategies, determining appropriate battery sizes, infrastructure, and operating schedules |
| EIQ Mobility "Evaluate" | ✓ | ✓ | ✓ | Recommends ideal locations, models, and chargers; compares TCO for each vehicle/location; provides recommendations for incentives/fundking; processes data to determine feasibility; tracks CO2 emissions and driver performance to develop cost efficient driving and charging behaviors |
| In-Charge | ✓ | ✓ | ✓ | Turn-key commercial EV infrastructure; covers fleet planning (load analysis, design, utility engagement, TCO, etc); design and enginerring (equipment specifications); construction services; hardware and commissioning; fleet software integration; site energy managment; O&M issues |

Current programs were mapped into the "customer need tiers" defined above to illustrate the real-world range of programs (and tools) available. Some of the utilities surveyed offer other incentives beyond Advisory Services such as rebates, Make-Ready programs, and special EV rates. A more comprehensive summary of the survey's findings, including live links to on-line sources, can be found in the Appendix.

# 6 Recommended Fleet Electrification Services Program

The study team recommends building off of the established three-tier structure defined in Section 6 to create a Fleet Electrification Service Program offering in the PSEGLI territory. This framework mirrors the natural sequence of decision-making that most customers move through: identifying the opportunities for electrification over time and establishing a **Vehicle Electrification Schedule**, creating a **Charging Infrastructure Plan** designed to support the electrification schedule, **understanding incentives** for either vehicles or chargers that may be applicable, and **understanding the impact** that vehicle charging will have on electrical service and power costs. The service offerings in each level within this framework are summarized below.

1. **Basic Fleet Electrification Service:** For customers that have already developed a detailed fleet electrification schedule and charging infrastructure plan, this basic level of service focuses on assessing impacts on the utility service, tariffs, and bills. This offering is therefore a relatively natural extension of the account support functions already provided by the utility to non-residential customers. Key functions include:
    a. The customer completes a “Customer In-Take Survey” through which they would communicate to the utility their plans and schedule for vehicle electrification, the associated charging infrastructure plan, and use-case plans/operating profiles.
    b. The utility would assess and recommend an interconnection method for the customer-planned charging infrastructure (either Behind-the-meter (i.e. existing service) or New Service).
        i. If Behind-the-meter, the utility will assess the impact that vehicle electrification would have on the existing service and determine the need for upgrades, if any.
        ii. If New Service, the utility provides “white glove” service, guiding the customer through the process for placing a New Service Request.
    c. The utility provides the customer with an estimate of electricity tariff implications and bill impacts and helps the customer navigate any economic considerations.
    d. The utility advises the customer on any other incentives that may be available to the customer either through the utility or at the state or federal level.
    e. In cases where the customer will be taking advantage of a utility incentive, the utility coordinates new service or upgrade with other charger construction and activation activities.
    f. The utility follows up with the customer after the advisory services delivery to assess customer satisfaction, receive feedback, and learn any lessons that may improve the process. There may be merit in completing a second review after the charging infrastructure has been in place for at least a year to refine the methodology.

2. **Mid-Range Fleet Electrification Service:** Some customers have developed the vehicle migration component of their electrification strategy but have not yet identified charging needs and associated implementation plans. These customers would benefit from advisory services about charging infrastructure, in addition to the Basic services outlined above. Key functions include:
    a. All functions provided under the “Basic Fleet Electrification Service” above.
    b. The “Customer In-Take Survey” is expanded to collect information about depot siting, fueling practices, and other details that would impact charging infrastructure planning. Operational factors, such as when and where vehicles charge today, and the operating profile for key vehicle segments would also be captured.

   c. The utility will advise the customer on how many chargers will be needed, what types of chargers will be best suited for their needs, and where those chargers would be ideally located. Advanced impact mitigation measures (such as integrated storage) can be identified at this point, along with future proofing considerations. A key priority is to develop the charging infrastructure plan in a way that minimizes operational changes or disruption.

3. **Advanced Fleet Electrification Service:** Some customers are interested in vehicle electrification but are very early in the planning process. They need support in establishing the vehicle transition schedule, developing charging plans, and assessing impacts on electricity service and costs. These customers need the most advanced and complete level of planning services, including:
   a. All functions provided under the "Basic" and "Mid-Range Fleet Electrification Service" above.
   b. The "Customer In-Take Survey" is expanded to include a collection of data about the customer's current vehicle inventory (including vehicle types and function), vehicle usage history (mileage/fuel use), vehicle age profile, natural fleet replacement and turn-over rates, and electrification goals and aspirations.
   c. The utility advises the customer on a vehicle electrification schedule that will primarily cover plug-in EV options, optimal timing, costs, and available incentives.

Given the evolution of the EV market on Long Island, and the precedent established by the Order, the study team recommends that PSEGLI offer Fleet Electrification Services to its non-residential customers as follows:

- Begin efforts to offer a **Basic "tier 1" FES-offering in 2022**, as an extension of the account services already provided for non-residential customers. This offering will meet the needs of customers that already have a good idea of what their vehicle migration and charging development plans are, especially for the more developed light duty vehicle segment.
- Build on the learning from the Basic program to **offer a Mid-Range "tier 2" FES-offering in approximately two years**. These services are strongly aligned with the traditional utility role since charging infrastructure and electrical service/tariff/bill impacts are closely related topics. It may make sense to deploy this second phase offering if/when the utility launches a make-ready program for medium- and heavy-duty vehicles, since charging infrastructure becomes more complicated, and potentially more grid-impactful, for that class of charging equipment.
- In parallel with the Mid-Range offering, or potentially earlier if there is demonstrated demand, **offer an Advanced "tier 3" FES-offering to select customers only**. This service would be highly customized to meet the needs of the customer and would support any level of vehicle electrification planning services required. This "select customers only" approach allows the utility to meet the needs of key customers that may merit a more tailored approach, without providing those more costly services on a general basis.
- Leave more general availability of Advanced planning services to be provided by the market.

# 7 Estimated Budget

Developing an estimated budget for the recommended Fleet Electrification Services offering depends on knowing a) the scale of the program to be deployed (how many fleet customers served), b) a schedule for the deployment and ramp-up of the program, and c) assumptions about unit costs for delivering the service. Scale and timing can be inferred from the number of fleets in the territory (estimated in the previous section), and the timetable for a growing portfolio of offerings as described in Section 7. The study team attempted to collect cost information from the market, but clear pricing information was extremely scarce. Basic unit costs were therefore estimated based on Gabel's experience delivering similar services to a range of clients, while also "benchmarking" program size relative to other utility offerings where high level information was available. Key assumptions for the budget included:

- Define the budget for a five year period, with the first year being 2022.
- Assuming that the program grows over time, increasing at roughly 50% per year. This strong growth rate aligns with the rapidly growing interest in fleet electrification. The budget assumes that 35 customers are served the first year, growing to 177 customers in the fifth year.
- The budget assumes that the program will benefit from learning and become more cost effective over time. Basic services are estimated to average $6,000/customer in the first year, declining to $5,000 per customer in the second year. The mid-range services are estimated to start at $10,000 per customer in the first year it is offered, declining to $7,000 per customer in the final year of the program.
- The tier 3 service, offered to select customers only, is assumed to be budgeted at $50,000/year in the first year, growing to $100,000/year in the last three years of the program.
- This multi-year budget will be adjusted based on learning and customer demand after the initial year of launch.
- This budget covers only the costs for delivering the Fleet Electrification Services. Additional administration and marketing costs may apply. These cost assumptions do not include support that may be provided by departments within PSEGLI, such as engineering, metering, etc.

