



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

2020 Annual Update

Prepared for Long Island Power Authority

July 1, 2020

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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. PSEG Long Island seeks a positive recommendation on the Utility 2.0 Plan from DPS and incremental funding approval from LIPA.

The first Utility 2.0 Plan was submitted in July 2014, and the 2020 Utility 2.0 Plan is an update to that plan and its prior iterations. The 2020 Utility 2.0 Plan reflects PSEG Long Island adapting to the changing needs of its customers, advancing technology, and the policy direction and goals developed within the Reforming the Energy Vision (REV) process in New York and in alignment with New York State's Climate Leadership and Community Protection Act (CLCPA). The initiatives detailed in this Utility 2.0 Plan encompass innovative offerings and foundational capabilities that will empower customers, improve system efficiency, and reduce greenhouse gas emissions.

In addition to the Utility 2.0 Plan, this document includes the 2021 update of the **Energy Efficiency and Demand Response (EEDR) Plan** (Appendix A). PSEG Long Island's energy efficiency programs (EE) 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.

Long Island Is a Leader in New York's Energy Future

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 (selected highlights included in Figure ES-1 below). Long Island is home to the State's most aggressive energy efficiency programs, its three largest utility-scale solar projects, the most 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. These initiatives are consistent with REV and State policy objectives, are cost-effective, and will help New York meet its ambitious decarbonization goals, as stated in the CLCPA.

Leader in deploying advanced metering infrastructure (AMI): LIPA began deploying AMI meters through pilot projects and targeted installations as early as 2009. Through these initiatives LIPA, and beginning in 2014, PSEG Long Island, have learned about customer impacts of AMI, how to integrate technology systems, and the need for process changes and workforce training to support the installation and automation of meter-related activities. In 2018, LIPA approved the Utility 2.0 Plan which included an AMI program to expand meter deployment and AMI-enabled capabilities and customer tools across Long Island. To date, PSEG Long Island has deployed meters faster than they had planned and has launched new customer engagement initiatives and tools which leverage data from these new meters.

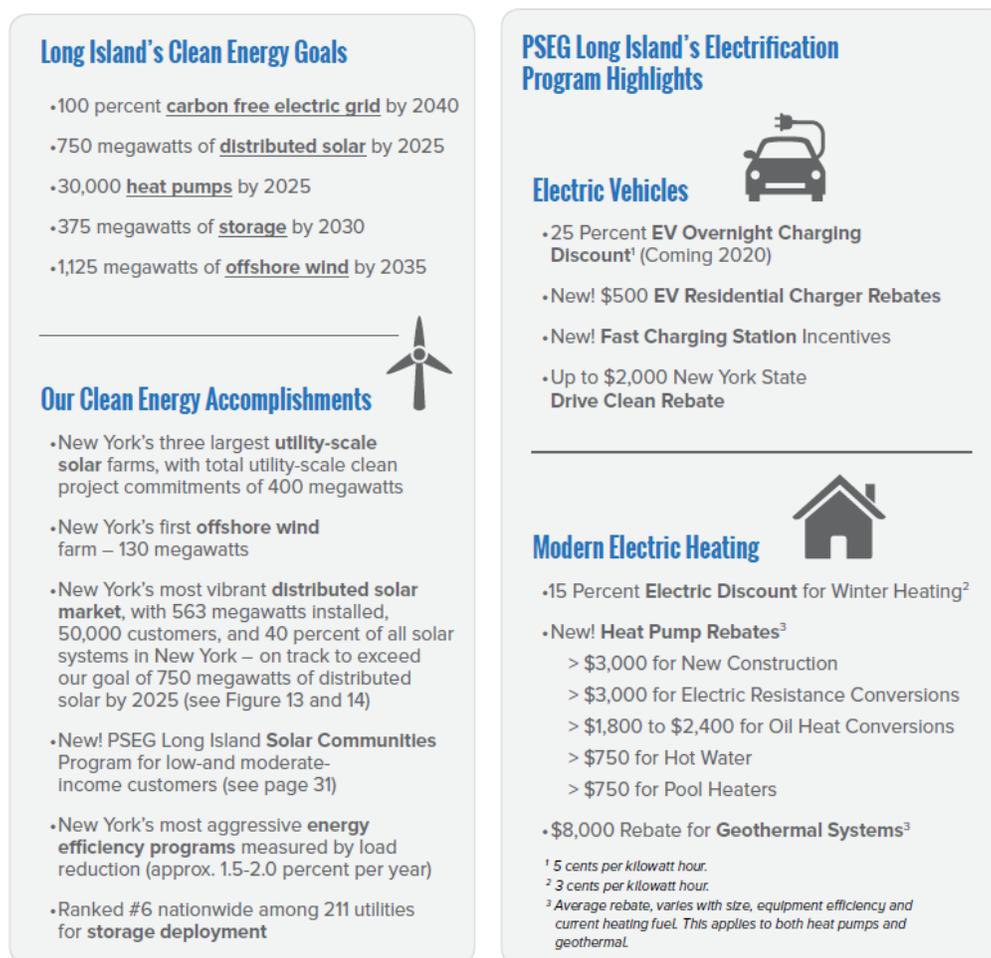
First-of-its-kind energy storage tariff: The Behind-the-Meter (BTM) Battery program uses LIPA's existing tariffs from the Commercial System Relief and Dynamic Load Relief programs to offer incentives for qualifying battery storage equipment—whether paired with distributed energy resources (DER) or standalone—in exchange for customers enrolling and participating in the programs. The BTM battery program has a lock-in period of 10 years to match the warranty length of most battery storage systems. The goal of the BTM battery program is to catalyze the local availability of energy storage for the commercial and residential market while providing load relief, especially in areas of the grid where peak demand needs are most critical. The modifications that allow for energy storage also make it possible for

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net energy metering and Value of DER (VDER) customers to participate in the Commercial System Relief and Dynamic Load Relief programs, expanding the capabilities of residential and commercial customers with dispatchable DER technologies to participate in demand response (DR) events.

Leader in New York State for energy efficiency: PSEG Long Island continues to build on the historic EE initiatives undertaken by LIPA. The Utility's efficiency 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 heating, ventilation, and air conditioning (HVAC) systems. PSEG Long Island keeps improving its offerings and launched an all-electric heat pump replacement and new construction programs in 2019.

Figure ES-1. Highlights of Clean Energy Successes on Long Island



Source: Powering Long Island: Clean, Lean, and Customer First, LIPA, December 18, 2019

Leader in the State for rooftop solar photovoltaics (PV): Long Island is home to New York's most vibrant distributed solar market, with 651 MW installed, 51,000 customers, and 37% of all solar systems in New York. PSEG Long Island is on track to exceed its goal of 750 MW of distributed solar by 2025.¹

Feed-in tariffs for solar: LIPA is the only utility in New York State that has offered feed-in tariffs for renewable generation. Such tariffs have led to 94 power purchase agreements totaling 86 MW of solar

¹ The cited solar PV installation data are valid as of June 2020, which is why they do not match the data shown in Figure ES-1.

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PV. About 77 MW of this capacity is now in operation, with the remainder in various stages of permitting and construction.

Solar Communities for Low-to-Moderate Income (LMI) Customers: LIPA and PSEG Long Island recently initiated a new 20 MW feed-in tariff program called Solar Communities bringing community solar to LMI, who are underserved by existing rooftop solar programs.

Largest utility-scale solar projects: In addition to the feed-in tariffs, LIPA has power purchase agreements with several developers of large utility-scale solar projects, including Riverhead Solar 2 (36 MW; pending), Long Island Solar Farm (31 MW), Shoreham Solar Commons (25 MW), Long Island Solar Calverton (23 MW), and Eastern Long Island Solar Project (11 MW).

South Fork portfolio for non-wires solutions (NWS): LIPA has four significant contracts for NWS in South Fork; 130 MW of offshore wind, two 5 MW battery storage contracts (80 MWh total), and 9.8 MW of DR and EE.

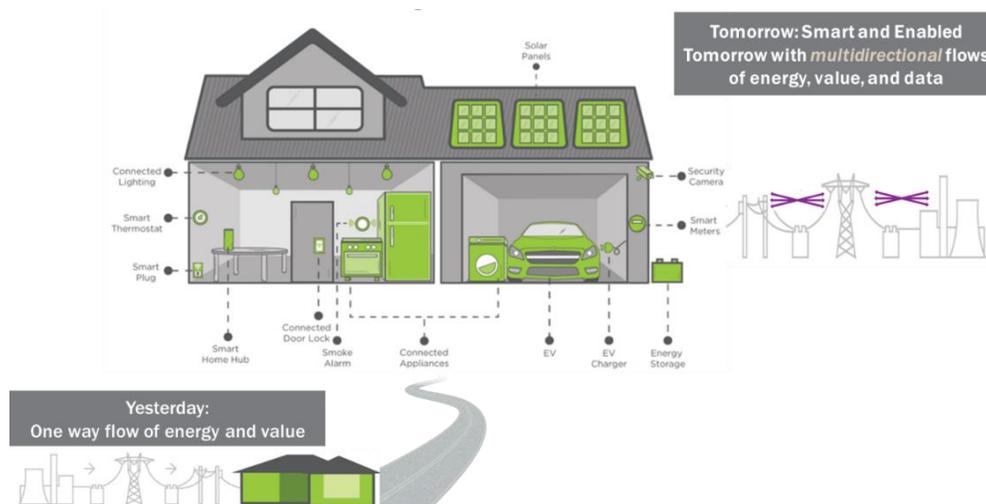
Utility 2.0 Vision and Pathway

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

New York's CLCPA law, 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 emissions 40% by 2030 and 85% by 2050. New York also adopted a comprehensive energy strategy to build a clean, more resilient, and affordable energy system through REV. REV seeks to strengthen and modernize New York's energy system by spurring innovation, acting on climate change, improving consumer choice, and creating economic opportunity throughout the State.

The factors described above converge to emphasize clean customer options and a more agile distribution grid (Figure ES-2), driving the need for the evolution of the distribution utility.

Figure ES-2. PSEG Long Island's Customer and Grid of the Future



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PSEG Long Island's Utility 2.0 vision is to continue to be a customer-centric, innovative, and forward-looking utility to address industry change, New York's energy policy objectives, and the needs and interests of its customers (Figure ES-3).

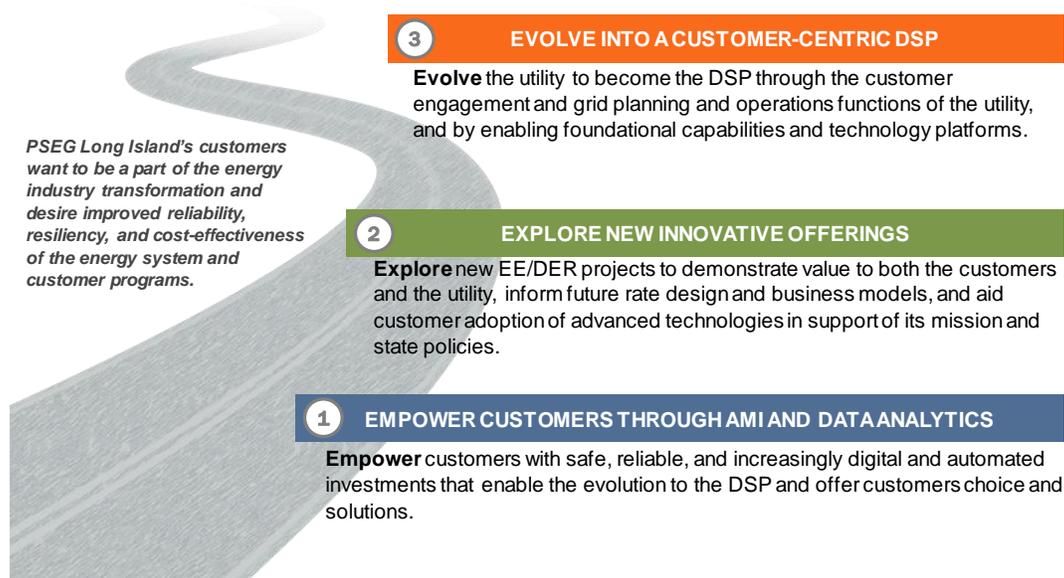
Figure ES-3. PSEG Long Island's Utility 2.0 Vision

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 advanced metering infrastructure (AMI), exploring new offerings, and evolving to become the utility of the future, including performing functions of the Distributed System Platform (DSP), for Long Island and the Rockaways.

Through the proposed programs, initiatives, and projects in the Utility 2.0 Plan, PSEG Long Island will act on this vision and continue to transform into a clean and distributed electric system, consistent with REV and the State's clean energy policies. PSEG Long Island's strategic pathway is divided into a three-part progression (Figure ES-4):

- 1. Empower Customers through AMI and Data Analytics:** PSEG Long Island will use AMI and related capabilities as a foundational enabler to deliver greater digital insights to its customers. PSEG Long Island intends to monitor the success of its initiatives in this space, evolving or adding to them based on direct customer feedback through customer engagement plans and following successful pilots.
- 2. Explore New Innovative Offerings:** PSEG Long Island will test new ideas, offerings, and technologies through time-limited programs or pilot projects that will provide the Utility with more experience around new technologies, solutions, and customer strategies that support the New York's clean energy goals.
- 3. Evolve into a Customer-Centric Distributed System Platform:** PSEG Long Island will invest in platforms and tools that support grid planning and operations, while enabling foundational capabilities that support its transition to a DSP. PSEG Long Island will do so by leveraging AMI data and capabilities and lessons learned from its new offerings.

Figure ES-4. PSEG Long Island's Strategic Pathways



Progress of Approved Utility 2.0 Initiatives

In 2018 and 2019, the LIPA Board of Trustees approved the initiatives shown in Figure ES-5, as proposed in PSEG Long Island’s respective annual Utility 2.0 Plans.

Figure ES-5. 2018 and 2019 Utility 2.0 Approved Programs

 Empower Customers Solutions that empower customers by improving the way they interact with their energy provider and offer tools and choice for DER solutions and payment options	 Explore New Offerings Pilots that test how new system capabilities and customer resources can monitor and interact between them to improve system efficiency and reduce greenhouse gas emissions	 Evolve into the DSP Studies, pilots, and foundational capabilities to enable the DSP, with efficient management of grid assets and quicker and more cost-effective DER interconnection
AMI Technology and Systems – Smart Meter Deployment	Super Savers: NWS with Targeted Energy Efficiency	Utility of the Future Team
Customer Engagement	Behind-the-Meter (BTM) Storage with Solar	Locational Value Study
AMI-Enabled Capabilities	EV Program	Non-Wires Solution Planning Tool
Data Analytics	Next Generation Insights Pilot	Utility-Scale Storage Program – Miller Place
Data Privacy	Energy Concierge Pilot	Interconnection Online Application Portal (IOAP)
Program Implementation Support: Business Process Design, Change Management	FlexPay – An Enhanced Prepay Program Concept*	CVR/VVO Study
	On-Bill Financing Program Concept*	Hosting Capacity Maps
	Electric School Bus Vehicle-to-Grid Pilot	
	Heat Pump Controls Pilot	

* Implementation Plan Only

In 2019, PSEG Long Island began implementing the initiatives proposed and approved in the 2018 Utility 2.0 Plan. This implementation will include the full-scale deployment of AMI across Long Island, as well as several other customer offerings and critical DSP capabilities. Because 2019 marked PSEG Long Island’s first steps to implement initiatives funded for four years, and ones that expects to yield benefits over the 20 years of its business case, PSEG Long Island took care to design capabilities, procure vendors, and begin work in ways that would set itself and its customers up for success. Throughout this inaugural year, PSEG Long Island gained insights, learned several lessons, and adjusted its direction where needed, as would be expected for such a comprehensive program affecting all aspects of their organization.

AMI is the foundational technology that enables the benefits and capabilities described in the 2018 Utility 2.0 Plan. Leveraging the Utility’s experience from past meter deployments, PSEG Long Island’s metering teams had an effective year, installing 305,000 meters by the end of 2019—133% of the annual goal. This success is the result of well-established processes and increased flexibility for meter installations, including by offering customers appointments on Saturdays and off-hours.

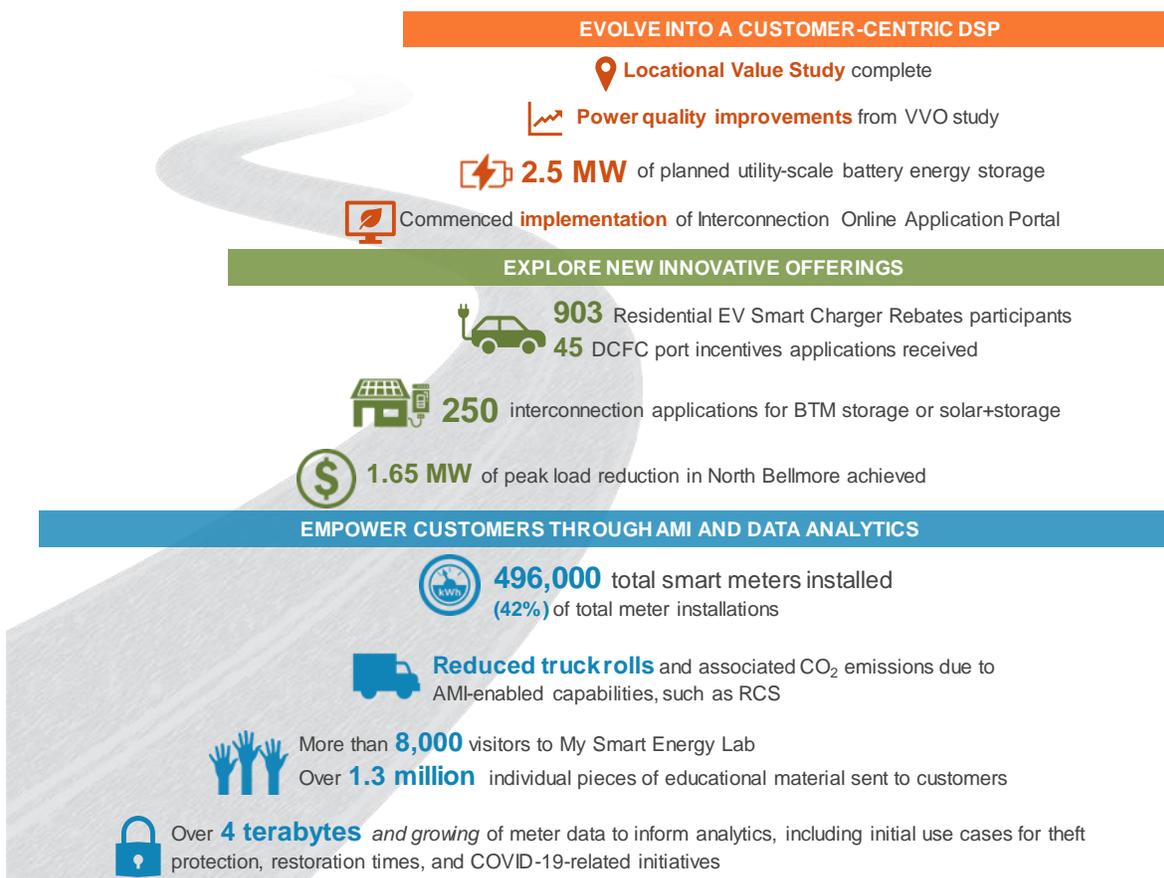
Parallel to the installation of AMI, PSEG Long Island started developing high value AMI-enabled capabilities, data analytics, and process changes that are critical to creating and capturing the benefits of an AMI program to customers and to society at large. In 2019, PSEG Long Island launched an initial set of capabilities, including remote connect/disconnect, outage management system (OMS) integration, and

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theft analytics. These capabilities have started to yield benefits within 2019, as highlighted in Figure ES-6 below (the image includes benefits accrued through the end of Q1 2020).

The AMI meter installation was supported by an extensive customer engagement initiative focused initially on early outreach to customers and followed by post-installation communications and surveys. As a result of the effective communication, PSEG Long Island saw the number of customers declining the advanced meter installation (also known as the “opt-out rate”) fall from 0.77% in the first quarter to 0.57% at the end of 2019, which is below the target of 0.59% that PSEG Long Island had set. PSEG Long Island also made customers aware of the features of AMI and how they can access tools that can help them understand their energy usage and conserve energy, such as My Account, an online suite of user-friendly tools, and the PSEG Long Island mobile app.

Figure ES-6. Success of Ongoing Utility 2.0 Initiatives as of End of Q1 2020



In 2019, PSEG Long Island also launched new customer offerings to promote the adoption of clean energy technologies in support of New York State’s clean energy goals. These offerings include programs to support electric vehicles (EVs) and BTM storage (including an innovative tariff structure) as well as the Super Savers program which is aimed at reducing peak in North Bellmore through targeted energy efficiency.

Overarching to these initiatives is PSEG Long Island’s vision to create an intelligent and customer-centric energy system that can seamlessly integrate DER, known as the DSP under New York’s REV. In 2019, PSEG Long Island advanced analytical efforts centered around leveraging AMI data for customer voltage optimization, locational value studies, and NWS planning tools. PSEG Long Island also began procuring

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its first distribution-level utility-scale energy storage project and began the implementation of an Interconnection Online Application Portal (IOAP).

In 2020, PSEG Long Island launched additional initiatives that were proposed and approved in the 2019 Utility 2.0 Plan. These initiatives include pilots for next-generation insights, energy concierge, heat pump controls, and electric school bus vehicle-to-grid (V2G). PSEG Long Island is also building out its DSP capabilities by developing Hosting Capacity Maps to inform customers and developers of areas on the grid that can accommodate DER.

Performance and Budget Reporting for 2019

The projects approved in the 2018 Utility 2.0 Plan were forecast to have societal benefits (net present value) over 20 years, as detailed in a benefit-cost analysis (BCA) and consistent with New York State utility practice.² In accordance with DPS recommendations, PSEG Long Island provides tracking of actual progress and spend against the original business case.³ Within this Utility 2.0 Plan, PSEG Long Island includes an update on the progress made to-date of all initiatives, as well as a year-end accounting of project performance to scope, schedule, benefits, and budget for all projects that were approved in the 2018 Utility 2.0 Plan and began implementation in 2019. Progress for projects approved in the 2019 Utility 2.0 Plan are currently reported in quarterly updates to DPS and LIPA, and a full progress update and funding reconciliation for these projects will be included in the 2021 Utility 2.0 Plan.

Table ES-1. Utility 2.0 Projected and Realized Program Benefits in 2019

Pathway	Initiative	Projected 2019 (\$M)	Realized 2019 (\$M)	Variance ⁴
Empower Customers through AMI and Data Analytics	AMI and AMI-Enabled Capabilities	5.99	5.39	(0.59)
	EV Programs ⁵		N/A	N/A
Explore New Innovative Offerings	Super Savers (North Bellmore)	0.35	0.17	(0.18)
	BTM Storage Program	0.05	-	(0.05)
Total		6.39	5.56	(0.83)

In 2019, the first year of implementation of AMI, enabled capabilities, innovative customer offerings, and DSP-enabling initiatives proposed and approved in 2018, PSEG Long Island began to accrue benefits for its customers in these program areas, as shown in Table ES-1 above. These realized benefits are proportional to the level of AMI deployment, the functional maturity of AMI-enabled capabilities, and the program spend in 2019. Each year, more benefits will be realized as AMI is further deployed on Long Island and as additional AMI-enabled capabilities and other Utility 2.0 projects are implemented and

² Benefit-cost analyses (BCAs) follow the June 2020 Benefit-Cost Assessment (BCA) Handbook with minor adjustments.

³ The benefits reported in the 2020 Utility 2.0 Plan are calculated using methodologies that are consistent with the ones used in the BCAs that were filed for the projects, when funding was requested in the 2018 Utility 2.0 Plan. 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 the Utility 2.0 Plan.

⁴ Benefits variances calculated as Realized Benefits minus Projected Benefits. As such, projects that over-perform compared to plan are shown as positive values.

⁵ Excludes the EV programs, which are not compared to original projections due to a change in methodology in measuring the benefits. See Appendix B.8.3 for more detail.

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matured. Also, the timing of when benefits are realized can vary because multiple technologies, vendors, and operational business processes are being implemented across the PSEG Long Island organization over the projects' lifetimes.

In 2019, PSEG Long Island's focus was to get planned initiatives and capabilities started, which for some initiatives included hiring new team members and third-party solution providers. In some cases, projects took longer to launch than expected, and the original budgets did not always account for this ramp-up period. As a result, some projects spent less in 2019 than the original projections (shown in Table ES-2). Given this was the first year for a set of initiatives that are funded for four years, PSEG Long Island intends to utilize approved funding in the remaining years of the initiatives to achieve the scope that was originally proposed, unless otherwise noted. In some cases, project schedules were extended accordingly.⁶

Table ES-2. Summary of 2019 Funding Spend⁷

Pathway	Initiative	Capital (\$M)			O&M (\$M)			Total Variance
		2019 Budget	2019 Spend	Variance	2019 Budget	2019 Spend	Variance	
Empower Customers through AMI and Data Analytics	AMI Core: Meter Reading and Meter Service ⁸	50.06	50.19	(0.13)	1.02	1.18	(0.16)	(0.28)
	AMI-Enabled Capabilities	5.30	3.52	1.78	0.59	0.26	0.33	2.11
	Program Implementation Support	2.00	1.64	0.36	0.25	-	0.25	0.61
	Customer Engagement	-	-	-	4.24	1.01	3.23	3.23
	Rate Modernization	9.50	1.59	7.91	6.14	0.57	5.57	13.49
	Data Analytics	3.80	2.08	1.72	1.05	0.09	0.96	2.69
Explore New Innovative Offerings	Super Savers	-	-	-	1.99	0.48	1.51	1.51
	BTM Storage	-	-	-	0.10	0.06	0.04	0.04
	EV Program	-	-	-	2.26	0.63	1.64	1.64
Evolve into the Customer-Centric DSP	Utility of the Future/ CVR / JU	0.30	0.26	0.04	0.80	0.16	0.64	0.68
	Locational Value Study	1.00	0.20	0.80	-	-	-	0.80
	NWS Planning Tool	-	-	-	0.50	-	0.50	0.50
	IOAP Phase 1	-	-	-	-	-	-	-
	Grid Storage – Miller Place	-	0.09	(0.09)	0.30	-	0.30	0.21
Total		71.96	59.55	12.41	19.24	4.42	14.82	27.23

⁶ In some cases, funding may be shifted between years and projects within the Utility 2.0 program. See details in Appendix B.

⁷ Funding reconciliation variances are calculated as Budget minus Spend. As such, projects that underspent compared to plan are shown as positive values.

⁸ Core AMI: Meter Reading and Meter Services spent \$6.9 million in 2018.

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A full accounting of the progress of the initiatives approved in the 2018 Utility 2.0 Plan, as well as the benefits reporting and a funding reconciliation, is included in Appendix B.

New Utility 2.0 Initiatives

In alignment with the Utility 2.0 vision and strategy and in support of the New York's clean energy goals, PSEG Long Island is requesting funding for the implementation of nine new initiatives starting in 2021. Table ES-3 summarizes the funding requests for these initiatives, which span five years (2021-2025).

- To further empower customers through AMI and data analytics, PSEG Long Island is proposing to:
 - Pilot demand alerts to commercial and industrial (C&I) customers to support energy bill savings due to demand charges.
 - Launch two new billing solutions in the form of FlexPay and On-Bill Financing. Both initiatives will offer customers increased flexibility while promoting energy conservation and the adoption of clean energy products, such as heat pumps. PSEG Long Island will launch FlexPay and On-Bill Financing as pilot programs and will evaluate their success before proceeding with a wider-scale deployment in future years.
- To continue exploring new innovative offerings in support of State clean energy goals, PSEG Long Island is proposing to:
 - Procure, configure, and launch an enhanced marketplace for EE products and clean energy services. The marketplace will support existing EE programs and offer customers another channel to engage with their utility, especially as e-commerce and online shopping becomes more prominent.
 - Launch an EV Make-Ready program. The program will span multiple years. In 2021 PSEG Long Island will focus primarily on program design and piloting the deployment of make-ready infrastructure in a small number of locations in 2021.
 - Investigate improvements in the way that NWS are identified, addressed, and monetized.
- To further enable its transition to a customer-centric DSP, PSEG Long Island is proposing to:
 - Deploy a DER visibility platform that will allow grid operators to collect granular data and monitor DER on the distribution grid, thereby enabling the release of hosting capacity for further DER interconnection.
 - Expand the functionality of Hosting Capacity Maps to Stage 3, building on the ongoing work for the development of Stage 2 maps in 2020.
 - Expand the use of conservation voltage reduction (CVR) in more substations to achieve energy savings with no impact on the customer experience.

In addition to these nine initiatives, PSEG Long Island has created a roadmap of future initiatives that are being explored to start in the period between 2022 and 2025. The Utility 2.0 Roadmap is included in Section 1.4 of this Utility 2.0 Plan, with short descriptions of each project included in Chapters 2 through 4.

All of the initiatives proposed in this year's Utility 2.0 Plan align with the Utility 2.0 guiding principles, as they support increased **customer satisfaction**, enable greater **system efficiency**, and contribute to the **reduction of greenhouse gas emissions**. Many of the proposed initiatives also have a direct contribution to New York's clean energy goals, as stipulated under the CLCPA and other State policy initiatives (such as New Efficiency: New York or the Energy Storage Roadmap). An analysis of how the proposed and planned initiatives map to major State policy goals is provided in Section 1.5.

Table ES-3. Summary of 2020 Funding Request for New Initiatives

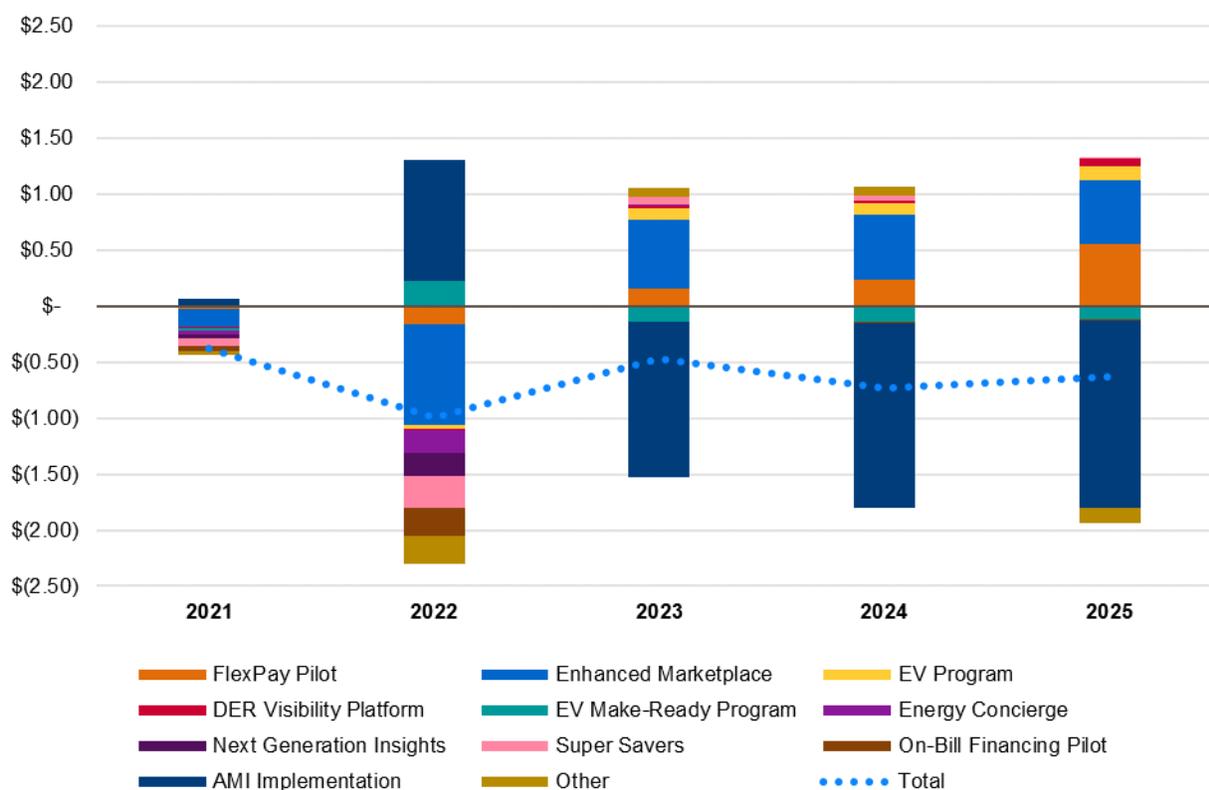
Pathway	Proposed Initiative	Detailed Description	Capital Request – Added (\$M)						O&M Request – Added (\$M)					
			2021	2022	2023	2024	2025	5-Yr. Total	2021	2022	2023	2024	2025	5-Yr. Total
Empower Customers through AMI and Data Analytics	C&I Demand Alert Pilot	Page 25	1.97	0.003	-	-	-	1.97	0.09	0.10	-	-	-	0.20
	FlexPay Pilot	Page 32	1.20	2.57	1.53	1.91	0.92	8.13	0.79	0.89	1.19	1.53	1.69	6.10
	On-Bill Financing Pilot	Page 45	1.07	0.05	-	-	-	1.12	0.70	0.81	0.10	0.10	0.10	1.82
Explore New Innovative Offerings	Enhanced Marketplace	Page 55	2.98	1.65	0.005	0.005	0.005	4.65	0.66	0.92	0.95	0.98	1.01	4.51
	EV Make-Ready Program	Page 65	3.20	-	-	-	-	3.20	1.19	0.15	0.16	0.16	0.17	1.83
	NWS Process Development	Page 80	-	-	-	-	-	-	0.50	-	-	-	-	0.50
Evolve into the Customer-Centric DSP	Hosting Capacity Maps, Stage 3	Page 89	1.70	-	-	-	-	1.70	0.49	0.43	0.34	0.32	0.24	1.84
	DER Visibility Platform	Page 94	4.92	1.10	0.62	0.63	0.66	7.92	0.07	0.04	0.05	0.06	0.07	0.29
	CVR Program	Page 100	0.94	-	-	-	-	0.94	0.09	-	-	-	-	0.09
Total			17.97	5.37	2.15	2.54	1.58	29.61	4.58	3.35	2.79	3.15	3.29	17.17

Utility 2.0 Rate Impact Analysis

The rate impact on residential customers from both ongoing Utility 2.0 initiatives and the initiatives proposed for funding in the 2020 Utility 2.0 Plan is illustrated in Figure ES-7. The results of the rate impact analysis reflect a cash return of \$3 million to customers from the 2019 regulatory liability account and an additional \$10 million in currently over collected funds as identified in the reconciliation of the spend for initiatives proposed in the 2018 Utility 2.0 Plan.

In 2021, PSEG Long Island estimates a reduction of approx. \$0.37 on average residential bills as a result of Utility 2.0 initiatives. This increases to approx. \$1.00 in 2022, with net reductions in residential bills every year through 2025. A major driver for the reduction in residential electricity rates is the savings that are expected to be achieved through the implementation of AMI and the launch of AMI-enabled capabilities in the coming years.

Figure ES-7. Residential Customer Bill Impacts from Utility 2.0 Initiatives



Energy Efficiency and Demand Response Plan

PSEG Long Island's energy efficiency (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 2021 Energy Efficiency and Demand Response (EEDR) Plan (included in Appendix A of this document) consists of four programs for residential customers and a multi-faceted program for commercial customers.

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PSEG Long Island’s program philosophy and delivery is structured to respond to market changes and cost-effective energy efficiency opportunities during any given year. In alignment with the State’s EE policy framework (New Efficiency: New York), PSEG Long Island’s 2021 goals are **1,090,882 MMBtu savings** and **332,455 MWh** of energy efficiency savings and are similarly reflected on a gross basis at site.

The proposed budget for EEDR programs in 2021 remains equal to the budget for 2020 at \$88.8 million. PSEG Long Island has initiatives that are budgeted for but will not have any MMBtu savings associated with them in 2021, such as the Direct Load Management program at \$1.3 million. In 2021, 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 \$5.3 million in spending in 2021, representing 21% of the non-commercial portfolio budget for rebates and incentives.

PSEG Long Island will offer \$1.2 million in funding for community adder incentives of \$200 per kW for community solar projects (up to 750 kW in size), which will further support the local availability of community solar when coupled with recent modifications to increase the community credit as part of Value of DER (VDER).

Table ES-4. Summary of Proposed Programs and Budgets in the 2021 EEDR Plan

Program	Savings (MMBtu)	Savings (MWh)	Program Budget (\$M)
Efficient Products	484,059	200,220	18.93
Home Comfort	113,425	3,563	11.62
REAP (Low-Income)	4,532	1,672	1.40
Home Performance	28,760	2,340	5.56
Commercial Efficiency	332,125	87,151	35.05
HEM (Behavioral)	127,374	37,331	2.40
Pay for Performance	606	178	0.16
Total, Budget Components with Programmatic Savings	1,090,882	332,455	75.12
Solar Community Adder	N/A	N/A	1.20
DLM Program	N/A	N/A	1.30
PSEG Long Island Labor, Outside Services, Advertising	N/A	N/A	11.18
Total, Budget Components not Associated with Programmatic Savings	-	-	13.68
Total	1,090,882	332,455	88.80

Impact of COVID-19

PSEG Long Island developed the 2020 Utility 2.0 Plan and the 2021 EEDR Plan while New York State was responding to the COVID-19 pandemic. The Plans were developed using assumptions and data that is reflective of pre-pandemic behavior and analysis. While it is too early to know definitively, PSEG Long Island notes that 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 that are proposed in both Plans, however the company also recognizes the need to maintain flexibility and adaptability to respond to changing customer behavior and needs.

Some of the proposed initiatives will directly support customers in the recovery from the coronavirus pandemic. For example, initiatives such as the FlexPay Pilot and the On-Bill Financing Pilot will provide customers with flexibility in the way they pay their energy bills and repay investments in clean energy products. Similarly, the Enhanced Marketplace will give customers access to an online platform in which they can procure products and services that reduce their energy consumption and lower their energy bills.

Structure of the Document

Acting on behalf of and in consultation with LIPA, PSEG Long Island has developed a detailed plan of initiatives to support REV adoption on Long Island, including:

- **Chapter 1** provides the drivers that influenced the shape of PSEG Long Island's investments, and the vision, strategy, and roadmap to address these drivers. The changing nature of the electric industry, the larger goals of New York through CLCPA, REV, and other New York State clean energy policies, and the Utility's informed view of the needs of its customers are the basis for the initiatives detailed in this Utility 2.0 Plan.
- **Chapter 2** describes progress to date on ongoing initiatives empowered by the full deployment of AMI across Long Island and the related capabilities that are planned to leverage this foundational infrastructure. The chapter includes a short description of the progress made for each ongoing initiative as well as future initiatives being explored for the period between 2022 and 2025.
- **Chapter 3** details the portfolio of innovative initiatives that test emerging solutions or implement platforms and systems that align with New York's policy goals. Like Chapter 2, this chapter provides an update on ongoing initiatives and short descriptions for future initiatives being explored.
- **Chapter 4** includes proposed new initiatives that support evolution toward a DSP—evolving the distribution grid into a multifaceted platform that can integrate a high penetration of DER in an efficient and reliable way. A progress update on ongoing DSP-enabling initiatives is also provided, as well short descriptions for planned future initiatives starting in or after 2022.
- **Chapter 5** provides an overview of the overall Utility 2.0 Plan budgets and correlating rate impacts. A positive net benefit is the central goal of the proposed initiatives, but other important aspects such as testing and learning new approaches and advancing policy goals focused on lowering carbon and resource diversity are also considered.
- **Appendix A** includes the PSEG Long Island's 2021 EEDR Plan.
- **Appendix B** summarizes the 2020 progress update and funding reconciliation for ongoing Utility 2.0 initiatives.
- **Appendix C through Appendix F** include supplemental information related to other ongoing initiatives outside the scope of the Utility 2.0 Plan, the Utility 2.0 Governance, the business case methodology, and 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. PSEG Long Island seeks a positive recommendation on the Plan from DPS and incremental funding approval from LIPA.

The first Utility 2.0 Plan was submitted in July 2014; this plan is an update to that plan and its prior iterations. The 2020 Utility 2.0 Plan reflects PSEG Long Island adapting to the changing needs of customers, advancing technology, and the policy direction and goals developed within the Reforming the Energy Vision (REV) process in New York and consistent with New York State Public Service Commission (PSC) proceedings. The initiatives detailed in this Utility 2.0 Plan encompass innovative offerings and foundational capabilities that will empower customers, improve system efficiency, and reduce carbon emissions.

1.1 Drivers for the Evolution to Utility 2.0

The development of new initiatives and the overall direction of Utility 2.0 is informed by the continued transformation of the modern energy system. As the overall energy system landscape evolves, PSEG Long Island, working with LIPA, will seek to evolve its solutions, initiatives, and projects to support its customers, vision, and mission. The Utility will design these solutions, initiatives, and projects to align with New York State's clean energy goals and regulatory objectives, which it has done since initiating its Utility 2.0 Plan in 2014.

The following subsections summarize the key drivers for PSEG Long Island's evolution to Utility 2.0.

1.1.1 New York State Climate Law and Clean Energy Policy Landscape

New York's Climate Leadership and Community Protection Act (CLCPA), passed by the Legislature and signed by Governor Andrew M. Cuomo in July 2019, is the most ambitious and comprehensive climate law in the country. It requires the state to reduce economy-wide greenhouse gas emissions 40% by 2030 and 85% by 2050, with a target of 100% reduction from 1990 levels. The law creates a Climate Action Council⁹ to craft a roadmap to these goals. The law targets a zero emissions electrical demand system in the state by 2040 and 3,000 MW of energy storage by 2030, 6,000 MW of solar generation by 2025, and 9,000 MW of offshore wind by 2035, among other goals.

Further and in support of the targets set in New York's CLCPA, Governor Cuomo announced nation-leading goals that were adopted by the New York State PSC into orders for energy efficiency, heating electrification, and energy storage:

- Statewide goal of 185 TBtu of customer-level energy reduction by 2025 and an incremental target of 31 TBtu of reduction by the State's utilities toward the achievement of that goal
- Subsidiary target of an annual reduction of 3% in electricity sales by 2025, as well as a subsidiary target of at least 5 TBtu in reduction through heat pump deployment
- 1,500 MW of energy storage by 2025

⁹ LIPA is represented on the Climate Action Council by its CEO, Thomas Falcone.

New York has also established ambitious goals for transportation electrification. In 2013, New York joined with seven other states in a Zero-Emission Vehicle (ZEV) Memorandum of Understanding (MOU) and corresponding Multi-State Action Plan to commit to a collective goal of 3.3 million ZEVs on the road by 2025. This translates into approximately 850,000 EVs in New York by 2025. New York doubled down on its ZEV goals as part of the International ZEV Alliance, committing to making all passenger vehicle sales ZEVs as soon as possible and no later than 2050.

If the overall CLCPA goals are to be met, a significant push toward these targets in the next 5 years is needed, and Long Island will have to play a large role in this effort. PSEG Long Island sees two ways in which it can support achieving New York's goals:

- Leveraging utility capital to deploy assets that directly support State goals (e.g., utility-owned storage or storage procured through contracts to defer the need for grid infrastructure investments, grid infrastructure deployment in support of EV chargers)
- Offering programs and services that enable customers to have access to clean distributed energy resources (DER) (e.g., rebates for energy efficiency products)

Section 1.5 describes how PSEG Long Island is contributing to the achievement of the goals stipulated in the CLCPA and other New York State policy initiatives.

1.1.2 Technology Advancement and Evolution of Customer Needs

Tomorrow's customers will expect a service experience on par with other industry leaders that, in many cases, are not utilities at all but customer-centric businesses like Airbnb, Netflix, and Amazon. Driven by these experiences, Long Island's residents, businesses, and communities will expect personalized and frictionless services that fit their lifestyles and aspirations, while maintaining value for the cost of services.

Meanwhile, the industry is seeing a significant transformation in how customers are powering their homes and businesses. Increasingly, customers are reducing their energy consumption, generating and storing their own electricity, and electrifying previously fossil fuel-powered building systems and vehicles. Growing up with the tools to manage engagement with their physical and digital worlds at their fingertips, first-time customers will expect greater lifestyle integration from their energy providers. Similarly, commercial customers are facing pressure to keep pace with sustainable, innovative, and customer-centric business models while managing their energy costs.

To handle the operational variability introduced by energy efficient technologies, electrification, and other DER, operators will rely on pervasive, intelligent digital networks that support complex operations such as advanced sensors, two-way communication networks, Internet of Things and DER management platforms, and customer engagement solutions. These new technologies are deployed as a foundational Distributed System Platform (DSP) in alignment with the definition of a DSP by the New York State DPS.¹⁰

¹⁰ According to the New York DPS the DSP is "an intelligent network platform that will provide safe, reliable and efficient electric services by integrating diverse resources to meet customers' and society's evolving needs. The DSP fosters broad market activity that monetizes system and social values, by enabling active customer and third-party engagement that is aligned with the wholesale market and bulk power system."

1.1.3 New York's Reforming the Energy Vision

Governor Cuomo has set New York State on a path to deliver a comprehensive energy strategy and build a clean, more resilient, and affordable energy system through REV. REV seeks to strengthen and modernize New York's energy system by spurring innovation, acting on climate change, improving consumer choice, and creating economic opportunity throughout the State.

At the core of REV are groundbreaking regulatory reforms to integrate clean DER as essential elements of the New York's energy system through new utility business models. These reforms rethink the roles of the utility, customers, and energy solution providers in an efficient, 21st century grid.

REV encourages third-party market actors including distributed energy developers, tech companies, companies offering building and energy services, customer engagement specialists, investors, and others to consider how their technologies and solutions can partner with utilities to bring New York's grid into the future.

New solutions under REV should be structured with the following core policy objectives in mind:

- **Boost system reliability and resilience:** New York's electricity system needs to be prepared for more severe weather. REV will help achieve greater reliability and resilience, including providing electricity during grid outages through DER.
- **Enable new energy markets and leverage ratepayer contributions:** REV will foster markets that allow customers and companies to use DER and optimize grid assets to create value and deliver energy more efficiently.
- **Enhance customer knowledge and capabilities:** Companies and utilities in New York will provide timely information and insights to customers so that they can better understand and manage their energy use.
- **Ensure fuel and resource diversity:** To make customers less vulnerable to dips in supply and spikes in prices, New York's energy system will integrate multiple sources of generation, demand management, storage, and energy efficiency (EE).
- **Improve systemwide efficiency:** Utilities will adopt new technologies and approaches to improve the utilization of the grid infrastructure by reducing peak demand and promoting beneficial electrification such as heat pumps and electric vehicles (EVs).
- **Reduce carbon emissions:** REV supports New York's goal of reducing carbon emissions 40% by 2030 by encouraging DER, energy efficiency (EE), and demand management.

Even though not regulated the same way as investor-owned utilities, PSEG Long Island is still well-positioned to help achieve the REV objectives on Long Island. Long Island already has New York's most vibrant distributed solar market, with 651 MW installed, 51,000 customers, and 37% of all solar systems in New York. Long Island also has New York's most aggressive energy efficiency programs measured by load reduction.

1.2 Utility 2.0 Vision and Strategy

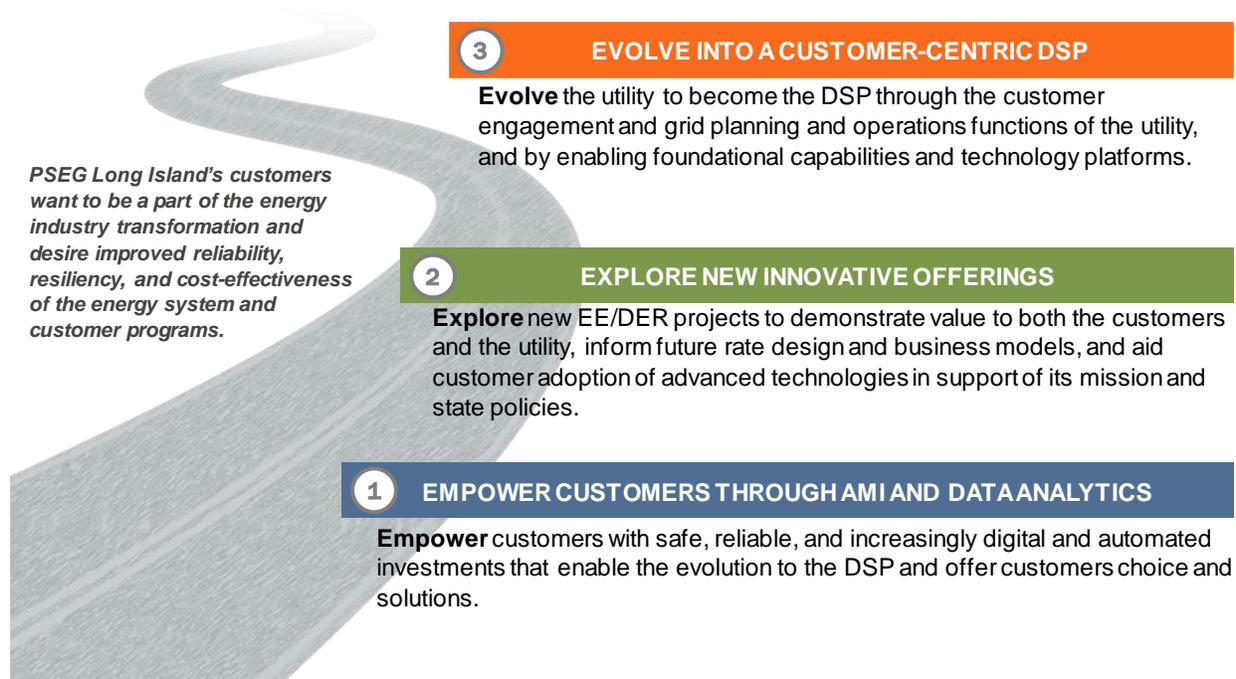
Based on drivers to evolve to Utility 2.0 and building on ongoing efforts, guiding principles, and the state of the market, PSEG Long Island's Utility 2.0 vision is to become a customer-centric, innovative, and forward-looking utility that provides clean and reliable energy, develops options for new energy products and services, and enables customers to make informed energy decisions.

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 2018 Utility 2.0 Plan outlined a strategy to execute its Utility 2.0 vision; the strategy was built on three strategic pathways (Figure 1-2.), ultimately enabling progress down the road from today to tomorrow. PSEG Long Island continuously seeks to improve and refine its strategy and tactics. In this 2020 Utility 2.0 Plan, the Utility leverages lessons learned from the past to inform the initiatives it will pursue in the future, while maintaining flexibility and being responsive to customer needs.

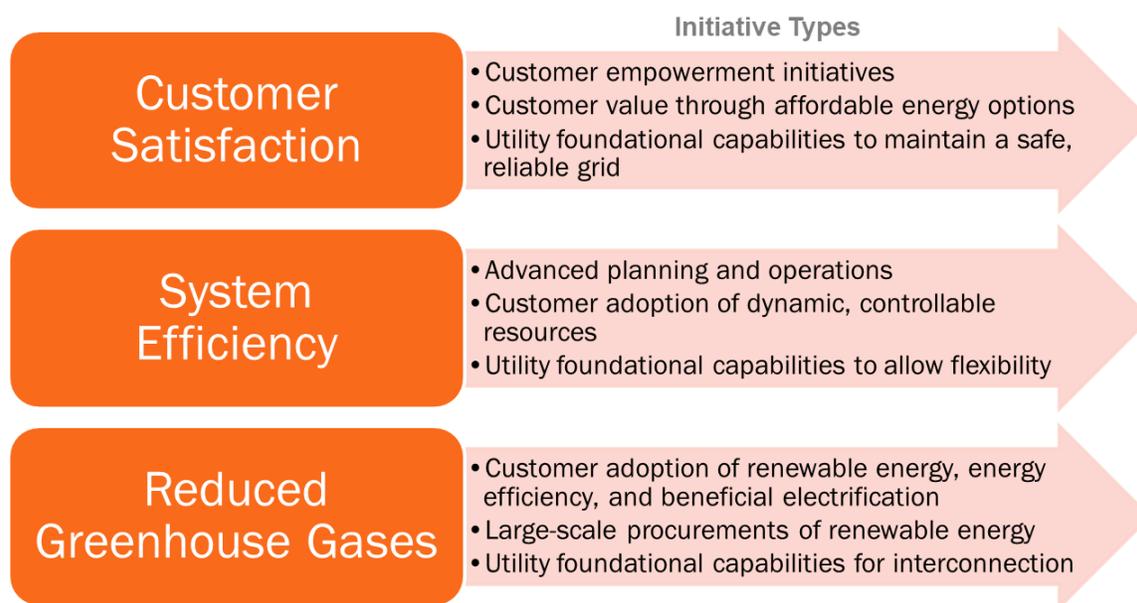
Figure 1-2. PSEG Long Island's Strategic Pathways



As described in Section 1.1, the drivers for evolution toward becoming a utility of the future are to advance New York's ambitious climate goals, satisfy customers' evolving needs, and align with REV objectives. To evaluate the type of initiatives to pursue as part of the Utility 2.0 strategy, PSEG Long Island has adopted three guiding principles that mirror these drivers and serve as a benchmark for strategic fit (Figure 1-3.). All of the initiatives proposed in this year's Utility 2.0 Plan align with these guiding principles because they support an increase in **customer satisfaction**, enable greater **system efficiency**, and contribute to the **reduction of greenhouse gas emissions**.

The following subsections outline the specific strategy that is the focus of the three strategic pathways detailed in Chapters 2, 3, and 4.

Figure 1-3. Guiding Principles for Utility 2.0 Investments



1.2.1 Empower Customers through AMI and Data Analytics

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

In the 2018 Utility 2.0 Plan, the foundation was laid for customer empowerment when the AMI rollout plan was approved by LIPA. The plan also included a selection of AMI-enabled capabilities that can provide customers with granular energy usage data and personalized insights into their energy consumption. Initiatives proposed included a portal for commercial and industrial (C&I) customers and an advanced billing engine to support rate modernization.

PSEG Long Island is exploring customer experience pilot projects to test personalized energy insights and to encourage customers to act on those insights to make decisions. Collectively, the initiatives included in the 2018 and 2019 Utility 2.0 Plan in this strategic pathway comprise a suite of informational and advisory tools that contain the building blocks of PSEG Long Island's next-generation customer experience. Over time, PSEG Long Island intends to continuously monitor the success of these building blocks and 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 five themes:

1. AMI Technology and Systems
2. AMI-Enabled Capabilities
3. Data Analytics
4. Customer Experience and Engagement
5. Rate Modernization and Billing Solutions

1.2.2 Explore New Innovative Offerings

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

In 2018, PSEG Long Island's offerings focused on initiatives to increase DER technology adoption through its Super Savers non-wires solution (NWS) program, EV charger incentives, and behind-the-meter (BTM) storage incentives. Utility-scale storage was also included as an innovative offering in the Utility 2.0 Plan; however, as the transmission and distribution (T&D) team pursues additional storage applications and builds experience around energy storage deployment, future utility energy storage updates and projects will be reported under the Evolve into a Customer-Centric DSP pathway (Chapter 4).

In 2019, PSEG Long Island's proposed offerings explored a suite of in-person and self-serve interactive tools for customers that provide insights and guidance on energy management and new customer payment options, including bill payment and DER financing. Furthermore, PSEG Long Island proposed technology tests that will transform the way DER interacts with the grid, including with vehicle-to-grid (V2G) technology and heat pump controls.

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. PSEG Long Island will build on these programs and explore partnerships with third-party market participants to deliver value through business model innovation, such as through its work with REV Connect.¹¹

Initiatives under this strategic pathway are organized in four themes:

1. Energy Efficiency and Heat Electrification
2. Transportation Electrification
3. Customer-Sited Energy Storage
4. Non-Wires Solutions (NWS)

1.2.3 Evolve into a Customer-Centric DSP

PSEG Long Island shares in the vision of transforming into a utility that performs the functions of the DSP as articulated in New York's 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

¹¹ 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

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(DLM). To enable this evolution, PSEG Long Island will pursue DSP-enabling initiatives that ensure its distribution system can serve as the foundation of the DSP. Leveraging the existing T&D infrastructure is critical to efficiently integrating renewable energy into the grid to reduce greenhouse gas emissions, lower customer costs, and increase reliability and resilience.

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 PSEG Long Island to achieve the DSP vision in alignment with the initiatives undertaken by peer utilities in New York State and nationwide. UoF team investments include but are not limited to power flow modeling tools, communication platforms, and information sharing maps that will help DER developers identify optimal locations for DER interconnection.

Initiatives under this strategic pathway are organized in four themes:

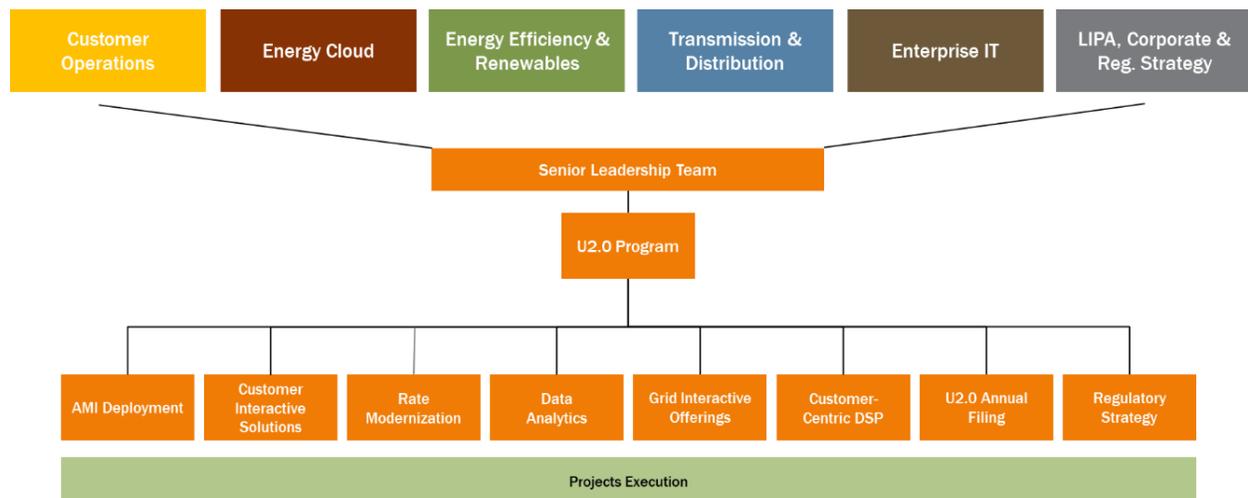
1. Integrated Planning
2. DER and Renewables Integration
3. Grid Operations
4. Utility Storage

1.3 Utility 2.0 Program Management

PSEG Long Island’s Utility 2.0 vision is realized through an enterprise-wide program which includes initiatives valued at 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.

In 2018, PSEG Long Island 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, information technology (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



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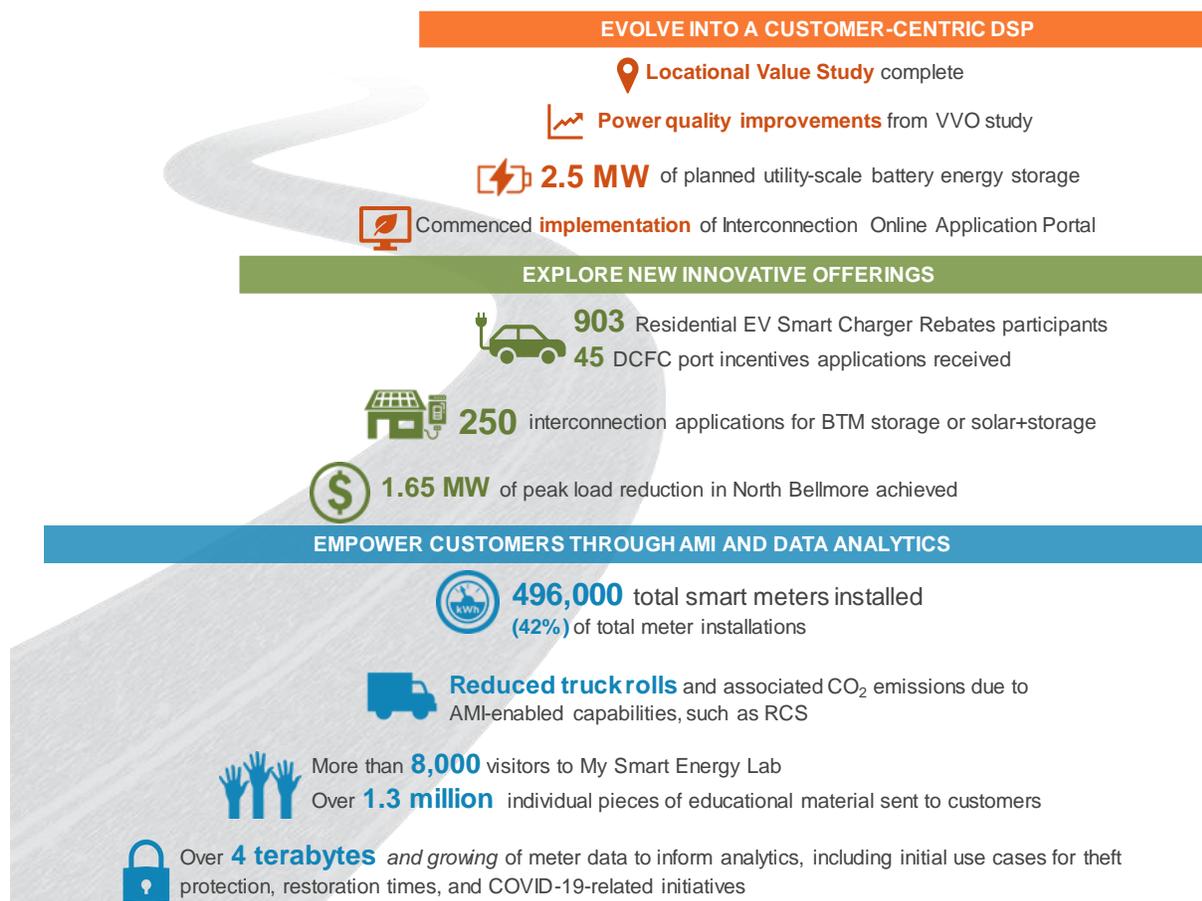
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The Utility 2.0 Steering Committee oversees program and project management. Though the Program Implementation Support was originally proposed as part of the AMI-related activities, it has expanded to address all Utility 2.0 initiatives, including the initiatives proposed in the 2018 and 2019 Utility 2.0 Plans. The initial focus of the Program Implementation Support has been on targeted support, such as business process design and change management of high value projects and establishing a progress reporting system for key stakeholders. As Utility 2.0 evolves, PSEG Long Island will adapt its program governance, budget oversight, and management of project health accordingly.

At the recommendation of the New York DPS, PSEG Long Island also 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.

PSEG Long Island has evolved significantly and learned many lessons from its first full year implementing Utility 2.0 initiatives. Figure 1-5 illustrates some of the successes to date.

Figure 1-5. Success of Ongoing Utility 2.0 Initiatives as of Q1 2020



1.4 Utility 2.0 Roadmap

Achieving PSEG Long Island's Utility 2.0 vision requires careful evaluation of the initiatives that need to be implemented in the short term, as well as those planned in the long term. PSEG Long Island has a

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number of ongoing initiatives across the three strategic pathways that comprise the Utility 2.0 strategy. In addition to these ongoing initiatives, nine new initiatives are being proposed in this year's Utility 2.0 Plan; these new initiatives provide complementary capabilities to ongoing work.

Figure 1-6. illustrates a roadmap for all ongoing and proposed initiatives as of 2020, including those that PSEG Long Island is evaluating for implementation in the next five years. Several of these initiatives are still at a nascent stage, and PSEG Long Island will evaluate their viability in future Utility 2.0 Plans.

The roadmap is organized across 13 themes, which are grouped into the three strategic pathways that comprise the Utility 2.0 strategy. The roadmap shows the launch date for all initiatives, with the end date open as ongoing initiatives may ultimately be extended beyond their originally proposed duration.

Each of the boxes in the roadmap represents an initiative that was proposed in the 2018 or 2019 Utility 2.0 Plans, as well as those proposed in this year's Utility 2.0 Plan. New initiatives proposed to start in 2021 are marked in the roadmap as "NEW." Potential future initiatives that are being evaluated internally are also included in the roadmap for illustrative purposes and are marked with two stars (**). A short description of each of these initiatives is provided in the respective subsections of Chapters 2, 3, and 4.

Figure 1-6. PSEG Long Island's Utility 2.0 Roadmap

		2018	2019	2020	2021	2022	2023	2024	2025	
			PMO and Change Management							
EMPOWER CUSTOMERS THROUGH AMI AND DATA ANALYTICS	AMI TECHNOLOGY AND SYSTEMS		AMI Technology and Systems							
	AMI-ENABLED CAPABILITIES		Outage Management							
			Revenue Protection							
			C&I Portal							
	DATA ANALYTICS		Data Lake							
				Revenue Protection						
				Transformer Load Management						
	CUSTOMER EXPERIENCE AND ENGAGEMENT		AMI Customer Engagement							
				Energy Concierge Pilot						
				Next Generation Insight Pilot						
					(NEW) C&I Demand Alert Pilot					
						** Next Best Action				
								** Pick Your Due Date		
	RATE MODERNIZATION AND BILLING SOLUTIONS		Advanced Rate Engine							
				Time Of Use Rates						
				(NEW) FlexPay Pilot						
				(NEW) On-Bill Financing Pilot						
					** Green Rate Program					
				** Appliance-Level Rate Modeling Functionality						
			Energy Efficiency and Demand Response Programs (EEDR Plan)							
EXPLORE NEW INNOV. OFFERINGS	EE AND HEAT ELECTRIFICATION		HP Control Pilot							
				(NEW) Enhanced Marketplace						
				** Partnership with Municipalities						

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		2018	2019	2020	2021	2022	2023	2024	2025
EXPLORE NEW INNOVATIVE OFFERINGS	TRANSPORTATION ELECTRIFICATION	EV Program							
		Electric School Bus V2G Pilot							
		(NEW) EV Make-Ready Program							
		** 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							
		(NEW) NWS Process Development							
INTEGRATED PLANNING	Locational Value Study and Tool								
	Joint Utilities Membership								
	** Enhanced Distribution Forecasting Tools								
EVOLVE TO THE CUSTOMER-CENTRIC DSP	DER AND RENEWABLE INTEGRATION	IOAP Phase I							
		Hosting Capacity Maps Phase I and II							
		(NEW) Hosting Capacity Maps – Phase III							
		(NEW) DER Visibility							
		** Connected Buildings Pilot							
	** Transactive Market Pilot								
	GRID OPERATIONS	Utility of the Future Team							
CVR Pilots									
(NEW) CVR Program									
** Smart Inverter Pilot									
UTILITY STORAGE	Miller Place								
	** Sayville								
	** Centereach								

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

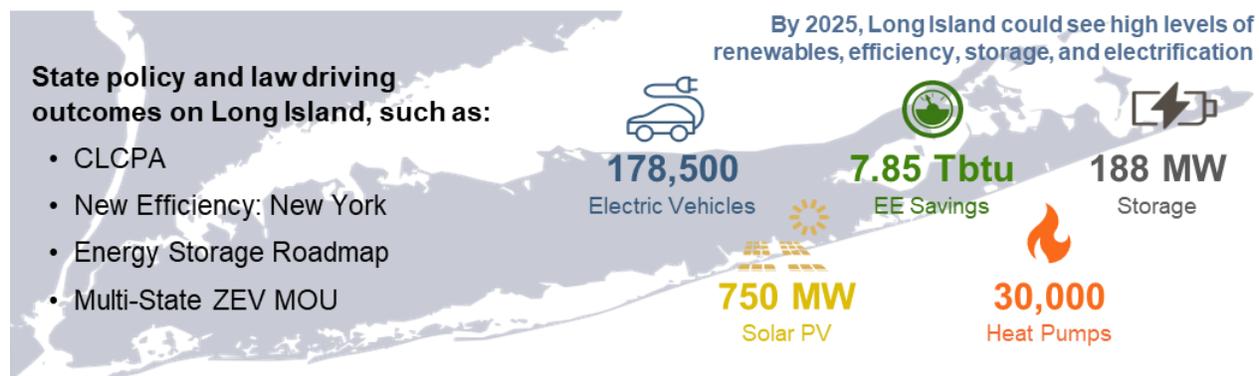
1.5 Supporting the Achievement of Statewide Clean Energy Goals for 2025

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 (Section 1.1.1); PSEG Long Island wants to ensure that it contributes its share.

Figure 1-7 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.

- Electric vehicles: 178,500 vehicles**
Based on Long Island’s share of vehicle registrations in New York (approx. 21%).
- Energy efficiency: 7.85 Tbtu of savings between 2020 and 2025**
Of the incremental target of 31 Tbtu of reduction by utilities toward the achievement of 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.¹²
- Energy storage: 188 MW installed by 2025**
Based on Long Island’s share of statewide peak load (approx. 12.5%).
- Heat pumps: 30,000 new heat pumps installed (approx. 1.15 Tbtu of savings) between 2020 and 2025**
The basis for this was the 2020 annual Energy Efficiency and Demand Response (EEDR) Plan for that year’s heat pump categories, with a reasonable growth rate across categories.
- Solar photovoltaics (PV): 750 MW of solar PV installed by 2025**
Based on Long Island’s share of statewide peak load (approx. 12.5%).

Figure 1-7. Long Island’s Share of the Statewide Clean Energy Goals for 2025



A number of 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 energy efficiency, energy storage, beneficial electrification (heating and transport), and renewable energy. Table 1-1 illustrates the initiatives that will contribute to each of the major clean energy goal areas in the period between 2021 and 2025. 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.

¹² Order Adopting Accelerated Energy Efficiency Targets, CASE 18-M-0084 In the Matter of a Comprehensive Energy Efficiency Initiative, December 13, 2018.

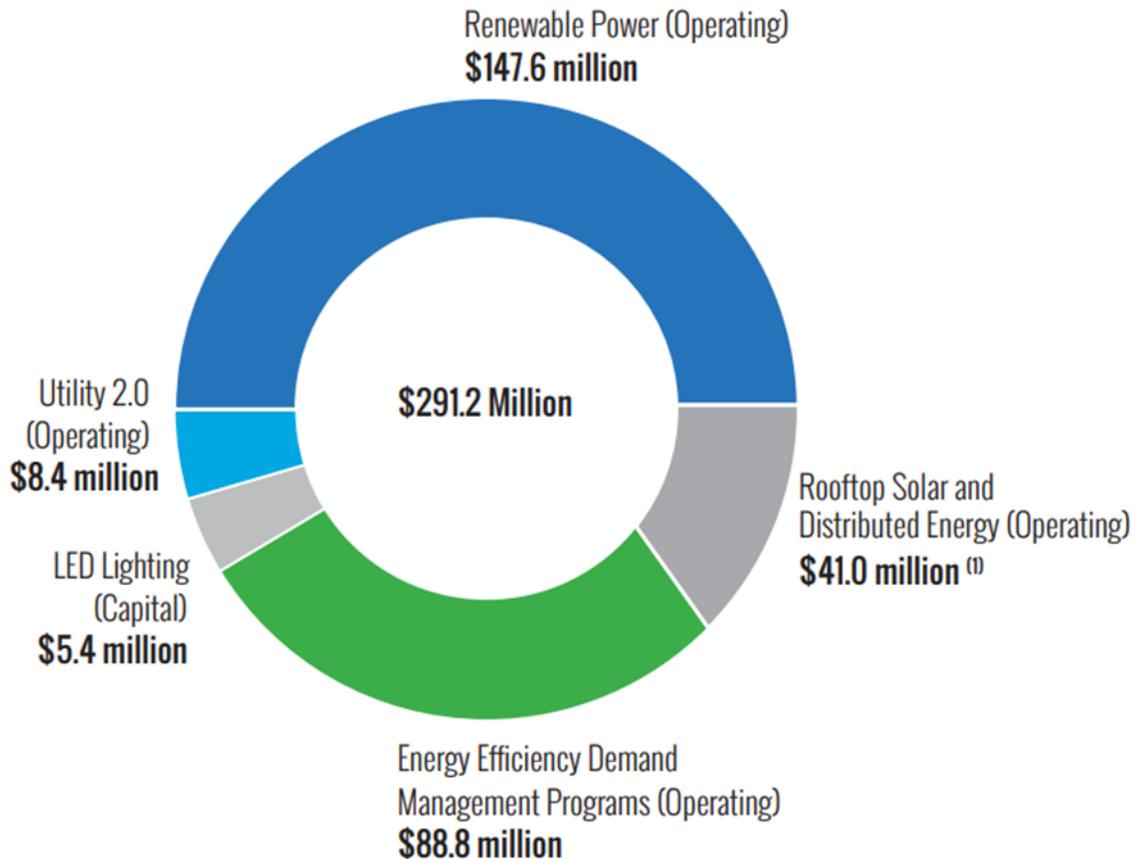
Table 1-1. PSEG Long Island Initiatives Contributing to New York State Clean Energy Goals

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	7.85 TBtu	1.15 TBtu (~30,000 installations)	188 MW	178,500	750 MW
Current Level on Long Island	~1 TBtu	~950 installations	~12 MW	~14,000	~625 MW
Ongoing Initiatives	<ul style="list-style-type: none"> Energy Efficiency Programs (EEDR Plan) Super Savers NWS 	<ul style="list-style-type: none"> Energy Efficiency Programs (EEDR Plan) Heat Pump Controls Pilot 	<ul style="list-style-type: none"> BTM Storage with Solar Utility Storage – Miller Place Energy Storage RFI 	<ul style="list-style-type: none"> EVs Program Electric School Bus V2G Pilot 	<ul style="list-style-type: none"> BTM Storage with Solar Hosting Capacity Maps Stages 1-2 Interconnection Online Application Portal (IOAP) Phase I
Proposed Initiatives (2021 Start)	<ul style="list-style-type: none"> Energy Efficiency Programs (EEDR Plan) On-Bill Financing Pilot Enhanced Marketplace 	<ul style="list-style-type: none"> Energy Efficiency Programs (EEDR Plan) On-Bill Financing Pilot Enhanced Marketplace 	<ul style="list-style-type: none"> Enhanced Marketplace On-Bill Financing Pilot Energy Storage Bulk Solicitation 	<ul style="list-style-type: none"> Enhanced Marketplace EV Make-Ready Program 	<ul style="list-style-type: none"> Hosting Capacity Maps Stage 3 DER Visibility Platform
Planned Initiatives (2022-2025 Start)	<ul style="list-style-type: none"> Energy Efficiency Programs (EEDR Plan) Next Best Action Partnership with Municipalities Multifamily/LMI Financing 	<ul style="list-style-type: none"> Energy Efficiency Programs (EEDR Plan) Next Best Action Partnership with Municipalities Multifamily/LMI Financing 	<ul style="list-style-type: none"> Grid-Beneficial C&I Storage Utility Storage (Further Locations) 	<ul style="list-style-type: none"> Fleet Electrification Light Duty V2G 	<ul style="list-style-type: none"> Hosting Capacity Maps – Advanced

1.6 Supporting Clean Energy Goals Outside the Utility 2.0 Plan

As Figure 1-8. illustrates, the Utility 2.0 Plan is only a small fraction of LIPA's overall budget for clean energy programs and DER on Long Island.

Figure 1-8. LIPA's 2020 Budget Breakdown for Clean Energy Programs and DER



Source: *Powering Long Island: Clean, Lean, and Customer First, LIPA, 2020*

PSEG Long Island has some of the most successful energy efficiency programs in the state, with annual investment around \$89 million. Further details around the energy efficiency programs PSEG Long Island is offering its customers are included in the EEDR Plan (Appendix A).

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 list below highlights some of these initiatives, as well as a summary of LIPA's budget for clean energy programs and DER (Figure 1-8).

- PSEG Long Island's Power Markets group is planning a bulk solicitation for energy storage in the second half of 2020. The goal is to procure between 155 MW and 175 MW of storage to achieve the New York state clean energy initiatives.
- LIPA and PSEG Long Island are launching Solar Communities in 2020. Solar Communities is a new program 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.

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- Orsted/Eversource, formerly Deepwater Wind, offshore wind project to be located southeast of Montauk Point will supply 130 MW of renewable energy to LIPA under a long-term contract concluded after a 2015 solicitation.
- In the summer of 2019, NYSERDA selected two offshore wind projects, totaling approximately 1.7 GW, as a result of a New York State Energy Research and Development Authority (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.
- Governor Cuomo has announced that NYSERDA will issue a second solicitation for offshore wind in 2020 for a minimum of 1,000 MW. It is expected that LIPA will purchase a portion of the Offshore Wind Renewable Energy Certificates that will be generated by the NYSERDA-solicited projects in addition to its own contracts for offshore wind.
- LIPA is investing \$148 million per year for utility-scale renewable purchases, including energy from solar farms in Calverton, Kings Park, Riverhead, Shoreham, and Upton.
- LIPA is also investing \$5 million in 2020 for new light-emitting diode (LED) lighting as part of an \$18 million Dusk to Dawn program to replace conventional light fixtures for commercial customers.
- 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 Orsted/Eversource wind farm mentioned above,
 - two energy storage systems of total capacity of 10 MW/80 MWh, and
 - a combination of energy efficiency and demand response projects achieving approximately 9.8 MW of load relief.

2. Empower Customers through AMI and Data Analytics

PSEG Long Island is committed to providing customers with more information and opportunities to control their energy usage. Through foundational investments such as the deployment of AMI technology and systems, PSEG Long Island will provide customers with granular and timely usage data, viewable through a streamlined platform and easily transferrable to authorized third parties to leverage for value-adding services and advanced solutions.

Over time, initiatives to empower customers will evolve and improve by using the insights made available through PSEG Long Island’s customer research and data analytics. These insights will enable customers to more effectively take control of their energy usage through both self-serve and agent-assisted channels. Further, PSEG Long Island ensures that all capabilities and initiatives maximize their impact both internally and with customers through a robust internal governance and change management process.

The chapter is organized in five subsections, each representing a theme area (as shown below). The first three subsections provide an update on the progress PSEG Long Island has made with the AMI rollout and the implementation of AMI-enabled capabilities and Data Analytics. The following two subsections include an update on ongoing initiatives proposed and approved in past Utility 2.0 Plans, detailed descriptions for new initiatives proposed in this year’s Utility 2.0 Plan for launch in 2021, and a preview of planned initiatives that are being considered for future Utility 2.0 Plans.

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2.1 AMI Technology and Systems Progress

To further its vision of becoming a customer-centric, innovative, and forward-looking utility, LIPA began deploying AMI meters through pilot projects and targeted installations as early as 2009. Through these initiatives, LIPA and, beginning in 2014, PSEG Long Island learned about customer impacts, systems integration, and other process changes. These lessons learned have and will help PSEG Long Island deliver value to its customers through the full-scale deployment of AMI across Long Island.

In the first quarter of 2019, PSEG Long Island expanded its initial meter deployment to a large-scale smart meter deployment. The Utility is deploying AMI across its service territory to maximize customer benefits and operational savings. Smart meters with AMI offer increased accuracy and enable new capabilities like remote metering, automated move-in and move-out requests, and remote connect and disconnects. Implementing these capabilities are key components to unlocking the full benefit of AMI. Between 2019 and 2022, PSEG Long Island will deploy more than 1.1 million smart meters.

PSEG Long Island met 133% of its annual goal with nearly 305,000 meters installed in 2019 and has installed an additional 65,500 in Q1 2020.¹³ The opt-out rate was 0.57% at the end of 2019, down from 0.77% at the beginning of 2019.

By the end of 2019, 37% of PSEG Long Island customers had AMI meters, encompassing 48% of the total load. These customers are primarily concentrated on the North and South Forks of Long Island as well as the southwest portion of Long Island, including the Rockaways.

As Figure 2-1 shows, PSEG Long Island began AMI installations at the two ends of the island and is progressing inward toward the middle of the island. The dark red areas on the two ends of the island represent ZIP codes that have completed or nearly completed meter installations.

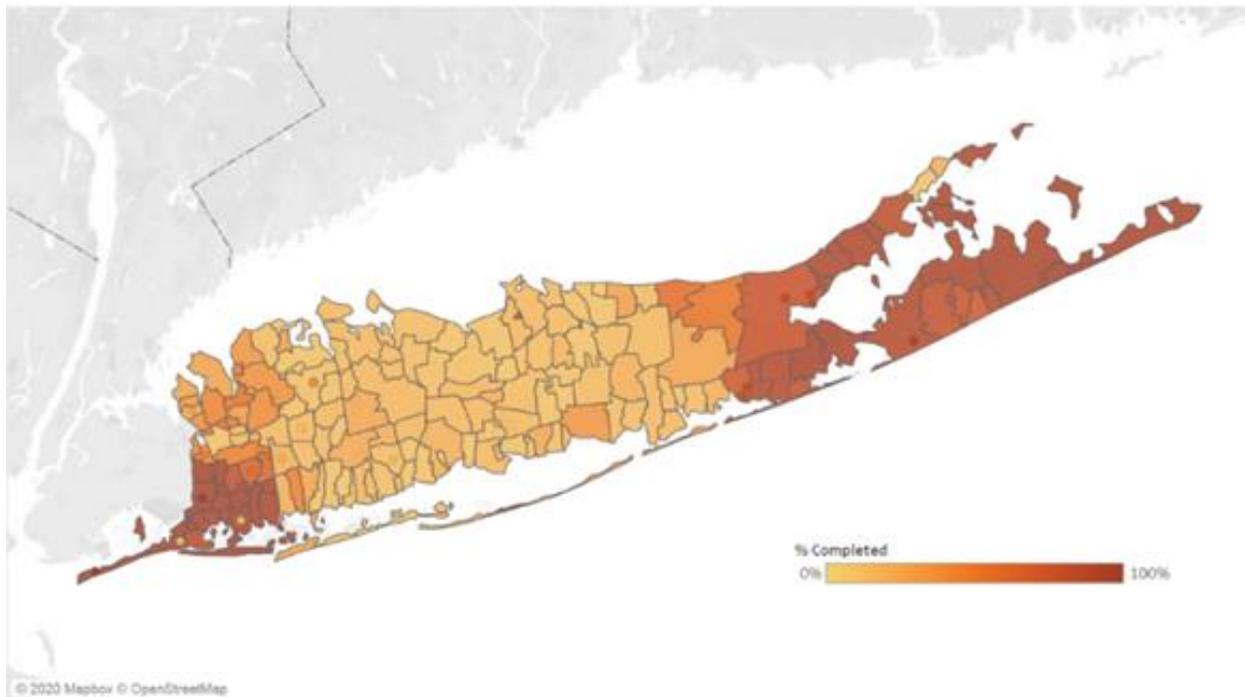
Continuity during COVID-19

All inside meter installations are rescheduled for health and safety.

Technicians received training on PPE, social distancing, and customer engagement related to the coronavirus outbreak.

Personnel assigned to now-suspended field activities have been redeployed to assist with AMI installations.

Figure 2-1. Smart Meter Installations by ZIP Code



For further detail on the progress of AMI Technology and Systems, refer to Section B.3 of Appendix B.

2.2 AMI-Enabled Capabilities Progress

PSEG Long Island's Utility 2.0 roadmap includes the phased implementation of capabilities that leverage the data made available by AMI. Data-driven insights can be used to change the way PSEG Long Island serves its customers and the way it manages the overall business, including improving the decision-

¹³ Annual and quarterly totals also include core meters—those funded outside of Utility 2.0.

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Chapter 2: Empower Customers through AMI and Data Analytics

making process and the management of the performance of the electricity grid. Some of these AMI-enabled capabilities that PSEG Long Island has made available include the following:

- Automating meter reading.
- Automating disconnect and reconnect capabilities through remote connect switch.
- Integrating with outage management systems (OMS) to improve outage restoration.
- Employing revenue protection solutions that reduce theft of service and decrease losses.
- Offering software tools to commercial customers including multiple account energy aggregation, energy-saving tips, energy use benchmarking, etc.

In 2019, PSEG Long Island initiated business process design and change management focused on launching the remote connect switch capability and integrating AMI with OMS. The Change Management team developed processes, communications, and provided training support for the move-in and move-out process enabled by remote connect switch. During the integration of AMI capabilities with OMS, the Change Management team supported the process, communication, and training development to validate single outages on AMI meters during storm operations. The team also helped to monitor systems in parallel operations and helped resolve issues.

With the increase in digital information transfer, data privacy is an integral part of utility operations. While not required, PSEG Long Island has chosen to align its corporate policies with the National Institute of Standards and Technology recommendations issued in September 2014, as well as the Fair Information Practice Principles. All applicable recommendations align with PSEG Long Island corporate policies.

For further detail on the progress of AMI-Enabled Capabilities, refer to Section B.3 of Appendix B.

Remote Connect Switch

PSEG Long Island has realized operation and maintenance (O&M) savings from the implementation of AMI-enabled remote meter reading and metering services. As AMI deployment grows, these benefits are expected to expand in 2020 and beyond.

Meter reading, including off-cycle readings, is now performed remotely for all AMI-metered customers, reducing the need for manual meter reading and the associated deployment of metering vehicles. Remote meter reading has also provided increased meter reading accuracy while improving employee safety through reduced time in the field. In October 2019, PSEG Long Island enabled the AMI remote connect and disconnect capability, automating the 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. With a 95% success rate in performing these tasks remotely, similar savings are achieved in truck roll¹⁴ reductions.

Revenue Protection

In 2019, PSEG Long Island detected meter tampering¹⁵ events via two main methods:

- During the AMI installation process

¹⁴ A truck roll refers to the dispatch of a utility vehicle with appropriate personnel and equipment onboard to customer premises. The reason for dispatch could be for installing a meter, servicing a meter, addressing an outage, etc.

¹⁵ 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.

- Using a data analytics algorithm to detect tamper and theft using AMI-reported data

The AMI-enabled remote connect capability launched in October 2019 has proven to be an additional source of revenue protection. PSEG Long Island can save unbilled electricity losses by immediately executing a start/stop service request on remote-capable AMI meters instead of taking a day or more for manual implementation.¹⁶

Outage Management

PSEG Long Island is following a phased approach to AMI-OMS integration, aimed at reaping the highest value benefits first. In the summer of 2019, PSEG Long Island trained its storm response team to ‘ping’ AMI meters and validate single customer outages during storms.¹⁷ Storms were prioritized because response times are most critical and service trucks are in high demand during these events. By ‘pinging’ meters in various 2019 storms, the storm response team was able to quickly validate single customer outages, and in cases where power had been already restored, saved additional truck rolls as compared to pre-AMI operations.

On November 15, 2019, PSEG Long Island successfully launched the integrated AMI-OMS solution, allowing operators to see AMI-reported outages in an environment alongside customer-reported outages, also known as “parallel operations”. PSEG Long Island continues to focus on change management within the parallel operations environment to ensure operators are fully trained to use the AMI solution to maximize benefits to operations and the customer, while minimizing any unintended impacts. A team of operators has implemented a comprehensive approach to document the types and patterns of AMI-reported outages and analyze how they differ from customer-reported outages. Based on these analyses, an integrated technical solution is being refined and optimized for performance. The goal is to develop rules and procedures for responding to each type of AMI-reported outage—for example, single versus multiple customer outages, meters with frequent “on-offs”, and known outages such as meter change outs and customer-initiated electrician work. Once these procedures are finalized and effectively socialized, operators will fully transition to the AMI-OMS integrated system.

Success Snapshot

After a reported outage by one of its largest customers, PSEG Long Island confirmed immediately and remotely that the AMI meter of the critical communication center in question was receiving power. By confirming that the issue was on the customer side, the customer was able to focus efforts and quickly resolve the issue.

C&I Portal

The C&I Portal will be launched in three phases:

1. **Launch the customer-facing portal and necessary employee tools.** PSEG Long Island procured, designed, and launched the portal in Q2 2020.
2. **Launch new graph capabilities for customers and integrate with Salesforce for the account management team.** Figure 2-2 offers some examples of what the graphing capabilities may look like when integrated into the C&I portal.

¹⁶ PSEG Long Island is not able to disconnect customers for non-payment remotely.

¹⁷ AMI operations staff can send a signal or “ping” over the AMI communications network to a single AMI or collection of AMI meters to determine if power is on or off at the premise level. Knowing with precision which customers are without power means that unnecessary service trips can be avoided and in larger outage events provides a clear depiction to restoration crews what part of the service territory is without power.

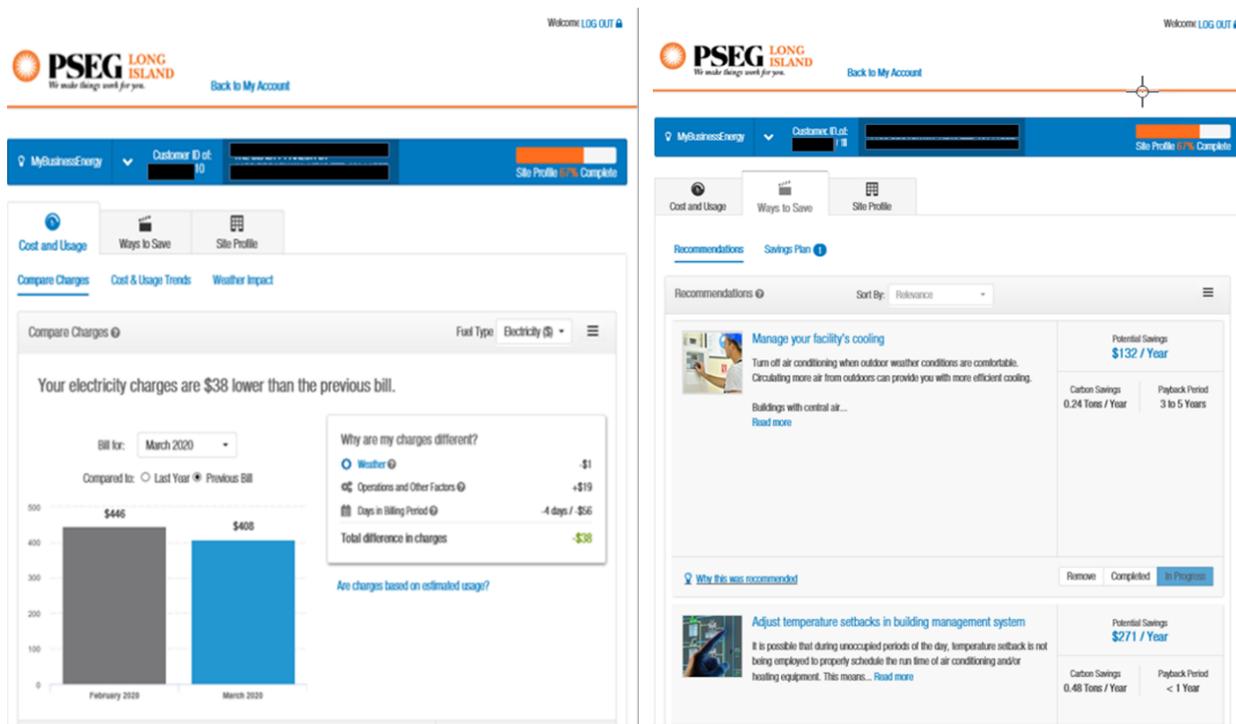
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- 3. Incorporate the Rate Modernization tool**, which allows customers to easily view and compare their potential energy costs on each of the new rates.

See Section B.6 of Appendix B for more detail on the Rate Modernization program and associated development schedule.

Figure 2-2. C&I Portal Enhancements



2.3 Data Analytics Progress

Applied analytics are essential to PSEG Long Island's Utility 2.0 vision and to achieving the full value of the AMI-enabled, digital grid. Analytic capabilities unlock value from data in sometimes unexpected ways, delivering insights from granular AMI data, grid data, and other customer data. PSEG Long Island's Data Analytics capabilities are embedded in its business and structured around several AMI-enhanced use cases to best serve customer needs. The Analytics team addresses data intake, data integration, analytics, data visualization, and other interactions with the data. The team delivers value by developing use cases in collaboration with different areas of the utility, such as T&D operations, customer engagement and experience, energy efficiency programs, and billing. Analytics will keep supporting energy efficiency, grid optimization, and customer analytics use cases for the Utility and current and future Utility 2.0 efforts.

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 and stores over 4 terabytes of data, with over 500 million AMI meter readings (across all meter channels) processed daily. The data lake is growing exponentially with AMI expansion and new use cases.

An example use case is the use of data analytics to improve customer reliability. The Analytics team collaborated with the UoF team to identify 50 overloaded transformers and 50 overloaded fuses across

the territory. These overloaded assets will be targeted for proactive replacement so that the customer outages resulting from the potential failures of this equipment can be avoided.

The Analytics team is also developing a prototype AMI-based analytics algorithm that detects meter tamper and electricity theft. This use case is another example of how data-driven analysis can help the business target cases for theft detection, resulting in revenue savings. Further, the team analyzed AMI data to identify commercial customers approaching the peak of their current rate class. By proactively reaching out to these customers, PSEG Long Island can save these customers the cost of exceeding their demand rates and improve customer satisfaction. The Analytics team also identified thousands of EV charging locations based on customer load patterns, helping PSEG Long Island prepare its distribution grid for greater EV penetration.

The Analytics team is working to improve the accuracy of the estimated time of restoration provided to customers during outages. The estimated time of restoration and associated storm messaging are extremely important to customers, and these analytics use cases are expected to improve the customer experience. The Analytics team partners with departments across PSEG Long Island to select use cases and deliver value in collaboration with business champions. The Analytics use case life cycle is presented in Figure 2-3

Data Lake by the Numbers

Over **500 million** meter reads per day

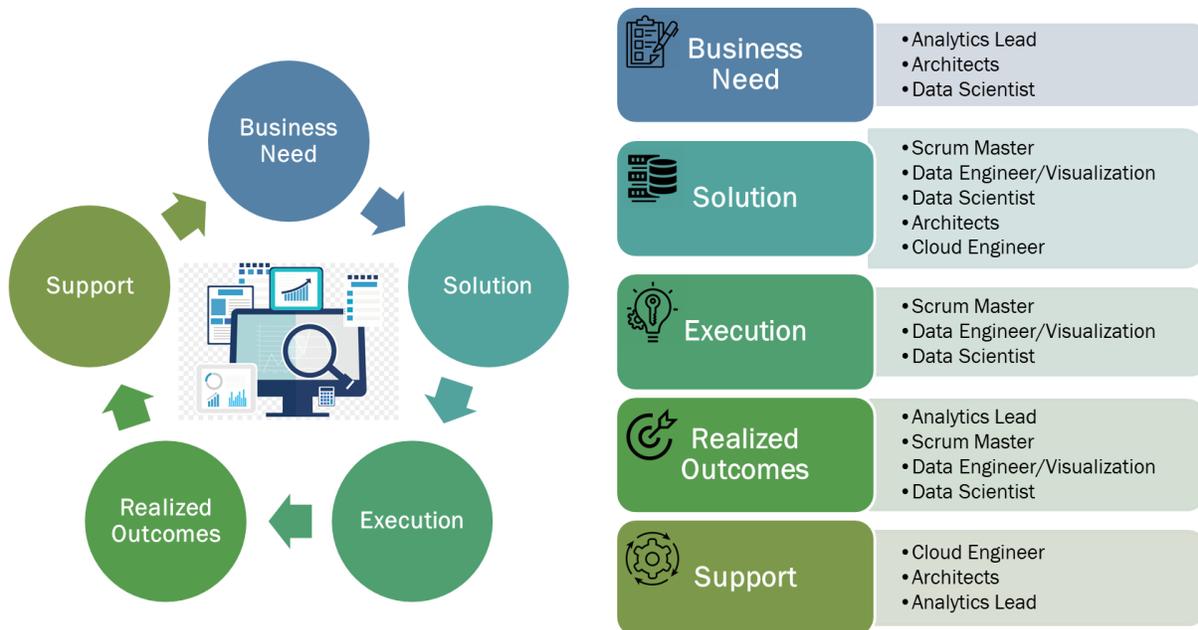
4 terabytes of data stored

30 periods of billing and consumption history to develop analytics

Over **160,000** transformers included in data

1.2 million distribution equipment service points included in data

Figure 2-3. Data Analytics Use Case Life Cycle



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During the coronavirus pandemic, PSEG Long Island is successfully using data analytics to help customers facing economic pressures and navigating the new normal of staying home. In March 2020, PSEG Long Island moved quickly to identify small businesses whose energy usage plummeted following stay-at-home orders. PSEG Long Island is designing rate discounts and payment assistance options for these valued members of the Long Island community.

Customer energy usage patterns have seen historic shifts since March 2020. Residential use grew rapidly, and eastern Long Island substations became heavily loaded as customers migrated east from New York City to their summer homes. Through real-time, AMI-based data analytics, PSEG Long Island has been able to maintain reliability for customers staying home.

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 the organization.

In 2020, the Analytics team will continue to build use cases to support energy efficiency, grid optimization, and customer analytics.

For further detail on the progress of Data Analytics, refer to Section B.4 of Appendix B.

Data Analytics Drives Response to COVID-19

PSEG Long Island has used AMI data analytics to identify customers whose electricity usage plummeted in the first few weeks of the pandemic, such as small businesses, and those who may need payment assistance or billing discounts.

Through analytics, PSEG Long Island is ensuring reliable power supply as customers stay home to stay safe. PSEG Long Island is rapidly responding to changing energy usage patterns. Data analytics has helped identify shifting residential demand profiles as customers stay home and increased demand in eastern Long Island as customers migrate.

2.4 Customer Experience and Engagement

As PSEG Long Island makes progress on AMI deployment and the relevant systems integration, the Utility will continue to assess opportunities and adjustments to current plans to engage customers, communities, and other stakeholders to help drive AMI-enabled benefits.

PSEG Long Island is investing in initiatives that improve the customer experience and the way customers interact with the utility. In the 2019 Utility 2.0 Plan, PSEG Long Island proposed two customer experience pilots: Next Generation Insights and Energy Concierge. These pilots aimed 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/DER actions for customers, analyzing high bills and advising on rates, and measuring the energy and monetary savings for both the customer and PSEG Long Island that result from these solutions.

In 2020, PSEG Long Island requests funding to pilot a C&I Demand Alert functionality. This functionality 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 will enable PSEG Long Island customer service representatives to provide personalized

recommendations to customers based on the analysis of backend data. PSEG Long Island 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).

2.4.1 Progress to Date

PSEG Long Island is engaging customers to inform them of the AMI installation process and to actively promote and incorporate feedback. In addition, the Energy Concierge and Next Generation Insights pilots are focused on elevating the customer experience.

AMI Customer Engagement Plan

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:

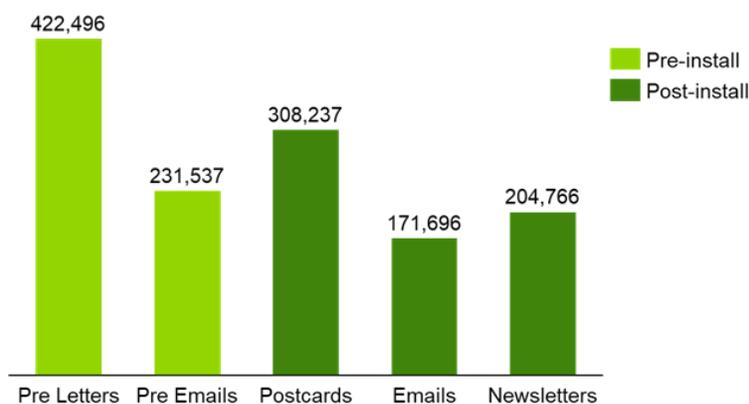
- Increase customer knowledge of AMI benefits
- Inform customers of their upcoming AMI installation
- Solicit feedback.

Figure 2-4. Process Flow for AMI Customer Engagement



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

Figure 2-5. Marketing Communications as of End of Q1 2020



As of the end of the first quarter in 2020, over 1.3 million individual pieces of marketing material (1.1 million through the end of 2019) in the form of letters, emails, postcards, and newsletters have been sent to customers across Long Island (Figure 2-5. above).¹⁸ Opt-out rates remain low through the first quarter

¹⁸ Email communications are only sent to customers who provide an email address, so engagement via email is lower than mail, which can be sent to all customers.