Those assumptions result in the following budget plan:

**Figure 5: Fleet Electrification Services, Initial Budget Estimates**

| Year: | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|
| General-FES Cust/Year: | 35 | 53 | 79 | 118 | 177 |
| General-FES Cost/Cust: | $6,000 | $5,000 | $10,000 | $9,000 | $7,000 |
| General-FES Scope: | Basic | Basic | Mid-Range | Mid-Range | Mid-Range |
| General-FES Costs/Yr: | $210,000 | $262,500 | $787,500 | $1,063,125 | $1,240,313 |
| | | | | | |
| Select "Tier 3" Advanced: | $50,000 | $75,000 | $100,000 | $100,000 | $100,000 |
| | | | | | |
| Total Cost/Yr: | $260,000 | $337,500 | $887,500 | $1,163,125 | $1,340,313 |

# 8 Appendix

This section summarizes details about the fleet electrification planning tools and the utility programs included in the market survey.

## Fleet Electrification Tools

### My Fleet Buy

My Fleet Buy provides a tool that allows fleet operators to compare the Total Cost of Ownership of vehicles to determine which are, overall, the most cost-effective over the life of the vehicle. The software provides both live and historical fleet tracking, determines the necessary range of fleet vehicles, assesses the charging needs of electric vehicles, and creates deployment plans that maximize the benefits of electrification. The tool has assessed over 10,000 vehicles to date and does not require any expensive hardware to operate. [66]

### Electriphi

Based on a sophisticated algorithm that simulates thousands of scenarios, Electriphi's results present the most optimal outcomes and provide an analysis that is customized for each vehicle fleet. The software's "wizard" walks the user through the process of collecting data inputs and will approximate default values as a proxy if data is not available. Generally, the tool compares the Total Cost of Ownership of traditional ICE vehicles and compares them to electric alternatives to determine feasibility. Electriphi also suggests available grants and funding; evaluates charging needs and strategies; and offers managed charging insight. [67]

### EVOPT

EVOPT is a collaboration between eCAL, NREL, Berkeley Lab, and Microgrid Labs that estimates Total Cost of Ownership, emissions, energy, and more using physics-based vehicle models and convex optimization techniques developed in eCAL. This tool informs decisions related to charging strategy, vehicle battery size, charging infrastructure, energy infrastructure, and operating schedules -- all of which are highly inter-dependent. EVOPT's three primary goals are to minimize costs, guarantee operations, and mitigate risks. There is a "Lite" version available for free and it appears that upgraded paid services are forthcoming and will be available in a tiered structure. [68]

### MapleSoft/MapleSim Fleet Forward

MapleSim Fleet Forward is a combination of fleet electrification modeling software, analysis tools, and services to help develop an electrification strategy. The program focuses on bus electrification and

[66] https://mygreencar.com/fleet/
[67] www.electriphi.ai
[68] https://myevopt.com/

provides insights into range needs (based on routes, passenger loading, weather, etc.), number of vehicles needed, charging requirements (time and costs), comparisons to ICE buses, environmental impacts and more. MapleSoft products generally range from $2,300-$6,700 for a single commercial license. [69]

## EIQ Mobility "Evaluate"

Designed for fleets of 10-10,000 vehicles, EIQ Mobility's "Evaluate" recommends ideal charger locations, models, and chargers; compares the Total Cost of Ownership and emissions for each vehicle/location; and provides recommendations of incentives that help cover the cost of vehicles and infrastructure. The tool processes data from fueling, telematics, and other sources; removes anomalies and generates reports characterizing the existing fleet; and then builds a variety of scenarios, providing results and feasibility. The availability of driver metrics present innovative operational opportunities such as rewarding employees and drivers for cost-efficient driving and charging behaviors. The tool tracks electric vehicle carbon emissions based on geo- and time-dependent electricity grid emissions and then compares it to those emissions that would have come from ICE vehicles to determine environmental benefits. [70]

## PG&E EV Fleet Savings Calculator

The PG&E EV Fleet Savings Calculator is part of the utilities fleet program. Using this basic calculator, the user can input vehicle type and vehicle charging behavior/operating behavior to receive a free savings estimate in terms of fuel savings and savings per mile. The process can be repeated for each vehicle in a fleet to determine an estimated fleet-level savings. [71]

## EnelX Fleet Electrification Management

EnelX's commercial offer for corporate e-mobility management examines specific needs of a corporate fleet to determine which ICE vehicles are suitable for replacement with electric alternatives. The analysis places an emphasis on creating a deliverable that highlights the key factors a company needs to assess to electrify a corporate fleet. These include suggestions and proposals involving the number of fleet vehicles that can be replaced by electric vehicles, the number and type of IDRs needed to support the management of the charging stage, and information about potential financial savings and reductions in polluting emissions. [72]

## In-Charge

In-Charge uses turn-key commercial electric vehicle infrastructure to accelerate transportation electrification. Services cover fleet planning (load analysis, design, utility engagement, Total Cost of Ownership analysis, etc.); design and engineering (equipment specification, load optimization, etc.); construction services (oversight, permitting process, interconnection, energy efficiency, etc.); and hardware and commissioning (preferred pricing, commissioning and activations, and certified EVSE installation kits). Software and Network Services include OCPP-based charger controls, a charger management portal, load management, fleet software integrations, and site energy management. From

[69] https://www.maplesoft.com/products/maplesim/
[70] www.eiqmobility.com/
[71] https://www.pge.com/en_US/large-business/solar-and-vehicles/clean-vehicles/ev-fleet-program
[72] https://www.enelx.com/it/en/electric-mobility/products/companies/fleet-electrification-management

an operations and maintenance (O&M) standpoint, the service includes preventative maintenance and alerts, emergency service and repair, environmental reporting, and guaranteed uptime programs.[73]

### Samsara

This tool considers LDV fleet age, fuel efficiency, daily range, maximum range, annual fuel savings, and annual saved emissions to identify candidate vehicles. It also determines a Total Cost of Ownership "break even" point where the cost of electric alternatives, over their lifetime, reach parity with traditional vehicles. Samsara also assesses infrastructure and operational readiness; researches legislative policies and EV supply; and explores internal support and leadership buy-in. Samsara provides a complete platform for fleet management and has worked with large municipal clients (i.e. City Fort Lauderdale and the City of Boston).[74]

## Utility Fleet Electrification Services

### Pacific Power (CA)

Through its partner, C2 Group, the utility offers on-site feasibility analysis of costs and charger options to non-residential customers. These projects might include workplace charging, Municipal Utility District (MUD) properties, municipal locations, and new construction. The evaluation covers charger technology options, costs, rates, siting, configurations, installation, and the management of equipment. The customer receives a report that includes an electricity utilization assessment, equipment assessment, site design assessment, preliminary site layout plan, and a preliminary project installation cost estimate.[75] Pacific Power is currently developing programs that will assist fleet operators and ride hailing companies (Uber, Lyft, etc.) to convert to EVs.[76]

### Pacific Gas & Electric (CA)

Pacific Gas & Electric (PG&E) offers a comprehensive program that includes incentives and rebates, site design and permitting, construction, activation, maintenance and upgrades. PG&E has a goal of helping 700+ organizations convert to EV fleet operations by 2024. The utility website provides an interactive tool that allows fleet operators to review eligibility and funding sources, calculate fuel savings, and work with PG&E to transition to an electric fleet.[77]

### Southern California Edison (CA)

Southern California Edison's (SCE) "Charge Ready" program was approved to install 38,000 chargers throughout its territory in August 2020. This will be the largest LDV charging program by an investor-owned utility (IOU) in the country. The $436-million Charge Ready 2 program will focus on infrastructure at workplaces, public parking lots, schools, hospitals, and destination centers. The program provides Make Ready infrastructure for charging stations at workplaces and MUD and to support the electrification of fleet vehicles; "turnkey" infrastructure solutions for charging stations at MUD; and rebates to ensure

[73] https://inchargeus.com/
[74] https://www.samsara.com/blog/new-tools-to-help-you-electrify
[75] https://www.pacificpower.net/savings-energy-choices/electric-vehicles/charging-station-technical-assistance.html
[76] https://www.pacificorp.com/environment/electric-transportation.html
[77] https://www.pge.com/en_US/large-business/solar-and-vehicles/clean-vehicles/ev-fleet-program/ev-fleet-program.page

newly constructed buildings are EV ready. The predecessor program installed over 1,800 chargers at 100+ sites. SCE installs and maintains the supporting infrastructure and provides rebates for charger stations, which are typically owned by the participant.[78] [79] [80] The utility website provides information and resources to assist with fleet transition, including contact information where customers can reach a manager to discuss transportation electrification.[81]

## San Diego Gas & Electric (CA)

Under the "Power Your Drive for Fleets" program, San Diego Gas & Electric (SDG&E) pays for, constructs, owns, and maintains infrastructure either up to the charging station or meter (two options). Transit agencies, school districts, and fleets in disadvantaged communities that are not Fortune 100 companies can receive EVSE rebates of up to $75,000 per charger for 150 kw+. Applicants are required to maintain the EVSE and any customer-owned infrastructure. The utility has proposed a High-Powered EV (EV-HP) Rate Plan that will replace demand charges with a new optional subscription pricing plan for commercial "Power Your Drive: Fleet" customers.[82] SDG&E is investing $107 million to build supporting infrastructure at over 300 private and commercial fleet sites by 2025.[83]

## Black Hills Energy (CO)

Black Hills Energy has proposed a regular stakeholder engagement process, which will also be used to help develop a pilot for electric fleet vehicles such as transit.[84]

## Xcel Energy (CO, MI, TX, MN, NM, ND, SD, WI)

Xcel assists fleet managers through the process of vehicle and infrastructure assessments for fleet transitions at little to no cost. Xcel determines feasibility after the evaluation of existing infrastructure and vehicle usage. Fleets must be 5 or more LDV. Customers must agree to share data collected from fleet vehicles, budget details, procurement information, and maintenance schedules, building and site data and other information required for analysis.[85] [86]

## Georgia Power (GA)

The "Will It Work" Fleet Electrification Process collects real data to demonstrate the beneficial impacts of electric vehicles. The program is built around a suitability assessment, electric vehicle demonstration, and transparent reporting. The results will address whether converting to electric vehicles will work in specific applications and outline potential benefits. This program assesses both on-road (LDV, shuttles, utility carts, transit bus, school bus, delivery trucks, and vans) and off-road vehicles (forklifts, airport equipment, standby refrigerated trucking, seaport, etc.). Consultations are free.[87]

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[78] https://energized.edison.com/stories/sce-gets-green-light-for-expanded-ev-charging-program

[79] https://www.sierraclub.org/press-releases/2020/09/california-greenlights-massive-electric-vehicle-charging-program

[80] https://enerknol.com/california-approves-437-million-for-sces-electric-vehicle-charging-program/

[81] https://www.sce.com/business/electric-cars/charging-stations-for-fleet

[82] https://www.sdge.com/sites/default/files/MDHD_Terms_Conditions_FINAL.pdf

[83] https://www.sdge.com/sites/default/files/documents/SDGE.PYDFF%20-%20EV%20Charging%20Guidebook_0.pdf

[84] https://energyoffice.colorado.gov/blog-posts/colorados-electrified-transportation-future-the-role-of-utilities

[85] www.xcelenergy.com/programs_and_rebates/business_programs_and_rebates/electric_vehicles/fleet_electric_vehicles

[86] www.xcelenergy.com/staticfiles/xe-responsive/Programs%20and%20Rebates/Business/FEAP%20one%20pager.pdf

[87] https://www.georgiapower.com/business/products-programs/business-solutions/electric-transportation-business-programs/fleet-electrification.html

## National Grid (MA)

National Grid (in their Massachusetts territory) supports electrification of its customers' fleets with current offerings limited to public transit, school buses, "Head Start" vans (and other publicly funded modes of transport for students), and public universities. The utility is offering 100 no-cost Fleet Advisory Service Program offers to assess fleet vehicles that are ready for electrification. Preference is given to eligible fleets serving Environmental Justice Communities. National Grid provides a form on their website to be completed by interested parties. The utility sought participation of fleet owners to take a survey that will analyze current fleets and provide a roadmap to electrification. The survey closed on January 8. 2020. This follows an October 2019 rejection from the Massachusetts Department of Public Utilities of a National Grid proposal for a fleet advisory services plan.[88] [89] [90] [91]

## Pacific Power (OR)

Through its partner, C2 Group, the utility offers on-site feasibility analysis of costs and charger options to non-residential customers. These projects might include workplace charging, MUD properties, municipal locations, and new construction. The evaluation covers charger technology options, costs, rates, siting, configurations, installation, and the management of equipment. Customers receive a report that includes an electricity utilization assessment, equipment assessment, site design assessment, preliminary site layout plan, and preliminary project installation cost estimate.[92] The company is also developing programs that will assist fleet operators and ride hailing companies (Uber, Lyft, etc.) to convert to EVs.[93]

## Portland General Electric (OR)

Portland General Electric (PGE) will offer free technical assistance to customers who are interested in EV charging and electric fleets. The utility will evaluate a potential site, recommend charging equipment, estimate costs, and provide overall advice to help ensure the project is a success.[94] PGE also plans to electrify more than 60% of its entire fleet by 2030, including electrifying 100% of the utility's Class 1 vehicles—such as sedans, SUVs, and small pickups—as well as forklifts, by 2025.[95] Since its inception in 2019, the Drive Change Fund has awarded 28 projects with more than $4.7 million, including 93 new electric vehicles and 86 chargers (this budget appears to possibly encompass fleet advisory services but is broader).[96]

## National Grid (RI)

The utility offers services to support fleet electrification, but the pilot program is limited to only 12 fleet operators in the state of Rhode Island.[97]