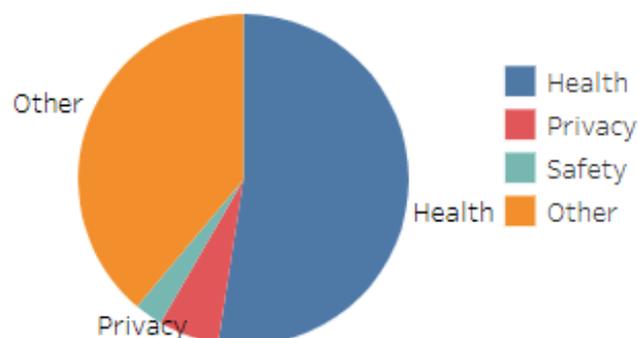
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of 2020. Through the My Smart Energy Lab, a mobile learning center, PSEG Long Island created opportunities for customer engagement and AMI education, with over 8,000 customers at local community events in 2019.

In 2019, PSEG Long Island conducted AMI customer research, including focus groups, interviews, and surveys. PSEG Long Island incorporated learnings from the customer feedback into future outreach plans, such as 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 2-6).

Figure 2-6. Reasons for Customer Opt-Out



Source: PSEG Long Island Outcomes Dashboard

Due to the coronavirus outbreak, 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.

In Q1 2020, PSEG Long Island expanded the smart meter educational resources available with the launch of “The Power to Control Your Energy” video on their website and social media channels. The video informs customers how the online My Smart Energy tool can help them save money and encourages them to sign up.

For further detail on the progress of Customer Experience and Engagement, refer to Section B.5 of Appendix B.

Energy Concierge Pilot

Energy Concierge is a personal residential advisory service to increase customer engagement and customer satisfaction through one-on-one interaction. The Energy Concierge team is finalizing the business process and requirements for implementing Phase 1 of the program in early fall 2020. Conducting Energy Concierge appointments virtually is also being explored as an option for customers.

Next Generation Insights Pilot

Next Generation Insights is a suite of proactive digital alerts, personalized recommendations, energy insights, and bill analysis tools that will enable customer engagement. The Next Generation Insights procurement process secured an energy disaggregation vendor in Q2. Internally, teams are working on product requirements and kickoff has launched.

2.4.2 New Initiative Proposed for 2021: C&I Demand Alert Pilot

PSEG Long Island is proposing a pilot that will test the hypothesis that demand alerts can help C&I customers manage energy costs that are incurred through demand charges. The solution is not expected to be used to address system peak; rather, it will enable 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.

A summary of how the C&I Demand Alert capability aligns with PSEG Long Island’s guiding principles for Utility 2.0 initiatives is provided in Table 2-1.

Table 2-1. Alignment of C&I Demand Alert Pilot with Utility 2.0 Guiding Principles

Customer Satisfaction	System Efficiency	Reduced Greenhouse Gases
Facilitates interactive and engaging relationship between the customer and the utility	Reduces customer demand, which may lead to systemwide peak demand reduction and improved grid utilization	Improves customer understanding of demand, thereby providing opportunities for energy conservation

2.4.2.1 Objective

This pilot is intended to test to what extent a real-time demand alert with actionable insights can help commercial customers avoid or reduce demand charges, which can constitute 60%-70% of a commercial customer’s bill. PSEG Long Island expects that C&I demand alerts will increase customers’ awareness around their ability to manage demand in near-real time. PSEG Long Island also expects this capability will enable commercial customers to understand the benefits of AMI and how it can be relevant to their business.

2.4.2.2 Scope

The proposed solution would leverage an existing Demand Manager application that runs on AMI meters and 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 reacts in real time, sending an 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 are trending to either reach or exceed their preset demand threshold.

The proposed 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 (i.e., 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 (i.e., 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.

To test these scenarios, PSEG Long Island is targeting enrollment of up to 1,000 commercial customers. A sampling strategy for enrollment will be developed as part of the pilot design phase.

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Performing demand forecasting at the meter means that all calculations use the most recent data and the Utility can react in real time to changes in demand. Demand forecasting at the meter also reduces latency, improves reliability, and ensures consistent results. In addition, the Demand Manager can be programmed remotely to follow a specific rate schedule stored in the meter.

In this pilot, PSEG Long Island will also investigate the potential to link energy insights based on the participating customer's C&I Portal profile to create an alert with actionable insights and recommendations. PSEG Long Island is implementing a C&I Portal (Section 2.2), which is intended to increase AMI data-driven benefits for business customers. Capabilities of the portal include usage and demand interval data visualizations with energy insights specific to the business customer cohort/profile. Usage and demand management recommendations and savings plans could be tied to the C&I Demand Alert capability. For example, below are some recommendations targeted at reducing demand that can be linked to these alerts:

- Install demand-controlled ventilation
- Retrofit enhanced ventilation controls
- Install variable speed drive controls on well pumps and booster pumps

Another recommendation that can be linked to this type of alert is participation in existing PSEG Long Island DR programs. The C&I Portal is planned to provide a Find My Best Rate capability, which identifies the best available rate plan for a customer based on their eligibility and historical usage. By working in tandem with the C&I Demand Alert capability, Find My Best Rate can provide the best rate plan for the customer, while the proactive demand alerts encourage customers to achieve savings on their bills.

2.4.2.3 Schedule

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. Because of this pre-existing foundation, the technology is expected to be ready to use toward the end of the fourth quarter of 2021, after regression testing is complete.

Similar to all other Utility 2.0 initiatives, PSEG Long Island will submit updates on the progress of the C&I Demand Alert Pilot in the annual Utility 2.0 Plan, as well in the quarterly Utility 2.0 Outcomes Dashboard. This will provide the Utility an opportunity to adapt and react to information that are collected over the course of the pilot, including potential changes in the design of the pilot, its schedule, and its budget.

The overall pilot implementation schedule is divided into six main stages:

1. **Design:** develop test scenarios, sampling strategy, and baseline data to measure effectiveness.
2. **Enroll Customers:** identify customers and engage for recruiting to the pilot.
3. **Build Solution:** configure application and deploy to enrolled meters.
4. **Test Solution:** test functionality and compatibility with other systems.
5. **Deploy Solution:** depending on the results of the test phase, solution will go live.
6. **Evaluate Outcomes:** assess outcomes and compare with target values and hypotheses.

Table 2-2 outlines the proposed project schedule, with each stage in the implementation schedule briefly described below. In the schedule below, light orange shade indicates the high-level stages, with darker orange shade denoting major tasks in each stage.

Table 2-2. Project Schedule – C&I Demand Alert Pilot

Stage	Q1 2021	Q2 2021	Q3 2021	Q4 2021	2022
Design					
Detailed Pilot Design					
Customer Sampling Strategy					
Enroll Customers					
Customer Acquisition					
Customer Communications					
Build Solution					
Demand Manager Application Configuration and Development					
Mobile App and Text Alert Implementation					
Test Solution					
Systems Integration Test					
Regression Test					
Deploy Solution					
Evaluate Outcomes					
Customer Surveys and Data Collection					
Analysis and Reporting					

Design

PSEG Long Island will develop a pilot design detailing how each scenario will be tested, what sampling strategy to follow, and what baseline data will be used to measure effectiveness of the C&I Demand Alert capability. Solution architecture technical requirements and specifications will be developed in this phase. Pilot customer communications and survey will also be defined in this phase.

Enroll Customers

PSEG Long Island will recruit C&I customers based on the demand profiles and available AMI data; the pilot will require several hundred commercial customers but not more than 1,000 pending sampling strategy (e.g., strata requirements would be defined in the Design phase).

Build Solution

PSEG Long Island will work with its AMI meter and network vendor to configure and adjust the Demand Manager application code and deploy it to enrolled meters over the air. PSEG Long Island will integrate the existing mobile app and messaging capabilities to create an end-to-end solution architecture.

Test Solution

PSEG Long Island will work with its AMI meter vendor and mobile app and messaging teams to test the technical components of the pilot to ensure that the desired functionality is delivered and that other systems are not affected due to the meter program changes (e.g., ensure billing determinants are calculating correctly).

Deploy Solution

Go-live will be determined based on the results in the Test phase. Communications will be sent to enrolled customers about what to expect in terms of alerts via mobile app or SMS/text along with pilot customer support information.

Evaluate Outcomes

PSEG Long Island will evaluate the success of the pilot against target values and hypotheses to determine whether the tool does achieve the desired objectives. The Utility expects to leverage the Demand Optimization data analytics use case already built to inform the customer target list and to use that data as the baseline for comparison when assessing the impact of demand alerts. Depending on the outcomes of the evaluation, the tool may be rolled out to a wider selection of customers.

2.4.2.4 Dependencies and Risks

The implementation of C&I Demand Alert depends on the successful completion of the meter data management system and command center upgrade, which are planned for early 2021. Because of the integration of the command center with the Demand Manager application, PSEG Long Island will need the latest versions of meter data management and the command center for complete communication functionality and real-time data visibility and reliability. The potential risks and proposed mitigation steps for implementation of the C&I Demand Alert pilot are outlined in Table 2-3.

Table 2-3. Risk and Mitigation Assessment – C&I Demand Alert Pilot

Category	Risk	Mitigation
Schedule	The completion of the meter data management system and command center upgrade is delayed, which would delay the pilot.	Depending on the length of the delay, the pilot will be assessed if still feasible for 2021 launch. It is not recommended that PSEG Long Island develop the solution architecture before the upgrades are complete.

2.4.2.5 Funding Request

Estimates for the capital and operating expenses for the C&I Demand Alert pilot through 2025 are presented in Table 2-4. The combined total 5-year cost is approximately \$2.2 million. The totals for each year are rounded to the second decimal point.

Table 2-4. Capital and Operating Expenses – C&I Demand Alert Pilot

Funding Subcategory	Capital Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
PM, Labor & Training	\$0.04	\$0.03	\$0.003	-	-	-
IT Upgrades	\$1.93	\$1.93	-	-	-	-
Total	\$1.97	\$1.97	\$0.003	-	-	-

Funding Subcategory	Operating Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
PM, Labor & Training	\$0.05	\$0.02	\$0.03	-	-	-
Marketing and Outreach	\$0.15	\$0.08	\$0.08	-	-	-
Total	\$0.20	\$0.09	\$0.10	-	-	-

2.4.2.6 Business Case

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. PSEG Long Island will test this hypothesis over the course of this pilot and evaluate whether the solution should be rolled out to a wider selection of customers.

Hypotheses

Table 2-5 summarizes the hypothesis and the metrics PSEG Long Island will use to evaluate the success of the pilot, and to determine whether the C&I Demand Alert Pilot can be rolled out to a larger number of customers and for a longer duration.

Table 2-5. Hypotheses – C&I Demand Alert Pilot

Hypothesis	Metric	Measure of Success
Demand alerts encourage rate 281 customers that exhibit potential to transfer to rate 280 to consistently maintain behavior to achieve that goal.	Decrease demand	The current criterion is 12 consecutive months of 5.6 kW.
Demand alerts notify rate 280 customers that exhibit risk of being transferred to rate 281 of high demand trends.	Decrease demand	The current threshold is two consecutive months of ≥ 7 kW of demand.
Demand alerts encourage rate 285 customers that exhibit potential to transfer down to rate 281 to consistently maintain behavior to achieve that goal.	Decrease demand	The current criterion is 12 consecutive months of 116 kW.
Demand alerts notify rate 281 customers that exhibit risk of being transferred to rate 285 of high demand trends.	Decrease demand	The current threshold is two consecutive months of ≥ 145 kW of demand.
Proactive alert capability will be received positively.	Customer satisfaction with the alerts	Pending pilot evaluation survey design—for example, top two box results on a 1-5 satisfaction scale.

Pilot Participation

PSEG Long Island will limit the participation to the pilot to 1,000 C&I customers over the course of the pilot.

Measurement and Reporting

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

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

Communications Plan

At the outset of the pilot, PSEG Long Island will specify a customer engagement approach for customers that will be targeted to enroll in the pilot. The Utility will work with its communications team to define the

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messaging, branding, format, and other content that will be shared with customers, emphasizing expected benefits.

As part of this pilot, PSEG Long Island will evaluate the use of insights gathered through the C&I Portal to create actionable alerts for participating customers. These alerts include energy-saving recommendations and savings plans as well as recommendations for the best available rate plan for a customer based on their eligibility and historical usage.

Principles for REV Demo Projects

The proposed pilot aligns with several principles of REV demos, as described in Table 2-6.

Table 2-6. Principles of REV Demos – C&I Demand Alert Pilot

Principle	Description
Includes partnership between utility and third-party service providers	PSEG Long Island will partner with a third-party provider and integrate the provider's application within its existing IT/OT landscape to deliver the C&I Demand Alert capability.
Demonstrations should delineate how the generated economic value is divided between the customer, utility, and third-party service provider(s)	The C&I Demand Alert capability provides value to all parties, with commercial customers receiving the value of additional insights and alerts regarding their data usage, third-party partner benefitting from additional data, and the Utility benefitting from data that can reduce overall costs to customers through savings.
Offers competitive markets for grid services	The insights from demand management alerts and C&I demand may inform the design of various programs and offerings for grid services.
Identifies questions it hopes to answer or problems or situations on the grid and the market should respond with solutions	Through the pilot, PSEG Long Island will identify patterns around the demand habits of commercial customers and the sensitivity and effectiveness of alerts versus a demand management system.
Informs rules that will help create competitive markets	If the pilot is successful, PSEG Long Island would have proven the value of demand management alerts for commercial customer savings, thus increasing the competitive market for these services and tools.
Informs pricing and rate design modifications	The pilot is based on rate pricing and stipulations for rate assignments.
Includes various customer participants	This pilot will be made available to commercial customers, whereas the majority of programs using AMI data are marketed toward residential customers. The implementation of this pilot will help commercial customers realize benefits from their AMI meters.

2.4.3 Looking Ahead

Taking the next step in the evolution of its customer options, PSEG Long Island is considering two initiatives to help customers unlock the capabilities and benefits that insights from their smart meter can deliver including personalized energy savings tips and increased flexibility of their billing experience. The initiatives described below are still at the concept stage and are being evaluated, with no specific commitment by PSEG Long Island for their launch.

Next Best Action (NBA)

PSEG Long Island is committed to leveraging data analytics insights to provide additional value to its customers. Next Best Action is a functionality that provides personalized recommendations to customers based on analysis of backend data and what programs or services should be most helpful. Next Best Action would utilize the Salesforce Einstein AI capability PSEG Long Island is implementing near the end of 2020.

Next Best Action recommendations would be centered around several use cases ranging from energy conservation and savings tips to program and specific rate recommendations. Using NBA, customer service representatives would be presented with personalized recommendations based on the customers' energy usage patterns.

The energy savings tips would be specific to the greatest savings opportunity for each individual home. These tips would be designed to take advantage of the energy disaggregation-based insights engine (i.e., the Next Generation Insights capability) and include PSEG Long Island's EE and DR programs, financing options for DER technology, innovative rates, and programs aimed at low-income customers.

With Next Best Action, PSEG Long Island customers are expected to realize savings and gain enhanced knowledge on the way they use energy. It is also expected that the personalized recommendations will improve customer satisfaction.

Pick Your Due Date

Pick Your Due Date will enable customers to take their billing date into their own hands. Specifically, PSEG Long Island proposes an investment for customers to choose the date on which they would like to be billed every month, though the billing cycle would remain the same duration. The flexible bill date is made possible using the AMI capability to read the meter usage at any time, on demand.

Pick Your Due Date will improve the billing and payment experience for customers and will give them more control and flexibility; it is expected this initiative would improve overall customer satisfaction when engaging with the utility.

2.5 Rate Modernization and Billing Solutions

PSEG Long Island's objective is to align itself with New York State REV goals, offering customers rate options that are simple to understand, easy to compare, and that meet the Utility's and the 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 is in the process of developing an Advanced Billing Engine that will allow the Utility to adapt internal systems to provide simple, easy to understand rate options to Long Island customers. In addition, PSEG Long Island is developing a web-based rate platform that will allow customers to compare and select from the new rate options.

In the 2020 Utility 2.0 Plan, PSEG Long Island is requesting funding to launch FlexPay, a prepay pilot program with adapted requirements that ensure Home Energy Fair Practices Act (HEFPA) compliance in New York State. PSEG Long Island included a request to evaluate FlexPay for potential pilot deployment in the 2019 Utility 2.0 Plan; following this evaluation, it is proposing a phased implementation over the period between 2021 and 2025.

PSEG Long Island is also requesting funding to implement On-Bill Financing to promote clean energy products to its customers. Similar to FlexPay, PSEG Long Island requested funding to evaluate On-Bill Financing for potential deployment in the 2019 Utility 2.0 Plan; following the evaluation, the Utility is proposing an initial two-year pilot offering using \$10 million in funding to deploy heat pumps on Long Island.

Looking to the future, PSEG Long Island is working on a Green Rate offering (i.e., a green power supply charge), which is expected to be available to customers in 2022.

2.5.1 Progress to Date

In 2019, the Rate Modernization team compiled and refined user stories to develop requirements for the Advanced Billing Engine. The team also carried out workshops and exploratory exercises to identify actions needed to bring other customer-facing items in line with the new rates—e.g., bill presentment changes and My Account updates. By remaining productive while awaiting completion of procurement and contracting with the vendor for the Advanced Billing Engine, the Rate Modernization team was able to identify opportunities to improve on the existing plan and to prepare effectively for the Advanced Billing Engine's implementation.¹⁹ The team developed a targeted rollout plan for the first two years of the pilot based on customer research and identified key rate impact, behavioral, and home attributes within PSEG Long Island's customer records.

In early 2020, PSEG Long Island started to design the Advanced Billing Engine with the solution vendor. New rates are scheduled for submission to LIPA in August 2020, with release to the public the following month. Next steps include developing customer journey maps for customers including engagement, motivation to act, authentication, and the rate review and selection process using the My Account platform, as well as developing informational webpages and associated educational materials.

The process for setting up the billing engine includes several key steps:

- Building connections between the vendor and internal systems
- Modeling and calculating existing and pilot rates within the billing engine
- Making necessary changes to align the existing billing system to the Advanced Billing Engine
- Designing and implementing customer and customers service representative comparison tool
- Testing and validating in parallel with each level of development

For further detail on the progress of Rate Modernization, refer to Section B.6 of Appendix B.

2.5.2 New Initiative Proposed for 2021: FlexPay Pilot

PSEG Long Island believes its customers should have an option that enables greater billing flexibility, including flexibility around their payment schedule, thus providing greater control over their energy use and spend. To enable this, the Utility is seeking to implement a FlexPay pilot, which is based on a prepay concept with adapted requirements that would ensure HEFPA compliance in New York.

¹⁹ The Advanced Billing Engine is the foundational technology that will provide all the capabilities proposed in the Rate Modernization scope of work.

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FlexPay will also allow customers to make payments in amounts and on schedules that best align to their cash flow. The proposed offering will enable customers with low-to-moderate outstanding balances to participate by splitting their payments between new usage and current arrears. Even though some believe that the same outcome can be achieved if customers overpay their monthly bill, in reality customers are never prompted to overpay, and the amount varies by payment channel (most common is \$10 over the amount due). In addition, with post-pay (paying at the end of the billing cycle), customers are used to receiving a monthly bill, and their payment is a reaction to that bill and whatever other outstanding balance they may have previously incurred. An overpayment is reconciled against actual usage via the standard monthly billing process; as such, it does not yield the same advantage as FlexPay.

The FlexPay solution will be able to track, monitor, and communicate balance and usage changes at a much greater frequency because of the AMI network. With greater granularity and frequency of information available to customers via FlexPay, they can be in greater control of how much money they spend on electricity and when, because increments are in days instead of months. Customers that make an advanced payment on the standard post-pay account would not be moved to FlexPay (there is no defaulting customers to FlexPay under any circumstance). FlexPay will be a voluntary pilot—customers will have to opt in and will maintain the ability to opt out and revert back to post-pay at any time. The FlexPay pilot's design has taken into consideration existing customer protections provided under HEFPA.

Usage alerts are currently in place for residential customers to encourage energy conservation; however, these alerts are only available in kilowatt-hours (kWh), not dollars (\$). Through contact center feedback channels and customer research, customers have communicated to PSEG Long Island their lack of understanding of kWh usage and the activities contributing to their day-to-day electric use in dollars. FlexPay is a more robust tool—like prepay cell phone plans, users are more aware of the remaining balance (in dollars) and are more inclined to control spend. All prepay studies show consistent bill savings for enrolled customers because of this increased awareness, which results in 8%-12% energy conservation (much higher than any other behavioral demand side management method).

Customers have difficulties understanding how their equipment and lifestyle decisions influence their bill. Feedback on a typical monthly billing cycle is delivered after the month's usage has occurred, so it is hard to attribute usage to specific activities conducted throughout the entire month. End of the month total bill surprises often catch customers off guard and contribute to a negative experience. Post-pay monthly billing customers have no opportunity to adjust their usage once the financial impact has been realized.

PSEG Long Island's customers use various payment methods to pay their utility bill, including digital self-serve, cash or checks. Additionally, customers' cash inflow cycles range over an entire month. Most customers with arrears would like to pay their outstanding balance; however, the prospect of the amount of money owed and the threat of collections adds stress to their lives.

Table 2-7 summarizes how the FlexPay Pilot aligns with PSEG Long Island's Utility 2.0 guiding principles.

Table 2-7. Alignment of FlexPay Pilot with Utility 2.0 Guiding Principles

Customer Satisfaction	System Efficiency	Reduced Greenhouse Gases
Increases access to flexible billing methods that may be more aligned with customers' financial schedule and situation	Increases foundational capability for flexibility around billing systems	Promotes energy conservation through increased frequency and transparency into usage impacts

2.5.2.1 Objective

The premise of FlexPay is to empower customers by giving them the information they need to understand and control their electricity usage. With FlexPay, customers can purchase energy in advance, monitor their energy use and associated costs daily, receive alerts as they use electricity, and reload their account to continue with service.

To achieve this, PSEG Long Island is proposing the implementation of FlexPay, a voluntary (opt in) prepay pilot program modeled after best practices in prepay programs provided by peer utilities. The basic premise of prepay programs is customer-driven advance payments for electric service, precluding customers' monthly bill statements. Instead of reacting to a monthly bill, the prepay program constantly monitors customers' energy usage and monetary balance and keeps customers informed of their account status. In lieu of receiving a monthly bill, the customer can access their account balance via digital channels 24/7 and receive FlexPay-driven alerts. The FlexPay Pilot will leverage AMI capabilities and provide a flexible billing and payment option to residential customers. The program will also provide transparency into users' payments and encourage energy conservation, thereby supporting New York State goals.

Figure 2-7 summarizes prepay program benefits based on data from prepay trends and analysis from the Prepay Energy Working Group.²⁰

Figure 2-7. Summary of Prepay Program Key Metrics



Source: Prepay Trends and Database Analysis, Webcast April 2020, Prepay Energy Working Group

While all segments of PSEG Long Island's customer base can benefit from FlexPay, the majority of customers enrolled in similar programs in utilities across the country are LMI customers. A prepay customer pays an average of 3-5 payments per month, the bill amount being less than their average monthly post-pay electric bill. FlexPay customers will have multiple payment options and channels, providing flexibility to pay via the payment channel convenient for them and as many times during the month that they want compared to paying an entire month's bill post-consumption. This flexibility makes the FlexPay program more affordable and financially viable for many customers.

The proposed pilot design is a modified variant of a traditional prepay program that will allow participating customers to pay in advance for electric service while preserving protections provided under HEFPA. FlexPay is intended to leverage near real-time AMI capabilities to offer greater flexibility and control to customers over their usage spend. PSEG Long Island customers have a hard time relating usage to dollars spent and have asked for better visibility on how their appliance and lifestyle decisions affect their

²⁰ For more information, visit <http://defgllc.com/about/consortia/prepaid-energy/>.

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bill. The end of the month bill comes too long after activities for some customers to connect their actions to associated cost spikes or decreases.

Historically, prepay programs have resulted in win-win outcomes for utilities and customers. Utilities that have implemented prepay programs have seen reduced net bad debt. According to a study conducted by a prepay provider servicing 66 utilities, similar programs have seen an average of 72% in bad debt reduction for 12% prepay penetration, with \$191, on average, arrearage recovered. PSEG Long Island has used conservative assumptions of these benefits while analyzing the feasibility of the FlexPay program. PSEG Long Island assumes that FlexPay participation would reach approximately 8% of the total customer base; however, national prepay programs participation ranges from 5% to 20% according to the Prepay Energy Working Group. Other benefits include improved bill rendering and delivery, with FlexPay customers all opted-in to electronic billing, and a reduction in field operation because the number of disconnects due to non-payment is expected to decrease. Figure 2-8 shows representative customer satisfaction outcomes with prepay programs.

Figure 2-8. Prepay Program Customer Satisfaction Metrics



Sources: *Prepay Energy Working Group Facts Sheet, May 2020*; *Duke Energy Carolinas Prepaid Advantage Pilot Learnings Report Sep 2017*. [Link](#)

FlexPay offers benefits to customers beyond what they can get on PSEG Long Island's Balanced Billing program ("Levelized Billing"). PSEG Long Island's balanced billing sets a set amount to be paid once a month and then reconciled with actual usage and charges on a periodic basis. The FlexPay program allows the customer complete control over their spend, whereas Levelized Billing is a post-pay bill payment option intended to smooth out monthly bill fluctuations. In Levelized Billing programs, a monthly installment is set using the prior 12-month consumption history; it cannot be changed until reconciliation or another significant event. These installments do not provide certainty of the eventual cost. Because of the retroactive billing, Levelized Billing programs do not drive energy conservation as customers are still reacting to the amount they have already used.

2.5.2.2 Scope

PSEG Long Island respects the long-held principles of HEFPA and the criticality to protect the interests of LMI and fixed-income customers. PSEG Long Island has evaluated other prepay programs across the country and found that participating customers reduce energy usage, sometimes as high as 12% below baseline, and express satisfaction with the program. As a result, the proposed pilot design for FlexPay will adopt industry best practices with unique features to protect customers and honor HEFPA.

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HEFPA Compliance

A core objective of FlexPay is to realize benefits within the confines of the HEFPA law—FlexPay was designed specifically with HEFPA in mind. The proposed FlexPay Pilot is consistent with HEFPA's termination of service provisions, and customers cannot be terminated for nonpayment while enrolled in FlexPay. HEFPA rights and protections remain intact and unchanged in FlexPay.

FlexPay uses customers' existing right to initiate turn-ons and turn-offs voluntarily; if a customer selects voluntary turn-off, they will be directed to a confirmation landing page to reconfirm the decision. The notification will conform to the existing process followed when a customer requests a turn-off. The following scenarios provide an overview on how HEFPA rights and protections are adhered to during and after FlexPay participation:

- In the situation that a customer cannot meet payment obligations for electric service in the customer's name, they will be converted to standard post-pay service after a grace period of five days. Customers will receive a bill for any outstanding balance they might have accumulated in the duration of the pilot, and standard collections actions will resume if the bill is not paid by the due date. As per current practice, all post-pay customers will be afforded the opportunity to make payment to the utility to avoid termination. This process will require a site visit, even where a remote device is used.
- In the situation that the party responsible for the electric service is different from the resident of the premise, such as in a multifamily dwelling, current HEFPA procedures will be followed. In PSEG Long Island's proposed FlexPay process, the Utility is not disconnecting for non-payment. Similar to the scenario above, FlexPay customers who do not meet payment obligations are then removed from the program after a grace period and converted to post-pay service where the normal HEFPA notification process takes place. In HEFPA, before service can be disconnected for non-payment in a multifamily dwelling, the Utility must notify the building to provide an opportunity for tenants to set up a tenant's association account to avoid service termination.

Eligibility Criteria

PSEG Long Island is proposing the following eligibility criteria for customers participating in the FlexPay Pilot:

- FlexPay is intended for residential customers on rate 180.
- The customer's premise must have a remote connect switch-capable AMI meter.
- The customer is not eligible if they are on medical, net metering, or solar programs.
- Participating customers must have the capability of receiving either text or email messaging from PSEG Long Island and must agree to allow the company to use those mediums to provide information to them regarding service such as balance alerts under the FlexPay offering.
- Customers on the Household Assistance Rate (HAR) will be eligible. Customers on this rate receive HAR discount that is applied daily, which would be in sync with ongoing daily FlexPay reconciliation process, i.e. the daily monitoring calculations that compare credits and usage in order to forecast remaining days balance.
- Customers that receive financial assistance via third party payments, where payments are sent directly to the utility (such as Home Energy Assistance Program and Department of Social Services checks) will not be eligible.

PSEG Long Island has detailed processes for the FlexPay Pilot. Below is the summary of the key processes:

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- **Enrollment:** An eligible customer signs up for FlexPay and makes an initial minimum payment to activate the account. If the customer has arrears, all FlexPay payments will be split 25:75 arrears versus prepay balance until the customer's arrears are paid off. Initial minimum payment is suggested to be \$75 because this is half of the utility's residential customers' average electric bill and consistent with other prepay programs. The arrears threshold proposed is \$1,500 (national averages range in lower hundreds). Both parameters would be confirmed during the detailed design phase pending program approval.
- **Monitoring:** Account-level charges are calculated from interval usage data (along with daily non-commodity charges) and constantly compared to the customer's prepay balance. The prepay engine will be able to forecast the number of days remaining at the current balance. At the 10-day, 5-day, and 1-day remaining balances, an alert is automatically triggered to notify the customer. PSEG Long Island would configure mandatory alerts and customers would have the ability to configure additional ones (e.g., at 7 days, 3 days, etc.) and specify the preferred alert channel. The customer can access their details on the FlexPay account 24/7 (enabled via My Account on the web and mobile app). The customer can add funds via any payment channel or elect to request a temporary disconnect. Based on prepay program research, it is not uncommon for customers to leverage the remote disconnect option to ensure they do not exceed their personal budget. It is this type of flexibility and control that provides certainty of cost. If the customer's prepay balance reaches zero or becomes negative, PSEG Long Island would automatically initiate a 5-day grace period. During this period, customers would continue to be reminded daily of their negative balance with amount they would need to pay to return to normal status.
- **Unenrollment:** The customer can unenroll from FlexPay at any time or at move out; they are transitioned to post-pay and billed/credited balance accordingly. In the case of a negative balance scenario and the 5-day grace period has expired, the customer is transitioned to post-pay and billed accordingly. Standard collections actions would be followed from this point on, which include HEFPA protections if customer does not pay their bill by the due date. A customer on FlexPay can never be disconnected for negative balance (non-pay).

2.5.2.3 Schedule

PSEG Long Island is proposing to start the development of FlexPay in 2021, with expected pilot launch in 2022. Given the timeline, the effect of the COVID-19 pandemic on the FlexPay Pilot is expected to be low.

The development and implementation schedule of the FlexPay pilot is informed by business and IT requirements PSEG Long Island would have to enable. Enabling these requirements will require extensive coordination with third parties that will provide new functionality or adapt existing applications PSEG Long Island utilizes. Project management, training, organization change management, and communications will cross the full life cycle of the implementation.

Similar to all other Utility 2.0 initiatives, PSEG Long Island will submit updates on the progress of the FlexPay Pilot in the annual Utility 2.0 Plan, as well in the quarterly Utility 2.0 Outcomes Dashboard. This will provide the Utility an opportunity to adapt and react to information that are collected over the course of the pilot, including potential changes in the design of the pilot, its schedule, and its budget.

The implementation schedule for the program would entail eight main stages, as illustrated in Table 2-8.

1. **Research and Partner:** Conduct customer research to validate customer preferences and identify target demographics for the pilot. Partner with an approved third-party prepay vendor.
2. **Plan:** Develop a detailed program implementation and workplan for FlexPay.

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3. **Define:** Develop the IT infrastructure, platform configuration, and data transfer.
4. **Design:** Design configurable user content and specifications.
5. **Integrate:** Integrate the internal billing system and application.
6. **Test:** Test user acceptance and functionality.
7. **Launch:** Share the final solution with customers.
8. **Ongoing Support:** Maintain and support implementation throughout the program lifetime.

Table 2-8. Project Schedule – FlexPay Pilot

Stage	Q1 2021	Q2 2021	Q3 2021	Q4 2021	2022	2023	2024	2025
Research and Partner	█							
Plan		█						
Define			█					
Design			█					
Build			█					
Test					█			
Launch					█			
Ongoing Support					█			

Research and Partner

PSEG Long Island will conduct customer outreach and surveying to validate customer preferences that will inform the design of the FlexPay Pilot. This will include the identification of specific demographic groups in PSEG Long Island’s service territory who may be well-suited for participation in the pilot program. PSEG Long Island will make the outcomes of this research available to LIPA and DPS and will include highlights in the 2021 Utility 2.0 Plan.

Furthermore, in this stage of the pilot PSEG Long Island will procure necessary development and software hosting services. The Utility will partner with an approved third-party prepay vendor to implement the FlexPay solution and provide ongoing transactions processing and communications services.

Plan

At program initiation, based on programs of this magnitude, it would be typical to allocate approximately three months to planning. It is recommended that this effort be prioritized with the rest of the program portfolio.

Some of the high-level activities during the planning phase of the project include the following:

- Develop program charter
- Identify stakeholders
- Establish logistics for the program
- Plan resources
- Create project plan

Define

The detailed requirements phase will require a deep analysis on all high-level requirements; the primary purpose of this phase is to understand each requirement and perform a deeper understanding of what systems and applications will be invoked. Some of the activities are listed below.

- Develop process designs and define detailed requirements (these inform configuration and functional designs in the next phase)
- Define technical architecture
- Define integration approach
- Define testing approach
- Develop approach to organizational change management and training for customer service representatives
- Finalize scope

Key deliverables that will be produced during this phase:

- Future process design specification
- Functional requirements specification
- Non-functional requirements specification (security, performance, environments, etc.)
- Requirements traceability matrix
- Scope and approach document
- Integration mapping/design document
- Testing strategy

Design/Build/Test Phases

The design, build, and test phases of the project will require engagement and interaction between PSEG Long Island's business, technical, and the necessary third-party resources. The primary components of the FlexPay solution and the integration with third-party applications will be conducted during these phases. Some of the activities include:

- Define configuration rationale and execute configuration steps
- Develop functional and technical designs for all development objects
- Develop all test scripts
- Finalize organizational change and training, including support procedures
- Build and deploy environments
- Plan for performance and security testing

Key deliverables that will be produced during this phase include:

- Functional and technical design specifications
- Test plan and test scripts
- Operational readiness checklist/assessment
- Interface source and executable code
- Solution configuration document
- Software modifications and enhancements

- Batch execution processes

Launch

Launch will include deployment of all configuration and developed objects and their migration into the production environment. Several checkpoints will be scheduled with the various stakeholder groups across the enterprise, ensuring the functionality deployed operates as designed.

Ongoing Support

PSEG Long Island will monitor enrollments and how the overall solution is performing to provide ongoing improvements, explore eligibility criteria expansion, and respond to customer feedback. Ongoing O&M includes fees for payment processing and communications (e.g., messaging, email, alerts, and notifications).

2.5.2.4 Dependencies and Risks

FlexPay depends on procurement and partnership with a third-party prepay vendor as well as on internal IT integration and completion of the functional requirements needed for this new customer capability.

Table 2-9 outlines the potential risks and proposed mitigation steps for implementing the FlexPay pilot.

Table 2-9. Risk and Mitigation Assessment – FlexPay Pilot

Category	Risk	Mitigation
Technical	IT engagement and availability: the lack of available staff or resources may push back the project timeline due to the need for IT integration and build.	Active engagement with IT in each step of the process and regular check-ins regarding potential roadblocks.

2.5.2.5 Funding Request

Estimates of the capital and operating expenses for the FlexPay pilot through 2025 are presented in Table 2-10. The combined total five-year cost is approximately \$14.2 million.

The bulk of the program’s costs are attributed to IT integration and IT upgrades. These costs include integration, licensing, transaction fees, communication fees, overhead, and risk and contingency. Other program costs include costs associated with customer research and engagement.

Capital expenses assume third-party integration with existing providers of messaging/alerts/notification service, customer portal, the AMI meter data management system, CRM system, and payments channels. Modifications to the customer information system are also included in the capital expenses; these costs are one-time costs that will not be incurred again even after if the program is scaled to more customers after the pilot completion. A conservative assumption that most customer transactions will be credit card payments was made to estimate operating expenses.

Similar to all other Utility 2.0 initiatives, PSEG Long Island will submit annual updates on the progress of the FlexPay Pilot in the annual Utility 2.0 Plan. This will provide the Utility an opportunity to adapt and react to information that are collected over the course of the pilot, including potential changes in the design of the pilot, its schedule, and its budget.

Table 2-10. Capital and Operating Expenses – FlexPay Pilot

Funding Subcategory	Capital Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
IT Upgrades	\$5.70	\$1.07	\$2.01	\$0.96	\$1.33	\$0.33
Materials and Equipment	\$1.44	-	\$0.36	\$0.36	\$0.36	\$0.36
PM, Labor & Training	\$0.99	\$0.14	\$0.20	\$0.21	\$0.22	\$0.22
Total	\$8.13	\$1.20	\$2.57	\$1.53	\$1.91	\$0.92

Funding Subcategory	Operating Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
Third-Party Support	\$1.78	\$0.49	\$0.33	\$0.36	\$0.34	\$0.26
Marketing and Outreach	\$2.99	\$0.23	\$0.43	\$0.58	\$0.83	\$0.92
Ongoing O&M	\$0.38	-	\$0.01	\$0.05	\$0.11	\$0.20
PM, Labor & Training	\$0.68	\$0.07	\$0.12	\$0.16	\$0.17	\$0.17
IT Upgrades	\$0.27	-	\$0.01	\$0.04	\$0.08	\$0.14
Total	\$6.10	\$0.79	\$0.89	\$1.19	\$1.53	\$1.69

2.5.2.6 Business Case

PSEG Long Island believes that the overall *business case* for FlexPay is strong, both for customers and the business. FlexPay was part of PSEG Long Island’s overarching rate modernization roadmap that was included in the 2018 Utility 2.0 Plan, and which is part of the wider business case for the AMI rollout on Long Island.

Studies have shown that participation in prepay programs leads to energy conservation. FlexPay customers see how their energy usage impacts the remaining balance in their account, which increases the customer’s awareness. As customers continue to monitor their usage with regular usage alerts and online viewing of their account, they become more aware of how the decisions they make affect their electric usage and how they can make their payment last longer—e.g., when usage is unusually high, such as in the summer months, the balance may need to be replenished sooner. This education of the customer along with regular usage alerts sent to them leads to greater energy consciousness, tying together how their actions affect their usage (and associated costs). Specific examples include Salt River Project identifying a 12% average decrease in energy use, while Duke Energy identified an 8.58% average decrease in energy use. This conservation directly reduces overall usage and peak demand.

Energy savings can be furthered by a psychological gaming effect, where a customer tries to stretch out their remaining funds to not hit a zero balance. This is similar to the experience customers get from prepay cell phone plans—users are aware of the remaining balance in dollars until their cycle renews, which empowers them to control their usage and spend.

Hypotheses

Even though peer utilities have documented and reported savings from prepay programs in other jurisdictions, these may not be comparable to New York given the difference in the laws and the existence of HEFPA protections. PSEG Long Island believes that the way the FlexPay offering has been designed, with New York-specific design specifications, will enable participating customers and the Utility to realize similar levels of energy savings as those reported elsewhere. However, this is something that will need to be tested and substantiated as part of the FlexPay pilot. If this hypothesis is proven true, the

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Pilot will pave the way for a prepay offering to be made available more broadly on Long Island and across the entire State.

PSEG Long Island also hypothesizes that FlexPay can deliver additional benefits, such as:

- Increase in customer satisfaction by increased flexibility and more options.
- Increased customer engagement, leading to reduction in arrears, complaints, bad debt, and turnoffs, as well as increases in Days Sales Outstanding (DSO) savings.
- FlexPay is targeting a part of PSEG Long Island’s customer base that has traditionally been underserved – including customers that like to pay in advance, similar to pay-as-you go mobile phone plans.

Table 2-17 summarizes the hypothesis and the metrics PSEG Long Island will use to evaluate the success of the pilot, and to determine whether FlexPay can be rolled out to a larger number of customers and for a longer duration.

Table 2-11. Hypothesis – FlexPay Pilot

Hypothesis	Metric	Measure of Success
Providing customers with flexibility in the scheduling of bill payments will increase customer satisfaction.	Customer satisfaction among participants in the pilot.	Pending pilot evaluation survey design—for example, top two box results on a 1-5 satisfaction scale.
Providing customers with education and visibility around their energy bill as part of a HEFPA-compliant prepay program will reduce the average energy usage for participating customers.	Energy savings and bill savings realized by participating customers.	Percentage reduction in energy usage or bill totals for participating customers as compared to baseline usage, and also to savings reported by peer utilities.
By enrolling customers with arrears, FlexPay will enable past-due dollars to be collected more effectively.	Arrears (past-due dollars) collected from participating customers.	Percentage of participating customers in arrears at the time of their enrollment. Annual number of customers who enroll to the pilot in arrears and continue participating in the pilot until they are no longer in arrears (i.e., past-due dollars paid off).

Pilot Participation

Assuming adherence to the timeline and schedule described above, PSEG Long Island will target 1,000 customers for participation in the FlexPay Pilot by the end of 2022, and 5,000 customers annually after that. Roughly 70%-80% of the total customer population is estimated to be eligible for FlexPay based on the business criteria for eligibility. PSEG Long Island estimates that total customer participation as part of this Pilot could reach approximately 8%.

Measurement and Reporting

Data will be collected on internal and external factors that may be influencing the process. The pilot program will be exposed to as broad of a range of inputs and process conditions as possible, with a summary of findings included in PSEG Long Island's annual Utility 2.0 Plan.

Pilot results will be compiled and evaluated, and continuous improvements will be implemented:

- Analyze performance.
- Analyze the pilot plan. What worked? What didn't? What had to be added or changed?
- Conduct customer satisfaction and process improvement research.
- Communicate pilot results—create a summary of the strategy used to pilot the solution and communicate the results achieved.
- Change management is a key part of project success. Soliciting feedback during stakeholder interviews gives access to thoughts from those impacted by the project.
- Review the original stakeholder analysis to determine how/if anything has changed, and what PSEG Long Island may want to do to address those results.
- Prepare a recommendation brief whether to scale the prepay program and what is the recommended implementation plan for the full scale prepay program—a summary of the strategy to be used for implementation of the piloted solution.

Customer Engagement and Communications Plan

As part of the 2018 Utility 2.0 Plan, PSEG Long Island developed a customer engagement plan that is specifically tailored to rate modernization initiatives (section A.7.6 of 2018 Utility 2.0 Plan). The goal was to achieve consistency in the way customer engagement is executed as specific rates and new billing solutions are developed, approved, and activated.

The rate modernization customer engagement plan spans across six key areas, which will also be applied in the engagement with potential participants to FlexPay:

- **Customer Research:** Prior to the launch of FlexPay, PSEG Long Island will conduct customer research to validate the program design and optimize the customer communication and engagement experience. After launch the customer experience will be assessed through surveys and a variety of internal feedback channels.
- **Customer Education and Awareness:** A variety of channels are planned to educate and inform customers about FlexPay. A diverse multichannel education and awareness campaign, including but not limited to website pages, educational videos, social media, customer service representative referrals and direct customer marketing engagement, will encourage customer interest in learning about the best fit for their lifestyle.
- **Customer Adoption:** Personal history, home facts, and lifestyles will be used to help customers know if opting into FlexPay is right for them. Therefore, PSEG Long Island will develop personalized-messaging, and welcome kits to provide customers with a seamless adoption experience.
- **Customer Optimization:** Customer optimization will begin once a customer chooses to opt-in to FlexPay. PSEG Long Island will issue proactive, personalized information, tools and communications to assist each customer in achieving their desired results from participating in the program (avoiding costs, reducing overall usage and/or monthly bills) and feel good about the choice they made.

- Stakeholder and Community Group Involvement:** Long Island residents and businesses have many interests that are served by local governments, special interest groups, and other community-based organizations. These groups provide an important source of feedback as well as engage their membership base in new programs and services PSEG Long Island delivers. For each new rate option being delivered (including FlexPay), the Utility includes outreach and coordination with the relevant stakeholders and community groups.
- Internal Training and Change Management:** Internal training and change management programs will be utilized to effectively share the objectives, features, processes and procedures necessary to implement FlexPay, and to have meaningful personalized conversations with customers as an energy advisor.

Principles for REV Demo Projects

The proposed pilot aligns with several principles of REV demos, as described in Table 2-18.

Table 2-12. Principles of REV Demos – FlexPay Pilot

Principle	Description
Includes partnership between utility and third-party service providers	Enables collaboration between prepayment engine operator and a third-party prepay vendor with PSEG Long Island.
Demonstrations should delineate how the generated economic value is divided between the customer, utility, and third-party service provider(s)	Identifies and quantifies associated costs and benefits, supporting subsequent development of more scalable business models for residential customers that effectively allocate costs and benefits between stakeholders.
Offers competitive markets for grid services	Informs opportunities to increase energy conservation, energy efficiency and customer satisfaction.
Informs rules that will help create competitive markets	Pilot will provide insights that inform future prepay rules, and rules regarding grid disconnection, which would support the market for companies in this space.
Identifies questions it hopes to answer or problems or situations on the grid and the market should respond with solutions	Hypotheses listed above.
Informs pricing and rate design modifications	May inform rates based upon flexible timing of bill payments.
Includes various customer participants	Potential participating customers include seasonal customers, customers that are budget conscious and would like to have the power to choose when and where they pay, low-income customers, seasonal as well as rental property customers.

2.5.3 New Initiative Proposed for 2021: On-Bill Financing Pilot

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, PSEG Long Island is proposing the implementation of an On-Bill Financing pilot that will provide residential customers with the option of paying for the purchase of clean energy products through charges on their monthly electricity bills.

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 aggressive levels of 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 more products beyond heat pumps and also extending the program beyond the initial two-year duration.

Table 2-13 summarizes how the On-Bill Financing Pilot aligns with PSEG Long Island’s Utility 2.0 guiding principles.

Table 2-13. Alignment of On-Bill Financing Pilot with Utility 2.0 Guiding Principles

Customer Satisfaction	System Efficiency	Reduced Greenhouse Gases
Increases customer satisfaction by providing access to flexible payment options for EE and DER	Encourages adoption of EE products through financial loan service	Encourages adoption of EE products, thereby lowering greenhouse gas emissions

2.5.3.1 Objective

A major challenge to the widespread adoption of DER and EE is the upfront cost of installing efficient products. Residential homeowners may be challenged and unwilling to seek additional funding or loans from traditional providers to solely support the costs of new energy efficiency or beneficial electrification technology upgrades; similarly, traditional lenders may not be familiar with the beneficial and cost-effective nature of such technologies.

To overcome this challenge, PSEG Long Island is proposing to launch an On-Bill Financing pilot program that will provide customers with a viable and affordable financing option, which will in turn enhance their ability to pay for energy efficiency upgrades and clean energy products. The pilot will first target issuing loans for the deployment of residential heat pumps and will test the hypothesis that by offering customers the ability to choose between or a combination of an upfront rebate, low-cost financing, or a combination of the two, the overall participation in PSEG Long Island’s heat pump program (Home Comfort program) will increase compared to solely offering rebates. PSEG Long Island also hypothesizes that providing additional choices will increase customer satisfaction. It should also be noted that PSEG Long Island has an existing electric rate tariff that provides a discount of about 15% on its electric price from October to May for customers with whole-house heat pumps, providing customers with an additional incentive, and enhanced satisfaction with using clean heating and cooling.

A two-year pilot was deemed reasonable for testing the hypothesis. Upon completion of the pilot period, if the hypothesis is proven valid, PSEG Long Island expects to transition the pilot into a full-scale customer offering and will likely broaden the selection of technology measures that can be financed to include products such as EV chargers, solar PV, and energy storage, which directly support the State’s clean energy goals.

Comparison with other offerings in New York

Financing is currently offered to New Yorkers through the Green Jobs Green New York Program for solar PV, solar thermal, air-source and ground-source heat pumps, and energy efficiency measures. Unlike this existing financing program, the proposed pilot will offer PSEG Long Island customers the flexibility to choose between financing with a lower interest rate (as low as 0%), an upfront rebate at the point-of-sale, or a combination of the two. Such financing will have a term of up to 18 years for heat pumps. The overall NPV of the incentives payable to participating customers will be the same, but customers will be given the flexibility to choose what type of incentive they get to offset the cost of their investment. This set up is similar to the optionality that consumers have when buying a new car—they have the option for an upfront discount, financing with a low interest rate, or a combination of the two.

The ability to combine different levels of rebate and financing is not practically feasible for customers through Green Jobs Green New York, since financing is offered by the State whereas rebates are offered by the Utility. Furthermore, PSEG Long Island is able to leverage LIPA's status as a state agency to offer a favorable interest rate to customers, even before applying any buy-down. This means that customers who opt to get the full value of the up-front rebate will have the ability to secure financing at a rate that is more competitive than Green Jobs-Green New York.

Legal considerations

PSEG Long Island and LIPA commissioned a legal review of the proposed design of the On-Bill Financing Pilot to ensure compliance with the New York State Public Service Law. The review indicated that PSEG Long Island's ability to offer financing for energy efficiency products and collect payments through on-bill charges is supported both by the Public Service Law's language around cost recovery and termination, as well as enabling legislation that was adopted to set up the Green Jobs-Green New York program (such as, the Green Jobs Green New York Act and the Power NY Act).²¹

2.5.3.2 Scope

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 ability simplifies the overall financing process and provides customers with a convenient method of repayment.

PSEG Long Island will leverage capital that will be secured by LIPA for the purposes of this pilot. Specifically, PSEG Long Island will have \$10 million dollars available for this initial two-year offering. LIPA will be the capital provider, and PSEG Long Island will manage all parts of the loan program itself or in partnership with qualified third parties. Customers seeking financing will be strongly encouraged to conduct an energy audit and to use the recommendations from the audit and a cost-effectiveness analysis in their application.

Customers who opt to use interest buy-down on the loan will get this over the entire duration of the loan, which for heat pumps it is assumed to be up to 18 years.