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[88] https://www.nationalgridus.com/media/pdfs/bus-ways-to-save/ee7483fleetadvisoryform.pdf
[89] https://www.atlasevhub.com/news/national-grid-opens-fleet-advisory-services-program-survey/
[90] https://www.utilitydive.com/news/massachusetts-rejects-national-grid-electric-vehicle-ev-plan-oil-interests-lobbied-api/564670/
[91] https://www.nationalgridus.com/MA-Business/Energy-Saving-Programs/Electric-Vehicle-Charging-Station-Program
[92] https://www.pacificpower.net/savings-energy-choices/electric-vehicles/charging-station-technical-assistance.html
[93] https://www.pacificorp.com/environment/electric-transportation.html
[94] https://portlandgeneral.com/energy-choices/electric-vehicles-charging/electric-vehicle-options-organization
[95] https://portlandgeneral.com/news/2020-09-24-portland-general-electric-to-electrify-more-than-60-of-its-fleet
[96] https://portlandgeneral.com/news/2021-01-27-pge-drive-change-fund-awards-usd2-3-million-to-local
[97] https://www.nationalgridus.com/RI-Business/Energy-Saving-Programs/Electric-Vehicle-Charging-Station-Program?regionkey=ri&customertype=business

# Appendix C. Related Initiatives Outside of Utility 2.0

This appendix summarizes initiatives that are delivered outside the Utility 2.0 Plan but that support PSEG Long Island's Utility 2.0 vision and strategy. PSEG Long Island may request funding to further support these or other related initiatives in the future.

## C.1 Empower Customers through AMI and Data Analytics

PSEG Long Island's goal is to implement and integrate enhancements to existing digital communication channels between the company and the customer. By developing and using digital tools, PSEG Long Island will be able to achieve the following:

- Improve customer satisfaction and J.D. Power scores
- Improve self-service registration rates
- Decrease frequency of late payments

The enhancements include the addition of another customer communication channel (i.e., mobile app), enhancements to existing self-serve channels, and increased integration of customer communications and data across multiple channels.

### *C.1.1 Introducing Voice Assistant Channel – Alexa Skill*

Alexa Skill launched in November of 2018, and allows MyAccount customers to pay bills, review usage history, get a bill summary, check meter reading dates, and get energy-saving and safety tips through voice activation of their Amazon Alexa device.

### *C.1.2 Modernizing Customer Relationship Management*

In 2018, PSEG Long Island began implementation of a market-leading customer relationship management solution, Salesforce. Initial release of this solution, the Salesforce web chat service, launched in April 2019, and uses an automated chat-bot to streamline the process for both customer service representatives (CSRs) and customers. By enhancing an existing customer communication channel, PSEG Long Island offers more convenient digital communication to the customer as the chat-bot is responsive outside of regular business hours.

## C.2 Explore New Innovative Offerings

PSEG Long Island and Long Island Power Authority (LIPA) have been active participants in REV Connect, a New York State program that connects utilities with market players to accelerate the implementation of scalable, market-based solutions through partnerships between utilities and solution providers. In 2019, PSEG Long Island participated in the Connected Communities Innovation Sprint, specifically soliciting ideas for electric buses and heat pumps.

The grid-interactive distributed energy resources (DER) projects proposed in the 2019 Utility 2.0 Plan, both the electric bus and heat pump pilots, stem from submissions to REV Connect addressing these interest areas. The Electric Bus Vehicle-to-Grid (V2G) Pilot is based on a submission from Suffolk

Transportation Services and its partner, Edgewise Energy. The Heat Pump Pilot is based on a submission from Resideo, a spin-off of Honeywell.

Furthermore, PSEG Long Island has been engaged with submitters who previously participated in REV Connect to help inform various different Utility 2.0 initiatives planned or underway, including Nuvve for the electric bus V2G project and Bidgely for Energy Concierge.

PSEG Long Island intends to further integrate REV Connect into its planning process, including using the upcoming Innovation Sprint on energy storage and other future sprints to support its Utility 2.0 Plan and other filings. In addition, PSEG Long Island may look to build on REV Connect; for example, by offering a demo day that invites REV Connect submitters to present their ideas to a broader audience of PSEG Long Island and LIPA staff.

## C.3 Evolve into a Customer-Centric DSP

PSEG Long Island is in the process of deploying Distributed System Platform (DSP)-enabling capabilities. Some of these initiatives have or will be through the Utility 2.0 Plan, while others may be funded and delivered using other means.

### *C.3.1 Generation-Scale Energy Storage*

As part of a wider effort to manage constraints on the local grid, PSEG Long Island deployed two storage systems of total capacity of 10 megawatts (MW)/80 megawatt-hours (MWh) on the South Fork in 2018, which is the fastest growing region on Long Island with an approximate 2.0% annual growth. The overall effort is supported by a targeted energy efficiency (EE) and demand response (DR) program. All were in response to an RFP issued in 2015 for NWS on the South Fork.

PSEG Long Island sees a role for large-scale energy storage systems in managing peak demand on Long Island. With changes in environmental rules for gas emissions, PSEG Long Island expects that it will become more critical to deploy alternatives to fossil fuel-based peaker units, which provide most of the peak generation capacity on Long Island.

PSEG Long Island's Power Markets group issued a bulk solicitation for energy storage in April 2021. The goal is to procure between 155 MW and 175 MW of storage to achieve New York State clean energy initiatives.

### *C.3.2 Grid Modernization*

In a decentralized yet integrated energy future, electricity networks must be responsive to the changing demands for traditional services while enabling new opportunities for energy resource sharing and balancing. By connecting thousands of customer-owned generators and energy storage systems to each other, networks act as platforms which help match supply and demand. Grid modernization investments help achieve these objectives by making the underlying infrastructure reliable and resilient.

PSEG Long Island's commitment to modernizing the grid is demonstrated by the completion of Federal Emergency Management Agency-sponsored grid reinforcement and an annual approximately $400 million capital investment, including:

- Advanced asset management
- Operational Data Lake implementation on the Amazon Web Service platform

- Ongoing DSCADA implementation

Going forward, PSEG Long Island is considering implementation of the following:

- An ADMS platform which will incorporate distribution management system and OMS for advanced grid operation
- Advanced relay coordination for safe and reliable DER integration at scale (currently addressed through interconnection process)
- DER management system to enable safe operation of high penetration of DER
- Advanced distribution planning and forecasting analysis for detailed feeder models
- An analytical tool for advanced transformer and fuse load management to maintain a prioritized queue of transformers and fuses deserving programmatic remediation

### *C.3.3 Energy Cloud*

PSEG Long Island, along with its parent company PSE&G in New Jersey, recently established the Energy Cloud organization to evaluate and implement technology for a modern transmission and distribution (T&D) system, including infrastructure services platform and different software and product solutions.

As it is envisioned, the Energy Cloud will:

- Provide solutions to automate advanced operations and effectively manage the electric grid of the future
- Support individuals and communities by analyzing large amounts of customer data to predict customer needs, develop tailored solutions, and automate customer interactions
- Optimize energy consumption and sustainability through intelligent demand management and grid operations
- Provide a platform for the Utility and others to offer advanced energy service and products

PSEG Long Island's Utility 2.0 initiatives, particularly around evolving to the DSP, are encompassed by the Energy Cloud. In this way, PSEG Long Island and PSE&G will be able to align in their objectives for developing the distributed platform of the future.

Under this effort, technology deployments will be unified under the Energy Cloud program. Standards on application compatibility, data availability and device interoperability will be put in place to ensure scalability and full value realization.