The application process will be divided into three stages:

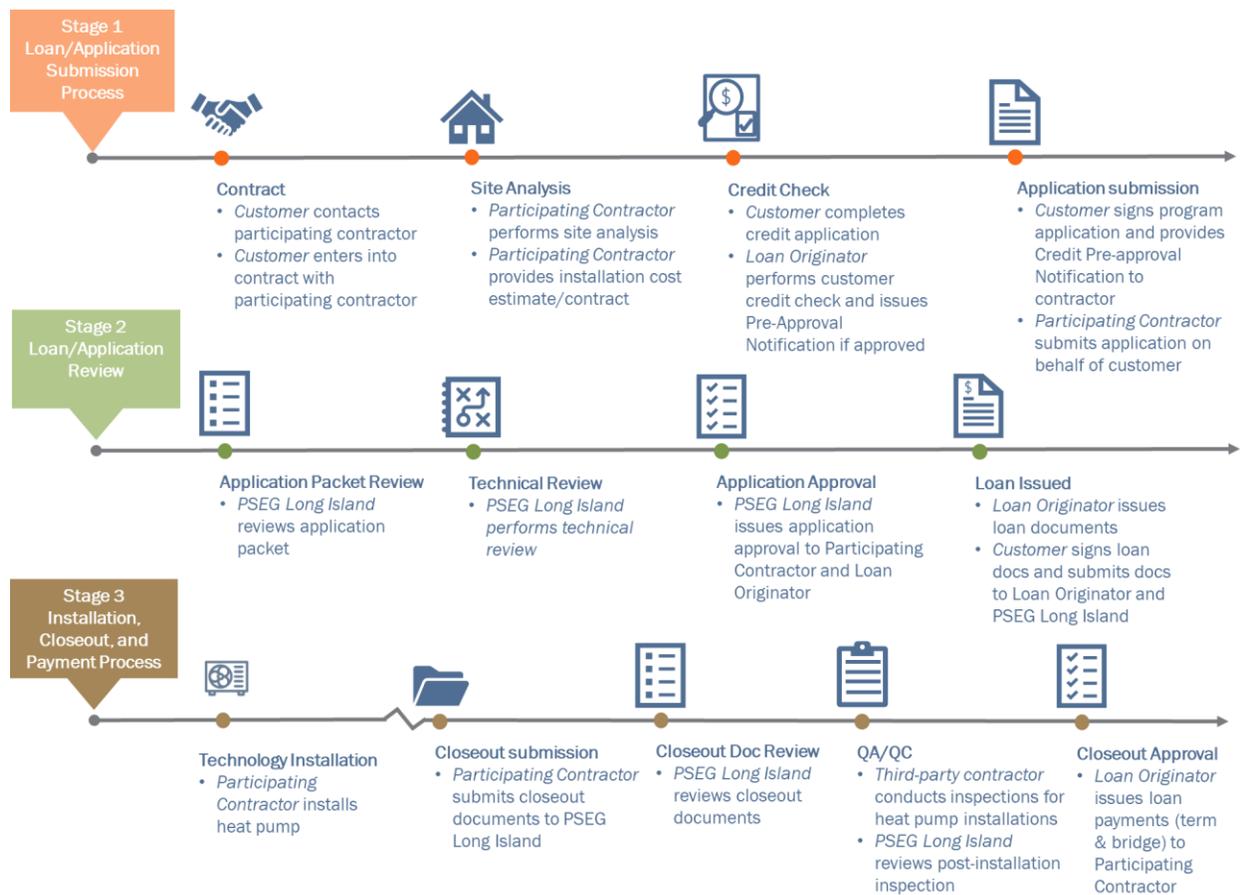
- **Stage 1 – Loan/application submission process:** PSEG Long Island will use existing trade allies to perform site analyses, provide installation cost estimates, and submit program applications on behalf of customers. PSEG Long Island expects a third-party loan originator will be contracted to perform credit checks and approve loans.

²¹ Green Jobs-Green New York Act of 2009, 2009 Sess. Law News of N.Y. Ch. 487 (A. 8901); Power NY Act of 2011, 2011 Sess. Law News of N.Y. Ch. 388 (A. 8510).

- Stage 2 – Loan/application review:** PSEG Long Island will be responsible for reviewing all applications and will approve or issue notices of missing information accordingly. PSEG Long Island expects to use the same loan underwriting standards as NYSERDA’s Green Jobs – Green New York Program. Following application review, PSEG Long Island will leverage existing partnerships with trade allies to conduct technical reviews, and the loan will be issued once all parts of the application are approved.
- Stage 3 – Installation, closeout, and payment process:** Once the application is approved, trade allies will install the technology upgrade at the residential customer site. PSEG Long Island will coordinate with the internal T&D team to plan any anticipated interconnection for new DER. At the end of the loan term, closeout documents will be submitted for approval. PSEG Long Island expects a third-party contractor to perform post-installation quality assurance/quality control (QA/QC) inspection for 10% of heat pump installations.

Figure 2-9 details each stage of the process.

Figure 2-9. On-Bill Financing Loan Application Process



2.5.3.3 Schedule

To launch the On-Bill Financing pilot, PSEG Long Island will leverage existing billing functionality, however additional IT investment will be required as part of pilot launch. The design of the pilot will start in late 2020, with the launch of the pilot expected in 2021.

Utility 2.0 Long Range Plan

Chapter 2: Empower Customers through AMI and Data Analytics

Similar to all other Utility 2.0 initiatives, PSEG Long Island will submit updates on the progress of the On-Bill Financing Pilot in the annual Utility 2.0 Plan, as well in the quarterly Utility 2.0 Outcomes Dashboard. This will provide the Utility an opportunity to adapt and react to information that are collected over the course of the pilot, including potential changes in the design of the pilot, its schedule, and its budget.

The implementation schedule for the pilot is divided into three main stages:

1. **Preparation and Development:** PSEG Long Island will make key business decisions about the deployment plan and will partner and procure with a third-party loan originator.
2. **Training and Outreach:** PSEG Long Island will train the contractors who will be interacting with the customers and will conduct outreach to customers and communities for their participation in the program.
3. **Ongoing Reporting and Feedback:** PSEG Long Island will develop the IT functionality required for the program, as well as platform configuration and data transfer.

Table 2-12 outlines the proposed project schedule Table 2-14.

Table 2-14. Project Schedule – On-Bill Financing Pilot

Stage	2020	2021	2022	2023	2024	2025
Preparation and Development						
Billing System Modification						
3 rd Party Loan Originator Procurement						
Marketing Plans and Materials Development						
Training and Outreach						
Contractor Training and Outreach						
Customer/Community Outreach						
Ongoing Reporting and Feedback						
Monthly Contractor Outreach/ Feedback Meetings						
Monthly Reporting of Metrics						
Quarterly Evaluation Reports						

Preparation and Development

PSEG Long Island will develop an RFP to partner with a vendor for the On-Bill Financing pilot. The vendor will be a third-party loan originator.

Training and Outreach

In this stage, PSEG Long Island will start marketing outreach to customers and communities to encourage participation in the On-Bill Financing pilot. PSEG Long Island will also contact and train contractors who will be the customers' primary contacts.

Ongoing Reporting and Feedback

In this stage, the On-Bill Financing pilot will be evaluated quarterly, and its metrics will be reported monthly. A Quality Control framework will be in place where PSEG Long Island evaluates 10% of the customer premises where energy efficiency products have been installed through On-Bill Financing.

2.5.3.4 Dependencies and Risks

A key dependency for the launch of the pilot is to secure loan capital. PSEG Long Island has already engaged loan originators and has held discussions with LIPA about the creation of the fund that will be used for the two-year duration of the pilot. This fund will use \$10 million, which can enable the sale of approximately 1,000 heat pumps.

Table 2-15 outlines the potential risks and proposed mitigation steps for implementing the On-Bill Financing pilot.

Table 2-15. Risk and Mitigation Assessment – On-Bill Financing Pilot

Category	Risk	Mitigation
Project Management	Availability of PSEG Long Island staff in different departments (e.g., IT and marketing) to coordinate efforts due to multiple programs and pilots.	Implement processes to leverage IT capabilities enabled for NYSERDA’s On-Bill Recovery financing; marketing efforts would be an add-on within other energy efficiency marketing efforts.
External	Lack of customer engagement and adoption because of reluctance to take on loan during or shortly after an economic downturn.	PSEG Long Island will be able to offer 0% financing for loan applications through the entire two-year duration of the proposed pilot.
External	Missed On-Bill Financing installment payments because customers move out of rented properties.	Terms and conditions of loan agreement must require customer to notify any new tenants of the loan associated with the premise and arrange as to who continues to pay outstanding On-Bill Financing installments.
External	Missed On-Bill Financing installment payments.	PSEG Long Island will provide notice of termination to customer and subsequently terminate service for failure to pay On-Bill Financing installment charges in the same manner as the failure to pay utility service charges.
External	On-Bill Financing installment arrears.	PSEG Long Island will offer a deferred payment agreement for On-Bill Financing installment charge arrears in the same manner as arrears on utility service charges. PSEG Long Island would consider canceling the pilot if it results in increased level of arrears or terminations.

2.5.3.5 Funding Request

Table 2-16 summarizes the capital and operating expenses expected for enabling processes for the On-Bill Financing pilot. The capital expenditure 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 even after 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 QA/QC inspections. It is worth noting that the \$10 million loan capital is not included in the funding request and will be secured by LIPA.

Table 2-16. Capital and Operating Expenses – On-Bill Financing Pilot

Funding Subcategory	Capital Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
IT Upgrades	\$1.04	\$1.04	-	-	-	-
PM, Labor & Training	\$0.08	\$0.03	\$0.05	-	-	-
Total	\$1.12	\$1.07	\$0.05	-	-	-

Funding Subcategory	Operating Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
Marketing and Outreach	\$0.31	\$0.15	\$0.16	-	-	-
PM, Labor & Training	\$0.02	\$0.006	\$0.01	-	-	-
Third-Party Support	\$1.49	\$0.54	\$0.64	\$0.10	\$0.10	\$0.10
Total	\$1.82	\$0.70	\$0.81	\$0.10	\$0.10	\$0.10

2.5.3.6 Business Case

By providing customers with the option of financing (potentially at a bought down interest rate) or receiving a rebate, or both, PSEG Long Island believes that the overall customer uptake of heat pumps through the existing Home Comfort program will be greater compared to only offering rebates. PSEG Long Island will test this hypothesis over the course of this pilot and evaluate whether On-Bill Financing should be offered beyond the two-year duration.

Hypotheses

Table 2-17 summarizes the hypothesis and the metrics PSEG Long Island will use to evaluate the success of the pilot, and to determine whether On-Bill Financing can be rolled out to a wider selection of products and for a longer duration.

Table 2-17. Hypothesis – On-Bill Financing Pilot

Hypothesis	Metric	Measure of Success
Providing customers with a financing option that can supplement the existing rebates for heat pumps will increase customer uptake of heat pumps.	Participation in Home Comfort program beyond existing baseline forecast.	The target is to have 1,000 customers participate in On-Bill Financing over the course of the two-year pilot, which is equal to an increase of approximately 13% over the expected participation in the Home Comfort program if only rebates were offered. ²²
Providing customers with a financing option that can supplement the existing rebates for heat pumps will increase customer satisfaction.	Customer satisfaction among participants in the pilot.	Pending pilot evaluation survey design—for example, top two box results on a 1-5 satisfaction scale.

²² This estimation assumes that all of the capital that is available for the financing in the initial two years of the pilot is used for heat pumps. PSEG Long Island will evaluate the use of On-Bill Financing for other products depending on customer feedback.

Pilot Participation

PSEG Long Island will not limit the participation to the pilot to a specific number of customers, however a limiting factor will be the loan capital that is available (\$5 million each year for a total of \$10 million for the duration of the pilot).

Measurement and Reporting

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

- **Customer participation:** PSEG Long Island will measure the number of customers that participate in the Home Comfort program by signing up for On-Bill Financing, as well as total participation in the program (i.e., including customers that use just the traditional rebate option).

Communications Plan

At the outset of the pilot, PSEG Long Island will specify a customer engagement approach for rolling out the pilot to residential customers. The Utility will work with its internal communications team to define the messaging, branding, format, and other content that will be shared with customers, emphasizing expected benefits, the loan application process, and eligibility.

Principles for REV Demo Projects

The proposed pilot aligns with several principles of REV demos, as described in Table 2-18.

Table 2-18. Principles of REV Demos – On-Bill Financing Pilot

Principle	Description
Includes partnership between utility and third-party service providers	PSEG Long Island will partner with third-party trade allies to promote the offering to its customers. A loan originator and servicer will be hired to provide On-Bill Financing to customers.
Demonstrations should delineate how the generated economic value is divided between the customer, utility, and third-party service provider(s)	Customers will have increased options for accessing EE products. The Utility has an added tool for increasing participation to EE programs in support to State goals. Third-party solution providers see an uptake in the adoption of clean energy products and increased engagement from customers.
Identifies questions it hopes to answer or problems or situations on the grid and the market should respond with solutions	Through the pilot, PSEG Long Island will test the hypothesis that providing an on-bill financing option will increase participation in the heat pump (Home Comfort) program.
Informs rules that will help create competitive markets	If the pilot is successful, PSEG Long Island would have proven the value of on-bill financing to support competitive sales of heat pumps, as well as other EE products.
Informs pricing and rate design modifications	Informs the ability to reduce future reliance on incentives and opportunities to offer financing for other EE measures and DER.
Includes various customer participants	The pilot will actively engage residential customers. PSEG Long Island may also consider applications for commercial customers, where practical.

2.5.4 Looking Ahead

To further enhance its Rate Modernization offerings and drive consumer behavior change, PSEG Long Island is evaluating two initiatives. The initiatives described below are still at the concept stage and are being evaluated, with no specific commitment by PSEG Long Island for their launch.

Appliance-Level Rate Modeling Functionality

PSEG Long Island is proposing to implement a functionality that will be able to model customer bill impacts by analyzing time-of-use shifts by individual major appliances. This analysis will include technologies such as EVs, pool pumps, heaters, electric stoves, and thermostats. This functionality will be offered to customers via My Account.

With the Appliance-Level Rate Modeling Functionality, PSEG Long Island will offer customers increased transparency and flexibility and allow them to use data to inform the way in which they consume energy at home. This solution aligns with the REV objectives to empower customers and enhance their knowledge around energy use.

Green Rate Program

PSEG Long Island is committed to making progress toward New York's CLCPA, with a trajectory based on CLCPA's Clean Energy Standard. The proposed Green Rate program is intended to provide additional choices for customers and advance or accelerate progress toward achieving New York State renewable energy goals.

The preliminary design of the Green Rate program reflects the primary goals to:

- Offer a voluntary opt-in Green Rate that meets customers' growing demand for optional renewable energy products
- Create customer advocates for New York's clean energy goals
- Enhance customer satisfaction

PSEG Long Island anticipates offering a Green Rate that results in a reasonable additional cost to subscribing customers, with multiple pricing options to reflect varying levels of optional enrollment levels and customer enrollment preferences. Non-subscribing customers would be protected against any cost increases related to the program and are likely to benefit from the program through any additional, incremental renewable resource or demand reduction investments that Green Rate contributions help support.

PSEG Long Island intends for the Green Rate program to support additional investments in New York-based clean energy solutions that reflect its customers' values and support innovation on Long Island. Customer preferences and message testing will be conducted to confirm final plan design, value parameters, and customer engagement regarding the promotion and adoption of this program.

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, encouraging the adoption of technologies that support New York State policy goals and LIPA objectives. Through the initiatives previously proposed in Utility 2.0 Plans and through work in EEDR programs, PSEG Long Island has laid the groundwork for increased adoption of beneficial DER on Long Island. Focus has shifted to a test, learn, and scale approach for future program development. Included in this year’s Utility 2.0 Plan is a set of initiatives that will transform the way customers have access to clean energy products, the way NWS projects are solicited for, and the way the market is able to scale infrastructure that can meet the State’s ambitious transportation electrification goals.

PSEG Long Island will continue to solicit future ideas for scalable, market-based solutions from customer feedback, from the market through REV Connect, and from internal ideation and innovation channels. Additionally, PSEG Long Island 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 or leverage learnings from its pay for performance or heat pump pilots to identify scalable models that limit the need for utility incentives yet remain attractive to customers.

The chapter is organized in four subsections, each representing a theme area (as shown below). The subsections provide an update on ongoing initiatives proposed and approved in past Utility 2.0 Plans, detailed descriptions for three new initiatives proposed in this year’s Utility 2.0 Plan for launch in 2021, and a preview of potential follow-on initiatives being considered for future Utility 2.0 Plans.

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3.1 Energy Efficiency and Heat Electrification

Energy efficiency 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 PSC 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. The Order further established two subsidiary targets: an annual reduction of 3% in electricity sales by 2025 and at least 5 TBtu in reduction through heat pump deployment.

Of the incremental target of 31 TBtu of reduction by the State’s utilities toward the achievement of the statewide goal, 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

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Chapter 3: Explore New Innovative Offerings

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 2021 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 in turn 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.

In 2020, PSEG Long Island is proposing to implement an Enhanced Marketplace that revolutionizes the way in which customers can access efficient products and services and aligns with the marketplaces used by other New York State utilities. In addition to this new initiative, the Heat Pump Controls pilot, an initiative launched earlier this year, continues to progress and is expected to provide keen insights and results in the upcoming heating season.

In the future, PSEG Long Island sees an opportunity to incorporate energy efficiency, beneficial electrification, and renewable energy solutions in building design earlier on in the development stage and is considering potential partnerships with municipalities to offer advisory services during the initial discussion stages municipalities may have with developers prior to the building permitting process. PSEG Long Island is also considering a financing program that would build on the proposed On-Bill Financing project, specifically targeting multifamily and LMI customers to help them access DER. This program would support a segment that has traditionally been underserved and is of high priority in New York State climate law and clean energy policy.

3.1.1 Progress to Date

PSEG Long Island has a long track record of delivering savings through EE and DR programs. New capabilities are being piloted, such as the control of heat pumps.

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 2021 EEDR Plan (included as Appendix A of this document) consists of four programs for residential customers and a multi-faceted program for commercial customers.

Heat Pump Controls Pilot

The Heat Pump Controls pilot is a technology pilot to demonstrate integrated smart thermostat controls for ductless mini-split heat pumps, targeting customers with central oil-fueled heating systems. The pilot deploys new smart thermostat technology that increases the use of underutilized heat pumps for winter heating. PSEG Long Island is contracting with its partner for this pilot, though that has been delayed due to the coronavirus outbreak. PSEG Long Island is targeting thermostat installations in fall 2020 for the 2020-2021 heating season.

3.1.2 New Initiative Proposed for 2021: Enhanced Marketplace

PSEG Long Island offers a marketplace to its customers that is limited in its depth of energy efficient products offered and its functionality. The Utility recognizes the need to provide an improved customer-centric energy management experience and is proposing the implementation of an Enhanced Marketplace (Marketplace), an expansion and modernization of its existing online energy marketplace. This Enhanced Marketplace will:

- Promote the sales of DER and EE products and related services
- Increase participation in EE and DER programs
- Integrate with PSEG Long Island’s other online tools and platforms to provide a seamless, customer-centric experience.

The Marketplace will also be able to provide customized rebates for authenticated customers based on their location on the grid, potentially supporting NWS and other grid-beneficial offerings in the future. Table 3-1 summarizes how the Enhanced Marketplace aligns with PSEG Long Island’s Utility 2.0 guiding principles.

Table 3-1. Alignment of Enhanced Marketplace with Utility 2.0 Guiding Principles

Customer Satisfaction	System Efficiency	Reduced Greenhouse Gases
Provides 21 st century e-commerce experience with the ability to purchase a greater array of products and related services; offers alternative to in-person purchases in a post-pandemic environment.	Promotes greater adoption of technologies and programs, supporting EE and beneficial electrification; can offer customized incentives for customers on constrained circuits to support NWS opportunities.	Promotes adoption of clean and efficient technologies.

3.1.2.1 Objective

The Enhanced Marketplace directly supports New York State’s goal of achieving 185 TBtu in energy efficiency savings by 2025 and the CLCPA goals of achieving 6,000 MW of solar by 2025, 3,000 MW of storage by 2030, and 70% of electricity from renewables by 2030. The Marketplace will also promote transportation electrification, supporting New York’s goal of having 850,000 EVs on the road by 2025.

Many utilities, including the New York State Joint Utilities, offer e-commerce solutions for their customers through online energy marketplaces. These marketplaces have traditionally offered basic EE products, such as LED light bulbs and smart thermostats. Recent technology and e-commerce advancements have resulted in utility marketplaces that are significantly more advanced and robust. These enhanced marketplaces provide customers with a broader suite of clean energy technologies, such as energy storage and EV charging stations, and a variety of services and utility program offerings.

Increasing customer expectations around engagement, specifically online engagement, are driving utilities to modernize their online platforms. Online marketplaces enable a personalized customer experience through native functionality (e.g., customized rebates based on grid location) and linkages with other offerings (e.g., ability to act on recommendations from Home Energy Management behavioral reports). This is especially valuable when considering the impact of the COVID-19 pandemic to customer behavior in the short term, with a potential increase in the use of online solutions that could create greater demand for digital engagement and e-commerce offerings.

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This initiative has three main objectives:

- **Maximize EE/DER adoption:** Promote adoption of EE and DER measures by providing products and services, enable customers to manage and optimize energy usage, and support New York State in achieving EE and clean energy goals.
- **Increase customer satisfaction:** Improve customer experience by enhancing digital engagement and facilitating customer management of their energy usage to maximize energy savings.
- **Empower customers with personalized information:** Provide customers with access to relevant and actionable information through native functionality (e.g., based on customer's location) and linkages with other offerings (e.g., recommendations from Home Energy Management behavioral reports), and educate customers on different technology, services, and program offerings.

3.1.2.2 Scope

The Enhanced Marketplace is envisioned to provide a streamlined customer experience in a single platform that:

- Acts as a one-stop-shop for all products, services, and program offerings
- Simplifies the purchasing and enrollment process based on authenticated eligibility
- Enables customers to take more active control over their energy usage
- Offers the ability to act on energy insights and recommendations by linking to specific products and programs
- Educates and motivates customers to consider marketplace offerings

While the Marketplace will primarily be marketed toward residential customers, commercial customers will still have access to the Marketplace. The Marketplace will be available to all customers through their My Account portal and will have integration points with other online platforms, such as PSEG Long Island's website, its CRM platform, the Home Energy Management Portal, and Home Energy Analyzer, among others. The Marketplace will facilitate a seamless process for customers to receive energy insights and behavioral recommendations (e.g., home energy management recommendations) and then act on them via the Marketplace.

PSEG Long Island expects to contract a third-party vendor to design, develop, and implement the Marketplace platform. An RFP for the Enhanced Marketplace was released in Q2 2020.

PSEG Long Island's Enhanced Marketplace is proposed to include five key components:

- **Direct Product Purchase Online Catalog:** Includes direct sale of consumer goods and large product offerings such as smart thermostats, lighting, advanced power strips, water heaters, heat pumps, storage, and EV chargers.
- **Home Services Marketplace:** Recommends available services and connects customers to reputable third-party vendors.²³ Examples of services include EV charging installation, home

²³ Product/service providers will not be charged a fee to participate in the Marketplace program in order to contain costs to customers. The approved list of contractors will benefit customers by being prescreened for criteria such as Building Performance Institute (BPI) certification. The customer will be able to receive rebates and incentives if they purchase devices separately and use contractors of their choice.

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auditing services, and installation of efficient appliances, weatherization goods, and heating, ventilation, and air conditioning (HVAC) equipment.

The platform will allow customers to post reviews and ratings of contractors. This platform could be further expanded to permit contractor bidding on services such as those recommended to customers from the Energy Concierge pilot (or pre-existing audit results) and from AMI data analytics and customer billing history.

- **Point-of-Sale Instant Rebates:** Applies rebates at the time of purchase to the customer's account, advertises products, and refers retail channels based on the customer's profile. Examples of products eligible for rebates include refrigerators, water heaters, and heat pumps.
- **Product Advisor:** Facilitates a customer's product purchase decision and allows customers to leave reviews and ratings of products. Information on estimates of annual operating cost, total lifetime cost and potential energy cost, and usage savings are expected to be provided. Examples of products include HVAC equipment and EVs.
- **Program Enrollment Center:** Allows for a streamlined process with validation, bundling, and data integrations to facilitate enrollment in various EE/DER programs and links to other resources such as a rate engine calculator.

A phased-in approach will be used to implement the full Enhanced Marketplace. The Marketplace is expected to be launched with simpler improvements to the existing marketplace first, and additional enhancements are expected to be built out over time. PSEG Long Island plans to implement the Marketplace in two phases over a period of two years. Details of the phases are indicated in Table 3-2.

Table 3-2. Marketplace Launch Plan

Phase	Implementation Year	Marketplace Component
I	2021	Direct Product Purchase Online Catalog
		Home Services Marketplace
II	2022	Point-of-Sale Instant Rebates
		Product Advisor
		Program Enrollment Center

The Marketplace website is expected to be available with the completion of Phase I, with the mobile platform made available with the completion of Phase II when Point-of-Sale Instant Rebates become available for PSEG Long Island's customers.

Though beyond the scope of this investment, the Marketplace may be leveraged to allow participation in other EE or DER offerings, such as shared solar and Green Rate products.

3.1.2.3 Schedule

The implementation plan is divided into six main stages:

1. **Market Solicitation:** PSEG Long Island will partner with a third-party vendor, who will design and deliver the Marketplace platform.
2. **Design and Preparation:** Involves establishing outreach and marketing plan, identifying requirements for third-party vendor integration, and internal IT integration.
3. **Development:** Includes developing customer outreach materials, IT infrastructure and website, platform configuration, and data transfer.

4. **Marketplace Content Development:** Involves content development and configuration of each Marketplace component. Two phases are planned for content development (see Section 3.1.2.2).
5. **Testing and Launch:** Involves functional testing and launch of the Marketplace in two phases.
6. **Ongoing Maintenance:** Ongoing maintenance related to websites and data integration is expected throughout the duration of the investment.

Table 3-3 outlines the proposed project schedule; details of each implementation stage are described in further sections.

Table 3-3. Project Schedule – Enhanced Marketplace

Stage	H2 2020	H1 2021	H2 2021	H1 2022	H2 2022	2023+
Market Solicitation	[Shaded]					
Design and Preparation	[Shaded]					
Define Requirements for Third-Party Vendor and IT Integration		[Shaded]				
Establish Outreach and Marketing Plan		[Shaded]				
Development		[Shaded]				
Develop Customer Outreach Materials		[Shaded]				
Develop IT Infrastructure and Website		[Shaded]				
Platform Configuration		[Shaded]				
Data Transfer		[Shaded]				
Marketplace Content Development		[Shaded]				
Phase I Development		[Shaded]				
Phase II Development			[Shaded]			
Testing and Launch			[Shaded]			
Phase I Testing and Launch			[Shaded]			
Phase II Testing and Launch				[Shaded]		
Ongoing Maintenance				[Shaded]		

Market Solicitation

PSEG Long Island has developed an initial set of requirements for each Marketplace component and an RFP to partner with a vendor for Marketplace implementation. PSEG Long Island released the RFP for the Marketplace in Q2 2020.

Design and Preparation

While bids are being reviewed, PSEG Long Island will coordinate with its internal marketing team to develop a customer outreach plan. The tentative outreach plan is to promote the Marketplace via media advertising, billing inserts and brochures, and in-person outreach, which may occur during and after

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program rollout. Once a contract is awarded to a vendor, initial requirements identified in Stage 1 will be refined to meet all parties' expectations.

Development

In the Development stage, PSEG Long Island will coordinate with its internal marketing team to develop the customer outreach materials designed in Stage 2. Customer outreach is expected to be conducted throughout implementation and rollout of the Marketplace. PSEG Long Island's IT team will coordinate with the Marketplace vendor to implement necessary IT and website infrastructure. Once all infrastructure has been implemented, configuration of the Marketplace platform will take place. Any necessary data transfer and integration will take place during this stage.

Marketplace Content Development and Testing and Launch

In Stage 4, integration of any existing or development of new Marketplace components will take place. Marketplace components will be launched in two phases as described in Section 3.1.2.2. Functional testing will occur prior to launch for each phase.

Ongoing Maintenance

The Marketplace platform is expected to require ongoing maintenance of the website, IT, and data integration channels.

3.1.2.4 Dependencies and Risks

Launch of the Marketplace depends on the availability of IT staff to coordinate deployment of each Marketplace component. In addition, the Marketplace has planned integrations with other IT platforms and systems. Constraints on IT staff or issues with platforms and systems being developed in parallel may cause delays in the project schedule.

The potential risks and proposed mitigation steps for implementing the Enhanced Marketplace are outlined in Table 3-4.

Table 3-4. Risk and Mitigation Assessment – Enhanced Marketplace

Category	Risk	Mitigation
Technology	Complex technology may result in integration issues and timeline delays.	Effective business process design in the Program Design and Preparation stage.
Timeline	Delays in project schedule due to IT integration delays.	Incorporated contingencies in the project schedule by using a phased-in approach for all components of the Marketplace and in the project budget.
Stakeholder Engagement	Availability of PSEG Long Island staff in different departments (e.g., IT and marketing) for coordination efforts.	Validation of availability with PSEG Long Island stakeholders and identification of alternate paths if essential staff members are unavailable.

3.1.2.5 Funding Request

Table 3-5 summarizes the capital and operating expenses estimated for implementing the Enhanced Marketplace. Internal IT upgrades and platform integration costs include project support, Sitecore, mobile

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app, data lake integration, integration support, and penetration testing, as well as additional overhead and contingency.

Operating costs under IT upgrades include platform license and management fees. The cost for one incremental full-time equivalent (FTE) spending half their time to support the program is also included in these estimates.

Table 3-5. Capital and Operating Expenses – Enhanced Marketplace

Funding Subcategory	Capital Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
Third-Party Support	\$0.21	\$0.15	\$0.06	-	-	-
PM, Labor & Training	\$0.10	\$0.04	\$0.05	\$0.005	\$0.005	\$0.005
IT Upgrades	\$4.34	\$2.80	\$1.54	-	-	-
Total	\$4.65	\$2.98	\$1.65	\$0.005	\$0.005	\$0.005

Funding Subcategory	Operating Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
Marketing and Outreach	\$1.25	\$0.21	\$0.22	\$0.25	\$0.27	\$0.30
Ongoing O&M	\$2.38	\$0.33	\$0.51	\$0.51	\$0.51	\$0.51
PM, Labor, and Training	\$0.88	\$0.12	\$0.18	\$0.19	\$0.19	\$0.20
Total	\$4.51	\$0.66	\$0.92	\$0.95	\$0.98	\$1.01

3.1.2.6 Business Case

While PSEG Long Island does have an existing marketplace, this significant investment in new IT infrastructure is warranted because of the significant increase in functionality, products, and services that it offers (see Section 3.1.2.2) and the resultant benefits generated (described below) from providing a seamless, customer-centric digital engagement. Benefit streams considered for the BCA include increased participation in residential energy efficiency programs and reduced customer acquisition costs. The benefits are largely driven by net non-energy benefits and avoided energy and capacity benefits. Notably, the benefits resulting from the Enhanced Marketplace are expected to be captured in respective EEDM programs.²⁴

The benefits are largely driven by the following assumptions:

- 1% increase in existing residential EE program participation in the first year of implementation
- 3% increase in existing residential EE program participation following the first year of implementation
- 0.5% increase in residential EE program participation due to locational programs
- 5% reduction in marketing and customer acquisition costs for residential EE programs

The 3% assumption for energy efficiency program participation is a conservative value based on the lower end of the range observed in similar utility Marketplace programs. As a benchmark, Pacific Gas and Electric and AEP Ohio experienced approximately 3.1% and 3.7% increases in energy efficiency program

²⁴ PSEG Long Island recognizes the overlap in benefits tracked under the EEDR Plan. Savings associated with the Enhanced Marketplace will be presented in the EEDR Plan.

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participation in the first year of implementation, respectively. Notably, these reference values included either increased participation in energy efficiency programs or purchases that were non-rebated, making 3% a conservative assumption. PSEG Long Island's Marketplace is expected to promote DER in addition to energy efficiency products and programs, which can result in benefits that go beyond those from existing energy efficiency programs.

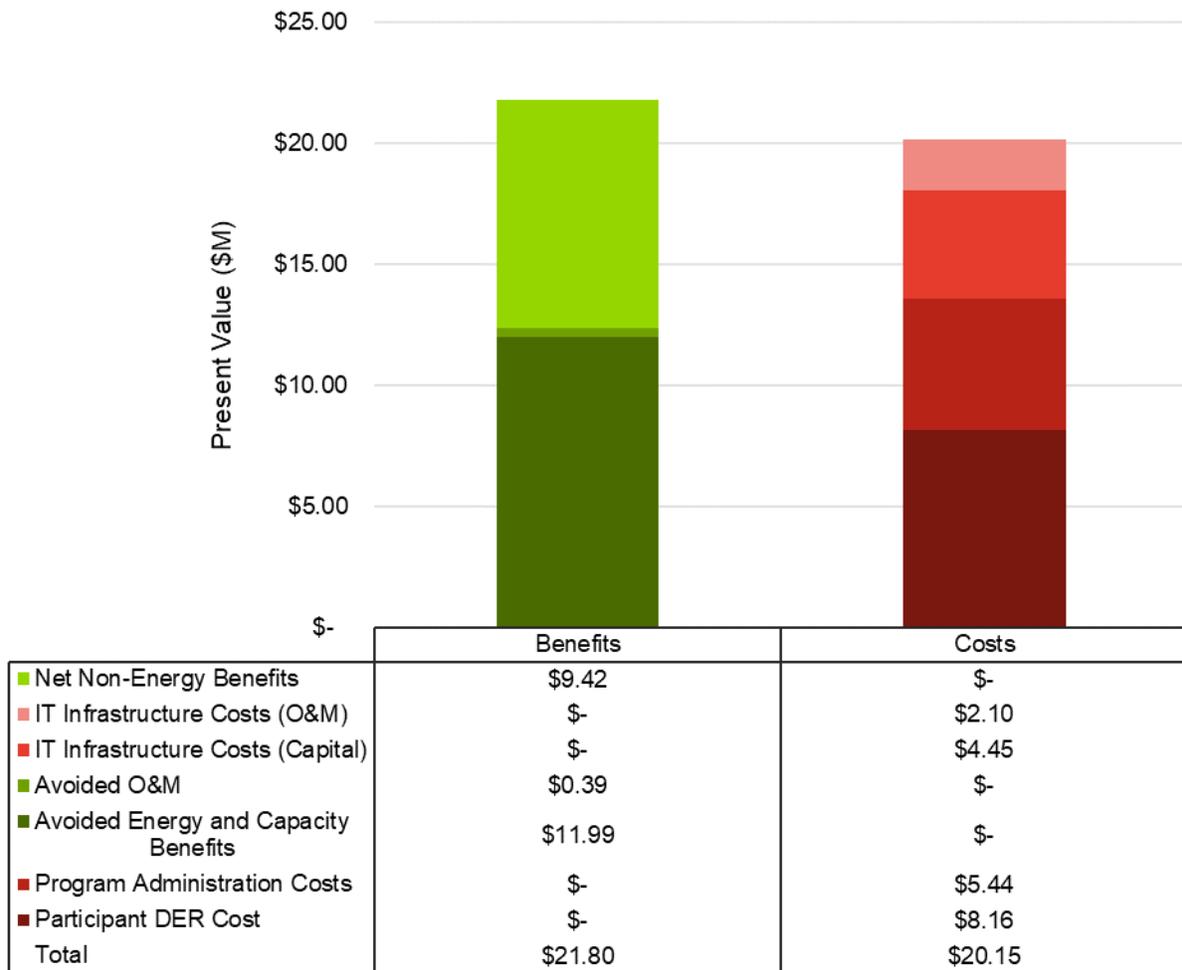
In addition to the 3% increase in energy efficiency program participation, a 0.5% increase in program participation is expected from locational programs. Moving forward, PSEG Long Island expects to target customers in high value areas similar to the Super Savers demonstration and expects that the Marketplace would help facilitate more cost-effective NWS realization.

Although the participation rate is expected be low in the first year of implementation, PSEG Long Island expects the rate to increase as it fully rolls out a broad suite of programs and services. The combined impact of increases in rebated and non-rebated energy efficiency measures and the adoption of other DER may comprise benefits significantly greater than what is projected in this analysis.

The bulk of the direct program cost is attributed to IT integration and upgrades. Costs of the program include external and internal software platform integration, platform licensing and management fees, internal platform management, program management, marketing, overhead, and risk and contingency.

The Enhanced Marketplace has a SCT benefit-to-cost ratio of 1.08. As noted above, the BCA is based on a conservative assumption for increased energy efficiency program participation, so there is the potential for significant additional upside. PSEG Long Island expects that greater benefits may be realized over time. Details of benefits and costs are described in Figure 3-1.

Figure 3-1. Present Value Benefits and Costs of SCT – Enhanced Marketplace



#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
1	Net Non-Energy Benefits	Based on societal benefits associated with energy efficiency program adoption and a 3.5% increase in residential energy efficiency program participation (3.0% + 0.5% from locational programs).	\$9.42	
2	Avoided O&M	Based on a 5% reduction in marketing and customer acquisition costs for both PSEG Long Island and its contractors.	\$0.39	
3	Avoided Energy and Capacity Benefits	Based on utility benefits associated with a 3.5% increase in energy efficiency program adoption (including avoided energy and capacity costs).	\$11.99	

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#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
4	IT Infrastructure Costs (O&M)	Includes cost of platform license and management fees.		\$2.10
5	IT Infrastructure Costs (Capital)	Includes cost of external and internal software platform integration, additional overhead, and risk and contingency.		\$4.45
6	Program Administration Costs	Includes additional utility cost associated with a 3.5% increase in energy efficiency program participation, incremental labor, and marketing.		\$5.44
7	Participant DER Cost	Accounts for increased measure cost associated with 3.5% increase in energy efficiency program participation.		\$8.16
Total Benefits			\$21.80	
Total Costs				\$20.15
SCT Ratio			1.08	

NPV = Net present value

3.1.3 Looking Ahead

In its continued effort to make energy efficiency more accessible to customers, PSEG Long Island is considering the following initiatives to begin after 2021. The initiatives described below are still at the concept stage and are being evaluated, with no specific commitment by PSEG Long Island for their launch.

Multifamily/LMI Financing

PSEG Long Island is proposing a Multifamily/LMI Financing pilot program to make clean energy investments affordable for and accessible to multifamily building owners and LMI customers. This pilot 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 launched as an add-on to the On-Bill Financing pilot (Section 2.5.3), should the On-Bill Financing offering be extended beyond its initial 2-year implementation.

Although other financing options such as Green Jobs – Green New York and residential On-Bill Financing are or will be available to PSEG Long Island customers, these financing options do not directly respond to the specific needs of renters, multifamily customers, and Long Island’s underserved communities. The financing product for this pilot may be traditional loans, on-bill financing, Property Assessed Clean Energy financing, or savings-backed arrangements. Results of this pilot would inform the development of scalable solutions to promote customer adoption of utility offerings among multifamily/LMI customers.

Partnership with Municipalities

PSEG Long Island is seeking to reduce the need for capital upgrades and expand its energy efficiency, beneficial electrification, and renewable energy efforts by working with local municipalities to introduce

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these subjects with developers in the early stages of project development. This would increase the focus on high impact opportunities to new larger-scale developments that might require utility construction to upgrade the local grid supply, thus providing a win-win-win partnership between the municipality, the prospective developer, and PSEG Long Island while reducing emissions and energy consumption.

PSEG Long Island proposes partnering with one or more municipalities to influence the building design and permitting processes toward a higher efficiency, lower emission, and smaller energy footprint building design. The scope of the engagement would consist of initially working with one or two municipalities to define steps in the routine engagement process that a larger-scale development project would take prior to the permitting process. These steps would trigger the municipality to bring energy impacts from the development into discussion (e.g., in a similar manner to other matters such as impacts to school, traffic, employment, services, community) prior to the more formal permitting process getting underway. An architecture and engineering firm hired by PSEG Long Island would work on behalf of the municipality and with the developer to promote clean and efficient energy investments that go beyond the minimum requirements specified in building codes. The goal would also be to have the municipality set a higher bar for permitting beyond the base building energy code for energy efficiency, renewable energy, and beneficial electrification.

3.2 Transportation Electrification

The transportation sector contributes approximately one-third of New York State's greenhouse gas emissions, and the State is taking steps to transform the sector to meet the decarbonization goals set out in the CLCPA. New York State is a signatory to the eight-state ZEV 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.²⁵

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

- Promote greater adoption of clean, electrified transportation
- Ensure that 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 programs consisting of outreach and marketing, a Residential Smart Charger program, a Workplace Charging program, and a Direct Current Fast Charging (DCFC) program. The Residential Off-Peak Charging Rewards program will also be launched soon (5.3B.8). The programs aim to enhance penetration of EVs on Long Island, align EV customer adoption strategy with reducing greenhouse gas emissions, empower customers, animate the EV charging infrastructure market, and deploy smart EV charging systems while attempting to minimize charging of such vehicles during peak load times.

With the release of the DPS Staff Whitepaper Regarding Electric Vehicle Supply Equipment and Infrastructure Deployment²⁶ in early 2020, PSEG Long Island decided to launch an EV Make-Ready program in 2021 that will support the deployment of publicly available EV charging stations on Long

²⁵ Long Island's EV target is based on its 21% share of vehicle registrations in New York State.

²⁶ 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).

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Island. Given that the State is still evaluating the structure of the program for New York's investor-owned utilities, PSEG Long Island has decided to request funding in this year's Utility 2.0 Plan to further refine estimated make-ready costs on Long Island stations, to identify an optimal approach for economically addressing this need while minimizing overall costs for its customers, and to support initial deployment of make-ready infrastructure associated with the program. Based on the findings from the proposed 2021 scope along with guidance that may be issued by the DPS subsequent to this Plan, PSEG Long Island intends to propose a larger-scale make-ready program in 2021 to support infrastructure deployment through 2025.

PSEG Long Island is also considering the launch of a fleet electrification program in support of municipalities and commercial customers, as well as a potential expansion of the V2G pilot to light duty vehicles.

3.2.1 Progress to Date

PSEG Long Island supports transportation electrification through a variety of initiatives, including the EV programs that launched in 2019 and the Electric School Bus V2G pilot.

EV Program

PSEG Long Island launched the DCFC program in September 2019. By the end of 2019, the DCFC program received three applications representing 31 ports toward the 5-year goal of 360 ports.

Success Snapshot

The Workplace Charging program surpassed its goal of 100 workplace charging ports.

The Workplace Charging program surpassed its goal of 100 workplace charging ports with 105 charging ports committed, preapproved, or in process before closing in Q3 2019. Customers seeking rebates for workplace charging are now redirected to the NYSEDA workplace charging program, Charge Ready NY.

The offer take-rate²⁷ for the Residential Smart Charger rebate was higher than expected, 17% compared to the forecasted 10%, suggesting that the marketing for the program is effective. Despite the higher take-rate, EV adoption rates in 2018 and 2019 were slower than projected in PSEG Long Island's initial forecasts—this is consistent with the experience of the rest of New York State.

For further detail on the progress of the EV programs, refer to Section B.8 of Appendix B.

Electric School Bus V2G Pilot

The Electric Bus V2G pilot is intended to demonstrate the use of electric school buses as mobile batteries to address specific locational needs on the distribution network. Due to challenges with the electric bus design and concerns from the bus company stemming from the coronavirus pandemic, spending for this program is suspended for 2020.

3.2.2 New Initiative Proposed for 2021: EV Make-Ready Program

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

²⁷ Defined as the fraction of new vehicle sales that sign up for the program.

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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 January 2020, the New York DPS released a whitepaper that proposes statewide goals for a utility supported EVSE Make-Ready program (DPS Staff Whitepaper). The premise of the DPS Staff Whitepaper 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.

Table 3-6 summarizes how the EV Make-Ready program aligns with PSEG Long Island's Utility 2.0 guiding principles.

Table 3-6. Alignment of EV Make-Ready Program with Utility 2.0 Guiding Principles

Customer Satisfaction	System Efficiency	Reduced Greenhouse Gases
Helps overcome range anxiety by improving access to charging infrastructure for clean transportation on Long Island	Manages EVSE siting based on system needs	Facilitates the adoption of clean transportation on Long Island

3.2.2.1 Objective

In line with the proposed investments in the DPS Staff Whitepaper, PSEG Long Island proposes an EV Make-Ready program to invest in make-ready infrastructure²⁸ for new DCFC and Level 2 charging stations. The ultimate objective is to accelerate EV adoption on Long Island.

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

Given the scale and multi-faceted aspects of the full-scale program, as well as ongoing proceedings and uncertainties related to the DPS Staff Whitepaper, PSEG Long Island is planning to develop an implementation plan in the second half of 2020 that identifies 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.

The implementation plan will be accompanied by funding to support initial deployment of charging infrastructure in 2021 based on the findings from the implementation plan. The costs used in this year's Utility 2.0 funding request are based on current estimates of program costs, however the assumed levels of infrastructure deployment and associated costs are subject to refinement following the completion of the implementation plan in the first quarter of 2021.

²⁸ Make-ready refers to the grid infrastructure needed to enable installation of EV charging stations. Costs for make-ready include electrical transformer upgrades and trenching and boring for conduits, conductors, poles, and towers.

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A key step in supporting customers' charging needs and offering more economical rates is understanding EV adoption and charging behavior. PSEG Long Island is, therefore, proposing the development of an EV Salesforce database in 2021 to capture and store customer data on EVs and charging stations as participation in EV programs increases.

3.2.2.2 Scope

The components of the Make-Ready program largely address key aspects of the recommendations outlined in the DPS Staff Whitepaper. 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.
- **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.

PSEG Long Island is proposing to build a foundation in 2020 and 2021 that includes three main components:

1. Implementation Plan Development
2. EV Make-Ready Infrastructure and Incentives
3. EV Salesforce Database

These components are detailed in the subsections below.

Implementation Plan Development

PSEG Long Island is planning to develop an implementation plan that addresses key design elements of the program, laying the foundation for cost-effective investments and successful program execution. PSEG Long Island expects that a third-party consultant will be contracted to facilitate development of the implementation plan. The scope of the development is divided into five main components:

- **Identify target ports:** The target number of ports by charging station type (i.e., DCFC, public Level 2, and workplace Level 2) will be specified on a year-by-year basis from 2021 through 2025.
- **Estimate infrastructure costs:** The cost associated with infrastructure deployment will be further refined. This includes assessing Long Island-specific costs for overall make-ready infrastructure, as well as the breakdown between utility-side and customer-side costs.
- **Evaluate business models:** Assess business models that incorporate different ownership, financing, or payment structures. Potential models to be evaluated include the rebate model as recommended in the DPS Staff Whitepaper, a LIPA ownership model, and a mixed ownership model. For the LIPA ownership model, different approaches may be considered with respect to ownership, operation, and maintenance of the make-ready infrastructure versus the charging equipment.

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- **Design program funding requirements:** Determine appropriate funding amounts and required support necessary to achieve identified target port goal. The design of the funding program is expected to be informed by the infrastructure cost estimates and the business model evaluation.
- **Develop siting support approach:** Develop an approach for indicating optimal locations for EVSE siting to customers. This approach may include a plan for developing EVSE Hosting Capacity Maps or other customer engagement strategies.

EV Make-Ready Infrastructure and Incentives

PSEG Long Island is proposing to support make-ready infrastructure deployment and funding support mechanisms during 2021 to facilitate EVSE infrastructure development. While identifying the target number of ports for Long Island will be addressed as part of the implementation plan, PSEG Long Island considered tentative 2025 infrastructure targets for the funding request in 2021. For 2021, PSEG Long Island proposes supporting the initial build of the utility-side make-ready infrastructure and deploying funding for respective customer-side make-ready infrastructure.

The tentative 2025 infrastructure targets were based on Long Island's fraction of New York State vehicle registrations (21%), 90% access to home charging,²⁹ full support for battery EVs (DCFC), and 20% support for plug-in hybrid EVs (PHEV) (Level 2).³⁰ Applying these assumptions with the National Renewable Energy Laboratory's EVI-Pro Lite tool, PSEG Long Island determined tentative 2025 targets for additional infrastructure: 402 DCFC ports, 1,496 public Level 2 ports, and 2,740 workplace Level 2 ports. The funding request for 2021 is based on 6% of these tentative targets: 24 DCFC ports, 90 public Level 2 ports, and 164 workplace Level 2 ports.³¹

The funding request was developed primarily using the rebate model for third-party EVSE ownership recommended in DPS Staff Whitepaper, where 90% of make-ready costs for public and 50% of make-ready costs for workplace chargers will be incentivized. The make-ready cost is estimated to be approximately \$73,000 per port for DCFC chargers and \$7,500 per port for Level 2 chargers. Utility- and customer-side portions of make-ready cost were assumed to be 60% and 40%, respectively, for DCFC and 30% and 70%, respectively, for Level 2 chargers. While utility-side make-ready was assumed to be 100% covered, a portion of customer-side make-ready was assumed to be incentivized through rebates.

These estimates are subject to change based on the outcome of the implementation plan and are expected to be updated in the submission of the full-scale EVSE Make-Ready plan, which is anticipated to be proposed in 2021. LIPA may also make additional funding available prior to the submission of the 2021 Utility 2.0 Plan, should this be deemed appropriate based on the findings of the implementation plan.

In the development of the 2021 budget, four of the 24 DCFC ports are assumed to be owned and operated by LIPA. These LIPA-owned ports will help to inform the assessment of different business models and the overall program design through the implementation plan. The different costs associated with LIPA-owned ports versus third party-owned ports were factored into the funding request. LIPA

²⁹ PSEG Long Island's customer base is approximately 90% single-family homes with access to home charging.

³⁰ Due to PSEG Long Island's customer base (90% single-family homes), most PHEV drivers will not need to rely on public charging to meet daily charging needs. Assuming full support for PHEVs risks over-investment in Level 2 infrastructure that may not significantly drive EV adoption. The specific degree of PHEV support and associated target number of ports will be revisited as part of the implementation plan development.

³¹ Tentative projections of overall deployment from 2021 through 2025 are 6%, 9%, 15%, 25%, and 45%, respectively. These projections represent a compound annual growth rate of about 65%, varying from 50% to 80% in each year. The projection will be refined following the completion of the EV Make Ready implementation plan in Q1 2021.

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ownership of at least a portion of charging infrastructure may offer a variety of benefits to customers such as more rapid deployment of EVSE, reduced annual revenue requirements (particularly in the near term), and more optimal and equitable placement of infrastructure (including locations with minimal current or projected network constraints, locations serving underserved communities, or necessary remote locations where utilization may lag behind average utilization rates). The LIPA ownership model is expected to have lower rate impacts because all construction costs would be capitalized and amortized over their useful life.

The allocation of costs in the funding request is intended to be indicative rather than prescriptive. PSEG Long Island maintains the flexibility to adjust the distribution of funds between different types of chargers and the ownership structure for those chargers as a result of the implementation plan and the final DPS Order regarding utility support of make-ready infrastructure. The funding request ultimately serves as a cap on spending for make-ready infrastructure and incentives in 2021.

EV Salesforce Database

PSEG Long Island is proposing to develop an EV Salesforce database to efficiently collect data on EVs and charging stations. EV and EVSE adoption is expected to increase as a result of this program, and more data on customer participation 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, ultimately leading to improved and more cost-effective customer offerings with the potential to put downward pressure on rates.

This database would collect data from different program offerings into a single database to support analysis and use for system planning and operations. The focus of the database will be on EVs and EV charging station data, such as vehicle make/model, charger type and brand, and PSEG Long Island's EV programs in which the customer participated. The database is expected to track the installation of home, workplace, and public chargers and the types of chargers (e.g., Level 1, Level 2, DCFC).

PSEG Long Island will work with its internal IT team to identify needs to implement the database. It is expected that the platform provided by Salesforce will be used to develop this database.

3.2.2.3 Schedule

The proposed schedule for the EV Make-Ready program is summarized in Table 3-7 and is aligned with the three key stages being proposed for 2021:

- 1. Implementation Plan Development:** Includes identifying infrastructure targets, estimating infrastructure costs, evaluating business models, designing the rebate program, and developing an approach for siting support. A third-party consultant will be contracted to facilitate the development.
- 2. Make-Ready Infrastructure and Incentives:** Includes building utility-side make-ready and deploying incentives to cover a portion of the customer-side make-ready for DCFC, public Level 2, and workplace Level 2 chargers.
- 3. EV Salesforce Database Development:** Includes developing a Salesforce database in coordination with the internal IT team.

Table 3-7. Project Schedule – Make-Ready Program

Stage	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021
Implementation Plan Development	■					
Procure Consultant	■					
Identify Target Ports		■				
Estimate Infrastructure Costs		■				
Evaluate Business Models		■				
Design Funding Program		■				
Develop Siting Support Approach		■				
Infrastructure and Incentives			■			
Establish Funding Process			■			
Build Utility-Side Make-Ready			■			
Deploy Customer-Side Funding			■			
EV Salesforce Database					■	
Develop Database					■	
Conduct Functional Testing					■	

Implementation Plan Development

PSEG Long Island will partner with a third-party consultant to develop the implementation plan. Procuring the consultant is expected to begin in Q3 2020 in order for work to begin in Q4 2020 and be completed by Q1 2021. The third-party consultant is expected to support five main stages:

- **Identify Target Ports:** Develop detailed estimate of infrastructure requirements using tools customized for PSEG Long Island’s service territory.³²
- **Estimate Infrastructure Costs:** Estimate infrastructure costs using cost estimation tools customized for PSEG Long Island’s service territory, benchmarking against costs estimated in other utility and state programs and issuing a request for information to assess the cost of different EVSE designs.
- **Evaluate Business Models:** Evaluate different and innovative business models, including various ownership and revenue structures, by performing financial viability assessments and cost-effectiveness tests. The analyses would consider market factors, rate analysis, and address accounting questions regarding rebates.
- **Design Funding Program:** Define funding amounts and the support needed to achieve the identified target port goal, participant requirements, allocation of funding for different ownership models, and other funding allocation considerations (e.g., to ensure equitable access for underserved communities).
- **Develop Siting Support Approach:** Coordinate with internal teams to develop an approach for EVSE siting support. This includes assessing existing tools and considering new approaches to better support EVSE siting. Any significant investments in siting tool development would be proposed in next year’s Utility 2.0 Plan.³³

³² Tools may include the National Renewable Energy Laboratory’s EVI-Pro Lite or other tools customized for PSEG Long Island’s territory.

³³ PSEG Long Island plans to support infrastructure deployment while the development of its support approach is in progress. PSEG Long Island will consider any existing resources that may be leveraged, in the short and longer terms, such as its existing hosting capacity maps.

Infrastructure and Incentives

PSEG Long Island will establish the program design according to the Implementation Plan Development stage. Subsequently, PSEG Long Island will coordinate with relevant stakeholders to build the utility-side infrastructure and deploy customer-side make-ready rebates.

EV Salesforce Database Development

PSEG Long Island will coordinate with its IT team to develop the EV database in Q3 or Q4 2021. PSEG Long Island expects to use the Salesforce platform to develop the database. After successful functional testing, the database is expected to be operational in 2022.

3.2.2.4 Dependencies and Risks

The Make-Ready program will be influenced by the DPS Order on the Statewide Make-Ready program, which is expected to be released in the second half of 2020. PSEG Long Island expects to track developments on a statewide basis and that those developments will inform the implementation plan. PSEG Long Island will consider amending the scope and budget of the Make-Ready program as stated in this year’s Utility 2.0 Plan after the completion of the implementation plan in Q1 2021 and prior to the submission of the 2021 Utility 2.0 Plan, if this is deemed appropriate.

Table 3-8 outlines the potential risks and proposed mitigation steps for implementing the EV Make-Ready program.

Table 3-8. Risk and Mitigation Assessment – EV Make-Ready Program

Category	Risk	Mitigation
Stakeholder Engagement	Availability of PSEG Long Island staff for coordination efforts regarding make-ready infrastructure build-out.	Validate availability with PSEG Long Island stakeholders and identify alternate paths if staff is unavailable.
Timeline	Delays in developing EV Salesforce database due to IT integration delays.	Validate availability with PSEG Long Island stakeholders and identify alternate paths if staff is unavailable.
Technology	Part of a nascent market, electric vehicles and EVSE technology are evolving rapidly and may become obsolete in the near future.	Build in risks and contingencies into the ultimate program budget to prevent overinvesting in technology before its commercial sustainability is established.
EV Adoption	Customers may adopt electric vehicles at a slower pace than the state targets require, despite the availability of sufficient charging infrastructure.	PSEG Long Island is offering a portfolio of electric vehicle programs (home charging, managed charging, outreach) to address barriers associated with electric vehicle adoption on Long Island.
Developer Adoption	Developers may adopt EVSE at a slower pace due to lower-than expected EV adoption and/or lower utilization of public charging infrastructure than expected.	Address cost barriers associated with EVSE adoption by identifying suitable locations for EVSE siting that minimize costs for developers.

3.2.2.5 Funding Request

PSEG Long Island is working closely with LIPA to develop the details of the EV Make-Ready program and is requesting funding to advance the make-ready infrastructure and incentives deployment and development of the EV Salesforce database. PSEG Long Island is already planning to launch the

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implementation plan for the EV Make-Ready program in the second half of 2020, and therefore costs associated with the development of the plan have been excluded from the funding request.

Capital expenses include the make-ready cost of 20 DCFC, 90 public Level 2, and 164 workplace Level 2 chargers under the rebate model, make-ready and EVSE costs of four DCFC under the LIPA ownership model, and the development costs associated with the EV Salesforce database.

Operating costs include make-ready incentives and rebates paid to developers, and ongoing O&M associated with the four LIPA-owned DCFC chargers. In addition, one incremental FTE is proposed to spend half of their time supporting the Make-Ready program through 2025.

Table 3-9. Capital and Operating Expenses – EV Make-Ready Program

Funding Subcategory	Capital Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
Materials and Equipment	\$1.97	\$1.97	-	-	-	-
PM, Labor & Training	\$0.03	\$0.03	-	-	-	-
IT Upgrades	\$1.20	\$1.20	-	-	-	-
Total	\$3.20	\$3.20	-	-	-	-

Funding Subcategory	Operating Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
Customer Incentives	\$1.09	\$1.09	-	-	-	-
PM, Labor & Training	\$0.69	\$0.09	\$0.14	\$0.15	\$0.15	\$0.16
Ongoing O&M	\$0.05	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01
Total	\$1.83	\$1.19	\$0.15	\$0.16	\$0.16	\$0.17

3.2.2.6 Business Case

Funding is being requested for the first year of program implementation only; therefore, the BCA is based on proposed infrastructure deployment in 2021. 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.³⁴

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 benefits, which account for avoided gasoline consumption from EV uptake, vehicle O&M savings from lower operations and maintenance costs associated with EVs, and gasoline security value from

³⁴ 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 federal tax credit was excluded because it is being phased out starting in January 2020. The benefit stream associated with the state tax credit was also 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.

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decreased need for imported oil. For the BCA, we have assumed approximately 5,400 additional electric vehicles will be attributable to this investment that will be made in 2021, even though PSEG Long Island expects a larger number of electric vehicles on Long Island.³⁵

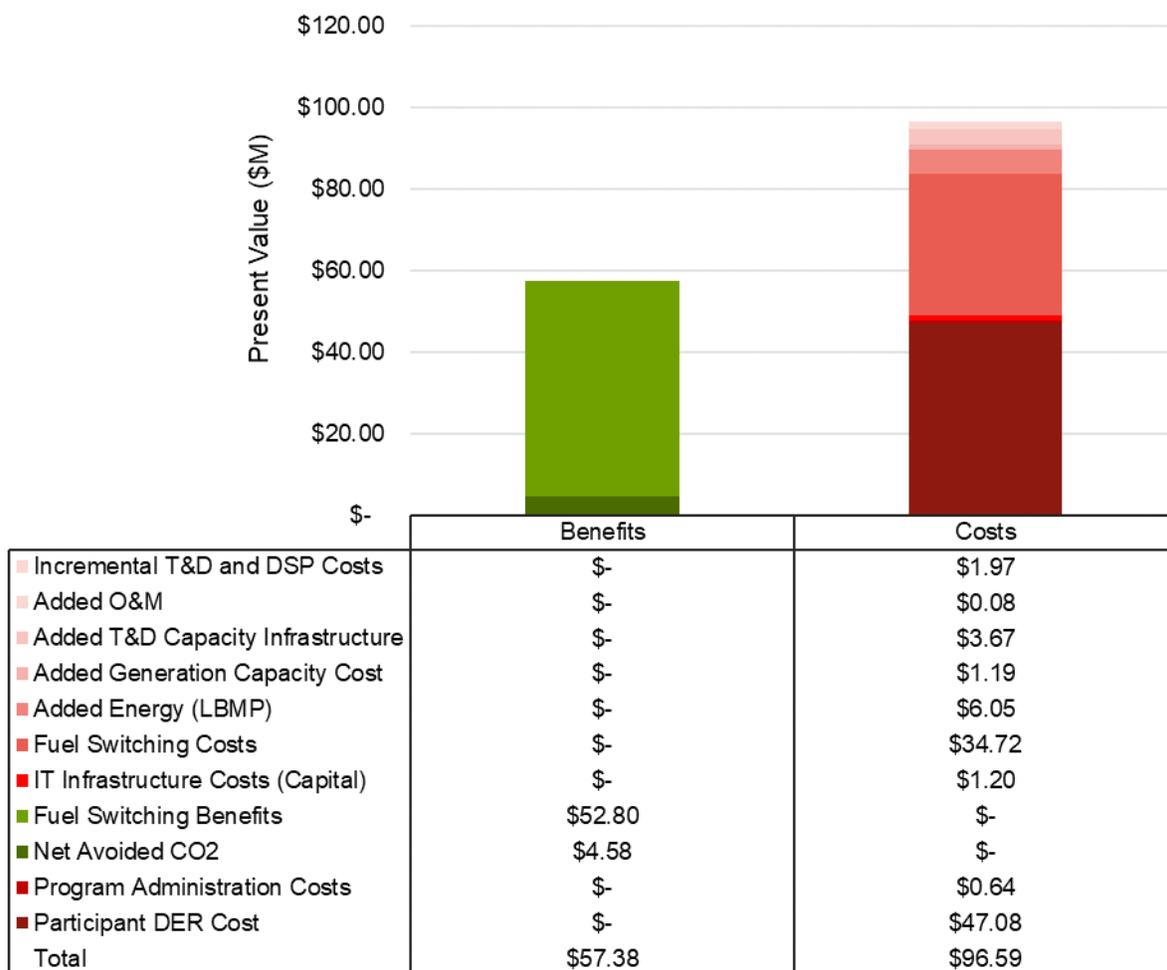
Program costs include make-ready infrastructure, EVSE and respective ongoing O&M for LIPA-owned chargers, program management, and development of the EV Salesforce database. Other cost streams considered include added energy from increased electricity usage, added electricity costs for customers, added 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 3-2. Though considered in this analysis, some value streams were not included in the SCT, including added electricity costs as gained utility revenue and make-ready rebate costs.

PSEG Long Island is proposing to refine cost estimates and infrastructure requirements in the implementation plan development in 2020; therefore, the BCA was conducted based on the assumptions described in Section 3.2.2.2.

The proposed Make-Ready program has a SCT benefit-to-cost ratio of 0.59. Although this may not seem favorable, this value is expected to improve over time, and it is important to begin investment now to be prepared to deploy charging infrastructure at significantly greater scale in the coming years. Notably, the costs are primarily driven by the incremental cost of purchasing an EV, which is expected to fall significantly over time as battery prices fall.

³⁵ This estimate assumes 6% of the vehicles supported by 2025 are supported in 2021, proportional to the fraction of EVSE supported in 2021 (6%). The estimated number of vehicles supported by 2025 is based on the incremental additional plug-in hybrid EVs and battery EVs added relative to current levels, considering attribution of vehicle adoption to this make-ready program. This attribution assumes a net-to-gross factor of 90% for battery EVs and 20% for plug-in hybrid EVs, the latter being proportional to the level of assumed plug-in hybrid EV support. While the number of vehicles attributable to this investment is based upon statewide targets, the make-ready infrastructure deployed through this program may support more than the expected 5,400 vehicles.

Figure 3-2. Present Value Benefits and Costs of SCT – EV Make-Ready Program



#	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.	\$52.80	
2	Net Avoided CO₂	Includes reduced carbon emissions from reduced gasoline consumption and increased emissions from increased electricity consumption.	\$4.58	
3	Incremental T&D and DSP Costs	Includes cost of utility-side make-ready under the rebate model and cost of LIPA-owned make-ready infrastructure and EVSE.		\$1.97

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#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
4	Added O&M	Includes cost of rebate program development and ongoing O&M associated with LIPA-owned ports		\$0.08
5	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.		\$3.67
6	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		\$1.19
7	Added Energy (LBMP)	Includes cost of added energy from increased electricity consumption. Based on marginal energy cost and estimated charging volume for added EVs.		\$6.05
8	Fuel Switching Costs	Includes added electricity costs from increased electricity consumption from charging. Based on PSEG Long Island residential and commercial energy and demand rates and the estimated allocation of charging for each charger type (e.g., home, Level 2, DCFC).		\$34.72
9	IT Infrastructure Costs (Capital)	Includes IT integration costs for EV Salesforce database development.		\$1.20
10	Program Administration Costs	Includes cost for one incremental FTE spending 50% of their time on the Make-Ready program for program management.		\$0.64
11	Participant DER Cost	Accounts for participant cost of make-ready not covered by rebates, cost of EVSE and respective ongoing O&M, and incremental vehicle cost of added EVs.		\$47.08
Total Benefits			\$57.38	
Total Costs				\$96.59
SCT Ratio			0.59	

NPV = Net present value
 LBMP = Location-based marginal pricing

3.2.3 Looking Ahead

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. The initiatives described below are still at the concept stage and are being evaluated, with no specific commitment by PSEG Long Island for their launch.

Fleet Electrification

Electrifying municipal and commercial fleets is a great opportunity for transportation electrification. Governor Cuomo has announced a plan to create 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. PSEG Long Island is already speaking with municipalities on Long Island about moving in this direction. For example, Suffolk County is considering electrifying two bus depots that serve approximately 40 buses. PSEG Long Island is supporting this initiative by ensuring there is sufficient capacity on the grid to accommodate the new load.

PSEG Long Island is also evaluating a fleet electrification pilot project to advance transportation electrification efforts on Long Island. The pilot would target municipal and commercial light duty fleets, investing in 5-10 vehicles and the associated Level 2 EVSE for one or more customers that require frequent short-range trips.

The pilot will seek to understand how fleet vehicles are used by local small-to-medium businesses and to gain insights on how EVs could affect small businesses. Managed charging will be incorporated to avoid adverse grid impacts from deploying EVSE and charging behavior will be studied to identify lessons for future fleet electrification efforts. The pilot may also incorporate internal fleet electrification efforts. Ultimately, this pilot would be leveraged to inform a scalable and cost-effective model to promote fleet electrification.

Light Duty V2G

PSEG Long Island is evaluating a pilot to test V2G technology by using light duty EVs as grid assets. 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.

This pilot will help PSEG Long Island learn how EVs can be more effectively leveraged to provide grid value and inform opportunities and barriers to the implementation of full-scale V2G programs. The pilot may focus on fleet vehicles in conjunction with fleet electrification efforts. PSEG Long Island will reassess use cases and the scope of the pilot as V2G technology evolves over the next 2-3 years, which may include more viable vehicles (currently limited primarily to the Nissan Leaf) as well as approaches that incorporate direct communication with vehicles instead of EVSE.

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 ambitious 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 PSC 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 utilizing two storage systems with a total capacity of 10 MW/80 MWh in South Fork in 2018 which is the fastest growing region on Long Island with approximately 2.4% annual load growth.

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In the second half of 2020, PSEG Long Island's Power Markets team is planning to issue a solicitation for 155 MW-175 MW of energy storage to support the electric system on Long Island. The Utility 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. In the coming years, PSEG Long Island is planning to launch a customer-sited energy storage program that will use several different offerings to promote the use of energy storage by customers. The program may include models such as community storage, premium power, and traditional customer incentives. This proposed program is in addition to the ongoing BTM Energy Storage program, which is 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.

3.3.1 Progress to Date

PSEG Long Island filed the BTM Storage DLM tariff on schedule and obtained LIPA Board of Trustees approval by May 1, 2019. DLM program enrollment for summer 2019 closed on May 15, 2019, too soon to gather enough participants to meet the 50-kW threshold. In part, this closure was due to a timing difference with NYSERDA's NYSun program, which began open enrollment on June 1, 2019, and PSEG Long Island learned that many aggregators, which are the target for the DLM program, waited for that date to connect their projects. This timing mismatch proved to be a structural issue for the first year of the program, but PSEG Long Island does not expect it to be an issue in the future.

Over the remainder of 2019, PSEG Long Island received 159 interconnection applications for solar PV paired with battery storage, exceeding the year-end goal of 90 applications. This result indicates a favorable customer response to the DLM tariff in support of the New York State's energy storage goals.

To further increase DLM program participation, PSEG Long Island will leverage its existing network of solar PV contractors and build a network of energy storage installers and aggregators. Initially, program staff found it challenging to educate aggregators about the DLM program and the potential business opportunities available. To address this, program staff created a Baseline Methodology Guide to help aggregators better understand how PSEG Long Island calculates performance compensation for those participating in the program.

In the first half of 2020, PSEG Long Island saw a slowdown in installations due to the coronavirus outbreak. However, PSEG Long Island expects participation in the DLM tariff to increase this year based on feedback it has heard from participants.

For further detail on the progress of BTM Storage with Solar, refer to Section B.9 of Appendix B.

3.3.2 Looking Ahead

PSEG Long Island is considering a program with innovative approaches to promote greater adoption of customer-sited energy storage, particularly for customers in constrained locations. PSEG Long Island is investigating in a customer storage program that deploys different models based on the specific needs that arise for different projects. The program will target constrained network locations to defer the need for traditional grid investments and to enable greater integration of distributed resources such as EVSE, including DCFC.

Three deployment models are of interest:

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- **Community storage** for customers who might otherwise deploy storage in grid locations that would offer limited grid value. As an alternative, PSEG Long Island may offer customers the option to purchase shares (e.g., in kW increments) of a community storage system that is sited and operated in a manner that maximizes grid value. In this scenario, the customer would receive reduced demand charges proportional to the number of shares they purchased.
- **Premium power** for network locations where it is difficult to site storage. PSEG Long Island could offer backup power service to customers on target circuits in exchange for hosting batteries on their property. The batteries could be in front of the meter and operated to maximize grid value during normal operation. In this model, during a system outage, the battery would be islanded from the grid and provide backup power to the host customer.
- **Customer incentives** for customers who plan to independently deploy storage via third-party vendors.

3.4 Non-Wires Solutions

Over recent years, NWS have become an area of significant focus for utilities, particularly in New York State, 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 systemwide 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 a NWS Planning Tool to improve the confidence level that screened projects could actually be realized. PSEG Long Island is currently working with a third-party contractor on the development of the NWS Planning Tool and expects it to be operational in Q4 2020.

With the NWS Planning Tool, PSEG Long Island expects to identify more opportunities for competitive NWS solicitations to defer or avoid capital construction projects. Thus, PSEG Long Island is proposing the development of a new NWS process to yield a standardized, scalable approach for addressing NWS opportunities. This approach will address the market solicitation process, contracting process, contract management process, and defined funding mechanism. These processes will help PSEG Long Island to more quickly act on NWS opportunities, run more effective solicitations, and procure more cost-effective solutions, as well as avoid missing any economically beneficial NWS opportunities due to funding uncertainty.

3.4.1 Progress to Date

PSEG Long Island piloted NWS through the Super Savers program that targeted the North Bellmore area. A new NWS Planning Tool will offer analytical capabilities in evaluating new locations for NWS projects.

Super Savers: NWS with Targeted Energy Efficiency

By the end of 2019, the North Bellmore Super Savers program achieved a 1.56 MW peak demand reduction, 52% of the 3 MW peak reduction goal for 2019. The remaining peak reduction of the 4 MW

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goal is being targeted as the goal for 2020. At this level of reduction, Super Savers is contributing a 3.5% 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.

In 2019, PSEG Long Island used various strategies to reach customers with its Super Savers programs and targeted offerings, pivoting its strategy throughout the program based on findings. By the end of 2019, 221 smart thermostats were installed and enrolled in the DLM tariff, with an additional 174 customers enrolled in the Smart Savers DR program. Under Super Savers, PSEG Long Island also completed 75 commercial lighting installations against a 2019 goal of 200 installations.

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, PSEG Long Island offered larger incentives and increased its marketing and outreach campaigns. The team learned that increasing the value of rebates and incentives to customers did not necessarily increase participation. Even when the value of the incentives resulted in a free or nearly free offer, the participation rate remained lower than expected, totaling about 10% of eligible customers. The same is true for increased outreach and marketing, which seemed to have little impact on participation

To address this, the project team 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. The Super Savers team has also partnered with another vendor for 2020 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 used 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.

In 2020, the Super Savers team is launching another NWS zone with the Patchogue pilot, which was expanded in 2019 to include four circuits. Procurement is underway for a vendor to manage the program using a pay per performance (\$/kW) model. PSEG Long Island intends to use lessons learned from North Bellmore in the Patchogue pilot, future NWS processes and solutions, and other initiatives for customer outreach and offerings. For example, PSEG Long Island may seek to use a third party to administer future NWS programs.

For further detail on the progress of the Super Savers program, refer to Section B.10 of Appendix B.

Non-Wires Solution Planning Tool

An RFP for outside consulting support was issued and reviewed in Q4 2019. A vendor was selected in Q1 2020 and is expected to work with Data Analytics and the T&D organization to use analytics and complete the tool by the end of 2020.

PSEG Long Island looks to incorporate data from the data lake, which may or may not include studies from Utility 2.0 projects. The tool will leverage outputs from the Locational Value Study and other customer inputs (usage data, prior program participation) to forecast whether a solution set could be expected to be bid by a third-party contractor that would meet the savings load shape necessary to defer a planned capital construction project.

For further detail on the progress of the NWS Planning Tool, refer to Section B.11 of Appendix B.

3.4.2 New Initiative Proposed for 2021: NWS Process Development

PSEG Long Island seeks to develop a standardized, replicable process for identifying, addressing, and monetizing NWS. 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 re-appropriation efforts or postponement to future budget cycles.

PSEG Long Island’s T&D Planning team identifies the areas on the grid that need infrastructure upgrades to meet the demands of that area. This information is provided to the Energy Efficiency & Renewable Energy department so that it can screen the project for potential NWS opportunities. After assessing who the customers are in that area and applying technology measures that would help reduce the peak demand, a BCA is prepared to determine if an NWS approach is more cost-effective than the traditional grid investment.

PSEG Long Island used offshore wind, energy storage, and EE measures in the South Fork to defer infrastructure investments. More recently, PSEG Long Island has used the Super Savers program and utility-scale storage to address constrained circuits. Building upon these programs, PSEG Long Island is interested in exploring more innovative and cost-effective solutions for addressing locational distribution system constraints. The Utility has learned that, particularly for the BTM solutions, competitive market solicitations are expected to provide the most cost-effective solutions.

Table 3-10 summarizes how NWS Process Development aligns with PSEG Long Island’s Utility 2.0 guiding principles.

Table 3-10. Alignment of NWS Process Development with Utility 2.0 Guiding Principles

Customer Satisfaction	System Efficiency	Reduced Greenhouse Gases
Reduces impact on customer rates due to deferral of wires investments	Increases utilization of existing transmission and distribution infrastructure	Promotes adoption of clean and efficient technologies to help relieve system constraints

3.4.2.1 Objective

Based on its experience with past and ongoing NWS efforts, PSEG Long Island sees a need to develop a formalized, replicable, and transparent process for identifying, selecting, procuring, and deploying NWS for transmission and distribution-level deferral opportunities. While the Power Markets group within PSEG Long Island has already developed a process for transmission-level resources, this process is not readily

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applicable for distribution-level procurements. Additionally, while New York State utilities have coordinated to develop effective NWS processes, these approaches need to be tailored to fit the unique aspects of PSEG Long Island's organizational, operational, and financial structure.

The intent of this project is to build on the existing NWS and procurement processes developed by both PSEG Long Island and LIPA, and to incorporate best practices for NWS solicitations identified from utilities in New York State and elsewhere. This project aims to increase contractor responsiveness to NWS solicitations and produce a process that can routinely handle NWS solicitations without the need for third-party oversight and management. Some examples of areas where adjustments are needed include:

- Tailoring to fit distribution-level resource needs and supporting apples-to-apples comparison of a diverse set of resources, including BTM resources.
- Simplifying the process so that procurement and contracting are streamlined, replicable, and do not require paying significant expense for outside support for each procurement.
- Expanding the applicability of the process to consider contracted and utility-owned resources.
- Improving funding mechanisms and clarifying the applicability of each mechanism.
- Identifying and providing the information NWS providers need most to provide confident bids and minimize risk premiums due to uncertainties associated with the grid relief being sought.

PSEG Long Island aims to address these gaps by developing formalized guidelines for successful distribution-level NWS implementation, which can deliver benefits to the distribution grid, as well as the transmission grid. Specifically, developing formalized guidelines will ensure that PSEG Long Island:

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

Developing such a process will ultimately allow PSEG Long Island to leverage the growth of DER to defer traditional investments while maintaining system reliability.

3.4.2.2 Scope

PSEG Long Island is proposing to develop a standardized, replicable process for identifying, addressing, and monetizing transmission and distribution-level NWS opportunities. The outcome of this proposed initiative is an NWS Process Playbook that will include detailed guidelines for identifying NWS opportunities, soliciting market solutions, and accounting for the associated costs.

PSEG Long Island expects that a third-party consultant will be contracted to help develop the Playbook. The third-party consultant will be responsible for the following components:

- **NWS opportunity identification:** Develop a framework to identify projects screened through the NWS Screening Tool that offer the highest likelihood and suitability for solicited NWS solutions. This framework includes guidelines for selecting NWS opportunities to pursue and establishing if different solicitation approaches are necessary based on the screened output of anticipated measures (e.g., energy efficiency/DR programs, storage systems).
- **Market solicitation process:** Develop a framework for pursuing NWS through a competitive market solicitation. This framework includes guidelines for establishing how solicitations should

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be issued and what information should be included in the solicitation, developing bid scoring templates, and establishing contract templates for successful solicitations.

- **Accounting process:** Develop a framework for monetizing NWS opportunities to specifically address how more economical NWS opportunities can be funded when they are deferring or avoiding planned capital construction projects.³⁶

For each of these components, the third-party consultant is expected to perform the following:

- **Benchmarking** of best practices used by other utilities in New York as well as outside of New York.
- **Assessing** the current state of PSEG Long Island's NWS programs and processes.
- **Developing** any necessary tools and new processes based on the Assessing stage.

Beyond the scope of this project, PSEG Long Island expects to use the NWS Process Playbook for all future NWS opportunities.

3.4.2.3 Schedule

PSEG Long Island is proposing a three-stage approach to develop an NWS Process Playbook:

1. **Procurement:** Issuing an RFP for and selecting the third-party consultant to develop the Process Playbook.
2. **Benchmarking:** Identifying and assessing best practices from utilities in New York and other states.
3. **Assessment:** Assessing the current state of PSEG Long Island's NWS programs and processes.
4. **Development:** Developing any necessary tools and new processes based on the Benchmarking and Assessment stages.

Details on the overall implementation schedule (shown in Table 3-11) and the individual stages are described in the following subsections.

Table 3-11. Project Schedule – NWS Process Development

Stage	Q1 2021	Q2 2021	Q3 2021	Q4 2021	
Procurement	■				
Benchmarking			■		
Assessment of Best Practices			■		
Assessment			■		
Assessment of Current State			■		
Development				■	
Development of Tools				■	
Development of Processes				■	

³⁶ For example, the Super Savers program was funded through the operating expense budget to defer a capital investment. However, this mechanism presents challenges including long lead times for budgetary approval and potential constraints with the available operating budget.

Procurement

Prior to developing the Process Playbook, PSEG Long Island will 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. Once a third-party consultant has been contracted, the third-party consultant will be responsible for facilitating the development of the Process Playbook.

Benchmarking

A third-party consultant will research industry best practices in New York State and in other jurisdictions and will highlight best practices for PSEG Long Island's consideration. Specifically, the benchmarking stage will assess best practices for defining and pursuing NWS opportunities, developing market solicitation processes, and addressing accounting of associated costs.

Assessment

The third-party consultant will assess the current state of PSEG Long Island's NWS programs and processes to identify existing resources and processes to leverage, key barriers that need to be addressed, and opportunities for improving process design. The assessment will include interviews with PSEG Long Island staff and a review of prior NWS solicitations and their outcomes.

Development

Based on the outcomes of the Benchmarking and Assessment efforts, the third-party consultant will develop the necessary tools and processes and incorporate these into the NWS Process Playbook. This stage will differ in scope for each Playbook component:

- **NWS opportunity identification:** The third-party consultant will develop a framework that would help PSEG Long Island determine optimal opportunities. This framework would include upgrading or developing a new set of criteria and tools to help select opportunities and determine which mechanisms should be employed.
- **Market solicitation process:** The third-party consultant will develop a process for competitive market solicitation. This process may involve updates to the current process or developing a new process that facilitates market solicitation. The third-party consultant will need to establish template RFPs, define roles and responsibilities, and develop a process for running procurements and selecting bids.
- **Accounting process:** The third-party consultant will develop guidelines on how to fund NWS opportunities that are deferring or avoiding planned capital construction projects, including appropriate mechanisms (e.g., power supply charge), requirements (e.g., cost-effectiveness), and approval processes.

3.4.2.4 Dependencies and Risks

Using the NWS Process Playbook depends on the positive screening of NWS alternatives for planned capital investments through the NWS Screening tool.

Table 3-12 outlines the potential risks and proposed mitigation steps developing a formal NWS process

Table 3-12. Risk and Mitigation Assessment – NWS Process Development

Category	Risk	Mitigation
Stakeholder Engagement	Availability of PSEG Long Island staff in different departments for coordination efforts and to obtain input for process development.	Validate availability with PSEG Long Island stakeholders and identify alternate paths if staff members are unavailable.
Implementation	Best practices extracted from benchmarking against New York investor-owned utilities and other utilities may not be applicable to PSEG Long Island and LIPA.	Develop a set of criteria prior to the benchmarking exercise to consider differences in funding mechanisms and incentive structures of other utilities.

3.4.2.5 Funding Request

No capital expenses are expected for the NWS Process Development. Operating cost estimates include assessment of industry best practices and development of tools and processes by a third-party consultant.

Table 3-13. Capital and Operating Expenses – NWS Process Development

Funding Subcategory	Capital Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
N/A	-	-	-	-	-	-
Total	-	-	-	-	-	-

Funding Subcategory	Operating Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
Third-Party Support ³⁷	\$0.50	\$0.50	-	-	-	-
Total	\$0.50	\$0.50	-	-	-	-

3.4.2.6 Business Case

As PSEG Long Island seeks to explore further NWS opportunities, a formalized set of guidelines for its NWS planning purposes is necessary to ensure seamless NWS solution implementation. Specifically, the development of a process will ensure the following:

- Avoiding delays in budgeting and approval that may lead to missed NWS opportunities:** Today, PSEG Long Island’s process is lengthy and is normally run through the Utility 2.0 Plan. This means that the approval process alone is 6-12 months prior to procurement. This slow process leads to missed opportunities that PSEG Long Island might otherwise have pursued. Developing a formalized process will lead to a quicker process for selecting, procuring, and deploying cost-effective NWS opportunities.
- Avoiding issues associated with limitations in O&M budget that lead to de-prioritization of NWS opportunities:** O&M budgets may limit PSEG Long Island from pursuing opportunities that might otherwise be attractive because other investments may take greater priority. Developing a

³⁷ The budget is based on an estimate of approximately \$100,000 each for the Benchmarking and Assessment tasks and \$300,000 for the Development task. More or less budget may be required depending on the extent to which new tool and process development is required versus the extent to which existing PSEG Long Island tools and processes may be leveraged, respectively.

process can address this issue of shifting available capital expenses to operating expenses and would allow PSEG Long Island to pursue more opportunities.

- **Procuring the most cost-effective solutions to address NWS opportunities:** Selecting appropriate NWS mechanisms and resources poses challenges for successful implementation. A multitude of potential mechanisms could be applied—from utility-owned storage to customer-sited DR resources. Without a standardized, replicable process, there is a possibility that a less optimal resource is procured, which could lead to missed opportunities that might have been more cost-effective if appropriate mechanisms were used.
- **Improving alignment of NWS planning and procurement with other New York utilities:** In New York, utilities have been actively pursuing NWS as alternatives to traditional grid investments. To ensure greater transparency into the NWS identification and sourcing process, the New York Joint Utilities developed common guidelines for NWS planning.³⁸ In 2016, the Joint Utilities developed a common set of guidelines for NWS suitability criteria and related processes to identify potential viable NWS opportunities. To stay consistent with practices in place across the state, PSEG Long Island is aiming to align its NWS process to the Joint Utilities' efforts. Ensuring consistency among processes can aid in market animation throughout the state.

3.4.3 Looking Ahead

With the establishment of the NWS Process Playbook, PSEG Long Island will have a complete process through which planned capital projects can be screened for NWS and solicited for. 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 in the forthcoming years, 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.

³⁸ Joint Utilities of New York, "DER Sourcing: Summary of April 20, 2017 Stakeholder Engagement Group Meeting," 2017.

4. Evolve into a Customer-Centric DSP

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 DLM. Achieving this vision requires enhancing the platforms, tools, and information available to PSEG Long Island planning engineers and grid operators.

The Utility is investing in foundational projects and programs that can deliver such platforms, tools, and information in alignment with PSEG Long Island's overall Utility 2.0 Roadmap. In keeping with the customer-centric vision, PSEG Long Island has ensured that its DSP investments have tangible customer benefits in terms of service cost, service quality, or environmental footprint.

PSEG Long Island has several DSP-related initiatives underway, some funded through Utility 2.0 and some as part of regular operations and budgets. These initiatives support the vision to evolve into a customer-centric DSP but are only a subset of the overall portfolio of DSP-enabling projects. PSEG Long Island will continue to look for ways to support the vision of evolving to a customer-centric DSP through other channels and in business-as-usual operations.

The chapter is organized in four subsections, each representing a theme area (as shown below). The subsections provide an update on ongoing initiatives proposed and approved in past Utility 2.0 Plans, detailed descriptions for three new initiatives proposed in this year's Utility 2.0 Plan for launch in 2021, and a preview of planned initiatives that PSEG Long Island is considering for future Utility 2.0 Plans.

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4.1 Integrated Planning

With the rapid growth in DER adoption in the electricity 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 Utility of the Future (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:

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Chapter 4: Evolve into a Customer-Centric DSP

- 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/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 ensures the reliable, safe, and efficient planning and design of the electric T&D system with 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 will also expand their effort to unlocking future capabilities of AMI data in relation to REV-related initiatives.

4.1.1 Progress to Date

To support Integrated Planning, PSEG Long Island established the UoF team, which actively engages with the New York State Joint Utilities to implement best practices. The team is currently leading the development of a Locational Value Study and Tool along with establishing a framework for a conservation voltage reduction program utilizing AMI data.

UoF Team/Engagement with the Joint Utilities of New York

The UoF team was staffed in the first half of 2019 and has been leading several customer-centric DSP projects such as:

- Deploying the Locational Value Tool
- Issuing a grid storage RFP
- Developing Hosting Capacity Maps
- Engaging with data analytics and internal stakeholders
- Unlocking the capabilities of AMI to support New York REV and energy policy objectives.

Utilizing AMI data, the team has developed dashboards that provide real-time thermal loadings of transformers and fuses. In addition, the team is using AMI data to optimize voltages across the T&D system thus creating a framework for the conservation voltage reduction 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 REV. PSEG Long Island is currently working with the Joint Utilities to become a full member.

For further detail on the progress of the UoF team, refer to Section B.12 of Appendix B.

Locational Value Study and Tool

In 2019, PSEG Long Island selected a consultant and completed the preliminary results of the Locational Value Study. Using the granular 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 tried to capture the annualized (\$/kW-year) value of DER when implemented on the system to defer the capital investment.

The UoF team is developing a Locational Value Tool, building off the study, which will provide the value of the NWS used to defer T&D capital investment. The output of the tool will be used to evaluate the potential candidates for NWS projects. The tool will also be able to simulate and produce deferral cost based on the performance characteristic curve of the DER (e.g., wind, solar, battery).

For further detail on the progress of the Locational Value Study, refer to Section B.13 of Appendix B.

4.1.2 Looking Ahead

PSEG Long Island is making efforts to enhance its planning processes. PSEG Long Island will enhance its planning process by utilizing the locational value tool, and the resulting output will be used to further evaluate the potential candidates 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 project. The tool will work in conjunction with the NWS Planning Tool that is currently in development (section 3.4.1).

To prepare for future constraints on the grid, PSEG Long Island is considering enhancements to its current distribution load forecasting tools to proactively incorporate the variability associated with changing load patterns resulting from DER, EV, etc. These enhancements will aid in predicting load-constrained areas with higher accuracy, giving the Utility adequate lead-up time to plan for contingency and to evaluate capital deferrals, NWS projects, storage solutions, and other mitigation measures.

4.2 DER and Renewables Integration

With the State's adoption of ambitious renewable energy goals as part of the CLCPA, it is important for New York utilities to be able to accommodate growth and increased penetration in renewable energy on the distribution grid. This is particularly important for Long Island, which has the most vibrant distributed solar market in New York, with more than 40% of the entire State's solar installations.

To enable safe, efficient operation and to promote growth of DER interconnection, PSEG Long Island's UoF team is focusing on three areas:

- Streamlining the interconnection application process through investment in an Interconnection Online Application Portal (IOAP). The portal is being developed and is expected to be available later this year.
- Provide interconnection customers with granular information to allow for faster and cost-effective interconnection to the grid. PSEG Long Island is developing Stage 2 Hosting Capacity Maps and is requesting funding to further develop Stage 3 Hosting Capacity Maps in 2021. The Stage 3 Hosting Capacity Maps will provide more location-specific information and parameters for

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interconnecting DER onto the LIPA distribution grid. They will also provide visibility to the grid operator to optimize the operation of DER under different system conditions. This visibility will give more information to the operators on the impact that DER is creating under different system conditions. To achieve this, PSEG Long Island is requesting funding in the 2020 Utility 2.0 Plan to implement a basic version of an operational platform that provides DER visibility.

4.2.1 Progress to Date

PSEG Long Island is developing tools and capabilities that can offer customers data that facilitate efficient DER interconnection. This includes the IOAP and the Hosting Capacity Maps.

Interconnection Online Application Portal

Project related activities commenced in 2020. In the first half of 2020, PSEG Long Island completed the design and discovery phases for developing the IOAP. These phases included defining the scope, capturing data requirements, assigning roles and responsibilities, and determining the IT architecture of the portal. PSEG Long Island is building the IOAP Phase 1, and it is expected to go live in October 2020.

For further detail on the progress of Phase 1 of the IOAP, refer to Section B.14 of Appendix B.

Hosting Capacity Maps Stage 1 and 2

Hosting Capacity Maps will provide customers with information on where DER interconnection is cheaper and quicker through online Hosting Capacity Maps. The maps will show potential favorable locations for interconnecting DER on a relative basis by considering the fundamental distribution system limitations. The maps are vital to the growth and deployment of DER onto the grid.

The UoF team has started the design and discovery phase for Hosting Capacity Maps Stage 2 and selected a contractor for implementation. Presentations were made at the Interconnection Working Group to make stakeholders aware of the process and implementation plan for Stage 2. PSEG Long Island will leverage the best practices employed by the Joint Utilities in the realm of Hosting Capacity Maps to ensure alignment with the utility industry.

4.2.2 New Initiative Proposed for 2021: Hosting Capacity Maps Stage 3

In its 2019 Utility 2.0 Annual Update, PSEG Long Island proposed to develop Stage 2 Hosting Capacity Maps to better inform DER developers and customers of circuits with available hosting capacity. While Stage 2 maps provide relevant hosting capacity information at the feeder level, these maps lack granular, location-specific information.

To provide location-specific information on the amount of DER that can be accommodated at certain nodes of the feeder, PSEG Long Island is proposing to develop Stage 3 Hosting Capacity Maps in 2021. Stage 3 Hosting Capacity Maps are intended to display more granular, nodal information than Stage 2, which displays only feeder-level information, not location-specific information.

Table 4-1 summarizes how Stage 3 Hosting Capacity Maps align with PSEG Long Island's Utility 2.0 guiding principles.

Table 4-1. Alignment of Hosting Capacity Maps with Utility 2.0 Guiding Principles

Customer Satisfaction	System Efficiency	Reduced Greenhouse Gases
Provides granular information to interconnection customers on the amount of DER that can be added at a particular location; thus, enabling quicker interconnection.	Mitigates operational issues from high DER penetration.	Promotes integration of DER and renewables.

4.2.2.1 Objective

Hosting Capacity Maps are circuit maps that provide information on the amount of DER that can be interconnected at a particular location without resulting in adverse system conditions. Accessing the maps will provide guidance to the interconnection customers on the potential sites or locations that can or cannot accommodate large penetrations of DER. Customers have traditionally relied on inadequate and time-consuming interconnection processes that were based on assumptions and limited information regarding system conditions.

Stage 3 Hosting Capacity Maps would help to streamline the interconnection process by providing customers with accurate information on hosting capacity available for a given location. Maps at a granular level allow customers and developers to make informed decisions regarding DER interconnection based on locations that can best accommodate DER development. Similar to Stage 2, Stage 3 maps will also be published on PSEG Long Island’s website as an informational tool for DER developers and customers. These maps will help facilitate DER integration throughout PSEG Long Island’s service territory.

Stage 3 maps would help identify potential congested circuits in advance, providing valuable insight on the capacity available to accommodate DER. The maps can also help PSEG Long Island identify optimal locations for targeted locational programs, ultimately paving the way for implementing NWS and demand management programs in lieu of costly traditional grid investments.

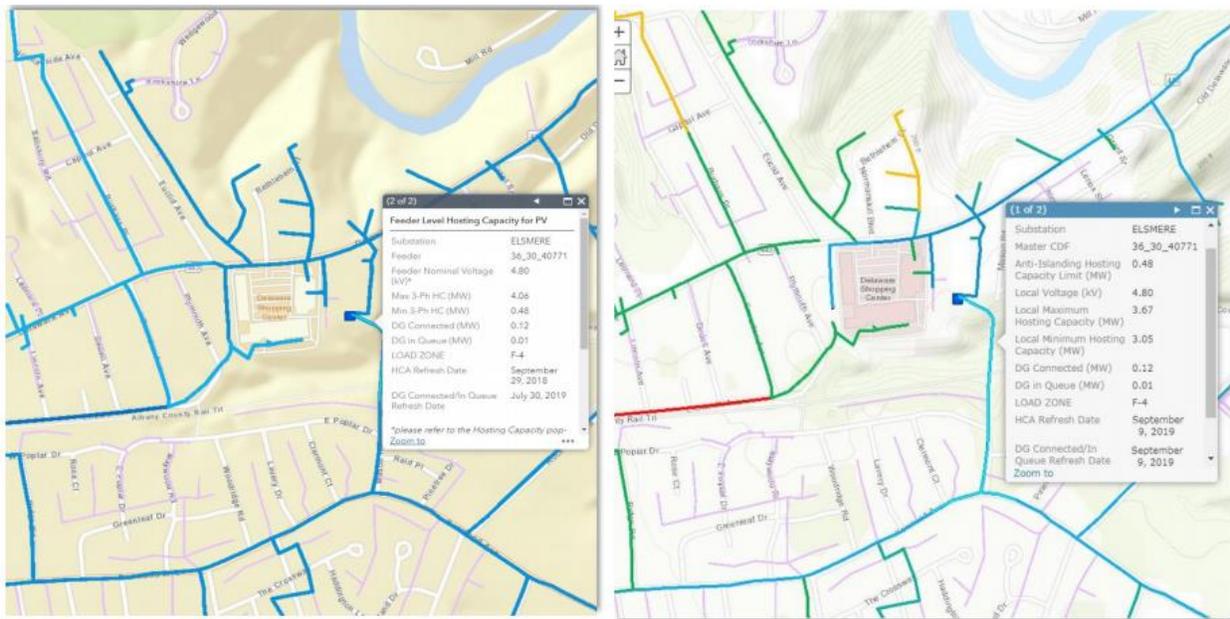
4.2.2.2 Scope

PSEG Long Island plans to leverage the best practices of the Joint Utilities to develop Hosting Capacity Stage 3 maps. Some of the alignment that PSEG Long Island intends to have with the Joint Utilities is consistent color coding of the maps and using the Electric Power Research Institute (EPRI) DRIVE tool.

PSEG Long Island expects to complete and publish the Stage 2 maps on its website by end of 2020. For the Stage 3 maps, PSEG Long Island will upgrade the maps by incorporating hosting capacity data at the sub-feeder and nodal level for LIPA distribution circuits. Figure 4-1 illustrates how sub-feeder-level Stage 3 maps will differ from feeder-level Stage 2 maps.³⁹

³⁹ Joint Utilities of New York, “Stage 3 Hosting Capacity Update – Follow-up Session (October 1 Release),” 2019. <https://jointutilitiesofny.org/wp-content/uploads/2019/12/JU-Hosting-Capacity-Stakeholder-Session-October-2019-Stakeholder-Feedback.pdf>.

Figure 4-1. Comparison of Stage 2 (Left) and Stage 3 (Right) Hosting Capacity Maps



PSEG Long Island expects that a third-party developer will be contracted to develop the Stage 3 maps, while hosting capacity technical analysis and ongoing updates to the hosting capacity technical analysis will be managed by PSEG Long Island’s internal UoF team. The maps will be available on PSEG Long Island’s website and are expected to be updated on a quarterly basis. While beyond the scope of this project, PSEG Long Island may continue to explore enhancements in future phases. This project scope does not include identifying optimal EV charging locations, which is addressed in the EV Make-Ready Infrastructure funding request (Section 3.2.2).

4.2.2.3 Schedule

The implementation plan for Hosting Capacity Maps Stage 3 is divided into four main tasks:

- **Completion of Stage 2 Maps:** Stage 2 maps will be completed prior to developing Stage 3 maps.
- **Data Collection and Analysis:** PSEG Long Island will collect relevant data and conduct advanced hosting capacity analyses at the sub-feeder level.
- **Stage 3 Map Development:** PSEG Long Island will develop the Stage 3 Hosting Capacity Maps based on the analysis in the previous stage and will make updates to the existing Stage 2 Hosting Capacity Maps on its website, possibly in collaboration with a third-party contractor.
- **Ongoing Updates to Map Data:** The underlying hosting capacity data and current state of DER interconnection will be updated on a quarterly basis.

Table 4-2 details the project schedule.

Table 4-2. Project Schedule – Hosting Capacity Maps

Stage	2020	2021	2022	2023	2024
Completion of Stage 2 Maps					
Data Collection and Analysis					
Data Collection					
Sub-Feeder-Level Hosting Capacity Analysis					
Stage 3 Map Development					
Develop Stage 3 Hosting Capacity Maps					
Update PSEG Long Island’s Hosting Capacity Map Portal					
Ongoing Updates to Map Data					

Completion of Stage 2 Map

In the 2019 Utility 2.0 Plan, PSEG Long Island proposed developing Stage 2 Hosting Capacity Maps. Completion of these maps is considered foundational to develop the Stage 3 maps. The Stage 2 maps are in progress and scheduled to be completed by the end of 2020.

Data Collection and Analysis

PSEG Long Island will work alongside a third-party developer to collect relevant data at the sub-feeder level and to conduct advanced hosting capacity analyses using EPRI DRIVE and CYME software. If Stage 2 maps are completed earlier than planned, the data collection and analysis for Stage 3 may begin earlier in Q4 2020.

Stage 3 Map Development

PSEG Long Island will work with a third-party developer to incorporate the advanced hosting capacity analysis into the already developed Stage 2 maps. PSEG Long Island will work with its IT team to coordinate updates to the website portal that hosts PSEG Long Island’s Hosting Capacity Maps.

Ongoing Updates to Map Data

PSEG Long Island’s UoF team will be responsible for ongoing updates to the underlying data, including both the hosting capacity and the DER interconnection queue. Additional validation analyses may be conducted to ensure all data has been reviewed against hosting capacity analysis values. The maps are expected to be updated on a quarterly basis.

4.2.2.4 Dependencies and Risks

Development of sub-feeder-level maps (Stage 3) will occur once feeder-level maps (Stage 2) have been made available on PSEG Long Island’s website.

Table 4-3 outlines the potential risks and proposed mitigation steps developing sub-feeder (Stage 3) Hosting Capacity Maps.