The Energy Cloud implementation will provide capabilities to operators, planners and maintenance groups a comprehensive real-time assessment of the T&D system. Through an advanced ADMS system, the Energy Cloud will provide the following operational capabilities

- Distribution power flow, distribution state estimation, short circuit analysis, and volt/VAR optimization (VVO) analysis to operators
- Advanced asset health, asset management, risk analysis, and risk scoring to the maintenance organization

### *C.3.4 Advanced Distribution Management System (ADMS)*

An Advanced Distribution Management System (ADMS) is a real-time integrated solution for the active management of distribution networks, providing a platform for PSEG Long Island's future roadmap and vision. It will enable PSEG Long Island to improve system reliability, efficiency, and safety, as well as provide timely and reliable information to internal and external stakeholders. Incorporating a full suite of advanced applications, ADMS represents a comprehensive and modern solution for the challenges facing distribution system operators and planners. Components of the ADMS are illustrated in Figure C-1.

The ADMS will support both the distribution management system (DMS) and the outage management system (OMS). The existing OMS system will be integrated into the new platform. The installed system will reach end of life within the next 5 years and will be replaced with a tightly integrated state-of-the-art outage management solution that empowers PSEG Long Island to better manage its outage restoration processes, minimize outage response times, keep customers, management, and regulators well-informed about the scope, status and forecast for outage restoration efforts, and improve overall system reliability.

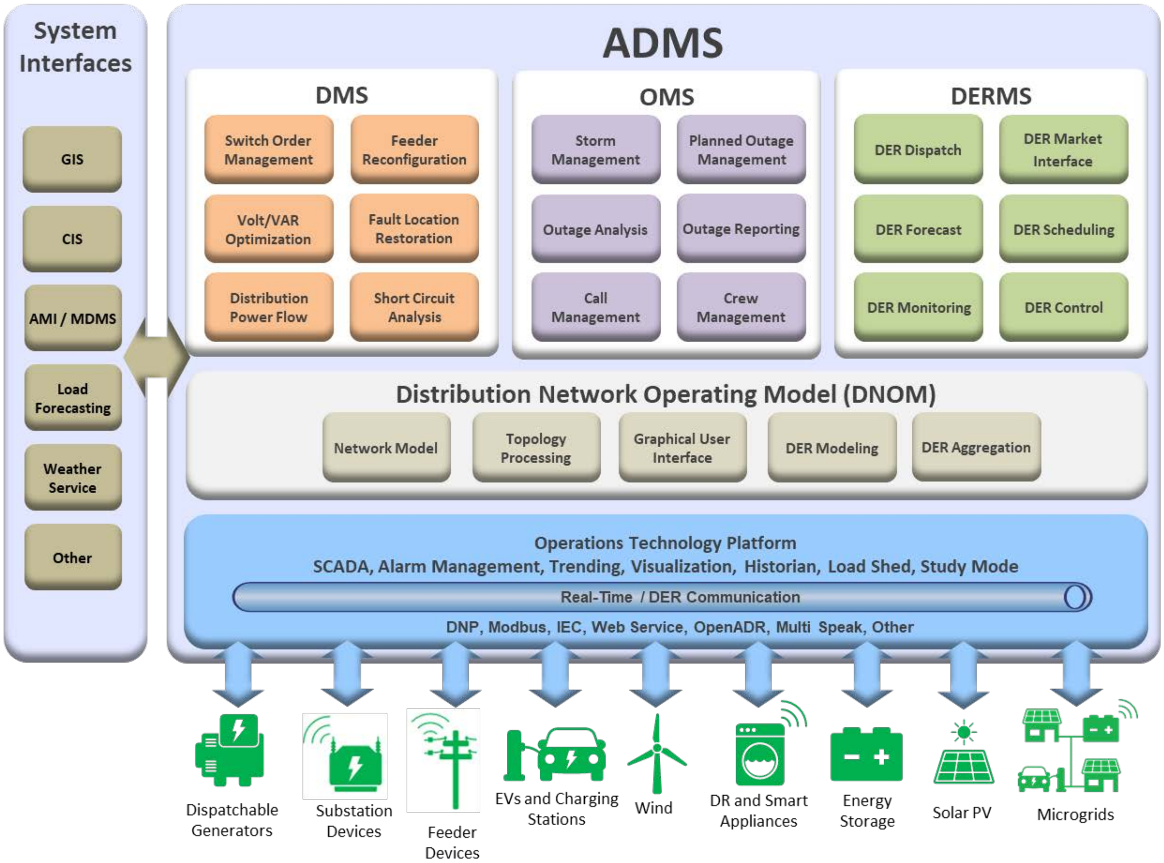
PSEG Long Island also plans to implement a DMS module as part of its ADMS, which will add key grid analysis applications and centralized distribution automation for more efficient system operations and asset utilization. Features of the DMS will include:

- Common, seamless user-interface with a standardized look and feel
- In-depth situational awareness
- Real-time monitoring and control
- Advanced analysis applications
- Centralized distribution automation
- Geographical and schematic views of the distribution system
- Fully functional operational interface for distribution operators

The DMS will provide the following capabilities:

- Distribution power flow to identify real-time voltage, capacity, and operational limit violations
- Distribution state estimator
- Short circuit analysis
- Fault location, isolation, and service restoration (FLISR), to locate faults and determine the switching steps required to isolate damaged equipment and restore service to un-faulted sections
- Feeder reconfiguration, to determine optimum load transfer switching procedures to improve the distribution system performance (e.g., relieve overloads, correct unacceptable voltage conditions)
- Fault protection analysis
- Volt/VAR control and optimization
- Switching order management
- Load estimation based on real-time feeder measurements
- Modeling of various types of DG
- Modeling of real-time field device operations (capacitor banks, load tap changers, voltage regulators, etc.)
- Study mode, to simulate "what-if" scenarios with different load models and system configurations.

**Figure C-1. ADMS Architecture**




### *C.3.5 Advanced Relay Coordination*

The constantly increasing amount of DER on feeders upends this assumption, and protection coordination must now be designed for possible two-way flow under a variety of contingencies. PSEG Long Island plans to develop a robust capability for advanced protection coordination which will provide superior distribution system reliability as it evolves into the DSP.

# Appendix D. Business Case Methodology

PSEG Long Island uses three distinct ways to justify proposed Utility 2.0 investments:

- **Benefit-cost analyses** (BCA) calculate the societal cost test (SCT) ratio of the present value benefits to present value costs as forecasted over the lifetime of an initiative, per the New York Department of Public Service's (DPS's) BCA Framework. This type of justification is performed on full-scale or mature initiatives.
- **Experimental design** is used for pilot projects that may or may not produce a positive net value but are anticipated to be cost-effective once fully deployed. For these projects, a hypothesis (or a set of hypotheses) are stated, and the pilot is designed in a way that either proves or disproves the hypothesis. This approach mimics the approached used by New York State utilities in Reforming the Energy Vision (REV) demonstration projects.
- **Enabling initiatives** are tools, studies, or systems that enable capabilities that align with the REV Guiding Principles but do not have specific monetized benefits directly as a result of the individual initiative.

For the investments proposed in the 2021 Utility 2.0 Plan, PSEG Long Island applied the justifications shown in Table D-1.