Table 4-3. Risk and Mitigation Assessment – Hosting Capacity Stage 3 Maps

Category	Risk	Mitigation
Implementation	Granular analysis and data collection may be a long process, leading to schedule delays. Issues surrounding physical or cyber security aspects of the map, data, and access of the maps will need to be defined.	Determine project schedule and roles and responsibilities clearly prior to project execution. Define security protocols that needs to be built into the system.

4.2.2.5 Funding Request

Capital expenses required include third-party support and in IT upgrades such as outside services, assessment, overhead, and risk and contingency. Operating expenses will be ongoing over the next 5 years and will cover the costs for ongoing annual maintenance of the maps and web portal, including third-party verification of model accuracy and ongoing annual software/license costs.

Table 4-4. Capital and Operating Expenses – Hosting Capacity Stage 3 Maps

Funding Subcategory	Capital Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
Third-Party Support	\$0.43	\$0.43	-	-	-	-
PM, Labor & Training	\$0.05	\$0.05	-	-	-	-
IT Upgrades	\$1.22	\$1.22	-	-	-	-
Total	\$1.70	\$1.70	-	-	-	-

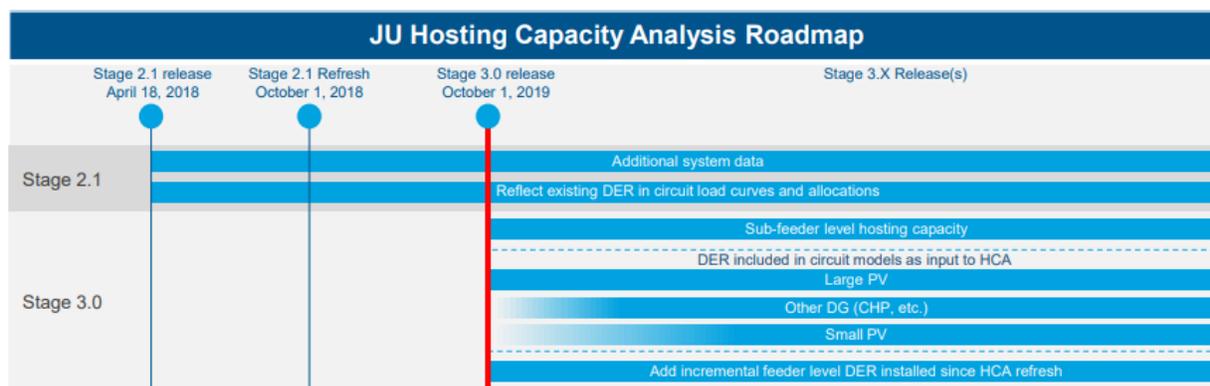
Funding Subcategory	Operating Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
Ongoing O&M	\$0.75	\$0.15	\$0.15	\$0.15	\$0.15	\$0.15
Third-Party Support	\$1.09	\$0.34	\$0.28	\$0.19	\$0.17	\$0.09
Total	\$1.84	\$0.49	\$0.43	\$0.34	\$0.32	\$0.24

4.2.2.6 Business Case

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 deployment of DER.

To help guide the development of Hosting Capacity Maps, the New York Joint Utilities adopted a Hosting Capacity Analysis Roadmap. In October 2019, the Joint Utilities completed Stage 3 in its roadmap and published advanced sub-feeder-level maps on their respective online portals (Figure 4-2).

Figure 4-2. Joint Utilities Hosting Capacity Analysis Roadmap



PSEG Long Island shares the Joint Utilities’ vision to provide Hosting Capacity Maps to DER developers in a consistent manner across the state and plans to use some of the practices employed by the Joint Utilities to develop its Hosting Capacity Maps. PSEG Long Island does not currently provide its customers with hosting capacity information and recognizes the importance of proposing Stage 3 immediately after the completion of Stage 2 in late 2020. To provide the same granularity of data for PSEG Long Island’s service territory as the rest of the State, it is crucial that PSEG Long Island accelerate the development process for its Hosting Capacity Maps.

4.2.3 New Initiative Proposed for 2021: DER Visibility Platform

PSEG Long Island is requesting funding to deploy an operational platform to allow distribution operators to better manage DER under different system conditions. This platform is a core grid operations capability that enables the integration, measurement, monitoring, and control of DER. The operational platform for managing the DER will provide operators with the visibility of real-time status and output of DER under various system conditions. The platform will provide operators enough information to ensure reliable operations of the system with higher penetrations of DER.

With the increasing amounts of distributed generation on the Long Island electricity system, this capability is critical to understand the DER contributions at the feeder level so that operational actions account for load masking effects under contingency scenarios. Without this capability, emergency load transfers under contingency conditions may mask the actual load, leading to thermal overloads and equipment failures. Implementing this platform is also essential to promote higher DER penetration by addressing the potential thermal constraints on the distribution system. This operational capability 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 the monitoring and control capabilities and to optimize DER integration onto the grid. For the future, other capabilities such as market-related functions associated with the DER will be considered when procuring the operational platform.

Table 4-5 summarizes how the DER Visibility Platform aligns with PSEG Long Island’s Utility 2.0 guiding principles.

Table 4-5. Alignment of DER Visibility Platform with Utility 2.0 Guiding Principles

Customer Satisfaction	System Efficiency	Reduced Greenhouse Gases
Maintains power reliability and grid stability; ensures customer reliability is maintained with higher penetration of DER.	Provides measurement and monitoring capability for DER and optimizes grid operations.	Increases hosting capacity for DER and enables increased penetration of DER.

4.2.3.1 Objective

PSEG Long Island is experiencing a rapid rise in DER penetration and interconnection applications, especially an increase in renewable resource applications. DER may mask load and pose reliability risk if not monitored. Through this project, PSEG Long Island is seeking to monitor real-time output of large DER projects and potentially increase hosting capacity limits on specific feeders safely and reliably.

DER output data is currently only available for larger DER (greater than 1 MW) and is not integrated with distribution operation platforms. The DER operational platform is envisioned to integrate with existing distribution systems. It will use the geographic information system (GIS) data and map the DER onto the GIS layout to provide the location and the output of the DER at any time of the day using SCADA.

The DER operational platform is expected to:

- Provide visibility to the operators so that reliable operational decisions can be made under different system conditions considering the impact of DER connected onto the circuit.
- Monitor, optimize, and enable higher DER penetration levels on PSEG Long Island's system.
- Help achieve New York State climate and energy goals in the most safe and reliable manner.

4.2.3.2 Scope

The DER Visibility Platform will focus on integrating the existing 27 locations with DER that are greater than 1 MW. Data such as MW and MVA_r coming through the SCADA system will be brought into the operational platform. In addition to the 27 existing locations, PSEG Long Island expects that 30 new large-scale DER applications will be interconnected per year in the first two years of implementation (2021-2022) and 50 new applications per year in later years (2023-2025).

PSEG Long Island expects that a third-party provider will be contracted to provide the software component of the platform. Once it is implemented and the data from all existing sites is migrated, PSEG Long Island will continue to connect all new locations added in the future to the new platform.

4.2.3.3 Schedule

PSEG Long Island is proposing a four-stage approach to implement the DER Visibility Platform:

- **Market Solicitation:** PSEG Long Island will partner with a third-party vendor to provide the DER Visibility Platform
- **Platform Installation:** Involves IT integration, configuration, and installation.
- **Functional Testing and Launch:** Functional testing will be conducted to ensure the platform has been integrated properly prior to launch.
- **Ongoing Maintenance:** Ongoing maintenance is expected throughout the lifetime of the platform.

Table 4-6. Project Schedule – DER Visibility Operational Platform

Stage	Q1 2021	Q2 2021	Q3 2021	Q4 2021	2022+
Market Solicitation	■				
Platform Installation		■	■	■	
IT Integration		■			
Configuration		■			
Installation			■		
Functional Testing and Launch			■	■	
Functional Testing			■	■	
Launch			■	■	
Ongoing Maintenance				■	■

Market Solicitation

PSEG Long Island will select a third-party vendor to provide the software platform. The platform will be expected to provide capabilities that allow distribution operators to identify and determine DER output on a feeder-by-feeder basis.

Platform Installation

Once a contract is awarded to a vendor, PSEG Long Island will coordinate with its internal IT team to support integration, configuration, and installation of the DER Visibility Platform. Any necessary data transfer and integration will take place during this stage.

Functional Testing and Launch

In Stage 3, PSEG Long Island’s IT team will conduct functional testing of the platform prior to launch. Once launched, the platform is expected to be accessible to distribution operators who will undergo necessary training and change management to adopt the tool.

Ongoing Maintenance

PSEG Long Island will coordinate with the third-party vendor and internal IT team for ongoing maintenance.

4.2.3.4 Dependencies and Risks

Implementation of the DER Visibility Platform depends on PSEG Long Island’s ability to import data seamlessly from the SCADA network. Initial migration of data may be time-consuming, potentially causing delays in the project schedule. Detailed design workshops will be held early next year to customize the tool to meet operator needs.

Platform implementation depends on the procurement of a software platform with monitoring capabilities from a qualified third-party solution provider. The launch of the platform depends on the availability of IT staff. Constraints on IT staff may cause delays in the project schedule.

The potential risks and proposed mitigation steps for developing the DER Visibility Platform are outlined in Table 4-7.

Table 4-7. Risk and Mitigation Assessment – DER Visibility Platform

Category	Risk	Mitigation
Timeline	Delays in project timeline due to IT integration delays.	Incorporate contingencies in project schedule by considering timeline buggers.
Budget	Uncertain budget because the cost of the software platform depends on the selected third-party vendor.	Incorporate 50% risk and contingency in project budget.
Stakeholder Engagement	Delays in project timeline due to constraints on IT staff.	Ensure availability of IT team to support installation of the platform.

4.2.3.5 Funding Request

Capital expenses account for IT integration costs including vendor software design, engineering and implementation services, security assessments, data lake, integration services, and product licenses. Ongoing operating expenditures will be required to cover annual IT maintenance of the platform.

Table 4-8. Capital and Operating Expenses – DER Visibility Operational Platform

Funding Subcategory	Capital Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
IT Integration	\$4.00	\$2.15	\$0.53	\$0.42	\$0.43	\$0.46
Third-Party Support	\$2.15	\$1.97	\$0.18	-	-	-
PM, Labor & Training	\$1.77	\$0.79	\$0.39	\$0.20	\$0.20	\$0.20
Total	\$7.92	\$4.92	\$1.10	\$0.62	\$0.63	\$0.66

Funding Subcategory	Operating Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
PM, Labor & Training	\$0.07	\$0.07	-	-	-	-
Ongoing O&M	\$0.22	-	\$0.04	\$0.05	\$0.06	\$0.07
Total	\$0.29	\$0.07	\$0.04	\$0.05	\$0.06	\$0.07

4.2.3.6 Business Case

As PSEG Long Island seeks to enhance its DER monitoring and control capabilities, developing a DER Visibility Platform is an essential building block toward fully enabling DER monitoring and control capabilities. Other utilities such as PSE&G in New Jersey and Con Edison have made similar investments in DER management technology. Specifically, the DER Visibility Platform will enable the following:

- **Inform feeder limitations for future DER interconnection, increasing hosting capacity:** The most important use case for the DER Visibility Platform is obtaining the visibility of DER output at any given time, thus addressing the thermal constraints from the load masking scenarios. Obtaining visibility into actual DER output will allow PSEG Long Island distribution operators to ensure the safety and reliability of the electric system with DER integrated on the circuits under different system conditions.
- **Monitor and enable increased DER penetration levels on PSEG Long Island's system:** Today, PSEG Long Island does not have visibility of DER output. As DER adoption increases,

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PSEG Long Island recognizes the importance of monitoring DER output levels on its distribution system. Having more insight into DER of significant size will allow the Utility to better monitor and eventually control DER output on feeders where it is feasible. This capability increases the hosting capacity by addressing the thermal constraints associated with load masking scenarios. The visibility enables reliable switching actions under contingency scenarios resulting in increased hosting capacity to non-dedicated feeders where applicable. The DER Visibility Platform may also promote cost effective integration of DER in certain scenarios by allowing increased penetration to the non-dedicated feeders. Additionally, this allows PSEG Long Island to manage grid operations with increased flexibility.

- **Help achieve New York State climate and energy goals:** This investment directly supports the New York goals of achieving 70% renewable energy penetration in the State’s electricity generation, as stated in CLCPA. Additionally, this investment supports New York State’s Accelerated Renewable Energy Growth and Community Benefit Act (Renewable Energy Growth Act) in “prioritize[ing] the planning, investment and responsible development of grid infrastructure, which will allow for renewable energy power to be delivered to where it is needed in the State” to meet CLCPA targets.⁴⁰ The proposed DER Visibility Platform directly supports the Renewable Energy Growth Act by enabling safe, reliable interconnection of the increased penetration of DER. In addition, the platform gives operators visibility into ways to optimize the use of DER under different scenarios.
- **Better inform related projects proposed in the Utility 2.0 Plan and other DSP-related projects:** Having visibility into DER output can inform the operators of the potential impact of other related projects:
 - Impact of smart inverters capabilities and functionalities—identifying system risks and assessing future need for power quality improvement by implementing devices like static synchronous compensators (STATCOMs)
 - Understanding of the operational impact of DER under different system conditions.

4.2.4 Looking Ahead

PSEG Long Island is evaluating the following initiatives to support management of DER as penetration increases, maintaining reliability and meeting customer needs. The initiatives described below are still at the concept stage and are being evaluated, with no specific commitment by PSEG Long Island for their launch.

Connected Buildings Pilot

PSEG Long Island is evaluating the launch of a technology pilot to demonstrate integrated controllable devices and sensors in homes and buildings to respond directly and autonomously to utility price and dispatch signals. These controllable and autonomous devices can lead to more efficient and optimal management of homes and buildings, providing customers with potential energy savings while providing grid value and supporting beneficial electrification.

The pilot could target new construction and retrofits, deploying multiple smart devices within a single building, which may be commercial or residential. In addition to deployment of the controls, a subscription or flexible rate may be offered to help incentivize controllable loads and beneficial electrification and to

⁴⁰ NYSDA. New York State Announces Passage of Accelerated Renewable Energy Growth and Community Benefit Act as Part of 2020-2021 Enacted State Budget. 2020. <https://www.nyserda.ny.gov/About/Newsroom/2020-Announcements/2020-04-03-NEW-YORK-STATE-ANNOUNCES-PASSAGE-OF-ACCELERATED-RENEWABLE-ENERGY-GROWTH-AND-COMMUNITY-BENEFIT-ACT-AS-PART-OF-2020-2021-ENACTED-STATE-BUDGET>

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inform the development of broader subscription or flexible rates. This pilot could provide valuable insights on opportunities and challenges in using controllable customer resources for grid value.

DER Transactive Market

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 would effectively take constructs that exist in wholesale markets and bring them to distribution markets, enabling a more diverse set of transactions between customers, the distribution utility, and wholesale markets.

A full-scale, enterprise-wide DER transactive market is not expected to be required until after 2025, but a pilot project in the interim can help PSEG Long Island plan its priorities when embarking on a larger-scale transactive market infrastructure. The initial pilot would focus on a subset of potential features of a DER transactive market, such as peer-to-peer trading of excess renewable energy or distribution markets with variable locational or temporal value. The envisioned scope will be refined as PSEG Long Island learns lessons from other related projects (e.g., BTM storage, V2G buses) and builds more capabilities through related investments (e.g., DER management system).

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 4.2.2) is an example of these steps.

Even though PSEG Long Island has included initiatives that support Grid Operations in prior Utility 2.0 Plans, several other investments were made, and capabilities developed outside the context of this Plan. Notably, PSEG Long Island's commitment to modernizing the grid and its operations is demonstrated by the completion of the Federal Emergency Management Agency-sponsored grid reinforcement program and an annual capital investment of approximately \$400 million in advanced asset management, operational data lake implementation on the Amazon Web Service platform, the AMI-OMS integration for advanced outage management, and the ongoing distribution SCADA implementation on the Long Island grid.

Central to the evolution of Grid Operations for the DSP is establishing the UoF team within the organization. The team is responsible for planning, developing, and operationalizing the capabilities that are required in evolving to a DSP, including the Utility's ongoing work around VVO and CVR.

4.3.1 Progress to Date

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 is being expanded to Patchogue in 2020, and PSEG Long Island intends to expand CVR into a program covering other parts of Long Island in 2021 to achieve energy savings.

4.3.2 New Initiative Proposed for 2021: CVR Program

Building on successful CVR trials in North Bellmore and Patchogue, PSEG Long Island proposes implementing CVR at targeted locations. Through CVR, PSEG Long Island seeks to reduce energy consumption of its customers through optimization of the voltages on distribution circuits. The target locations for CVR are based on the penetration of AMI and LMI areas. 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.

With AMI data, PSEG Long Island is able to identify feeders where there is potential to lower the voltage and conserve energy. The CVR program will involve upgrading and relocating existing capacitor banks and adding capacitor banks to enable voltage control capabilities. These smart capacitor banks will allow PSEG Long Island to manage voltage across the feeder within applicable design criteria limits. PSEG Long Island will also use these capacitor banks to optimize voltage profiles across target feeders, accomplishing VVO as well as CVR.

Table 4-9 summarizes how the CVR program aligns with PSEG Long Island's Utility 2.0 guiding principles.

Table 4-9. Alignment of CVR Program with Utility 2.0 Guiding Principles

Customer Satisfaction	System Efficiency	Reduced Greenhouse Gases
Potential for energy conservation resulting from voltage reduction	Reduces energy consumption and line losses	Reduces carbon emissions

4.3.2.1 Objective

Currently, voltage on PSEG Long Island's system is managed manually; crews are dispatched to substations and the capacitor banks are operated on either fixed kilowatt and reactive power (kVAr) settings or time clock settings (e.g., turn on at certain times). Distribution secondary voltages typically range within the design criteria but can be optimized to achieve maximum energy savings

With AMI penetration growing across Long Island, PSEG Long Island can use AMI data to determine with high confidence where voltage can be reduced for energy savings. Through the CVR program, PSEG Long Island is proposing to install smart capacitor banks that will operate on preset voltage control settings, optimizing the voltage across the entire circuit. In addition, smart capacitor banks will provide status information (e.g., turned on or off) and the kVAr produced. The smart capacitor bank capabilities will allow voltage optimization across the entire feeder.

PSEG Long Island has selected three substations for CVR implementation in 2021: Valley Stream, Baldwin, and Far Rockaway. These areas are primarily LMI and will have sufficient AMI penetration by 2021 to enable effective CVR deployment. The CVR program is intended to lower average customer energy usage, resulting in lower energy consumptions on the bills. An additional 17 locations will be targeted for CVR deployment for 2022-2025, for a total of 20 substations over 5 years (see Table 4-10).⁴¹ PSEG Long Island plans to conduct further VVO trials each year at 3-5 target substations to confirm these locations are good candidates for CVR. Results of these trials will be submitted in future Utility 2.0 updates as CVR locations are finalized, and funding will be requested accordingly.

⁴¹ The field equipment needed for CVR implementation will be installed by PSEG Long Island crews. The pace of CVR deployment depends on field crew availability and is capped at 3-5 substations per year.

PSEG Long Island is proposing to implement CVR throughout the year and at all times of the day and week when feasible. The voltage adjustment on target distribution feeder will impact the customers' voltages; however, the energy savings will not be uniform across customers. Every piece of electrical equipment responds differently to voltage changes; for the same voltage drop across the device, no two customers may experience the same energy usage reduction. CVR impacts will also not be uniform over times of day or seasons because the customers have different energy usage patterns for different days, weeks, or months.

As feeders serve complex mixes of load types, it can be difficult to predict CVR impact ahead of time without empirical trials. To this end, in 2019 and 2020, PSEG Long Island conducted CVR trials at the North Bellmore substation. Based on the trial results, the CVR factor varied across days and weeks. On average, the factor was approximately 1.25. PSEG Long Island found the CVR factor to be in line with the studies conducted by other utilities on CVR.⁴²

In the future, PSEG Long Island will evaluate the feasibility and benefits of the implementation of real-time VVO based on the results from the CVR program proposed in this Plan. Real-time VVO relies on a centralized VVO software that analyzes real-time AMI data and issues automated commands to field equipment (such as capacitor banks and load tap changers) to optimize distribution voltage.

4.3.2.2 Scope

PSEG Long Island is planning to deploy CVR to 20 of its substation transformer banks over five years. The substations were selected based on LMI customer demographics, AMI penetration, existing technology in place, and based on J.D. Power customer satisfaction metrics. Substations selected for 2021 will also have sufficient AMI deployment in time for CVR deployment. Any substation listed in Table 4-10 beyond 2021 will be reassessed on an annual basis for CVR implementation and the potential for future real time VVO deployment and, therefore, the list shown below is subject to change.

Table 4-10 indicates the tentative list of substations that were selected based on the factors mentioned above. Of the 20 substations that are targeted for the overall program, three substations will be the focus for CVR implementation in 2021. The list of target substations and funding requests for future years (2022-2025) will be refined through reassessment and field trials annually and are subject to change.

Table 4-10. Tentative CVR Deployment Plan

Year	Number of Substations
2021	3*
2022	3
2023	4
2024	5
2025	5

* Far Rockaway, Valley Stream, and Baldwin included in current funding request.

At the proposed CVR locations, PSEG Long Island is planning to upgrade manually operated capacitor banks to enable voltage control capability. The Utility may also need to relocate specific capacitor banks to better understand feeder voltage profiles. PSEG Long Island has an ongoing program to replace pager-controlled capacitor banks with modern controllers. The CVR program will coordinate with the

⁴² Guidehouse proprietary database of North American utility CVR programs.

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capacitor bank replacement program to save costs where possible, making the CVR program even more cost-effective. Details of the 2021 CVR deployment plan are indicated in Table 4-11.

Table 4-11. CVR Program 2021 Deployment Plan

Substation	Capacitor Bank Controller Upgrades	Capacitor Bank Relocations	New Capacitor Bank Installations
Far Rockaway (2H)	11	3	2
Baldwin (4M)	8	3	2
Valley Stream (2K)	7	3	2

For the three substations listed above, PSEG Long Island plans to use the smart capacitor banks to optimize feeder voltages after the voltage at the substation is reduced. Based on the preliminary analyses conducted, assuming a CVR factor of 0.6, the peak load reduction will range from 221 kW to 316 kW per year for each of the mentioned substations. The annual expected energy savings based on a CVR factor of 0.6 will be approximately 0.5% with the reduction of 1 V. The actual annual savings will be determined once field trials are conducted at each of the mentioned substations.

PSEG Long Island is planning to perform CVR simulations in the first half of 2021 at the three target locations listed in Table 4-12 using CYME software and leveraging AMI data. The simulations are expected to yield more tailored savings projections for selected locations. Note that savings are expected to be realized beginning in 2022. Individual customers may experience varying levels of energy and demand savings at different times, as mentioned above.

Table 4-12. Peak Load Reductions and Energy Savings for Target Substations

Substation	Generation-Coincident Peak Load Reduction (kW/year) ⁴³	Transmission-Coincident Peak Load Reduction (kW/year)	Distribution-Coincident Peak Load Reduction (kW/year)	Annual Energy Savings (MWh/year)
Far Rockaway (2H)	221.3	221.3	221.3	813.6
Baldwin (4M)	307.2	307.2	307.2	950.7
Valley Stream (2K)	316.7	316.7	316.7	1,174.9

In future years, PSEG Long Island plans to perform CVR and VVO field trials for 3-5 target substations each year in anticipation of CVR deployment. These trials will yield high confidence estimates of CVR potential at each location. Results will be reported annually and will be used to finalize target locations on an annual basis. The outcome of the review of feasibility and benefits of real-time VVO deployment may result in accelerating the trajectory of the proposed CVR initiatives across Long Island and the resultant recommendation will be captured in a future Utility 2.0 Plan.

4.3.2.3 Schedule

The implementation plan is divided into three main stages:

- 1. Simulation and Analysis:** As a first step, PSEG Long Island will perform CVR simulation studies in CYME for the three substations listed in Table 4-11 for 2021 deployment.

⁴³ Generation-coincident peak load reduction was assumed to equal transmission-coincident peak load reduction.

- **Deployment:** In parallel with the analysis, PSEG Long Island will perform engineering, design, and installation of field equipment (capacitor bank controls and relocations) at these substations.
- 2. **Implementation:** Once installation is complete, CVR will be implemented on the three substations listed in Table 4-11.
- 3. **Field Trials:** PSEG Long Island will conduct field trials to assess CVR potential at substations targeted for 2022 (listed in Table 4-10).

Table 4-13. Project Schedule – CVR Program

Stage	Q1 2021	Q2 2021	Q3 2021	Q4 2021	2022+
Simulation and Analysis					
Deployment					
Engineering and Design					
Installation					
Implementation					
Field Trials					

Simulation and Analysis

Beginning in Q1 2021, PSEG Long Island will perform simulation studies for each of the three substations targeted for 2021. The intent is to assess the feasibility of implementing CVR and to determine correct voltage settings for the smart capacitor banks.

Deployment

Following an engineering and design phase, PSEG Long Island will use in-house crews to install new capacitor banks and upgrade or relocate existing capacitor banks. See Table 4-11 for the deployment plan.

Implementation

PSEG Long Island will test CVR and begin implementing it at targeted substations in Q4 2021. Benefits are expected to begin in late 2021 and early 2022.

Field Trials

In the second half of 2021, PSEG Long Island will conduct field trials at substations targeted for 2022. This process is to fine-tune the expected CVR savings because they typically vary by location. The target locations for 2022 will be confirmed pending the results of the field trials and a preliminary assessment of CVR feasibility.

4.3.2.4 Dependencies and Risks

The list of target substations for 2021 was selected based on the AMI penetration and LMI areas. The savings calculated are based on an assumed 0.6 CVR factor, which results in 0.5% savings achieved when voltage is reduced by 1 V. Actual feasibility of implementing CVR to the substation will depend on existing voltage conditions in the area, and the ability to lower voltages without resulting in substandard voltages for the customers. PSEG Long Island will conduct load flow simulations prior to any equipment installations to rule out any scenarios that will result in low voltage conditions.

Table 4-14 outlines the potential risks and proposed mitigation steps for developing the CVR program.

Table 4-14. Risk and Mitigation Assessment – CVR Program

Category	Risk	Mitigation
Scope	Substations selected for CVR implementation may not yield expected savings.	Conduct load flow simulations to determine the feasibility of performing CVR on each substation prior to equipment installation.
Timeline	Field crews are engaged in other ongoing activities.	Ensure availability of PSEG Long Island staff to meet deployment timelines through early planning.

4.3.2.5 Funding Request

The capital funding request includes estimated costs for existing capacitor bank controls upgrades and new capacitor banks for three substations in 2021. Operating expenses include capacitor bank relocations and cost for program management.

Table 4-15. Capital and Operating Expenses – CVR Program

Funding Subcategory	Capital Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
Materials and Equipment	\$0.94	\$0.94	-	-	-	-
Total	\$0.94	\$0.94	-	-	-	-

Funding Subcategory	Operating Expenditure (\$M)					
	5-Year Total	2021	2022	2023	2024	2025
PM, Labor & Training	\$0.02	\$0.02	-	-	-	-
Materials and Equipment	\$0.07	\$0.07	-	-	-	-
Total	\$0.09	\$0.09	-	-	-	-

4.3.2.6 Business Case

Benefit streams considered for the BCA include avoided energy, avoided generation, T&D capacities, and avoided carbon emissions. Though the largest benefit stream is avoided energy, the benefits are not driven by any single benefit stream. Benefits are assumed to be realized starting in winter 2021, per project schedule outlined in Table 4-13.

As described in Section 4.3.2.2, PSEG Long Island proposes implementing CVR to three substations in 2021. The BCA is based on annual energy savings and peak demand reductions estimated for each of the three substations assuming year-round application of CVR, at both peak and off-peak times. A CVR factor of 0.6 was derived from early indicative VVO trials and was used to derive energy and demand savings.

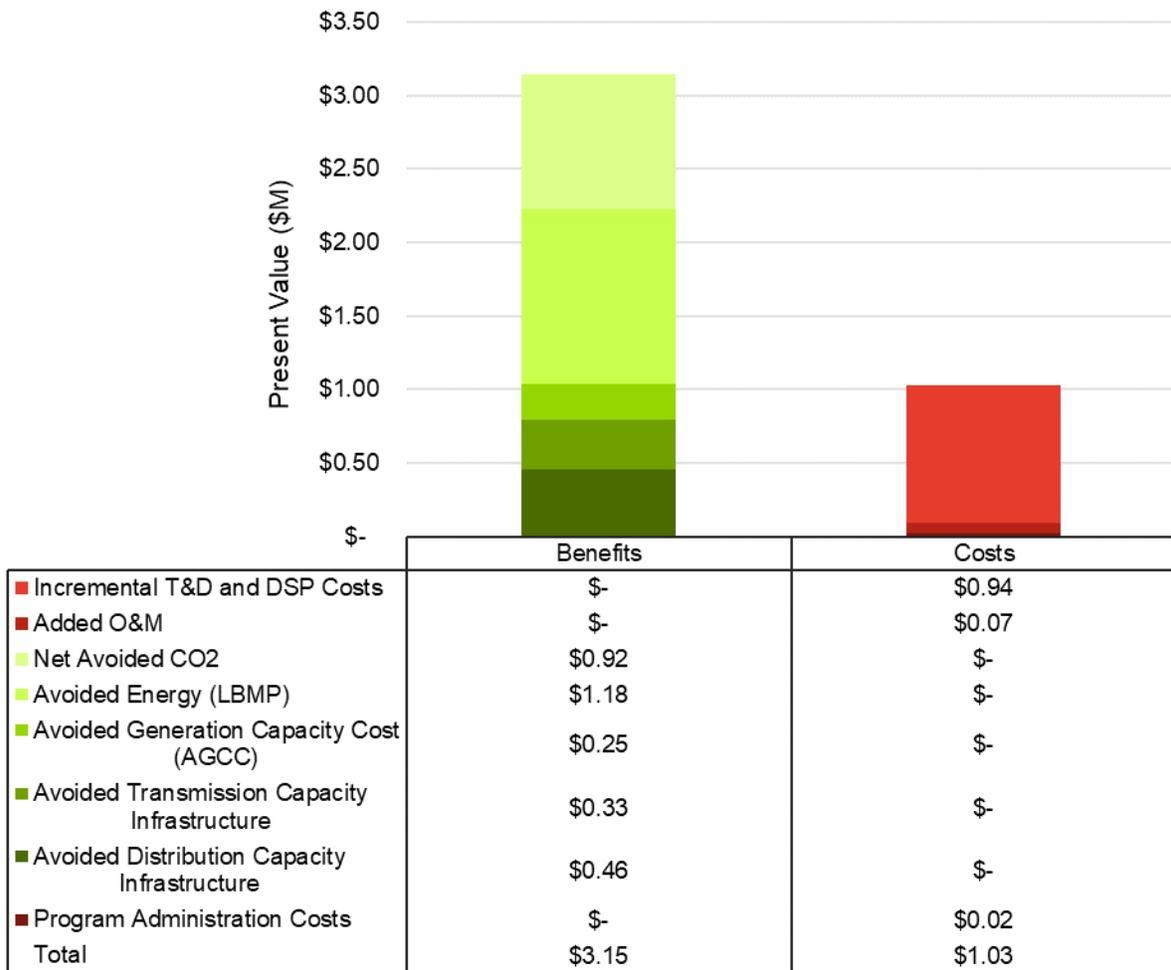
The bulk of the program cost is attributed to capital upgrades for smart capacitor bank controls and relocations. A BCA was conducted for each target substation with the assumed project time horizon of 20 years. The resulting societal benefit-to-cost ratios for each substation are listed in Table 4-16.

Table 4-16. SCT for 2021 Target Substations

Substation	SCT
Far Rockaway (2H)	3.04
Baldwin (4M)	3.27
Valley Stream (2K)	2.88

The aggregate SCT benefit-to-cost ratio for the three substations targeted for 2021 CVR deployment is 3.06. Details of the benefits and costs are described in Figure 4-3.

Figure 4-3. Present Value Benefits and Costs of SCT – CVR Program



#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
1	Net Avoided CO₂	Calculated using substation-specific energy savings and avoided carbon cost adder.	\$0.92	
2	Avoided Energy (LBMP)	Calculated using substation-specific energy savings and marginal energy cost in each year while accounting for line losses.	\$1.18	
3	Avoided Generation Capacity Cost	Calculated by multiplying the total reduction in peak for all substations by a general input for levelized avoided capacity cost in each year.	\$0.25	
4	Avoided Transmission Capacity Infrastructure⁴⁴	Calculated by multiplying the total reduction in peak from all substations by a general input for levelized avoided transmission capacity cost in each year.	\$0.33	
5	Avoided Distribution Capacity Infrastructure⁴³	Calculated by multiplying the total reduction in distribution peak by a general input for levelized avoided distribution capacity cost in each year.	\$0.46	
6	Incremental T&D and DSP Costs	Includes hardware costs (capacitor bank control upgrades and new capacitor banks) and risk and contingency.		\$0.94
7	Added O&M Program	Includes capacitor bank relocations.		\$0.07
8	Administration Costs	Includes internal labor costs for program management.		\$0.02
Total Benefits			\$3.15	
Total Costs				\$1.03
SCT Ratio			3.06	

NPV = Net present value

LBMP = Location-based marginal pricing

4.3.3 Looking Ahead

To get ahead of the challenges expected to affect grid operations with increased DER penetration, PSEG Long Island is considering a Power Quality Improvement program.

⁴⁴ The CVR program will not result in the deferral of specific transmission and distribution capacity infrastructure or projects. In the context of CVR program, the BCA value stream of avoided transmission capacity infrastructure and avoided distribution capacity infrastructure includes the potential benefits that will result from reduced average energy consumption at peak hour at the substations where CVR is implemented.

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Increasing levels of DER adoption bring considerable benefits along with new challenges. One major challenge is effectively mitigating power quality issues arising from the intermittent nature of DER. Some common power quality issues such as flicker, voltage fluctuations, and harmonic distortions could potentially occur on the system. These issues are expected to become especially pronounced when DER penetration becomes very high (2023 and beyond).

In anticipation of these power quality issues, PSEG Long Island is considering testing technologies that effectively improve power quality. These pilots could include STATCOM and inductive devices to test harmonics suppression and transient and flicker studies. The results will inform PSEG Long Island's strategy in preparing the PSEG Long Island system for increasing penetrations of DER.

4.4 Utility Storage

As noted in Section 3.3, 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 PSC 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.

Currently, there are approximately 12 MW of energy storage on Long Island, most of which are located in South Fork. PSEG Long Island deployed two storage systems with a total capacity of 10 MW/80 MWh in South Fork in 2018 which is the fastest growing region on Long Island with approximately 2.4% annual load growth. In the second half of 2020, PSEG Long Island's Power Markets team is planning to issue 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 is continuously evaluating the need to deploy energy storage systems on the distribution grid. An example of this is PSEG Long Island's work in Miller Place. In late 2019, the Utility issued a competitive solicitation for third-party support to the delivery of a 2.5 MW/12.5 MWh system that, when delivered, will defer the need for investment on the local substation. The bids to the solicitation are being evaluated and reviewed.

In 2020, the UoF team examined locations on the distribution grid that could be candidate sites for energy storage and identified two suitable locations: Sayville and Centereach. Both locations are expected to require system reinforcements in the 2024-2025 timeframe assuming no additional unexpected lump loads are added into the area from 2020 to 2025. PSEG Long Island will request funding for battery storage projects at these locations as part of the 2021 Utility 2.0 Annual Update. It is expected that by next year learnings from the Miller Place project will be available with respect to battery energy storage system procurement and the associated costs. Additionally, information from the planned solicitation of the energy storage RFP to procure 155 MW – 175 MW of energy storage is expected to be available. This proposed timeline is expected to be sufficient to procure battery storage for Sayville and Centereach or to install capital upgrades as the alternative.

PSEG Long Island will be issuing a planned solicitation for procuring energy storage systems for the Sayville and Centereach substations in 2021. The energy storage systems will interconnect on the 13-kV side and will be used to defer the existing T&D capital project at Sayville and Centereach.

4.4.1 Progress to Date

In Q4 2019, PSEG Long Island launched the storage project at Miller Place with the development and release of an RFP. The RFP was to solicit third-party services for the deployment of a utility-owned grid storage project interconnecting at the 13 kV Miller Place substation. At the time of writing the 2020 Utility 2.0 Plan, PSEG Long Island was in the process of reviewing the proposals from various bidders.

For further detail on the progress of Utility-Scale Storage, refer to Section B.15 of Appendix B.

4.4.2 Looking Ahead

In addition to the planned energy storage system at the Miller Place substation, PSEG Long Island is evaluating the deployment of two additional energy storage systems at Sayville and Centereach on the 13-kV side.

Based on the evaluation of the grid planning team, a 3 MW/18 MWh battery storage system at the Sayville substation will defer the need to install \$14.8 million in installations/reinforcement by 10 years starting in 2024. Similarly, a 5 MW/30 MWh battery storage system at the Centereach substation will defer the need to install a \$15.3 million reinforcement by 10 years starting in 2025. Further details on the two sites are provided in Table 4-17.

Table 4-17. Description of Need in Potential Future Energy Storage Sites

Location	Energy Capacity (MWh)	Power Capacity (MW)	Estimated Deferred Cost (\$M)	Grid Need Description	Start Year
Sayville	18.0	3.0	\$14.8	The substation is currently operating near its maximum capacity, and a new transformer bank is expected to be needed in 2024 when load growth is forecast to surpass the planning limit. A 3 MW/18 MWh battery storage system at the Sayville substation will defer the need to install \$14.8 million in installation/reinforcement by 10 years.	2024
Centereach	30	5.0	\$15.3	The substation is currently operating near its maximum capacity, and a new transformer bank is expected to be needed in 2025 when load growth is forecast to surpass the planning limit. A 5 MW/30 MWh battery storage system at the Centereach substation will defer the need to install \$15.3 million in installation/reinforcement by 10 years.	2025

5. Utility 2.0 Funding Request Summary

The following subsections summarize the expected variances in the budgets of the Utility 2.0 initiatives started in 2019, as well as the funding request for new projects starting in 2021. The impact of the overall funding request to residential and commercial rates is also included.

5.1 Budget Variance for Ongoing Utility 2.0 Initiatives (Approved in the 2018 Utility 2.0 Plan)

Table 5-1 and Table 5-2 summarize the variances in capital and O&M spend for the Utility 2.0 initiatives approved in the 2018 Utility 2.0 Plan compared to the initially filed budget. Detailed explanations for the variances shown in the table are provided in Appendix B. Funding reconciliation variances are calculated as “Budget” minus “Spend”. As such, projects that under-spent compared to plan are shown as positive values.

Table 5-1. Capital Budget Variance for Utility 2.0 Initiatives Approved in the 2018 Utility 2.0 Plan

Pathway	Initiative	2018 (\$M)	2019 (\$M)	2020 (\$M)	2021 (\$M)	2022 (\$M)	2023 (\$M)	2024 (\$M)	2025 (\$M)	8-Yr Total
Empower Customers through AMI and Data Analytics	AMI Technology and Systems	(6.92)	(0.13)	-	-	9.34	-	-	-	2.30
	AMI-Enabled Capabilities	-	1.78	(2.08)	(1.86)	(1.87)	-	-	-	(4.03)
	Program Implementation Support	-	0.36	-	-	-	-	-	-	0.36
	Customer Engagement	-	-	-	-	-	-	-	-	-
	Rate Modernization	-	7.91	(3.68)	(4.42)	(0.19)	(0.19)	-	-	(0.56)
	Data Analytics	-	1.72	(1.19)	(0.50)	(0.20)	-	-	-	(0.16)
Explore New Innovative Offerings	Super Savers	-	-	-	-	-	-	-	-	-
	BTM Storage	-	-	-	-	-	-	-	-	-
	EV Program	-	-	-	-	-	-	-	-	-
Evolve into the Customer-Centric DSP	Utility of the Future / CVR / JU	-	0.04	0.02	0.26	0.26	-	-	-	0.55
	Locational Value Study	-	0.80	(0.30)	-	-	-	-	-	0.50
	NWS Planning Tool	-	-	-	-	-	-	-	-	-
	IOAP Phase 1	-	-	-	-	-	-	-	-	-
	Grid Storage - Miller Place	-	(0.09)	(0.60)	(1.44)	(3.70)	-	-	-	(5.83)
Total		(6.92)	12.41	(7.85)	(7.96)	3.64	(0.19)	-	-	(6.88)

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Table 5-2. O&M Budget Variance for Utility 2.0 Initiatives Approved in the 2018 Utility 2.0 Plan

Pathway	Initiative	2018 (\$M)	2019 (\$M)	2020 (\$M)	2021 (\$M)	2022 (\$M)	2023 (\$M)	2024 (\$M)	2025 (\$M)	8-Yr Total
Empower Customers through AMI and Data Analytics	AMI Technology and Systems	-	(0.16)	(0.36)	(0.67)	(0.79)	-	-	-	(1.97)
	AMI-Enabled Capabilities	-	0.33	(1.14)	(1.23)	(1.23)	-	-	-	(3.27)
	Program Implementation Support	-	0.25	0.10	0.05	0.05	-	-	-	0.45
	Customer Engagement	-	3.23	0.04	1.45	1.85	-	-	-	6.57
	Rate Modernization	-	5.57	1.64	(0.85)	0.71	(5.21)	-	-	1.85
	Data Analytics	-	0.96	(0.06)	(0.62)	(0.30)	-	-	-	(0.01)
Explore New Innovative Offerings	Super Savers	-	1.51	0.12	(0.96)	(0.65)	-	-	-	0.02
	BTM Storage	-	0.04	-	-	-	-	-	-	0.04
	EV Program	-	1.64	3.95	2.08	2.47	(2.42)	(2.50)	(2.90)	2.32
Evolve into the Customer-Centric DSP	Utility of the Future / CVR / JU	-	0.64	(0.43)	(0.54)	(0.53)	-	-	-	(0.86)
	Locational Value Study	-	-	-	0.03	(0.16)	-	-	-	(0.18)
	NWS Planning Tool	-	0.50	(0.20)	-	-	-	-	-	0.30
	IOAP Phase 1	-	-	1.47	0.34	0.34	-	-	-	2.15
	Grid Storage - Miller Place	-	0.30	0.30	(0.23)	(0.71)	-	-	-	(0.34)
Total		-	14.82	5.42	(1.20)	1.07	(7.63)	(2.50)	(2.90)	7.08

5.2 Funding Requested for New Utility 2.0 Initiatives (Starting in 2021)

Table 5-3 summarizes the capital and O&M budget requests for the 9 new initiatives proposed in this Utility 2.0 Plan.

Table 5-3. Summary of 2020 Funding Request for New Initiatives

Pathway	Proposed Initiative	Detailed Description	Capital Request – Added (\$M)						O&M Request – Added (\$M)					
			2021	2022	2023	2024	2025	5-Yr Total	2021	2022	2023	2024	2025	5-Yr Total
Empower Customers through AMI and Data Analytics	C&I Demand Alert Pilot	Page 25	1.97	0.003	-	-	-	1.97	0.09	0.10	-	-	-	0.20
	FlexPay Pilot	Page 32	1.20	2.57	1.53	1.91	0.92	8.13	0.79	0.89	1.19	1.53	1.69	6.10
	On-Bill Financing Pilot	Page 45	1.07	0.05	-	-	-	1.12	0.70	0.81	0.10	0.10	0.10	1.82
Explore New Innovative Offerings	Enhanced Marketplace	Page 55	2.98	1.65	0.005	0.005	0.005	4.65	0.66	0.92	0.95	0.98	1.01	4.51
	EV Make-Ready Program	Page 65	3.20	-	-	-	-	3.20	1.19	0.15	0.16	0.16	0.17	1.83
	NWS Process Development	Page 80	-	-	-	-	-	-	0.50	-	-	-	-	0.50
Evolve into the Customer-Centric DSP	Hosting Capacity Maps Stage 3	Page 89	1.70	-	-	-	-	1.70	0.49	0.43	0.34	0.32	0.24	1.84
	DER Visibility Platform	Page 94	4.92	1.10	0.62	0.63	0.66	7.92	0.07	0.04	0.05	0.06	0.07	0.29
	CVR Program	Page 100	0.94	-	-	-	-	0.94	0.09	-	-	-	-	0.09
Total			17.97	5.37	2.15	2.54	1.58	29.61	4.58	3.35	2.79	3.15	3.29	17.17

5.3 Rate Impact Analysis

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 this Utility 2.0 Plan’s funding requirements, including both ongoing initiatives from the 2018 and 2019 Utility 2.0 Plans, as well as proposed initiatives in this year’s 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 5-1 and Table 5-2 above identify a \$14.8 million budget variance for 2018 Utility 2.0 projects during 2019. Due to known project delays, \$12 million was reallocated to the 2020 budget with a corresponding negative Utility 2.0 budget amendment in 2019. The remaining dollars, approximately \$3 million, was identified as a regulatory liability to be refunded to customers via the 2021 Distributed Energy Resources Cost Recovery Rate. The tables above also indicate that in 2020, the 2018 programs under-ran their original budget (excluding the additional \$12 million budget amendment) by \$5.4 million. Lastly, Table 5-1 and Table 5-2 indicate that some projects will be delayed until 2025 and when those dollars are included, the final variance drops to \$7.1 million.

Table 5-4 and Table 5-5 reflect a cash return of \$3 million to customers from the 2019 regulatory liability account and an additional \$10 million in currently over collected funds as identified in Table 5-1 and Table 5-2. The currently estimated amount of over collection is more than \$10 million, however, to return all currently estimated over collected funds in 2021, only to ask for it again in the future is not prudent. The \$10 million will offset new funding requests in 2021 and lower the DER Cost Recovery Rate rider rate. Any additional budget variance beyond the \$10 million will continue to be tracked through either a regulatory liability held to offset the 2022 DER or rolled into the 2021 budget for Utility 2.0.

Table 5-4. Residential Rate Impacts

Year	Initiative	2021	2022	2023	2024	2025
2020	C&I Demand Alert Pilot	(0.00%)	(0.01%)	0.01%	0.00%	0.00%
	FlexPay Pilot	(0.02%)	(0.10%)	0.09%	0.14%	0.32%
	On-Bill Financing Pilot	(0.03%)	(0.15%)	(0.00%)	(0.01%)	(0.01%)
	Enhanced Marketplace	(0.10%)	(0.55%)	0.37%	0.34%	0.32%
	EV Make-Ready Program	(0.01%)	0.14%	(0.08%)	(0.08%)	(0.06%)
	NWS Process Development	(0.01%)	0.00%	0.00%	0.00%	0.00%
	Hosting Capacity Maps Stage 3	(0.01%)	(0.02%)	0.02%	0.01%	0.01%
	DER Visibility Platform	(0.00%)	(0.00%)	0.02%	0.01%	0.04%
	CVR Program	(0.00%)	(0.03%)	0.02%	0.02%	0.01%
2019	Energy Concierge	(0.03%)	(0.13%)	0.01%	0.00%	0.00%
	Next Generation Insights	(0.02%)	(0.13%)	0.00%	0.00%	0.00%
	Heat Pump Controls Pilot	(0.00%)	0.00%	0.00%	0.00%	0.00%
	Electric School Bus V2G Pilot	(0.01%)	(0.00%)	0.00%	(0.00%)	(0.00%)
	Hosting Capacity Maps Stage 1-2	(0.00%)	(0.04%)	0.00%	0.00%	0.00%
2018	AMI Implementation	0.04%	0.66%	(0.83%)	(0.96%)	(0.96%)
	Super Savers	(0.04%)	(0.17%)	0.04%	0.03%	0.00%
	BTM Storage	(0.00%)	(0.01%)	0.00%	(0.00%)	(0.05%)
	EV Program	(0.01%)	(0.02%)	0.06%	0.06%	0.07%

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Locational Value Study	(0.00%)	(0.01%)	0.00%	0.00%	0.00%
Grid Storage - Miller Place	(0.00%)	(0.04%)	0.00%	0.03%	(0.05%)
Total	(0.23%)	(0.61%)	(0.28%)	(0.43%)	(0.36%)

Table 5-5. Commercial Rate Impacts

Year	Initiative	2021	2022	2023	2024	2025
2020	C&I Demand Alert Pilot	(0.00%)	(0.01%)	0.01%	0.00%	0.00%
	FlexPay Pilot	0.00%	0.00%	0.00%	0.00%	0.00%
	On-Bill Financing Pilot	0.00%	0.00%	0.00%	0.00%	0.00%
	Enhanced Marketplace	0.00%	0.00%	0.00%	0.00%	0.00%
	EV Make-Ready Program	(0.01%)	0.15%	(0.08%)	(0.08%)	(0.06%)
	NWS Process Development	(0.01%)	0.00%	0.00%	0.00%	0.00%
	Hosting Capacity Maps Stage 3	(0.01%)	(0.02%)	0.02%	0.01%	0.01%
	DER Visibility Platform	(0.00%)	(0.00%)	0.02%	0.01%	0.04%
	CVR Program	(0.00%)	(0.03%)	0.02%	0.02%	0.01%
2019	Energy Concierge	0.00%	0.00%	0.00%	0.00%	0.00%
	Next Generation Insights	0.00%	0.00%	0.00%	0.00%	0.00%
	Heat Pump Controls Pilot	0.00%	0.00%	0.00%	0.00%	0.00%
	Electric School Bus V2G Pilot	(0.01%)	(0.00%)	0.00%	(0.00%)	(0.00%)
	Hosting Capacity Maps Stage 1-2	(0.00%)	(0.04%)	0.00%	0.00%	0.00%
2018	AMI Implementation	0.04%	0.58%	(0.70%)	(0.79%)	(0.78%)
	Super Savers	(0.00%)	(0.01%)	0.00%	0.00%	0.00%
	BTM Storage	(0.00%)	(0.00%)	0.00%	(0.00%)	(0.00%)
	EV Program	(0.01%)	(0.04%)	0.10%	0.09%	0.10%
	Locational Value Study	(0.00%)	(0.02%)	0.00%	0.00%	0.00%
	Grid Storage - Miller Place	(0.00%)	(0.04%)	0.01%	0.03%	(0.05%)
Total	(0.02%)	0.52%	(0.61%)	(0.73%)	(0.73%)	

Appendix A. Energy Efficiency and Demand Response Plan

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 2021.

A.1.1 *Impact of COVID-19*

PSEG Long Island developed the 2021 EEDR Plan while New York State was responding to the COVID-19 pandemic. The Plan was developed using assumptions and data that is reflective of pre-pandemic behavior and analysis. While it is too early to know definitively, PSEG Long Island notes that 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 that are proposed in both Plans, however the company also recognizes the need to maintain flexibility and adaptability to respond to changing customer behavior and needs.

A.1.2 *Portfolio Budget and Target Summary*

PSEG Long Island's EE 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, thereby lowering their bills. PSEG Long Island has partnered with TRC Companies (TRC, formerly Lockheed Martin) to deliver the EE programs to the public. The proposed 2021 energy efficiency initiatives consist of four programs for residential customers and a multi-faceted program for commercial customers. 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 emissions by 40% by 2030, New York State set new statewide energy efficiency 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, as well as 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, since 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 2021 EEDR Plan focuses on continuing to deliver EE savings programs to residential and commercial customers, while expanding efforts to include beneficial

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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 in turn 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 nationally recognized 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 2021 goals are **1,091,882 total MMBtu savings** and **332,455 MWh of energy efficiency savings** and are similarly reflected on a gross basis at site.

The proposed 2021 budget for EEDR remains equal to 2020's budget at \$88.8 million. PSEG Long Island has budgeted for some initiatives that will not have any MMBtu savings associated with them in 2021—e.g., the Direct Load Management program at \$1.3 million. For the first time in 2021, savings from the launch of the first pay for performance partnership with NYSERDA are expected.

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 \$5.3 million in spending in 2021, which represents 21% of the noncommercial portfolio budget for rebates and incentives.

PSEG Long Island will offer \$1.2 million in funding for community adder incentives of \$200/kW for community solar projects up to 750 kW in size, which will further support the local availability of community solar when coupled with recent modifications to increase the community credit as part of the Value of Distributed Energy Resources (DER).

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 Dynamic Load Management (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 or monthly review to help respond to market conditions.

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A.1.3 Portfolio Summary

Table A-1 summarizes the expected energy efficiency savings (on a 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 and DR programs.

Table A-1. 2021 Energy Efficiency and Beneficial Electrification Goals

Program	Savings (MMBtu)	Savings (MWh)	Program Budget (\$M)
Efficient Products	484,059	200,220	18.93
Home Comfort	113,425	3,563	11.62
REAP (Low-Income)	4,532	1,672	1.40
Home Performance	28,760	2,340	5.56
Commercial Efficiency	332,125	87,151	35.05
HEM (Behavioral)	127,374	37,331	2.40
Pay for Performance	606	178	0.16
Total, Budget Components with Programmatic Savings	1,090,882	332,455	75.12
Solar Community Adder	N/A	N/A	1.20
DLM Program	N/A	N/A	1.30
PSEG Long Island Labor, Outside Services, Advertising	N/A	N/A	11.18
Total, Budget Components not Associated with Programmatic Savings	-	-	13.68
Total	1,090,882	332,455	88.80

A.1.4 Benefit-Cost Analysis

While PSEG Long Island's energy efficiency planning is done on a gross basis 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 EE 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 energy efficiency 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 energy efficiency and renewable program and for the

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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 2020 BCA Handbook, including the avoided capacity and energy costs from including the carbon costs, to screen its 2021 EE programs and portfolio. The June 2020 Handbook is the same BCA Handbook that is being used for the 2020 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-2 presents the benefit-to-cost ratios for the SCT, UCT, and RIM tests for each program and for the overall energy efficiency portfolios. Table A-3 outlines the levelized costs on a MMBtu and kWh-basis for each program.

Table A-2. BCA for 2021 Energy Efficiency Portfolio

Program/Sector	SCT	UCT	RIM
Commercial	1.78	1.32	0.21
Efficient Products	2.34	3.32	0.19
Home Comfort	0.75	0.08	1.27
REAP	0.87	0.58	0.15
Home Performance	2.69	0.19	0.08
HEM	0.89	0.45	0.12
Residential	1.81	1.61	0.23
Overall Portfolio	1.80	1.48	0.22

Table A-3. Levelized Cost Comparisons for 2021 Energy Efficiency Portfolio

Program/Sector	\$/MMBtu	\$/kWh
Commercial	\$5.34	\$0.02
Efficient Products	\$1.58	\$0.004
Home Comfort	\$6.40	\$0.20
REAP	\$18.00	\$0.05
Home Performance	\$8.10	\$0.10
HEM	\$18.84	\$0.06
Residential	\$6.53	\$0.09
Overall Portfolio	\$3.81	\$0.02

A.1.5 TRC Companies Implementation

PSEG Long Island has partnered with TRC Companies (TRC) (formerly Lockheed Martin) to deliver the Utility's energy efficiency 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

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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 such activities 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.1.6 New Efficiency: New York

As part of its overall goal of reducing greenhouse gas emissions by 40% by 2030, New York set a new statewide energy efficiency 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 time period, or 7.85 TBtu when combining base-level electric savings and the incremental amount established in the December 2018 Order.

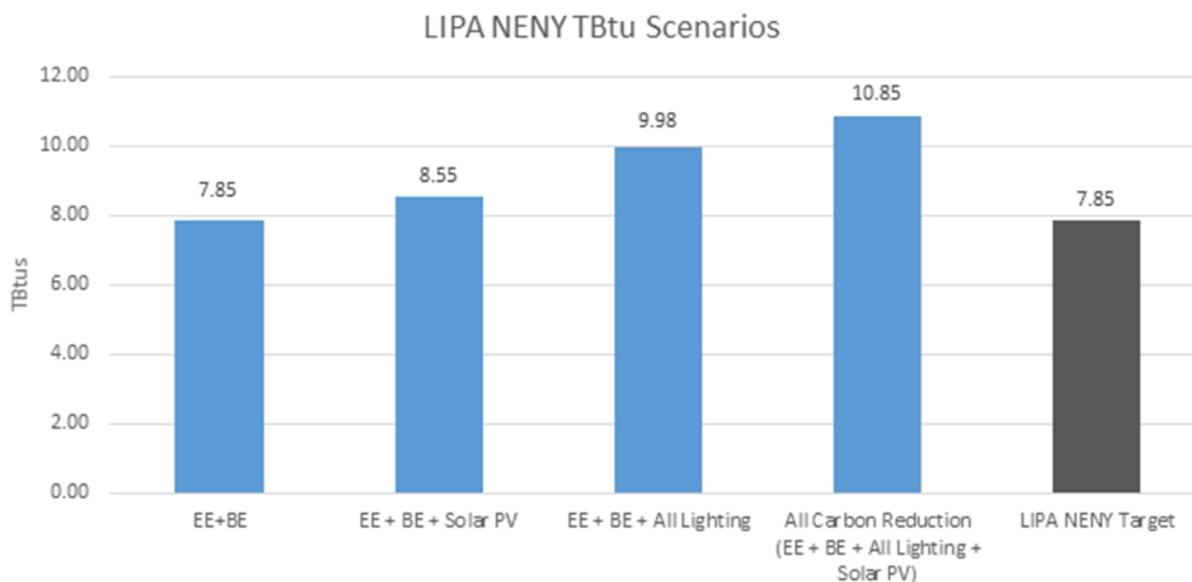
Beginning with PSEG Long Island's 2020 EEDR Plan, offerings were expanded to include rebates and incentives for installing EE measures that supply beneficial electrification to the grid and allow customers to save on their fossil fuel-based costs. As such, Long Island became the first region in New York State to convert all electric savings metrics to a MMBtu basis to better conform with the New Efficiency: New York goals. This effort was supported by converting the entire PSEG Long Island 2020 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.

A.1.6.1 Current Trajectory and Scenario Analysis

PSEG Long Island is on a pathway to meet or exceed the total contributions of fuel-neutral savings over the period of 2019-2025. Figure A-1 shows various scenarios under which savings could be tabulated.

Figure A-1. LIPA New Efficiency: New York TBtu Scenarios (by 2025)



Efforts to date have incorporated insights from Long Island’s 2018 EE potential study, NYSEDA’s commercial potential study, and benchmarking study updates from other Northeastern utilities since then. While the estimated figures in the chart do include expanded beneficial electrification efforts, as PSEG Long Island and the market gain greater insights from implementing fuel-neutral programs in 2020 and beyond, the share of Btu savings each year beyond electric savings would be expected to increase.

Scenarios in which PSEG Long Island continues its current trajectory of running EE programs (including enhanced rebates for heat pumps) yield contributions in line with LIPA’s anticipated target originally identified in the Order Adopting Accelerated Energy Efficiency Targets. The grid is likely to see large gross at-site benefits from lighting, resulting from a combination of codes and standards changes and residential market transformation. Depending on how the effect of these savings are reflected in the programmatic accounting included, the LIPA contributions may be 2 TBtu above the target set in New Efficiency: New York for Long Island. The treatment of lighting effects is discussed further below.

All carbon reduction effects that PSEG Long Island is likely to contribute to over the 2019-2025 period have been reflected, including those beyond the defined programmatic scope and solar PV-related impacts. Taken together, these represent about 10.85 of TBtu over the period, a level nearly 40% above the LIPA target. An expanded argument for treating all available cost-effective carbon reductions is included below.

A.1.6.2 Historical Performance

PSEG Long Island and LIPA have historically been more aggressive than other New York utilities in pursuing EE improvements. As a result, it is likely that their programs and saturation levels are more comparably mature than others in the state. Table A-4 compares EE as a percentage of load found in the January 2020 Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios for the New York utilities with the values for PSEG Long Island.

Table A-4. Energy Efficiency Savings as a Percentage of Load

Entity	2016-2025 Average	2019-2025 Average
New York Joint Utilities, without NYSEERDA	1.30%	1.44%
PSEG Long Island	1.57%	1.57%

Savings include NYSEERDA contributions from 2016-2020 but only reflect utility savings for future years (2021-2025).

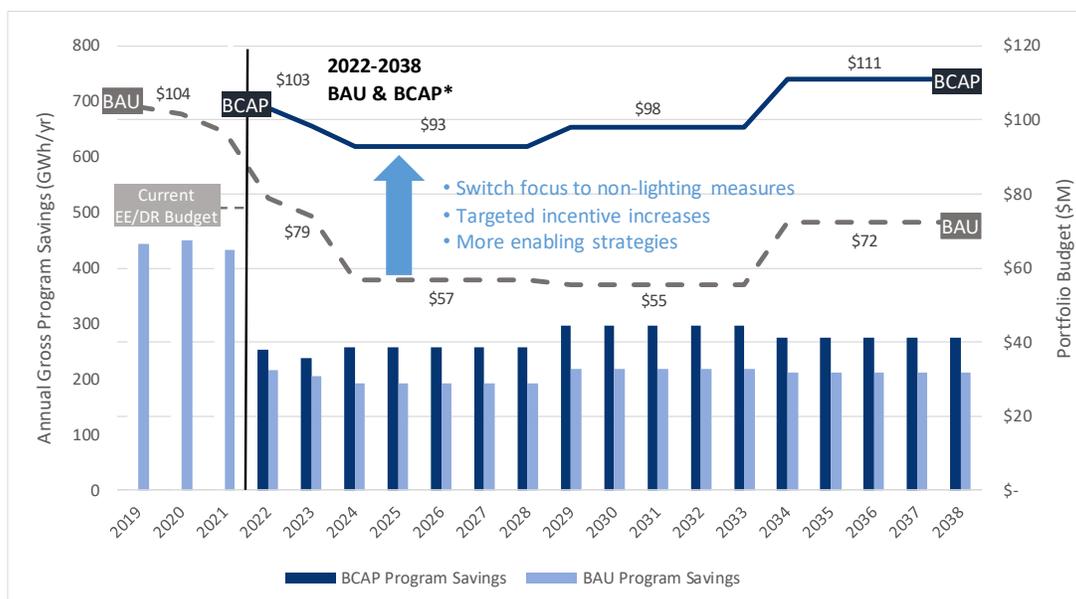
As shown in Table A-4, whether the time period for comparison is EE savings since 2015 or just a snapshot look at the period from 2019-2025, PSEG Long Island’s average level of savings as a percentage of load is considerably greater than the Joint Utilities’ ascribed savings under New Efficiency: New York. Additionally, PSEG Long Island’s achievable potential savings of less than 2% of sales reductions in 2025 is not a sign of stagnating progress; rather, it is an indication of early intervention in driving energy efficiency forward.

A.1.6.3 Potential Savings and Cost Implications

As a result of past programmatic efforts, the remaining potential for EE savings is both lower and more expensive as compared to recent historical results. As noted in PSEG Long Island’s 2018 potential study, “[c]urrent PSEG Long Island efficiency programs capture the majority of the achievable potential assessed under the BAU [business as usual] scenario, with a focus on capturing all or nearly all of the most cost-effective opportunities by relying heavily on lighting savings. However, once the residential lighting savings opportunity is largely eliminated by the EISA standards, along with a significant portion of the commercial sector lighting savings, annual BAU budget and savings drop to well below current levels.”

The study quantified that the budget-constrained achievable potential would result in increased expenditures over the 20-year study period to levels 30% higher than PSEG Long Island’s recent historical level of program spending. In spite of this modeled budget increase, gross at-site savings would still fall from current levels, as shown in Figure A-2 from the 2018 EE Potential Study.

Figure A-2. Comparison of Business-as-Usual and Budget-Constrained Achievable Potential Savings (Gross) and Budgets



Source: 2018 PSEG Long Island EEDR Potential Study

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Another basis of comparison for program costs and achievements for EE efforts can be ascertained by comparing data across utilities. The American Council for an Energy-Efficient Economy (ACEEE) publishes an annual scorecard that attempts to standardize metrics to rank states and utilities in various policy areas. Table A-5 uses data⁴⁵ from the most recent scorecard to compute relative levels of savings.

Table A-5. Relative Savings Using ACEEE Scorecard Data

		NGRID MA	EVERSOURCE	SDGE	COM ED	LIPA	PSE&G	NGRID NY	CON ED
MWH	SAVINGS	782,838	760,750	463,260	2,064,720	293,161	175,192	397,304	425,521
ANNUAL	SALES (\$000)	\$2,340,736	\$2,901,061	\$3,804,123	\$5,013,341	\$3,602,574	\$3,725,259	\$2,241,744	\$7,982,451
ANNUAL	SALES GWH	19,963	22,235	18,767	89,440	19,610	41,899	35,294	56,832
ANNUAL	SALES MWH	19,963,000	22,235,000	18,767,000	89,440,000	19,610,000	41,899,000	35,294,000	56,832,000
CUSTOMER	COUNT	1,317,661	1,052,881	1,453,179	4,021,991	1,131,776	2,266,387	1,679,057	3,482,663
EE	SPENDING	\$266,403,945	\$266,403,945	\$82,155,060	\$352,988,361	\$71,724,487	\$62,144,124	\$105,971,027	\$187,575,807
Spending/	Customer	\$202.18	\$253.02	\$56.53	\$87.76	\$63.37	\$27.42	\$63.11	\$53.86
MWH Sales/	Customer	15.1503	21.1182	12.9144	22.2377	17.3268	18.4871	21.0201	16.3185
Revenue/	Customer	\$1,776.43	\$2,755.36	\$2,617.79	\$1,246.48	\$3,183.12	\$1,643.70	\$1,335.12	\$2,292.05
EE Spending/	Customer Revenue	11%	9%	2%	7%	2%	2%	5%	2%
EE Savings	\$/MWH	\$340.31	\$350.19	\$177.34	\$170.96	\$244.66	\$354.72	\$266.73	\$440.81
Saving/	Sales	3.77%	3.31%	2.41%	2.26%	1.47%	0.42%	1.11%	0.74%

While some utilities can achieve greater EE savings as a percentage of load, these savings come at a significantly greater outlay of programmatic spending—over triple that of LIPA in the case of National Grid (Massachusetts) and Eversource. As compared to other New York utilities, PSEG Long Island realizes greater EE savings as a percentage of load at a lower cost per MWh, which may point to more aggressive attempts and the relative maturity of Long Island’s programs over the recent historical timeframe.

A.1.6.4 Carbon Reduction

From a carbon reduction standpoint, Long Island continues to be a state leader in solar PV, which will contribute significantly to a lower sales forecast in 2025. Solar PV and EE result in gross at-site reductions in energy usage. The phased introduction of Value of DER and the forthcoming charges that cannot be bypassed based on system sizes for all other residential and commercial installations in 2021 will mitigate concerns of rate impacts on nonparticipants. Ultimately, reductions in energy usage at-site result in greenhouse gas emissions reduction whether those originate from traditional EE or solar PV.

PSEG Long Island and LIPA have a long history of supporting the growth of the local installer market. Long Island was the first region in the state to fully allocate all available NY-Sun Megawatt Block funding for the residential and commercial sectors. In the case of residential installs, even though the NY-Sun rebates were last available over 4 years ago, the grid continues to see approximately 6,000 new residential installations on an annual basis, which points to a self-sustaining market. LIPA’s share of the New York State goal of 6,000 MW by 2025 is 750 MW, which Long Island is expected to meet and

⁴⁵ ACEEE data is done on a net basis, rather than gross at site like New Efficiency: New York.

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exceed. Long Island has a considerable local infrastructure to deliver gross at-site savings through solar PV. Both solar PV and residential LED lamps are significantly lowering overall electric sales on Long Island and should be recognized toward the overall state targets.

A.1.7 Energy Savings Portfolio of Programs

Table A-6 lists the programs offered under this Plan that are administered by TRC and PSEG Long Island.

Table A-6. Summary of EEDR Programs Offered by TRC and PSEG Long Island

Programs administered by TRC	Programs administered by PSEG Long Island
<ul style="list-style-type: none">• Energy Efficient Products (EEP) Program• Home Comfort Program• Residential Energy Affordability Program (REAP)• Home Performance with ENERGY STAR (HPwES)• Commercial Efficiency Program (CEP)	<ul style="list-style-type: none">• Behavioral Initiative (HEM Program)• DLM Tariffs• Pay for Performance

A.1.8 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 currently in the process of seeking a new vendor through a request for proposal (RFP) to evaluate program years 2020-2022.

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 energy efficiency and renewable energy program as well as for both portfolios.
- Conduct cost-effectiveness analysis for each energy efficiency and renewable energy program as well as for the portfolios.

Process Evaluation

- Assess how efficiently a program is being implemented by evaluating the operational efficiency of program administrators and contractors.

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- 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 2020 EEDR portfolio investments, where the 10-year economic impacts accrue from measures installed in 2019 over their remaining measure life.

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 energy efficiency 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. These could include 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 energy efficiency. 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 energy efficiency 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 energy efficiency 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.2 Products and Programs

The following sections provide details on the programs that are being offered in 2021. 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 Energy Efficient Products (EEP) program is to increase the purchase and use of energy efficient appliances and lighting among PSEG Long Island residential customers. The program provides rebates or incentives for ENERGY STAR-certified lighting, ENERGY STAR appliances, and battery-operated lawn care equipment through upstream and downstream promotions. These products meet the energy efficiency standards set by the US Environmental Protection Agency and US Department of Energy. Advanced power strips are also included in the product mix and are available through the Marketplace and special promotions. ENERGY STAR specifications are an important external factor to the EEP program offerings. If ENERGY STAR specifications change, PSEG Long Island adjusts its program offerings accordingly. The adjustments to the program offerings ensure that the program offers incentives for products that meet the latest standards and highest quality of efficiency.

In addition to financial incentives, the program educates customers about the benefits of using energy efficient products in their homes 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. The program uses a variety of mechanisms, most notably financial incentives, to increase the market saturation of these efficient products. These incentives are distributed either through direct consumer rebates or upstream incentives paid directly to manufacturers or retailers. The PSEG Long Island EEP program may also explore MOUs for 2021-2025 to ensure the program is reaching its market potential for measures such as Tier I and Tier II advanced power strips.

Since program inception, PSEG Long Island has significantly expanded its program offerings through the EEP. The expansion is a result of new technology development and availability, the increase in ENERGY STAR-certified products, and metric shifts (MMBtu goals). New York State has hefty greenhouse gas reduction goals; therefore, in 2020 the EEP began promoting and incentivizing beneficial electrification equipment, along with the historical ENERGY STAR offerings. This practice will continue in 2021 and through program year 2025.

In 2021 and through 2025, rebates will continue to be available for ENERGY STAR appliances and beneficial electrification equipment. Rebates for advanced power strips (Tier II) will likely be available through MOUs. In 2021, ENERGY STAR LEDs, standard, specialty, and connected lighting will be incentivized and then phased out accordingly from 2022 to 2025. Pool pumps may also be phased out after 2021 because of changes in code. Pool pumps will be incentivized for the entirety of the 2021 program year.

To provide a more comprehensive digital marketplace offering, PSEG Long Island anticipates issuing a solicitation for an Enhanced Marketplace (section 3.1.2) that will include a broader array of products and services that will be made available to customers. The Enhanced Marketplace will provide multiple channels for customers to pursue energy efficiency and distributed energy opportunities. PSEG Long Island expects this new offering to be available to customers in 2021.

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A.2.1.1 Program Delivery

The EEP program is delivered through partnerships between TRC, subcontractors, retailers, and product manufacturers. Customers who purchase qualifying ENERGY STAR models and beneficial electrification equipment are eligible for rebates on appliances and equipment or point-of-sale incentives on lighting products. The EEP provides training to retailer staff on efficient products and supports the stocking, sale, and promotion of efficient products at retail locations within the service territory. The overall goal of the EEP program is market transformation, which is the transition to a mature EE market that is self-sustaining without subsidies.

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 compared to a similarly sized consumer rebate. 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.

The implementation contractor negotiates a program agreement (PA) with retailers and manufacturers and reimbursement is based on the submission and verification of sales data. Several program agreements have been negotiated with lighting manufacturers and retailers that 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
- What sales data must be provided to PSEG Long Island's incentive processing contractor
- Frequency of sales data submissions
- Any marketing requirements, e.g., placement of PSEG Long Island-branded point of purchase (POP) materials

The fulfillment contractor is responsible for the following lighting rebate processing procedures:

- Gather credible point-of-sale (POS) data from retailers to confirm that the bought down or marked down product is selling through the stores to consumers
- Maintain a database that can track sales data on a product basis, date/time basis, store basis, by promotional PA's number, by manufacturer, and by retailer
- Ensure that incentives are paid only for eligible products sold through participating stores during an active promotional period and that any sales double-reported are caught so that incentives are not double paid

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- Input various sales reports supplied by different industry partners into a central program database and, after reviewing and subjecting inputted data to various quality assurance checks, pay industry partners in a timely fashion for incentives owed
- Issue incentive payment to manufacturers and retailers are currently issued twice a month

Downstream Rebates

Processing Mail-In Rebates

In mid-2018, TRC began processing pool pump applications and rebates in-house. Because the pool pump processing was so successful, TRC assumed responsibility of all appliance and pool pump rebate processing in 2019. TRC will continue to process all rebate applications in-house for 2021 to 2025.

The fulfillment contractor is responsible for processing all lighting incentives and any customer activity on the Marketplace, the online store. TRC processes all other mail-in and online submitted applications as follows:

- Customer submits a rebate application with a copy of the receipt/invoice.
 - TRC built an online application portal for customers to use in 2019 to expedite rebate processing (the portal was updated in 2020 to include the beneficial electrification equipment).
- Customer information system (CIS) account number is verified to ensure customer is a PSEG Long Island residential account holder.
 - The online application validates the CIS number against the Captures database.
- Products and appliances validated against the eligibility requirements per the program guidelines.
 - The program guidelines are found on the paper application and in the Rebate Requirements section in the online application.
- Rebate payment is authorized, pending multiple levels of quality assurance (QA) checks.
 - Paper checks are printed and mailed by PSEG Long Island.
 - A bill credit may be applied if the customer opts for this type of payment.
- Payment is sent to customer or a bill credit is applied to the residential electric account within six weeks of application receipt. Customers may also opt for payment in the form of a bill credit either to the residential electric account or a rebate check mailed to the account holder of application receipt

The Bulk Purchase Rebate program is offered to homeowners, builders, and contractors looking to install 20 or more ENERGY STAR-certified LED bulbs in residential applications within the PSEG Long Island service territory. Preapproval is required before purchase can be made. Rebates are processed by the fulfillment contractor.

The program is effectively delivered by using an implementation contractor and a fulfillment contractor with TRC managing the program and subcontractors on behalf of PSEG Long Island. Roles for the subcontractors are outlined below.

Implementation contractor

- Program implementation and oversight (day-to-day)
- Recruit retailers and distributors to participate in the EEP program
- EE products retailer and distributor
- Design and manage product promotions

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- Design marketing and program promotional materials
- Manage pool pump program dealers and installers
- Provide training, via field reps, to retailer and distributor sales staff on program participation and product eligibility requirements during regular retailer visits
- Provide staffing for in-store promotions of the PSEG Long Island program, efficient products, and current incentive offerings
- Develop and manage relationships with lighting and appliance manufacturers
- Work with both retailers and manufacturers to develop and implement upstream product promotions

Fulfillment contractor

- Retain a broad-based utilities division support staff including program management, data processing and customer service for retail rebate processing
- Services include processing upstream lighting incentives using retailer point-of-sale reports

A.2.1.2 Target Market

All residential customers with a PSEG Long Island account.

A.2.1.3 Measures and Incentives

Table A-7 lists the measures offered in the EEP program.

Table A-7. Energy Efficiency Products: List of Measures

Measure	2021 Planned Units	Measure Incentives	Measure Rebates
SSL - specialty	2,400,000	\$2.25	-
SSL - common (A19)	1,200,000	\$1.00	-
Advanced Power Strips (Tier II)	1,000	\$25.00	-
Most Efficient Clothes Washers	3,500	-	\$50
Heat Pump Water Heater ≤ 55 gallons	214	\$100.00	\$650
ES Dehumidifiers	7,500	\$30.00	-
ES Room Air Purifiers (<200 CADR) - Upstream	1,060	\$40.00	-
Techniart - SSL - specialty	6,400	\$2.63	-
ES Room Air Purifiers (>200 CADR) - Upstream	940	\$50.00	-
ES Dryer - Electric Resistance	2,500	-	\$50
Advanced Power Strips (Tier I) - Mid-stream/Upstream	15,000	\$15.00	-
Heat Pump Water Heater > 55 gallons	107	\$100.00	\$650
Most Efficient Dryers- Heat Pumps	350	\$300.00	-
LED In-Storage	1	-	-
Smart Thermostats - Connected (Wi-Fi Enabled)- Midstream	3,750	-	\$70
Smart Thermostats - Learning - Midstream	3,750	-	\$100
ENERGY STAR Windows (sq. ft.)	5,000	-	\$1
Instantaneous Water Heater	300	\$100.00	\$300

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Measure	2021 Planned Units	Measure Incentives	Measure Rebates
ENERGY STAR Variable Speed Pool Pump	2,750	\$100.00	\$350
Heat Pump Pool Heaters	150	-	\$750
Electric Lawn Mowers <4Ah	50	-	\$30
Electric Lawn Mowers > 5Ah	250	-	\$50
Electric Lawn Mowers 4-5 Ah	200	-	\$40
Electric Leaf Blowers	500	-	\$25
Electric Weed Trimmers	500	-	\$25
LED Linear Fixtures	2,000	\$6.00	-

A.2.1.4 Outreach

The EEP program for PSEG Long Island uses 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 the benefits of adopting such products.

Below are literature-based outreach strategies that have been effective for 2020 and new strategies that will be incorporated in 2021-2025:

- Limited-time offer e-blast promotions
- Bill inserts
- Customer segmentation
- Digital display ads
- Social media posts
- Point-of-purchase material at retailers

Below are in-person outreach strategies that are being used and that will continue to be used in 2021-2025:

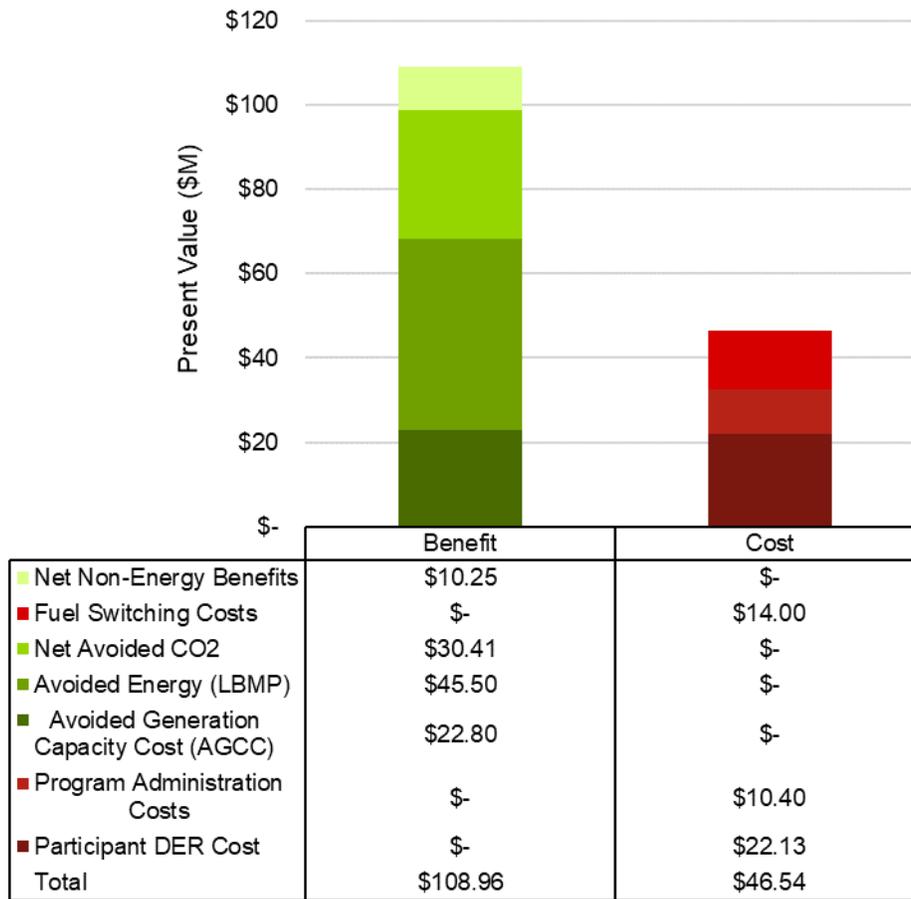
- Corporate lighting fairs
- In-store presentations by the field staff
- One-on-one interactions to provide customer support and guidance
- Community partner outreach events
- Home shows in Nassau and Suffolk counties

The outreach strategies currently employed by the EEP program have proven effective in engaging and educating customers on the benefits of adopting ENERGY STAR and beneficial electrification products. In 2021-2025, the EEP program will continue to use effective outreach strategies and 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 2.34 and RIM benefit-to-cost ratio of 0.19. 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 – Efficient Products



#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
1	Net Non-Energy Benefits	Includes 15% non-energy benefits adder.	\$10.25	
2	Net Avoided CO₂	Reduced greenhouse gas emissions from reduced energy consumption and beneficial electrification.	\$30.41	
3	Avoided Energy (LBMP)	Energy savings based on both on-peak and off-peak periods.	\$45.50	
4	Avoided Generation Capacity Cost (AGCC)	Based on demand savings and marginal capacity cost.	\$22.80	
5	Fuel Switching Costs	Considers costs to participating customers associated with fuel switching.		\$14.00
6	Program Administration Costs	Includes evaluation, advertising, contractors fee, and labor, general and administrative (G&A), and consulting fees.		\$10.40

#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
7	Participant DER Cost	Includes cost of incremental equipment and installation.		\$22.13
Total Benefits			\$108.96	
Total Costs				\$46.54
SCT Ratio			2.34	

NPV = Net present value

LBMP = Location-based marginal pricing

A.2.2 Residential Appliance Recycling

The Appliance Recycling program will continue in 2021-2025. The goal of the program is to promote the removal and retirement of older inefficient appliances that are still working and in use. The program provides vouchers to residential and commercial customers upon the removal and proper disposal of inefficient refrigerators, freezers, room air conditioners, and dehumidifiers from the electric system.

A.2.2.1 Program Delivery

On behalf of PSEG Long Island, TRC uses an implementation contractor that demonstrates a record of providing the services offered and responsibly disposing of the appliances. The contractor is responsible to perform, or subcontract for, all the services. The implementation contractor for recycling is responsible for:

- Scheduling pickups from customer homes or businesses, verification of appliance qualification, and appliance removal from customer homes or businesses
- Rebate processing
- Program tracking
- Providing voucher to customer via email/mail
- Periodically reporting progress toward program goals and identifying opportunities for improvement

The implementation contractor works with the program manager 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-8 lists the measures offered in the Residential Appliance Recycling program.

Table A-8. Residential Appliance Recycling: List of Measures

Measure	2021 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

Program requirements to recycle a refrigerator or freezer:

- Customer must have a valid PSEG Long Island account number and own the appliance.
- Appliance must be picked up at the service location associated with the customer account number.
- Refrigerator must be between 10 and 30 cubic feet in size, plugged in, and operating (cooling) at the time of the scheduled pick-up.
- Appliance must have been manufactured prior to 2010.
- Sub-zero models are not eligible for this program.
- Limit of two refrigerators/freezers per calendar year, per account number and service location.

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. Vouchers are for use at the PSEG Long Island Online Energy Efficient Products Catalog.

A.2.2.4 Outreach

ARCA, the implementation contractor, developed palm cards that contain program details for TRC to distribute to customers. The palm cards are distributed 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

The goal of the Residential Home Comfort HVAC program is to support residential customers through the adoption of energy efficient heat pump technology. Heat pumps provide clean renewable heating and cooling, while reducing reliance on fossil-fuels. The Home Comfort team and Home Comfort Partners work with customers to influence high efficiency choices when it comes to purchasing and installing ENERGY STAR ducted split air-source heat pumps, ductless mini split air-source heat pumps, and packaged terminal heat pumps.

The Home Comfort program collaborates with partners, distributors, and manufacturers to ensure that all customers who encounter the program are educated on the different efficient systems available and have the support needed to make effective purchase decisions.

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Heat pump systems are anticipated to provide clean heating and cooling in a customer's home for 10-25 years. Because of this, affecting the decision-making process upfront is critical in achieving PSEG Long Island's efficiency goals.

In the spring of 2019, PSEG Long Island rebranded the Cool Homes program to the Home Comfort program. The rebranding provided a new focus and market push on air-source heat pumps. To kick off the rebrand, the Home Comfort team launched an air-source heat pump pilot program targeting electric resistance heating communities. Enhanced rebates were offered for this pilot at \$800/ton for the replacement of existing heating and \$1,000 for new construction. The pilot boasted such great installation and engagement results, that in November 2019 the Home Comfort program began offering whole-house solutions rebates. Rebates were available for new construction, existing oil systems with no CAC present, and all other scenarios. Integrated controls were also included and rebated at \$500 per project. Partial house rebates were also available for customers who preferred to keep their fossil-fuel heating as a secondary heating source.

In total, about \$6.1 million in rebates and incentives will be distributed to customers to air-source heat pumps in 2020. The promotion of air-source heat pumps will continue in 2021-2025 with a goal of adding 30,000 heat pumps by 2025.

A.2.3.1 Notable Changes

In 2020, to promote a central pathway for heat pump and weatherization projects, the Home Comfort application expanded to include the Home Performance with ENERGY STAR measures in the same application. Low-Income Enhanced rebates and loans provided by EFS were also available for both Heat Pumps and Weatherization measures. The Home Comfort program does not intend to change this offering during the 2021-2025 program years.

Integrated controls were heavily promoted in 2020. The controls will continue to be necessary, to ensure any supplemental fossil fuel heating is not operating as the primary heating. Freeze stats will also be offered as an alternative to the integrated controls.

In 2021-2025, to continue the support of New Efficiency: New York goals, the Home Comfort program will remain in alignment with NYSERDA to increase heat pump installations. It is expected that rebate values, contractor incentives, and participation guidelines will be evaluated annually to ensure offerings are in line with market conditions. 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 a company that finances key home improvements using the money homeowners currently waste on energy. In addition, customers will have options for zero percent interest on-bill financing through PSEG Long Island for heat pumps (see Section 2.5.3 of this document).

The partnership will allow PSEG Long Island single-family residential customers to pay for energy-saving heat pumps and home improvements with the value of their expected energy savings. Leveraging capital provided by the partner and or other institutions (including the New York Green Bank), the partner would invest in home improvements that save energy, and customers would pay the partner back based on the actual energy they save. If customers don't save energy, the partner would not get paid back.

A partnership along these lines will be a market-based relationship and will not require any dedicated program budget from PSEG Long Island. The partner's business model is based on customer savings being realized over time. The partner provides all the necessary capital for customer acquisition, operations, and project finance.

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In addition to financing, the partner will provide upfront education and engagement on comfort and other non-energy customer pain points and provide customers with a proposal 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. Qualified customers will also receive the opportunity to use the partner's financing program and pay for some or all of their project with their energy savings.

A.2.3.2 Program Delivery

Home Comfort program participation is primarily driven through partnerships with installation contractors, or Home Comfort partners. Engaging the installation contractors to deliver the program has improved program performance and market impacts by ensuring the quality installation verification (QIV) of HVAC equipment. Home Comfort partners are trained and vetted by the program implementation team and are designated Home Comfort partners upon successful completion of the Home Comfort team's review. Because of the positive impacts, the relationship management of the Home Comfort partners is an integral part of the program. Members of the Home Comfort team are available to the Home Comfort partners as needed. TRC also holds weekly contractor meetings to assist the contractors with all aspects of program participation and promote two-way communication between the program and the contractors.

The Home Comfort program also provides Home Comfort partners with incentives to offset costs associated with equipment testing and other installation requests, as 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 2021-2025, all whole-house heat pump projects will require QIV installation.

Although geothermal systems are heat pumps, geothermal projects will continue to be offered on the standalone geothermal application. The geothermal application accommodates both commercial and residential geothermal installations and associated rebates. Rebate levels and contractor incentives are the same for both project types; however, measure savings will vary by applying appropriate attributes for commercial and residential customers. To ensure proper project processing, as savings are different for residential and commercial installations, the applicant who fills out the application will select either commercial or residential for the Customer Type field. The customer type is validated by rate code and site inspection

A.2.3.3 Target Market

The program is offered to all residential customers in the PSEG Long Island service territory.

A.2.3.4 Measures and Incentives

The list of measures that are offered in the Residential Home Comfort program are included in the table below.

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Table A-9. Residential Home Comfort Program: List of Measures

Measure	2021 Planned Units	Measure Incentives	Measure Rebates
Smart Thermostats (Connected WI-FI enabled) - CAC	60	-	\$70
Smart Thermostats - Learning - ASHP	65	-	\$100
Smart Thermostats (Connected WI-FI enabled) - ASHP	65	-	\$70
Integrated Controls	1,194	-	\$500
Integrated Controls - LMI	180	-	\$750
Smart Thermostats - Learning - CAC	60	-	\$100
ASHP (QI) New/EOL ≥ 15 SEER, ≥ 8.5 HSPF	286	\$200	\$750
ASHP (QI) New/EOL ≥ 16 SEER, ≥ 8.5 HSPF	137	\$200	\$813
ASHP (QI) New ≥ 16 SEER, ≥ 8.5 HSPF - Electric Resistance	102	\$500	\$2,000
ASHP (QI) New ≥ 16 SEER, ≥ 8.5 HSPF - Electric Resistance - LMI	15	\$500	\$3,000
ASHP Tune Up	300	-	\$50
ccASHP (QI) New > 17 SEER, ≥ 10 HSPF - NC Whole House	172	\$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	511	\$500	\$1,980
ccASHP (QI) New > 17 SEER, ≥ 10 HSPF - Whole House All Others - LMI	77	\$500	\$2,970
ccASHP (QI) New > 17 SEER, ≥ 10 HSPF - Whole House Existing Oil w/No CAC	511	\$500	\$2,320
ccASHP (QI) New > 17 SEER, ≥ 10 HSPF - Whole House Existing Oil w/No CAC - LMI	77	\$500	\$3,480
ccASHP (QI) New ≥ 17 SEER, ≥ 10 HSPF - Electric Resistance	102	\$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	107	\$250	\$875
ccDuctless Minisplit HP New/EOL > 18 SEER, ≥ 10 HSPF	428	\$250	\$540
Ductless Minisplit HP New/EOL ≥ 18 SEER, ≥ 8.5 HSPF	856	\$200	\$450
GSHP EER ≥ 25 EER	133	\$200	\$6,000
GSHP EER 19 to < 25 EER	67	\$200	\$3,000
PTHP-Packaged Terminal Heat Pump ≥ 11.4 EER, 3.3 COP	204	-	\$100
CAC Tune Up	700	-	\$40

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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

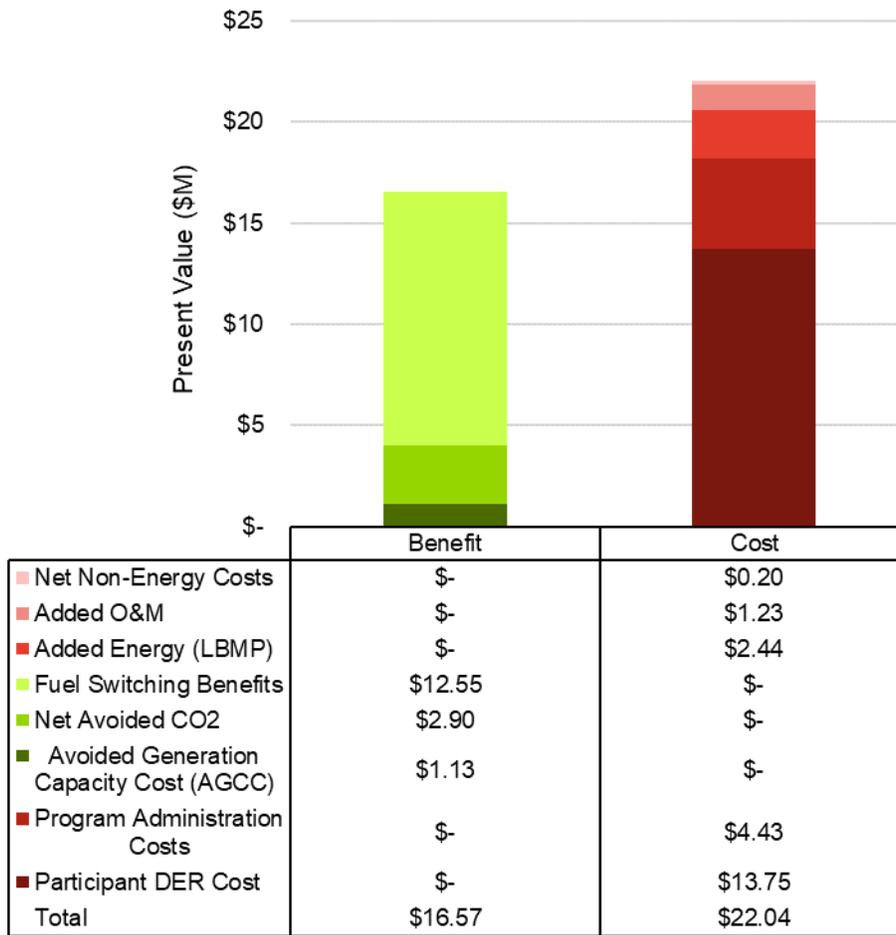
In 2021-2025, the Home Comfort team will continue to implement the above listed outreach strategies and work with participating contractors on tools to promote the installation of heat pump technology. In addition, the Home Comfort team will develop more educational material to provide contractors and customers a better understanding of the heat pump technology and the beneficial electrification components.

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.

A.2.3.6 Business Case

The Home Comfort program has a SCT benefit-to-cost ratio of 0.75 and RIM benefit-to-cost ratio of 1.27. 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 – Home Comfort



#	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.	\$12.55	
2	Net Avoided CO₂	Reduced greenhouse gas emissions from reduced energy consumption and beneficial electrification.	\$2.90	
3	Avoided Generation Capacity Cost (AGCC)	Based on demand savings and marginal capacity cost.	\$1.13	
4	Net Non-Energy Costs	Includes 15% non-energy adder.		\$0.20
5	Added O&M	Includes incentives paid to contractors.		\$1.23
6	Added Energy (LBMP)	Costs associated with increase in energy consumption		\$2.44
7	Program Administration Costs	Includes evaluation costs, advertising, contractors fee, incentives, and labor, G&A, and consulting fees.		\$4.43

#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
8	Participant DER Cost	Includes cost of incremental equipment and installation.		\$13.75
Total Benefits			\$16.57	
Total Costs				\$22.04
SCT Ratio			0.75	

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 for income-eligible customers and intended to save energy, provide education, and help participants reduce electric bills. Participation in REAP can also make a customer's home healthier and safer. This program encourages whole-house improvements to existing homes by promoting home energy surveys and comprehensive home assessment services. This process identifies potential efficiency improvements at no cost to the customer. The program goals include:

- 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

Similar to changes noted in the Efficient Products Program, REAP has included a significant reduction in savings due to expected Energy Independence and Security Act (EISA) impacts. Planning for 2021, and through 2025, anticipates a significantly lower number of LED bulbs replacing existing incandescent or halogen bulbs. Savings durations are also planned for much shorter periods of time due to the anticipation that upon existing bulb failure standard A19 LED bulbs would be the only choice the consumer has.

A.2.4.2 Program Delivery

PSEG Long Island and TRC will engage a third-party implementation contractor to efficiently meet energy saving goals while adhering to the program's budget. The program begins with targeted marketing toward specific homes: high intensity usage, underserved regions or populations, and specific need profiles such as low income. These homes will be offered a free comprehensive home assessment, enticing the customer to act afterward. While in the home, the implementation contractor will explain other products and services that PSEG Long Island has to offer. These additional resources will provide the customer with increased education and awareness on how to better manage their energy usage.

The program will utilize a proprietary technology platform to identify the most inefficient homes in the residential area with a high probability of program qualification. A designated call center will be responsible for scheduling an assessment with the customer. Prior to the appointment, customers receive a notification and other pre-assessment communications to highlight the key characteristics of the home.

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The implementation contractor will:

- Hire local staff to perform home energy surveys and direct measure installation
- Engage customers to schedule home energy survey appointments
- Provide customer service support
- Track program performance, including customer participation as well as quality assurance/quality control (QA/QC)
- Report monthly on progress toward program goals

PSEG Long Island will work with the implementation contractor to market the program to residential customers applying the following approaches:

- Utilizing bill inserts to raise awareness of the EE program to all PSEG Long Island customers
- Delivering targeted direct mail piece to further inform the customer of program benefits and scheduling information
- Outbound calling and door to door canvassing with the option to schedule an assessment over the phone or on the doorstep
- Emailing relevant information to eligible customers
- Hosting “open houses” at the offices Town Supervisors

To increase referrals and productivity, Program management will coordinate 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 that extensive customer energy education, counseling and involvement are critical to securing the savings of installed measures. The REAP program works with partners to identify potential actions they would be willing to take to lower their bills, and then secures customer “Action Commitments” to implement these behavioral measures. Examples of these actions include lowering water heater temperature, regularly checking furnace filters, turning off lamps when not in use, and energy saving settings on clothes washers and other appliances.

The partnership concept guides the approach to customer involvement. If customers want to participate in the REAP program, and receive its considerable benefits, they need to agree to become partners, accepting certain responsibilities and doing their part by making and keeping action commitments. This is formalized in a written participation agreement and personal action plan, signed by each participant and a REAP program representative.

The customer education component of the REAP program will help partners better understand their energy use, identify opportunities to reduce energy use, and achieve household energy savings. The energy education component will also seek to maximize the benefits of installed EE measures by helping

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partners understand the measures and how to use them to obtain high levels of EE. Education will focus on:

- 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

Referrals are defined as information (written and/or verbal) provided to the PSEG Long Island customer by the field technicians during the home energy survey that is related to other appropriate EE programs approved by PSEG Long Island. These referrals will benefit the customer by providing additional energy efficient measures or other assistance. Field technicians are trained to understand follow up EE measures related to programs including, but not limited to:

- 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

A REAP Customer Folder is provided to each Partner and includes an Energy Saving Guide with information on additional programs, such as eligibility requirements and contact numbers. The folder also includes PSEG Long Island brochures, including “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 spearheaded by the REAP program manager. This forum enables advocates to get connected to services that can have a positive impact on the lives of low-income family. Energy assistance programs for the clients include:

- 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.

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Appendix A. Energy Efficiency and Demand Response Plan

A.2.4.3 Target Market

The program will be 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-10. 2020/2021 REAP Income Guidelines

Size of Family	Annual Income	Monthly Income
1	\$65,050 or less	\$5,191 or less
2	\$74,350 or less	\$6,195 or less
3	\$83,650 or less	\$6,970 or less
4	\$92,900 or less	\$7,741 or less
5	\$100,350 or less	\$8,362 or less
6	\$107,800 or less	\$8,983 or less
7	\$115,200 or less	\$9,600 or less
8	\$122,650 or less	\$10,220 or less

*For each additional person, add \$7,400 to Annual Income/\$617 to Monthly Income

Customer Qualification

Verification of REAP program income eligibility for each PSEG Long Island customer is initially performed by the TRC's call center during the initial intake call. The customer must provide proof of income documentation prior to the start of the home energy survey. This eligibility shall be based on number of persons living in the home, total household income, and the inclusion of income from alternate sources. The program is open to both homeowners and renters.

The field 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

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- W-2 – Previous Year W-2 or 1040 SSE Form
- WCA – Workman’s Compensation Award Letter
- Other _____

A.2.4.4 Measures and Incentives

Current PSEG Long Island REAP program measures and energy education are as indicated below.

Table A-11. Residential Energy Affordability Partnerships Program: List of Measures

Measure	2021 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	120	-	-
Dehumidifiers 70 Pints/Day	50	-	-
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	600	-	-
8,000 Btu RAC 1 Unit/HH	200	-	-
Pipe Insulation/ln ft	356	-	-
Nightlight	2,000	-	-
LED Bulbs	22,000	-	-

It is estimated that 2,000 REAP visits will be conducted in the 2021 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-12. Core and Major Efficiency Measures Offered through REAP

Typical Core Measures	Major Efficiency Measures
<ul style="list-style-type: none"> • Installation of high-efficiency lighting • Pipe Insulation • High-efficiency showerheads • Faucet Aerators • Reducing electric water heater temperature settings • Thermostatic Shower Valves • Smart Strips 	<ul style="list-style-type: none"> • Replacement of inefficient room air conditioners (RACs), dehumidifiers, room air purifiers • Replacement of inefficient refrigerators

At the completion of a REAP visit follow up work may be identified in which the customer can utilize income eligible enhanced incentives through the 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.