**Table D-1. Justifications for New Utility 2.0 Investments**

| Proposed Initiative | Benefit-Cost Analysis (BCA) | Experimental Design | Enabling Initiative |
|---|---|---|---|
| Connected Buildings Pilot | | ✓ | |
| Suffolk County Bus Make-Ready Pilot | | ✓ | |
| Bucket Truck Electrification Plan | | | ✓ |
| Increasing Hosting Capacity | | | ✓ |

Note: Table does not include projects with scope expansions.

## D.1 Funding Request Methodology

For each initiative's funding request, PSEG Long Island splits out the capital and O&M costs by subcategory based on the definitions outlined in Table D-2.

**Table D-2. Funding Request Cost Category Definitions**

| Benefit Stream | Definition |
|---|---|
| **Customer Incentives** | Monetary incentives provided to customers from PSEG Long Island to promote technology adoption. |
| **IT Upgrades** | Costs incurred by PSEG Long Island to upgrade its IT systems. |
| **Marketing and Outreach** | Costs for marketing, outreach, and customer engagement to promote the proposed initiatives. |
| **Materials and Equipment** | Avoided energy and capacity costs associated with reduction in the transmission system loss factor. |

| Benefit Stream | Definition |
|---|---|
| **Ongoing O&M** | Costs incurred in an ongoing basis to maintain assets, equipment, and software. |
| **PM, Labor, and Training** | Costs for program management, additional FTEs required, and various training activities. |
| **Third-Party Support** | Costs for third parties and consultants (i.e., outside services). |

## D.2 Benefit-Cost Analysis Methodology

PSEG Long Island applied New York DPS's BCA Framework to calculate the benefits and costs from the SCT, utility cost test (UCT), and rate impact measure (RIM) test perspectives. Table D-3 summarizes this overall framework by cost test, where value streams labeled as a benefit are counted in the numerator of the benefit-cost ratio, cost streams are counted in the denominator, and N/A streams are not included in the calculation.

**Table D-3. Cost Test Definitions**

| Benefit or Cost Stream | SCT | UCT | RIM |
|---|---|---|---|
| Avoided Generation Capacity Cost (AGCC) | Benefit | Benefit | Benefit |
| Avoided Energy (LBMP) | Benefit | Benefit | Benefit |
| Avoided Transmission Capacity Infrastructure | Benefit | Benefit | Benefit |
| Avoided Transmission Losses | Benefit | Benefit | Benefit |
| Avoided Ancillary Services | N/A | Benefit | Benefit |
| Wholesale Market Price Impacts | N/A | Benefit | Benefit |
| Avoided Distribution Capacity Infrastructure | Benefit | Benefit | Benefit |
| Avoided O&M | Benefit | Benefit | Benefit |
| Avoided Distribution Losses | Benefit | Benefit | Benefit |
| Avoided Restoration Costs | Benefit | Benefit | Benefit |
| Avoided Outage Costs | Benefit | N/A | N/A |
| Net Avoided $CO_2$ | Benefit | N/A | N/A |
| Net Avoided $SO_2$ and NOx | Benefit | N/A | N/A |
| Avoided Water Impacts | Benefit | N/A | N/A |
| Avoided Land Impacts | Benefit | N/A | N/A |
| Net Non-Energy Benefits | Benefit | N/A | N/A |
| Gained Utility Revenue | N/A | N/A | Benefit |
| Program Administration Costs | Cost | Cost | Cost |
| Utility Incentives | N/A | Cost | Cost |
| Added Ancillary Service Costs | Cost | Cost | Cost |
| Incremental T&D and DSP Costs | Cost | Cost | Cost |
| Participant DER Cost | Cost | N/A | N/A |
| Lost Utility Revenue | N/A | N/A | Cost |
| Shareholder Incentives | N/A | Cost | Cost |
| Net Non-Energy Costs | Cost | N/A | N/A |

The value streams in Table D-4 were added to the original DPS BCA Framework to help add clarity to the model.

**Table D-4. Added Cost Test Definitions**

| Benefit or Cost Stream | SCT | UCT | RIM |
|---|---|---|---|
| Avoided Energy and Capacity Benefits | Benefit | Benefit | Benefit |
| Gained Utility Revenue | N/A | N/A | Benefit |
| Fuel Switching Benefits | Benefit | N/A | N/A |
| IT Infrastructure Costs | Cost | Cost | Cost |
| Fuel Switching Costs | Cost | N/A | N/A |
| Added Energy (LBMP) | Cost | Cost | Cost |
| Added Generation Capacity Cost | Cost | Cost | Cost |
| Added T&D Capacity Infrastructure | Cost | Cost | Cost |
| Utility Incentives | N/A | Cost | Cost |

Table D-5 provides the definitions of each benefit stream considered in this plan's business case.

**Table D-5. Benefit Stream Definitions**

| Benefit Stream | Definition |
|---|---|
| **Avoided Generation Capacity Cost (AGCC)** | Avoided generation capacity costs associated with a reduction in bulk system-coincident peak demand. |
| **Avoided Energy (LBMP)** | Avoided wholesale energy costs associated with a reduction in energy purchases at the wholesale level. |
| **Avoided Transmission Capacity Infrastructure** | Avoided infrastructure costs associated with a reduction in transmission system-coincident peak demand. |
| **Avoided Transmission Losses** | Avoided energy and capacity costs associated with reduction in the transmission system loss factor. |
| **Avoided Ancillary Services** | Avoided costs associated with a reduction in ancillary services requirements. |
| **Wholesale Market Price Impacts** | Benefit associated with downward pressure on energy and capacity prices due to energy and peak load reductions, respectively. |
| **Avoided Distribution Capacity Infrastructure** | Avoided infrastructure costs associated with a reduction in distribution system-coincident peak demand. |
| **Avoided O&M** | Benefit associated with reduced utility operations and maintenance costs. |
| **Avoided Distribution Losses** | Avoided energy and capacity costs associated with reduction in the distribution system loss factor. |
| **Avoided Restoration Costs** | Reduced restoration costs borne by the utility associated with restoring power during outages in a more efficient manner or avoiding outages events. |
| **Avoided Outage Costs** | Benefit to customers due to a reduction in the frequency and/or duration of outages. |
| **Net Avoided $CO_2$** | Benefit to society associated with reduced carbon emissions due to reductions in wholesale energy or reduced direct emissions from gasoline vehicles and DER. |
| **Net Avoided $SO_2$ and NOx** | Benefit to society associated with reduced sulfur oxide and nitrogen oxide pollutant emissions due to reduced direct emissions from gasoline vehicles and DER. |

| Benefit Stream | Definition |
|---|---|
| **Avoided Water Impacts** | Qualitative benefit associated with reducing water consumption. |
| **Avoided Land Impacts** | Qualitative benefit associated with reducing water consumption. |
| **Net Non-Energy Benefits** | Qualitative benefit associated with non-energy benefits such as customer satisfaction. |
| **Gained Utility Revenue** | Increase in utility revenue due to increased sales (e.g., from electric vehicles) or revenue protection (e.g., theft detection). |
| **Avoided Energy and Capacity Benefits** | Avoided wholesale energy and capacity costs associated with reductions in energy purchases at the wholesale level and in bulk-system coincident peak demand due to energy efficiency programs. |
| **Fuel Switching Benefits** | Benefit to customers associated with monetary savings due to reduced fuel consumption. |

Table D-6 provides the definitions of the cost streams considered in this plan's business cases.

**Table D-6. Cost Stream Definitions**

| Cost Stream | Definition |
|---|---|
| **Program Administration Costs** | Costs borne by the utility to administer initiatives and projects. This cost category is generally applicable to the DER projects. |
| **Utility Incentives** | Incentives paid from the utility to customers. |
| **Added Ancillary Service Costs** | Costs associated with DER causing additional ancillary service costs onto the system. |
| **Incremental T&D and DSP Costs** | Costs of building additional T&D infrastructure and enabling DSP capabilities. |
| **Participant DER Cost** | Equipment and participation costs borne by DER providers/customers. |
| **Lost Utility Revenue** | Reduced revenue to the utility (i.e., bill savings). |
| **Shareholder Incentives** | Annual costs to ratepayers of utility shareholder incentives. |
| **Net Non-Energy Costs** | Qualitative assessment of non-energy costs. |
| **IT Infrastructure Costs** | Costs of deploying upgraded IT infrastructure. |
| **Fuel Switching Costs** | Incremental cost to participating customers associated with fuel switching that are not encompassed within Participant DER Costs. |
| **Added Energy (LBMP)** | Added wholesale energy costs associated with increase in energy purchases at the wholesale level. |
| **Added Generation Capacity Cost** | Added generation capacity costs associated with increase in bulk system-coincident peak demand. |

| Cost Stream | Definition |
|---|---|
| **Added T&D Capacity Infrastructure** | Added infrastructure costs associated with increase in transmission system- and distribution system-coincident peak demand. |

# Appendix E. LIPA and PSEG Long Island Structure

As the owner of the system, Long Island Power Authority (LIPA) has the means to raise capital and plays an extensive oversight role. Oversight is bolstered by New York Department of Public Service (DPS), the New York State utility regulatory authority that provides a due diligence and advisory role to LIPA regarding retail rates and the content and direction of the Utility 2.0 programs.

## E.1 Long Island Power Authority

LIPA is a New York Public Authority that owns the electric T&D system on Long Island, New York. LIPA provides electric service to approximately 1.1 million customers in Nassau and Suffolk Counties and on the Rockaway Peninsula in Queens on Long Island. LIPA acquired responsibility for electric services on Long Island in 1998. At that time, LIPA acquired the electric T&D assets of Long Island Lighting Company (LILCO), KeySpan Corporation acquired LILCO's natural gas distributions assets, and LILCO's electric generating assets on Long Island. Exhibit I-1 provides an overview of the service territory. LIPA does not provide natural gas service or own any on-island generating assets.

LIPA as the owner of the utility plant retains the ultimate authority and control over the assets comprising the T&D System and as such has continuing oversight responsibilities and obligations with respect to the operation and maintenance of the T&D System, under the direction of the LIPA Board of Trustees. LIPA must obtain approval from the New York State Comptroller's Office for contracts in excess of $50,000. LIPA is also subject to the State Administrative Procedure Act, the Public Authorities Law, the State Finance Law, and various New York State Executive Orders.

## E.2 LIPA Board of Trustees

LIPA is governed by a Board of Trustees (LIPA Board) consisting of nine members appointed by the Governor, the President of the Senate, and the Speaker of the Assembly. The LIPA Board approves the electric charges and budgets and has policy making, oversight and regulatory obligations for the Long Island T&D system.

## E.3 PSEG Long Island (Service Provider)

PSEG Long Island is a wholly owned subsidiary of PSE&G headquartered in Newark, New Jersey. PSEG Long Island is fully dedicated to LIPA's operations and provides operations, maintenance, and related contract services for the T&D system, including:

- T&D operations to include electric transmission, distribution, engineering, system planning, and load serving activities for the safe and reliable operation and maintenance of the T&D system
- Capital planning development and execution of approved annual capital budget
- Management of rates, tariffs, and load forecasting functions, including performance of system revenue requirement
- Planning, deployment, and oversight of EE programs
- Management of all financial systems and reporting related to T&D operation
- Legal and regulatory related to T&D operation
- Energy markets

- Contract administration for LIPA owned or contracted generation assets
- Community and governmental relations related to T&D operation
- Performance measurement and reporting
- Treasury related to T&D operation
- Customer care, billing, and collections

The costs of operating and maintaining the Authority's T&D system incurred by PSEG Long Island are paid by the Authority. PSEG Long Island is paid a management fee and may earn incentives related to specified performance metrics outlined in the Operation Services Agreement. The structure is symmetrical where PSEG Long Island can earn an upward incentive and can, under certain circumstances, be assessed a penalty against the fixed component of the Management Services Fee.

The Amended & Restated Operating Services Agreement has a term of 12 years expiring on December 31, 2025, with a provision allowing for an 8-year extension.

In its role as Service Provider, PSEG Long Island is the face to the customer of the LIPA system with responsibility for all external branding, customer, and public communications.

The operating business is divided between the PSEG Long Island ManageCo that contains the senior management personnel and ServeCo that contains the balance of the employees. By design, the ManageCo is in place as long as PSEG Long Island remains in the role of Service Provider, while the ServeCo is directed by the ManageCo, would remain in place to support a successor Service Provider.

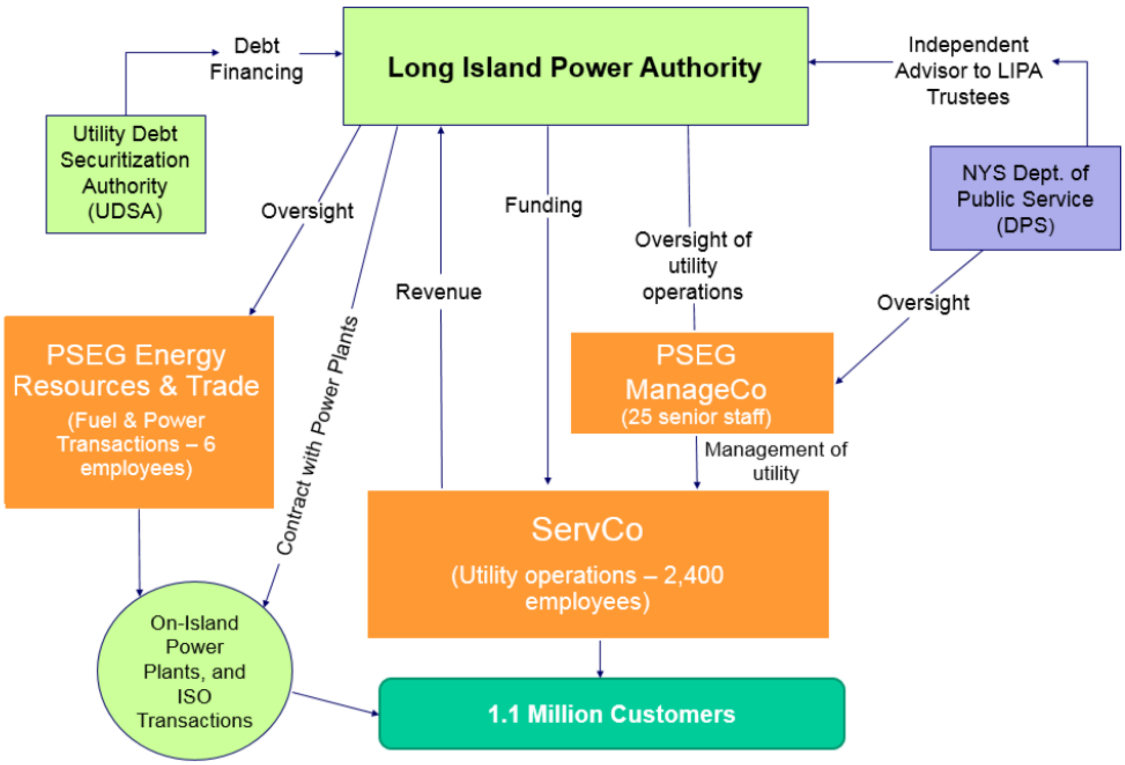
## E.4 New York DPS

New York DPS, as the state utility regulator and implementing agency for REV, plays a vital advisory role with respect to PSEG Long Island's annual Utility 2.0 Plan review. The amended LIPA Reform Act provides for LIPA to submit its annual Utility 2.0 Plan to the New York DPS for review. Public Service Law §§3-b(3)(a) and (g), authorizes New York DPS to review and make recommendations to LIPA with respect to rates and charges, including those related to energy efficiency and renewable energy programs, and more specifically, to review and make recommendation with respect to any proposed plan submitted by LIPA or its Service Provider related to implementation of such plans.

Consistent with the direction set out in the Amended Operations Services Agreement, PSEG Long Island actively engages with New York DPS in the development of each year's plan update, seeking input throughout to foster alignment in terms of the direction of the plan across LIPA, New York DPS, and PSEG Long Island. Each year the findings and recommendations provided by New York DPS is a critical step to the advancement of the program.

## E.5 LIPA's Public-Private Partnership Structure

**Figure E-1. LIPA's Public-Private Partnership Structure**




### Risks Managed by the Parties

Ultimately, LIPA owns all risks of the utility: those managed by PSEG Long Island as service provider and those that are managed by LIPA.

### Managed by LIPA:

- Strategic direction of the organization, electric rates, and budgets
- Risk management – ultimately responsible to protect the value of the system
- System ownership – ultimately responsible for the condition of the system
- Cash management – including issuance and management of debt to fund capital expenditures
- Long-term contracts – execute long-term power supply contracts
- Grant eligibility – qualify for and comply with federal and state grants

### Managed by the Service Provider:

- Customer and Brand Reputation – face of the utility
- Electrical System reliability and service standards within Operations Services Agreement metrics
- Customer Experience and Satisfaction within Operations Services Agreement metrics
- EE and DG within Operations Services Agreement metrics
- Administers Power Supply and Clean Energy Standard Procurements

# Appendix F. Acronyms and Abbreviations

| | |
|---|---|
| ADMS | Advanced Distribution Management System |
| AGCC | Avoided Generation Capacity Cost |
| AI | Artificial Intelligence |
| AMI | Advanced Metering Infrastructure |
| BCA | Benefit-Cost Analysis |
| BEV | Battery Electric Vehicle |
| BTM | Behind-the-Meter |
| Btu | British thermal unit |
| C&I | Commercial and Industrial |
| CAPEX | Capital Expenditure |
| CEP | Commercial Efficiency Program |
| Climate Act | Climate Leadership and Community Protection Act |
| $CO_2$ | Carbon Dioxide |
| CRM | Customer Relationship Management |
| CS-MR | Customer-Side Make-Ready |
| CSR | Customer Service Representative |
| CSRP | Commercial System Relief Program |
| CVR | Conservation Voltage Reduction |
| DAC | Disadvantaged Community |
| DCFC | Direct Current Fast Charging |
| DER | Distributed Energy Resources |
| DG | Distributed Generation |
| DLC | Direct Load Control |
| DLM | Dynamic Load Management |
| DLRP | Distribution Load Relief Program |
| DPS | Department of Public Service |
| DR | Demand Response |
| DSP | Distributed System Platform |
| e-bus | Electric Bus |
| EE | Energy Efficiency |
| EEDR | Energy Efficiency and Demand Response |
| EEP | Energy Efficient Products |

| | |
|---|---|
| EFS | Energy Finance Solutions |
| ESCO | Energy Service Company |
| ETR | Estimated Time of Restoration |
| EV | Electric Vehicle |
| EVSE | Electric Vehicle Supply Equipment |
| FTE | Full-Time Equivalent |
| GHG | Greenhouse Gas |
| GIS | Geographic Information System |
| HEM | Home Energy Management |
| HPwES | Home Performance with ENERGY STAR |
| HVAC | Heating, Ventilation, and Air Conditioning |
| IOAP | Interconnection Online Application Portal |
| IT | Information Technology |
| JU | Joint Utilities |
| KPI | Key Performance Indicator |
| kV | Kilovolt |
| KVAR | Kilowatt and Reactive Power |
| kW | Kilowatt |
| kWh | Kilowatt-Hour |
| LBMP | Location-Based Marginal Pricing |
| LED | Light-Emitting Diode |
| LILCO | Long Island Lighting Company |
| LIPA | Long Island Power Authority |
| LMI | Low-to-Moderate Income |
| LSRV | Locational System Relief Value |
| m | Meter |
| MDMS | Meter Data Management System |
| MMBtu | Million British Thermal Units (Btu) |
| MOU | Memorandum of Understanding |
| MVA | Mega Volt-Amp |
| MVAr | Mega Volt-Amp Reactive |
| MW | Megawatt |
| MWh | Megawatt-Hour |
| NPV | Net Present Value |
| NWS | Non-Wires Solution(s) |

| | |
|---|---|
| NYSERDA | New York State Energy Research and Development Authority |
| O&M | Operations and Maintenance |
| OEM | Original Equipment Manufacturer |
| OMS | Outage Management System |
| OSHA | Occupational Safety and Health Administration |
| PAC | Program Administrator Cost |
| PHEV | Plug-in Hybrid Electric Vehicle |
| PM | Project Management |
| PMO | Program Management Office |
| PPE | Personal Protection Equipment |
| PSEG | Public Service Enterprise Group Incorporated |
| PV | Photovoltaics |
| QA/QC | Quality Assurance/Quality Control |
| RCS | Remote Connect Switch |
| REAP | Residential Energy Affordability Partnership |
| REC | Renewable Energy Credit |
| REV | Reforming the Energy Vision |
| RFI | Request for Information |
| RFP | Request for Proposal |
| RIM | Ratepayer Impact Measure |
| SaaS | Software as a Service |
| SAFE | Safer Affordable Fuel Efficient |
| SCADA | Supervisory Control and Data Acquisition |
| SCT | Societal Cost Test |
| STS | Suffolk Transportation Services |
| T&D | Transmission and Distribution |
| TBtu | Trillion British thermal units |
| TOU | Time of Use |
| UCT | Utility Cost Test |
| UoF | Utility of the Future |
| US | United States |
| US-MR | Utility-Side Make-Ready |
| Utility 2.0 Plan | Utility 2.0 Long Range Plan |
| V2G | Vehicle-to-Grid |
| VAR | Volts-Amp-Reactive |

| | |
|---|---|
| VDER | Value of Distributed Energy Resources |
| VVO | Volt-VAR Optimization |
| ZEV | Zero-Emission Vehicle |