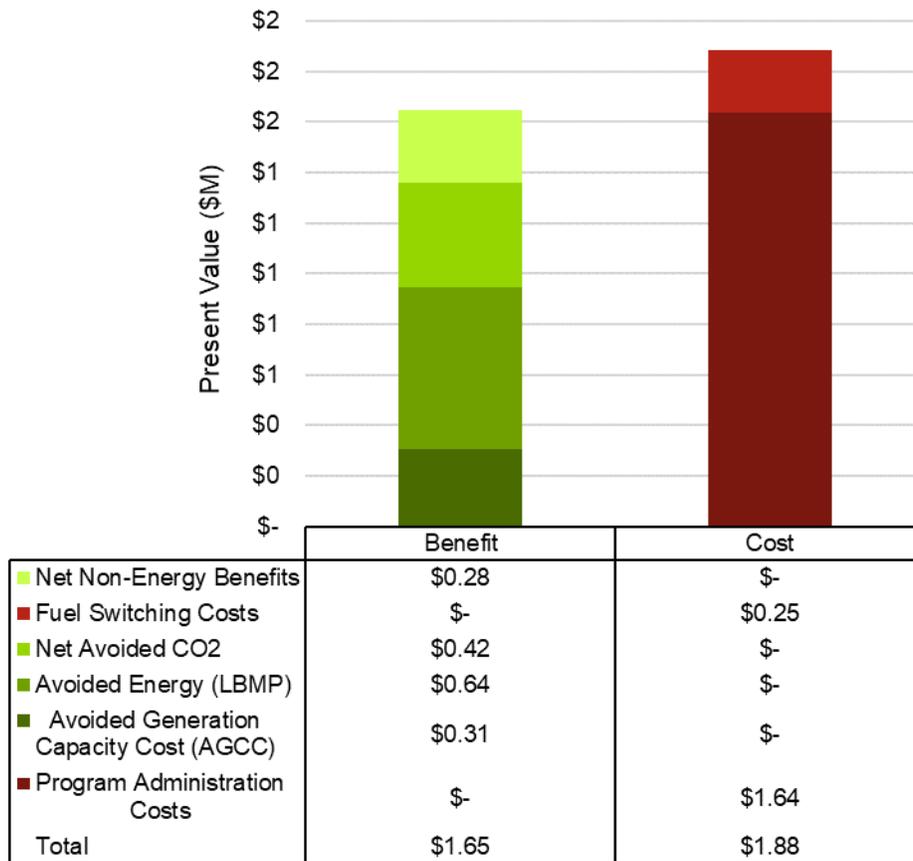
Customers can also reach the REAP program directly through the PSEG Long Island website or through E-blasts that are sent out periodically. Both avenues refer the customer to a REAP mini-application that is sent directly to the REAP team once completed. The E-blast response to the mini-app has resulted 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 2021-2025, 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 0.87 and RIM benefit-to-cost ratio of 0.15. 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 SCT – REAP



#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
1	Net Non-Energy Benefits	Includes 30% non-energy benefits adder.	\$0.28	
2	Net Avoided CO₂	Reduced greenhouse gas emissions from reduced energy consumption and beneficial electrification.	\$0.42	
3	Avoided Energy (LBMP)	Energy savings based on on-peak and off-peak periods.	\$0.64	
4	Avoided Generation Capacity Cost (AGCC)	Based on demand savings and marginal capacity cost.	\$0.31	
5	Fuel Switching Costs	Considers costs to participating customers associated with fuel switching.		\$0.25

#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
6	Program Administration Costs	Includes evaluation costs, advertising, contractors fee, and labor, G&A, and consulting fees.		\$1.64
Total Benefits			\$1.65	
Total Costs				\$1.88
SCT Ratio			0.87	

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 customers in making high efficiency choices when upgrading their home. 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 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 provides support to PSEG Long Island, program contractors, and customers. TRC’s program administration includes program design and management, quality assurance and quality control, technical training and providing contractor support to promote the quality installation of energy efficient measures.

The HPwES Program is intended to help homeowners improve the efficiency, safety, and comfort of their homes using a comprehensive, whole-house approach, while helping to protect the environment. This is achieved by building 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. Newly installed systems will operate in a customer’s home for the next 10 to 25 years, therefore, it is important to reach customers proactively.

Program Leads

1. PSEG Long Island Home Energy Assessments
 - a. PSEG Long Island Home Energy Assessments (HEA) are free energy audits available to any single-family homeowner in PSEG Long Island service territory. The program is administered by TRC. A qualified contractor is selected to conduct a Home Energy Assessment. The selected contractor conducts the assessment and informs the homeowner of the energy savings opportunities offered through PSEG Long Island. In 2020, PSEG Long Island launched its own energy audit data collection tool, used by the HPwES contractors. A PDF of the finished audit is imported to the TRC Captures database. The audit will continue to be used in program years 2021-2025.
 - b. PSEG Long Island HPwES contractors conduct these assessments in order to promote additional efficiency work under the HPwES Program. PSEG Long Island customers can apply for a Home Energy Assessment (HEA) using the online application on the PSEG Long Island website.

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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 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 for the 2021 program year, as well as each program year through 2025

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 tables below.

Table A-13. 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-14. Home Performance with ENERGY STAR: List of Measures

Measure	2021 Planned Units	Measure Incentives	Measure Rebates
DI - Smart Strips – Tier II (100% of projects)	350	-	-
DI - Water Temperature Turndown/HH (50% of projects)	175	-	-
DI - Faucet Aerators/unit (50% of projects)	175	-	-
DI - Low Flow Showerheads/unit (50% of projects)	175	-	-
DI - Thermostatic Valve (50% of projects)	175	-	-
DI - Duct Sealing (80% of projects)	280	-	-
DI - Pipe Insulation/In ft (50% of Projects)	175	-	-
DI - LED Bulbs (100% of projects; 8/HH)	2,800	-	-
DI - Nightlight (80% of projects)	280	-	-
HEA Audit Giveaway (A19 LEDs)	28,000	-	\$5
HEA Audits	7,000	-	-
LMI Projects	750	-	\$2,000
Market Projects	500	-	\$500

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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 free to all residential single-family homeowners in the PSEG Long Island service territory. The Home Energy Assessment (HEA) provides the customer with a comprehensive whole-house energy review including appliances, insulation, domestic hot water, and more. 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 through the Home Performance Partners.

The Home Performance Partner that conducts the HEA leverages the opportunity with the customer to promote the Home Performance with ENERGY STAR (HPwES) Program. The HEA reveals any energy efficient gaps in the home, that can be remedied by HPwES participation.

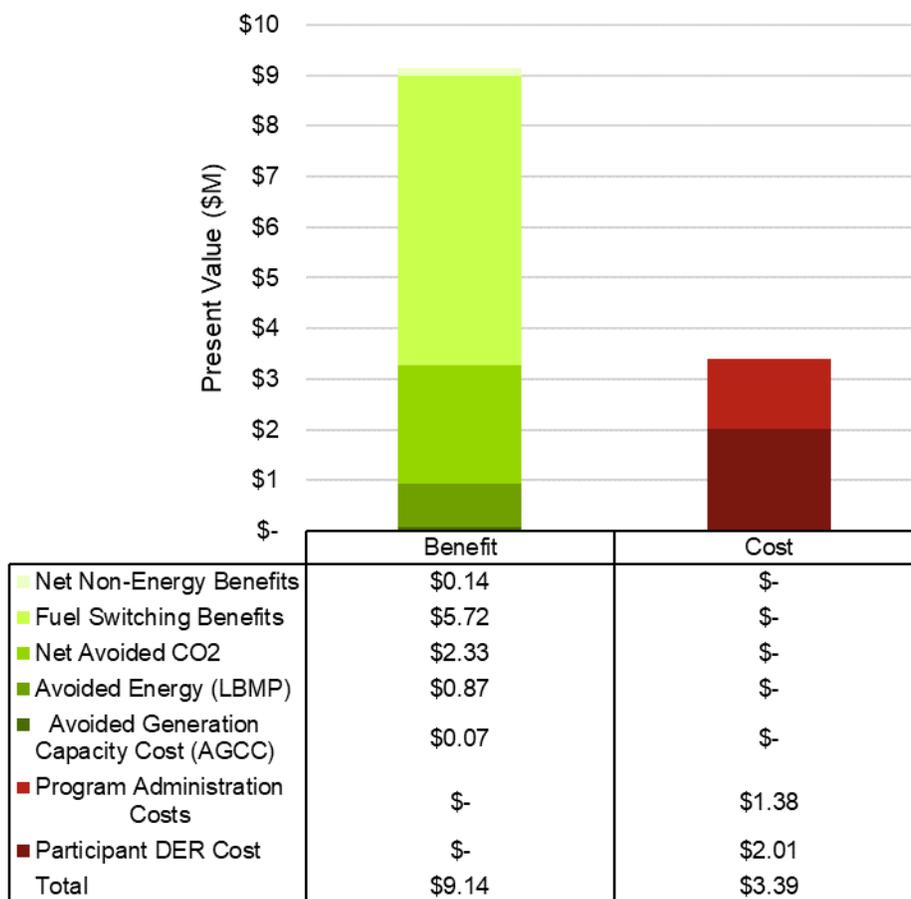
The Home Performance Direct Install Program (HPDI) is promoted through quarterly postcard mailings to single family homes with electric heat rate codes. The Home Performance team has also engaged communities directly, such as communities that have electric heat, and conducted presentations on the Residential Energy Efficiency Programs.

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.

A.2.5.6 Business Case

Home Performance with ENERGY STAR has a SCT benefit-to-cost ratio of 2.69 and RIM benefit-to-cost ratio of 0.08. 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 SCT – HPwES



#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
1	Net Non-Energy Benefits	Includes 15% non-energy benefits adder.	\$0.14	
2	Fuel Switching Benefits	Considers participant fuel cost savings associated with switching from oil, gas, and propane to electricity.	\$5.72	
3	Net Avoided CO2	Reduced greenhouse gas emissions from reduced energy consumption and beneficial electrification.	\$2.33	
4	Avoided Energy (LBMP)	Energy savings based on both on-peak and off-peak periods.	\$0.87	
5	Avoided Generation Capacity Cost (AGCC)	Based on demand savings and marginal capacity cost.	\$0.07	
6	Program Administration Costs	Includes evaluation costs, advertising, contractors fee, and labor, G&A, and consulting fees.		\$1.38

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#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
7	Participant DER Cost	Includes cost of incremental equipment and installation.		\$2.01
Total Benefits			\$9.14	
Total Costs				\$3.39
SCT Ratio			2.69	

NPV = Net present value

LBMP = Location-based marginal pricing

A.2.6 Commercial Efficiency Program

PSEG Long Island's Commercial Efficiency Program (CEP) is intended to assist nonresidential customers in saving energy by offering a number of rebates and incentives for the installation of energy conservation measures. In addition to rebates for energy savings measures, Technical Assistance rebates are available under the CEP to offset the cost of engineering and design services for qualifying projects.

To ensure an approach to market that is consistent with the CEP objectives for demand savings and proper lighting design, CEP continues to implement the Prime Efficiency Partner Program. All certified Prime Efficiency Partners have undergone program training and testing to ensure that they are familiar with the CEP guidelines and may be recommended by the program to end users. All certified Prime Efficiency Partners must apply for recertification each year. In addition, only Prime Efficiency Partners may participate in the Fast Track program component.

In 2021, and through program year 2025, PSEG Long Island's Commercial Efficiency Programs 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
 - Cool Roof
 - Variable Frequency Drives
 - Compressed Air
- Refrigeration
- Custom and Custom Retrofit
 - Data Collection forms for Chillers and Data Centers
- Multi-Family
- Beneficial Electrification
 - Non-Road Electric Vehicles
 - Pool Equipment
 - Lawn Care Equipment

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- Technical Assistance (TA) Program:
 - LEED Certification and Points
 - ENERGY STAR Labeled Buildings
 - Energy Engineering Study
 - Whole Building (Energy Modeling)

A.2.6.1 Notable Changes

In 2020, 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 performance-based lighting approach will continue to be offered for 2021-2025.

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 Energy Efficiency Programs with New York State's greenhouse gas reduction goals. Adjusting the metric paved the way for an adjustment in rebate offerings for existing fuel-switching measures, such as air-source heat pumps and variable frequency drives, and the introduction for more fuel switching measures. A prescriptive Beneficial Electrification program was launched to target those necessary MMBtu savings. Equipment offered under this program component includes non-road electric vehicles (golf carts and forklifts), pool heaters and solar covers, kitchen equipment, and lawn care equipment.

In mid to late 2020, a standalone multifamily application will be launched. This offering will target New Construction developments and evolve in 2021 to include a LMI component and existing building scenarios. The application includes rebates for in-unit appliances, in-unit heat pumps, common area lighting, and common area heating and cooling.

In 2021-2025, the CEP will continue to incorporate measures and programs that support the MMBtu savings goal.

A.2.6.2 Program Delivery

The CEP participation is driven through partnerships with installation contractors, or Lead Partners, though customers may apply directly without an installation contractor. Engaging the implementation contractors to deliver the program has improved program performance and market impacts. As such, Lead Partner relationship management is an integral part of the program. The program recognizes, and promotes, the importance of open communication between the contractors and the program. TRC holds weekly contractor meetings to ensure that contractors have the assistance they need when participating in the program.

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, TRC was invited back to AESP to speak at the Summer Conference. The TRC speakers discussed the strategic innovation behind the design and implementation of the Fast Track Program and the Prime Efficiency Partner Program (see below). Both programs work cohesively to drive customer engagement, satisfaction, and participation through collaborating with program participants and prioritizing their needs.

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

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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.

The introduction of the Prime Efficiency Partner network in 2017 has enabled the program to touch more small business customers and has led to an increase in project submittals. 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. Weekly trainings are conducted for those contractors wishing to achieve the Prime Efficiency Partner designation. Prime Efficiency Partners are subject to Quality Control Evaluation procedures as necessary, in an effort to ensure continued quality installations for commercial customers.

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. TC, 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 2017, 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 program team 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.

A.2.6.3 Target Market

All nonresidential customers in the PSEG Long Island service territory.

A.2.6.4 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 inputs: \$/kW, \$/kWh, Simple Payback, and Incremental cost, with overall \$/kWh and percentage of cost caps. Savings is determined through custom analyses and input to the Project Screening Tool. 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.2.6.5 Outreach

The CEP team continues to focus on engaging and educating the small and medium business customers through assessments. The assessment procedure has been modified from years prior to better meet the needs of the customers. When a customer requests an assessment, the Energy Consultant (EC) will arrange a meeting with the customer and discuss all the programs available to that customer. If the customer is looking for quick and easy tips on how to save energy, the EC or INS will leave the customer a checklist complete with energy saving tips to implement that covers the four basic measures found in a typical small business (Lighting, HVAC, Compressed Air, and Refrigeration). Customers who want a detailed energy usage report will receive a benchmark/level 1 audit of the facility. The EC or INS will utilize the ASHRAE Building Energy Quotient (bEQ) tool to complete the audit. The ASHRAE bEQ tool will provide all the information needed to submit an ENERGY STAR benchmark, as well as take inventory of all the measures and energy usage. If a large business customer requests an assessment, the EC will meet with the customer and review all of the available programs. After the initial meeting, if the customer would like an audit or to have their building(s) benchmarked, the EC will recommend Technical Assistant

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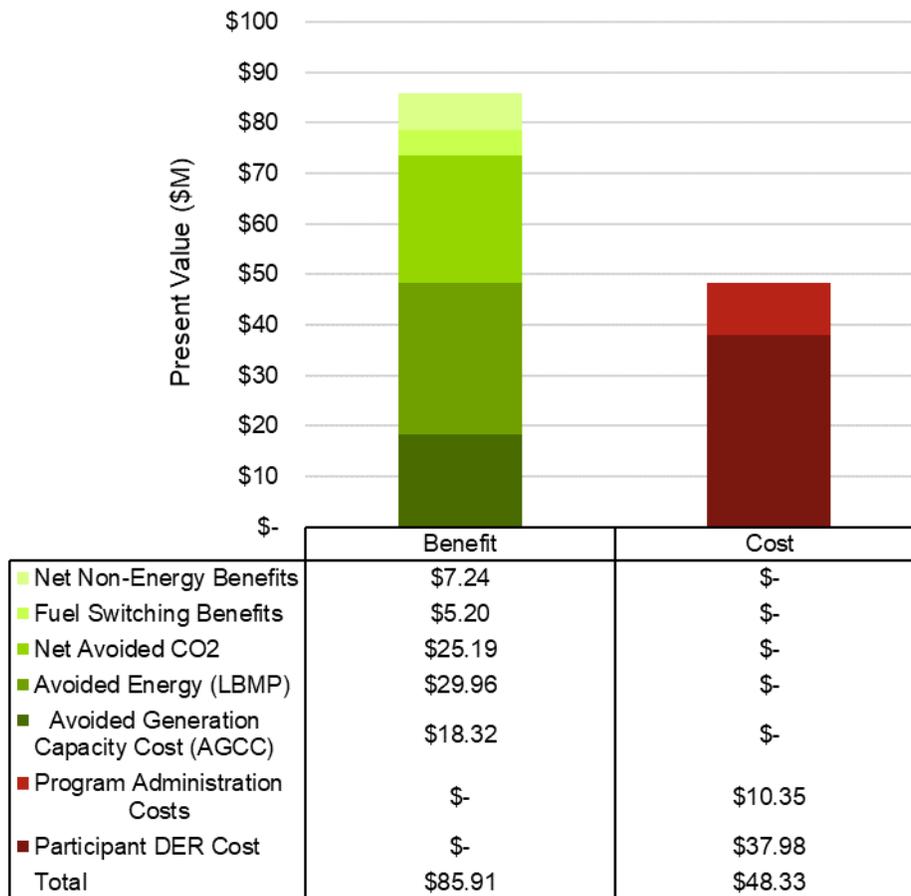
(TA) partners who can provide the service and then work with the customer to submit a project and receive rebates Technical Assistance Program.

The team also participates in Community Partnership Program (CPP) events to promote the different programs and interact with customers.

A.2.6.6 Business Case

The Commercial programs have a SCT benefit-to-cost ratio of 1.78 and RIM benefit-to-cost ratio of 0.21. 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



#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
1	Net Non-Energy Benefits	Includes 15% non-energy benefits adder.	\$7.24	
2	Fuel Switching Benefits	Considers participant fuel cost savings associated with switching from oil, gas, and propane to electricity.	\$5.20	
3	Net Avoided CO₂	Reduced GHG emissions from reduced energy consumption.	\$25.19	

#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
4	Avoided Energy (LBMP)	Energy savings based upon both on-peak and off-peak periods.	\$29.96	
5	Avoided Generation Capacity Cost (AGCC)	Based upon demand savings and marginal capacity cost.	\$18.32	
6	Program Administration Costs	Includes costs of evaluation, advertising, contractors fee, and labor, G&A and consulting.		\$10.35
7	Participant DER Cost	Includes cost of incremental equipment and installation.		\$37.98
Total Benefits			\$85.91	
Total Costs				\$48.33
SCT Ratio			1.78	

NPV = Net present value

LBMP = Location-based marginal pricing

A.2.7 Pay for Performance

PSEG Long Island is collaborating with NYSERDA, energy efficiency 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 energy efficiency 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 E programs that use measure-specific (e.g. light bulbs, appliances, etc.) rebates and incentives, this initiative will compensate service providers over a three-year period beginning in 2021 for measured energy efficiency that accrues from portfolios of residential and commercial customers that undergo EE upgrades and operational improvements. This flexible approach to investing in energy efficiency 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 energy efficiency.

A.2.7.1 Notable Changes

NYSERDA is currently in the process of launching pay for performance pilots with Consolidated Edison and National Grid. In the latter part of 2020, PSEG Long Island will leverage those learnings by partnering with NYSERDA to issue a RFP to competitively select one or more service providers. These service providers, known as Portfolio Managers, will engage with customers to implement energy efficiency solutions. After competitively selecting the winning Portfolio Manager(s), which will be awarded a 5-year contract with PSEG Long Island, comprising of a nearly two year Implementation Period 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 savings.

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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.2.7.2 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 is expected 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 2021 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 2021, 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 \$161,130 and then 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-15 below. 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 below are not directly comparable with the costs of PSEG Long Island's more mature EEDR programs.

Table A-15. PSEG Long Island Pay for Performance Pilot Program

Year	Number of Customers Enrolled	Annual Costs	Cost per Customer
2021	340	\$161,130	\$474
2022	595	\$206,602	\$347
2023	595	\$203,627	\$342
2024	255	\$144,697	\$567
Total	595	\$716,057	\$1,203

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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 three-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.

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 energy efficiency across a broader range of PSEG Long Island customers.

A.2.8 Dynamic Load Management Programs

LIPA introduced three Dynamic Load Management 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 transmission and distribution system needs. The program is effective during the capability period, which is May 1 – September 30th.

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 upon 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 upon whether the Commercial System Relief Program or Distribution Load Relief Program is initiated.

A.2.8.1 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.

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A.2.8.2 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 that purchase and install smart thermostats \$85. 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 transmission and distribution system. The goal of the program is to have the market provide such solutions and for PSEG Long Island to spend less on transmission and distribution 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 on-site 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 (CBL) 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.

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Customers and aggregators may participate by reducing or deferring load, or utilizing dispatchable on-site 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 CBL methodology, which requires detailed usage information made available on a timely basis.

A.2.8.3 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 chart below shows the enrollment activity as of January 1, 2020.

Table A-16. DLM Tariff Customer Enrollment as of January 1, 2020

Program	2019 Cumulative Customers	2019 Cumulative MW Reduction	Curtailment Events (cumulative)
Smart Savers Program	23,192	23.2	3
CSRP	215	22	22
DLRP	215	22	55

Customers currently enrolled in both the CSRP and DLRP are duplicative and are enrolled in both programs simultaneously.

Table A-17. DLM Tariff Customer Enrollment 5 Year Forecast

	2021	2022	2023	2024	2025
DLC MW Enrolled	36.6	44.1	51.6	59.1	66.7
CSRP MW Enrolled	29.6	34.1	39.2	45.1	51.8
DLRP MW Enrolled	29.6	34.1	39.2	45.1	51.8
Total MW Enrolled	66.2	78.2	90.8	104.2	118.5
DLC Customer Payment	\$1,365,050	\$1,552,550	\$1,740,050	\$1,927,550	\$2,115,050
CSRP Customer Payment	\$859,096	\$987,960	\$1,136,154	\$1,306,578	\$1,502,564
DLRP Customer Payment	\$562,856	\$647,284	\$744,377	\$856,034	\$984,439
Total Customer Payment	\$2,787,002	\$3,187,795	\$3,620,582	\$4,090,161	\$4,602,053

*All Customer Payments are collected through the Power Supply Charge and therefore do not impact the operating budget.

A.2.9 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 greenhouse gas levels and a 185 TBtu increase in statewide energy efficiency by 2030.

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Appendix A. Energy Efficiency and Demand Response Plan

A.2.9.1 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 energy efficiency 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 greenhouse gases
- 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.

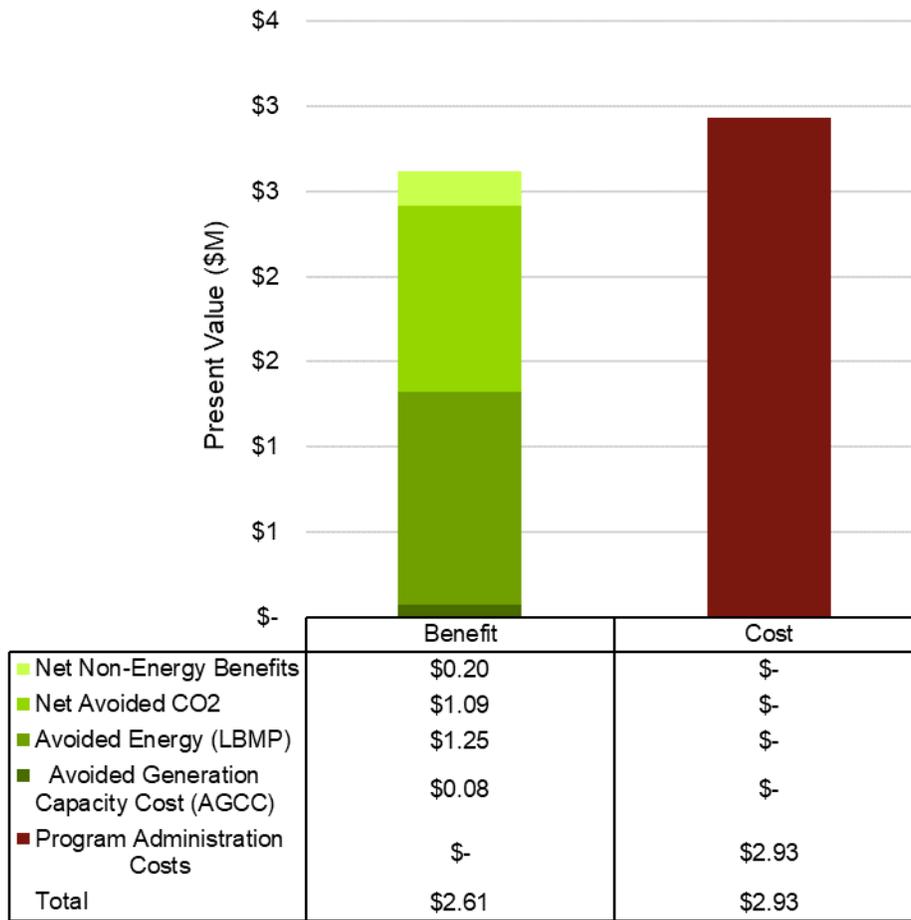
A.2.9.2 Notable Changes

In recent years, PSEG Long Island has expanded the Home Energy Report treatment group to over 500,000 residential customers. PSEG Long Island expects to enhance the HEM Program in early 2021 to include an integrated Enhanced Marketplace offering where customers will have the ability to purchase equipment and potential services through a holistic customer engagement platform. For more information on the Enhanced Marketplace, see Section 3.1.2 of this document.

A.2.9.3 Business Case

HEM has a SCT benefit-to-cost ratio of 0.89 and RIM benefit-to-cost ratio of 0.12. A list of the value streams considered in the BCA is detailed in Figure A-8.

Figure A-8. Present Value Benefits and Costs of SCT – HEM



#	Value Stream	Calculation Methodology	Benefits (NPV, \$M)	Costs (NPV, \$M)
1	Net Non-Energy Benefits	Includes 15% non-energy benefits adder.	\$0.20	
2	Net Avoided CO₂	Reduced greenhouse gas emissions from reduced energy consumption.	\$1.09	
3	Avoided Energy (LBMP)	Energy savings based on both on-peak and off-peak periods.	\$1.25	
4	Avoided Generation Capacity Cost (AGCC)	Based on demand savings and marginal capacity cost.	\$0.08	
5	Program Administration Costs	Includes evaluation costs, customer services, and labor, G&A, and consulting fees.		\$2.93
Total Benefits			\$2.61	
Total Costs				\$2.93
SCT Ratio			0.89	

NPV = Net present value

LBMP = Location-based marginal pricing

Appendix B. 2019 Progress Update and Funding Reconciliation

In accordance with reporting requirements requested by DPS in their recommendation letter Utility 2.0 Plan, PSEG Long Island has prepared this report of project status, performance reporting, and funding reconciliation for projects approved in the 2018 Utility 2.0 Plan. PSEG Long Island expects that performance and budget spend will fluctuate year-to-year through the duration of this four-year program. However, unless otherwise noted in this report, PSEG Long Island plans to deliver the program approved in 2018 within the overall approved funding as well as project-specific plans.⁴⁶

This report provides an accounting for 2019, the first full year of program implementation. This reporting approach is consistent with the timing of the approval and launch of initiatives. Following the approval of a set of proposed initiatives in the annual Utility 2.0 Plan (2018), PSEG Long Island uses the first year of implementation (2019) to develop reporting requirements and to allow time for operational change to commence, producing measurable benefits. From the second year after the approval (2020) and onwards, PSEG Long Island provides tracking of actual progress and spend against the original estimate. This concept is illustrated in Figure B-1.

Figure B-1. Reporting Approach for Utility 2.0 Initiatives by Year

	2018	2019	2020	2021	2022
Initiatives Proposed in 2018 Utility 2.0					
Initiatives Proposed in 2019 Utility 2.0					
Initiatives Proposed in 2020 Utility 2.0					
Initiatives Proposed in 2021 Utility 2.0					
Initiatives Proposed in 2022 Utility 2.0					

	Propose initiatives with investment justification
	Develop reporting requirements (no annual BCA outcomes reporting)
	Annual reporting against initial estimate

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 provides a reporting of key program metrics, as well as qualitative information such as goals and achievements as well as challenges and lessons learned.

B.1 Summary of 2019 Performance

AMI and its enabled capabilities were the cornerstone of the 2018 Utility 2.0 Plan, forecasting \$498 million in expected benefits over 20 years versus \$315 million in proposed costs over four years (per the AMI BCA presented in the 2018 Utility 2.0 Plan). Remote meter reading and remote metering services, including connect/disconnect, enhanced outage management, and revenue protection, were projected to be the biggest sources of AMI benefits, and in 2019, PSEG Long Island began to accrue benefits in these program areas, as shown in Table B-1 and described herein, and realized benefits are directly proportional to the level of AMI deployment and the functional maturity of AMI-enabled capabilities.

⁴⁶ Budgets may be shifted between projects, years or between capital and O&M.

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Appendix B. 2019 Progress Update and Funding Reconciliation

For example, while the original AMI BCA assumed a straight-line maturity curve for all capabilities, program schedules and performance have and will fluctuate from this assumption, and certain initiatives became operational quickly, whereas others took the full first year to implement. For example, benefits realized in 2019 from meter deployment exceeded projections because the meters were installed ahead of plan. On the other hand, AMI-OMS integration took the better part of 2019 to develop and implement, carrying outage management benefits to later than plan. Since it will take time for AMI-enabled capabilities to fully mature and become ingrained in daily business processes, PSEG Long Island does not expect to realize optimal benefits until later years.

The 2018 Utility 2.0 Plan also proposed innovative customer offerings including targeted energy efficiency under the Super Savers program, an EV program, and a behind-the-meter (BTM) storage program in support of NY 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 attempts to meet its goals and deliver value to customers. For the EV program, electric vehicle sales have been significantly lower than projected in 2019; 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. While the BTM storage program has been successful in increasing installations, the timing of the tariff inhibited benefits that could be realized for 2019.

Further, the 2018 Utility 2.0 Plan proposed several initiatives to support PSEG Long Islands evolution to becoming a DSP. These programs, like Locational Value Study and IOAP, were not linked to direct benefits in the 2018 Utility 2.0 Plan BCAs, though they enable other Utility 2.0 programs. As such, they are not included in Table B-1.

Additionally, some programs, such as Rate Modernization and Utility-Scale Storage, implemented, per their project schedules and updates, and benefits will be reported as they materialize in future years.

Table B-1. Utility 2.0 Projected and Realized Program Benefits

Pathway	Initiative	Benefit Category	Projected 2019 (\$M)	Realized 2019 (\$M)	Variance (\$M) ⁴⁷
Empower Customers through AMI and Data Analytics	AMI Core: Meter Reading and Meter Service	Avoided O&M Costs	2.88	3.68	0.80
		Avoided CO ₂ e Emissions	0.005	0.003	(0.002)
	Revenue Protection	Added Revenue from Move-in/Move-Out	0.02	0.01	(0.01)
		Added Revenue from Theft/Tamper Detection	0.89	0.48	(0.42)
		Added Revenue from Meter Accuracy	0.75	1.16	0.42
	Outage Management	Avoided O&M Costs	0.63	0.06	(0.57)
		Avoided Customer Outage Costs	0.81	-	(0.81)
	Rate Modernization	Avoided Fuel & Purchased Power (FP&P) Costs	None projected for 2019		-
		Avoided Capital Costs (Non-Labor)	None projected for 2019		-
		Avoided CO ₂ e Emissions	None projected for 2019		-
Explore New Innovative Offerings	Super Savers (North Bellmore)	Avoided FP&P Costs	0.28	0.14	(0.14)
		Avoided Capital Costs (Non-Labor)	0.07	0.03	(0.04)
	BTM Storage	Avoided FP&P Costs	0.02	-	(0.02)
		Avoided Capital Costs (Non-Labor)	0.03	-	(0.03)
	EV Program ⁴⁸	Participant Benefit			
		Added Revenue	N/A		N/A
Evolve into the Customer-Centric DSP	Utility-Scale Storage	Avoided FP&P Costs	None projected for 2019		-
		Avoided Capital Costs (Non-Labor)	None projected for 2019		-
Total			6.39	5.56	(0.83)

⁴⁷ Benefits variances calculated as Realized Benefits minus Projected Benefits. As such, projects that over-perform compared to plan are shown as positive values.

B.2 Summary of Funding Reconciliation

The 2018-approved Utility 2.0 projects had a request of \$238.5 million in capital and \$74.1 million in O&M, a total of \$312.6 million, to fund these projects for 2019-2022. After reconciling this plan with 2019 actual spending (Table B-2) and re-forecasted costs for the remainder of the 2019-2022 scope (Table B-3) for each project, PSEG Long Island forecasts that budget deficits and surpluses are expected to largely offset, leading to overall program costs approximately equivalent to the original funding plan.

The low levels of spending for Utility 2.0 initiatives in 2019 reflects in certain cases slower than expected ramp up to launch new initiatives within the first year of a four-year program. Some initiatives also experienced schedule shifts due to procurement, contracting, hiring of new staff, or other reasons described further below in this appendix. Most projects are expected to complete their scope within the four-year timeframe, through 2022, except for:

- **Rate Modernization:** Due to time to secure a contract with the selected vendor, the schedule and forecasted spend will be shifted by one year, with completion expected in 2023.
- **EV Program:** As actual market conditions experienced slower EV adoption than forecasted, the program now plans to use its budget through 2025.

The implementation updates provided in this appendix include a review of each project's spending in 2019 compared to plan, as well as any net increase or decrease in anticipated costs for the 2019-2022 scope of each project.

⁴⁸ The BCA for the EV Program assumed EV adoption above a certain baseline forecast for EV sales. However, actual EV adoption on Long Island in 2019 was below the baseline forecast. Going forward, PSEG Long Island will be reporting the benefits of transportation electrification based on the number of residential smart charging program participants as a proxy for the uplift in EV adoption as influenced by the EV Program. Due to this change, calculated benefits should not be compared with projected benefits in the EV Program BCA filed in the 2018 Utility 2.0 Plan.

Table B-2. Summary of 2019 Funding Reconciliation⁴⁹

Pathway	Initiative	Capital (\$M)			O&M (\$M)			Total Variance
		2019 Budget	2019 Spend	Variance	2019 Budget	2019 Spend	Variance	
Empower Customers through AMI and Data Analytics	AMI Core: Meter Reading and Meter Service ⁵⁰	50.06	50.19	(0.13)	1.02	1.18	(0.16)	(0.28)
	AMI-Enabled Capabilities	5.30	3.52	1.78	0.59	0.26	0.33	2.11
	Program Implementation Support	2.00	1.64	0.36	0.25	-	0.25	0.61
	Customer Engagement	-	-	-	4.24	1.01	3.23	3.23
	Rate Modernization	9.50	1.59	7.91	6.14	0.57	5.57	13.49
	Data Analytics	3.80	2.08	1.72	1.05	0.09	0.96	2.69
Explore New Innovative Offerings	Super Savers	-	-	-	1.99	0.48	1.51	1.51
	BTM Storage	-	-	-	0.10	0.06	0.04	0.04
	EV Program	-	-	-	2.26	0.63	1.64	1.64
Evolve into the Customer-Centric DSP	Utility of the Future/ CVR / JU	0.30	0.26	0.04	0.80	0.16	0.64	0.68
	Locational Value Study	1.00	0.20	0.80	-	-	-	0.80
	NWS Planning Tool	-	-	-	0.50	-	0.50	0.50
	IOAP Phase 1	-	-	-	-	-	-	-
	Grid Storage – Miller Place	-	0.09	(0.09)	0.30	-	0.30	0.21
Total		71.96	59.55	12.41	19.24	4.42	14.82	27.23

⁴⁹ Funding reconciliation variances are calculated as Budget minus Spend. As such, projects that under-spent compared to plan are shown as positive values.

⁵⁰ Core AMI: Meter Reading and Meter Services spent \$6.9 million in 2018.

Table B-3. Summary of 2019-2022 Funding Reconciliation

Pathway	Initiative	Capital (\$M)			O&M (\$M)			Total Variance
		2019-2022 Request	Updated Forecast	2019-2022 Variance	2019-2022 Request	Updated Forecast	2019-2022 Variance	
Empower Customers through AMI and Data Analytics	AMI Core: Meter Reading and Meter Service	196.29	194.29	2.30	7.53	9.50	(1.97)	0.33
	AMI-Enabled Capabilities	9.80	13.83	(4.03)	1.65	4.92	(3.27)	(7.30)
	Program Implementation Support	8.00	7.64	0.36	1.00	0.55	0.45	0.81
	Customer Engagement	-	-	-	15.29	8.72	6.57	6.57
	Rate Modernization ⁵¹	9.50	10.06	(0.56)	17.97	16.12	1.85	1.29
	Data Analytics	5.10	5.26	(0.16)	4.70	4.71	(0.01)	(0.17)
Explore New Innovative Offerings	Super Savers	-	-	-	3.48	3.46	0.02	0.02
	BTM Storage	-	-	-	0.20	0.16	0.04	0.04
	EV Program ⁵²	-	-	-	15.15	12.82	2.32	2.32
Evolve into the Customer-Centric DSP	Utility of the Future / CVR / JU	1.60	1.05	0.55	3.66	4.52	(0.86)	(0.31)
	Locational Value Study	1.00	0.50	0.50	-	0.18	(0.18)	0.32
	NWS Planning Tool	-	-	-	0.50	0.20	0.30	0.30
	IOAP Phase 1	2.27	2.27	-	2.25	0.10	2.15	2.15
	Grid Storage – Miller Place	4.91	10.75	(5.83)	0.71	1.04	(0.34)	(6.17)
Total		238.47	245.64	(6.88)	74.09	67.01	7.08	0.20

⁵¹ Due to contracting delays, Rate Modernization costs are projected out through 2023 for marketing and billing engine.

⁵² Due to delays in EV adoption, the EV programs' costs are projected out through 2025 to achieve the original scope.

B.3 AMI Technology, Systems and AMI-Enabled Capabilities

Advanced metering infrastructure (AMI) is the foundational technology that empowers customers by providing them an enhanced customer experience. PSEG Long Island is deploying smart meters across its service territory to maximize these customer benefits and operational savings. Smart meters with AMI offer increased accuracy and enable new capabilities, like remote metering, automated move-in and move-out requests, and remote connect and disconnects. Implementing these capabilities are key components to unlocking the full benefit of AMI.

PSEG Long Island's roadmap calls for a phasing in of AMI-enabled capabilities. The presence of AMI allows added and improved functionality to empower PSEG Long Island customers. The 2019 Utility 2.0 initiatives for customers comprise a suite of information and advisory tools including remote connect switch, revenue protection, outage management, and a Commercial and Industrial (C&I) Portal.

B.3.1 Meter Deployment, Reading, and Services

The installations of AMI meters and associated remote connect functionality, through the remote connect switch (RCS), is needed to enable functionality for customers and PSEG Long Island. The remote functionality of AMI provides operational savings through reduced need to deploy PSEG Long Island's Meter Reading and Meter Services teams—this is termed reduced truck rolls—as well as other AMI-enabled capabilities described here.

B.3.1.1 Scope Update

Scope to install AMI meters and supporting systems remains as originally proposed. Some additional resources have been identified to support this scope.

B.3.1.2 Schedule Update

Meter deployment is progressing ahead of schedule with respect to the targeted total number of installations for 2019. To support this increased activity, capital funding has proactively been accelerated forward from the Program's outer years (described in Table B-6). It is expected that PSEG Long Island will continue to install smart meters ahead of schedule, with the majority of installations currently projected to be complete in mid-2022, approximately 6 months ahead of the original deployment plan.

B.3.1.3 Performance Reporting

The business case for AMI was based on meters being deployed at the forecasted rate and cost, allowing for reductions in operating costs associated with meter reading and reduced meter services costs originating from the implementation of remote connect switch. Key performance indicators (KPIs) for meter deployment, including Meter Reading and Meter Services, are summarized in Table B-4.

Benefits of Remote Connect Capability

PSEG Long Island enabled remote connect capability for AMI meters in October 2019. In the last two months of the year alone, PSEG Long Island saved truck rolls for change name, special reads, and move-in and move-out requests. Without AMI, these requests would take up to several days to process, whereas AMI customers enjoy near instantaneous service.

Table B-4. Performance KPIs: Meter Deployment

Metric	Target 2019	Realized 2019	Variance ⁵³
Meters Installed – Residential	210,000	279,870	69,870
Meters Installed - Commercial	20,000	25,332	5,332
Opt-Out Rate at Year-End	0.59%	0.57%	(0.02%) ⁵⁴
FTE Reduction – Annual Equivalent	9	17	8
Vehicle Reduction – Annual Equivalent	8	11	3

Overall, meter deployment has yielded benefits above what was projected for 2019 in the business case, as shown in Table B-5. With the increasing use of remote meter reading and remote connect/disconnect services, PSEG Long Island was able to reduce its metering workforce by 31 personnel by the end of 2019, exceeding the business case goal. These employees were reassigned or left the company under natural attrition. Based on timing of the changes, this equates to an average of 17 full-time equivalent (FTEs) staff over the year; in future years, assuming no other changes, PSEG Long Island will realize the full benefit of the 31 FTE reduction. The personnel reductions saved \$3,509,000 in operations and maintenance (O&M) costs for PSEG Long Island in 2019, against a projected \$2,755,000 in savings in O&M for the same year. PSEG Long Island correspondingly reduced its metering fleet by 16 vehicles in 2019 (due to timing of these reductions, it equates to the full annual use of 11 vehicles), saving \$166,000 in O&M costs against the projected 2019 benefit of \$123,400. This reduction in metering routes and fleet saved an estimated 48 tons of carbon dioxide equivalents (CO₂e).

Table B-5. Benefit Reporting: Meter Deployment

Benefit Category	Projected 2019 (\$M)	Realized 2019 (\$M)	Variance
Avoided O&M Costs	2.88	3.68	0.80
Avoided CO ₂ e Emissions	0.005	0.003	0.002
Total	2.88	3.68	0.80

B.3.2 Revenue Protection

AMI meters help reduce lost revenue and write-offs in many ways, such as:

- During the process of AMI installation, PSEG Long Island has been detecting meter tamperers that otherwise may have gone unnoticed;
- PSEG Long Island has implemented an analytical algorithm that scans AMI data to flag potential cases of electricity theft or meter tamper;

⁵³ KPI and Benefit Variance calculated as Realized minus Target. Negative values are represented in parentheses.

⁵⁴ In this case, the negative value indicates that the Realized value is ahead of the Target.

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- PSEG Long Island can prevent unbilled consumption by promptly executing service connect/disconnect orders remotely with most AMI meters; and,
- Because AMI meters record customer usage more accurately than legacy electromechanical meters, PSEG Long Island can prevent lost revenue from meter inaccuracy over time.

B.3.2.1 Scope Update

Scope of activities associated with supporting revenue protection, including RCS integration, has been expanded to include continuous improvement efforts, described in Section B.3.5.

B.3.2.2 Schedule Update

The schedule remains as originally proposed.

B.3.2.3 Performance Reporting

PSEG Long Island uncovered 57 cases of meter tamper and electricity theft using AMI meters in 2019, in addition to 12 cases uncovered in 2018.

As a result, PSEG Long Island has saved revenue loss in 2019 through AMI-enabled theft analytics and detection of theft during the AMI installation process. These benefits were estimated based on two different values:

- **One-time Debit Benefit:** When potential revenue loss due to theft/tampering is detected and collected, 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/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. Therefore, it is estimated that these cases would have otherwise persisted longer into the future if it were not for AMI and data analytics capabilities.

In addition, AMI meters helped PSEG Long Island prevent revenue loss in 2019 by recording energy usage more accurately than legacy electromechanical meters.

PSEG Long Island implemented AMI-enabled remote connect/disconnect functionality in Q4 2019. A limited number of move-in/move-out requests were received from go-live to year-end 2019. Nevertheless, remote disconnects prevented unbilled revenue loss for PSEG Long Island in 2019. This is attributed to PSEG Long Island being able to discontinue service promptly after a requested move-out, instead of waiting a day or more for a manual shut-off.

Table B-6. Benefit Reporting: Revenue Protection

Benefit Category	Projected 2019 (\$M)	Realized 2019 (\$M)	Variance
Added Revenue from Move-in/Move-out	0.02	0.01	(0.01)
Added Revenue from Theft/Tamper detection	0.89	0.48	(0.42)
Added Revenue from Meter Accuracy	0.75	1.16	0.42
Total	1.66	1.65	(0.01)

B.3.3 Outage Management

AMI meters have the potential to help shorten outage durations and make outage response more efficient. AMI meters send outage alerts within seconds, often outpacing the customer calls and cutting outage detection time. Operators can use this data to assist with the analysis of the outages and in doing so, make informed decisions on the outage and dispatch crews more efficiently, than waiting on customer calls. Shorter outages have economic benefits for customers and operational benefits for PSEG Long Island as well.

B.3.3.1 Scope Update

The scope of outage management, including AMI-OMS integration, has been slightly expanded to include yearly stress testing of the system in response to recommendations provided by the DPS, as well as continuous improvement efforts discussed in Section B.3.5 below.

B.3.3.2 Schedule Update

The AMI-OMS integration entered a parallel operations environment in November 2019. Since then, PSEG Long Island has been working to optimize the solution, addressing the needs of both its operators and customers, updating corresponding business procedures and performing change management. As these efforts progress and the capabilities of the fully integrated AMI-OMS system are operationalized, along with the continued deployment of AMI meters, benefits will continue to be materialize. To date, great progress has been made to more fully understand the interaction of these two systems, and with the continued refinement of associated processes and procedures, additional benefits will be realized in the coming months.

B.3.3.3 Performance Reporting

PSEG Long Island avoided 154 truck rolls during several storms between August and December 2019. Also, while it is suspected that outage response was more efficient with AMI, PSEG Long Island is continuing to fully evaluate the impact and develop methods to better track and estimate the overall impact on customer outage restoration durations. As storm events continue to materialize, access to additional data will also be key to understanding the overall impact.

The avoided truck rolls include labor, fuel, and other O&M cost savings (and excludes benefit for reduced mutual aid discussed below). PSEG Long Island achieved these savings by pinging AMI meters and remotely validating the power status of customer-reported outages (i.e., confirmed “Power-ons”). AMI is helping PSEG Long Island avoid “no trouble found” truck rolls which cost time and subsequently lengthen the duration of overall storm repairs as resources are diverted to these non-outage calls. AMI enables service trucks to reach validated outages more quickly and reduce the overall duration of customer outages during storms. PSEG Long Island will continue to realize and account for these benefits as it refines methodologies to measure and track performance and as the AMI system continues to be more fully implemented.

Unexpected Benefits of AMI-OMS Integration

PSEG Long Island is investigating AMI on-off patterns to detect potential **tamper/theft**

PSEG Long Island identified a **power quality issue** affecting 12 customers using AMI-reported data

PSEG Long Island identified a **safety issue** involving a sparking pole-to-transformer connection using AMI-reported data

PSEG Long Island analyzed unusual voltage readings from AMI meters to catch a **faulty capacitor bank** causing sharp voltage spikes. It was fixed before it failed.

As described in the Utility 2.0 Business Case, AMI will provide opportunities for PSEG Long Island to improve the overall efficiency of its storm response over time and in doing so, help to better optimize costs associated with mutual assistance during storms. Such opportunities will take time to fully materialize as additional data will be needed to more readily understand the impact on the use of mutual aid resources (i.e., mutual assistance requests and the subsequent release of these resources). Having a better understanding of these impacts will be essential to revising mutual assist protocols as any changes to the use of such resources will need to be considered and balanced with ever increasing customer expectations regarding storm response. Additional experiences during storm response coupled with the continued build out of the AMI system and integration of the AMI-OMS system will assist in helping to identify and realize additional benefits in this area.

Table B-7. Benefit Reporting: Outage Management

Benefit Category	Projected 2019 (\$M)	Realized 2019 (\$M)	Variance
Avoided O&M Costs	0.63	0.06	(0.57)
Avoided Customer Outage Costs	0.81	-	(0.81)
Total	1.44	0.06	(1.38)

B.3.4 C&I Portal

The C&I Portal will enable PSEG Long Island to engage business customers with personalized energy insights through web, mobile, email, and telephone channels. The targeted platform's utility-facing applications enable Account Management, Sales, and Marketing teams to effectively target customers and increase program participation and revenue while reducing service costs. The platform will offer commercial customers new insights like multiple account energy aggregation, energy-saving tips, energy use benchmarking, and more.

B.3.4.1 Scope Update

The scope, including the development of the C&I Portal and associated capabilities, remains as proposed.

B.3.4.2 Schedule Update

The schedules for Phase 1 and 2 were shifted back two quarters (Phase 1 moving from Q4 2019 to Q2 2020) due to procurement and development delays. Phase 3 is dependent on the Rate Modernization effort which has had a 1-year schedule shift.

B.3.4.3 Performance Reporting

While there are no direct benefits projected, the additional energy insights offered by the C&I Portal are expected to offer indirect benefits like increased customer engagement and satisfaction. The C&I Portal is also expected to enable the Account Management, Sales, and Marketing teams to more effectively target customers for programs, increasing program participation and the success of engagement efforts.

B.3.5 Funding Reconciliation for AMI and AMI-Enabled Capabilities

PSEG Long Island's capital and O&M spending for AMI meter deployment, which includes Meter Reading and Meter Services, is on budget for 2019, as shown in Table B-8. The slight O&M overspend in 2019 was due to the addition of radio-frequency technicians tasked with maintaining the AMI network and resolving issues that have emerged during deployment.⁵⁵ This cost was partially offset by cost savings associated with meter pan replacements that were less than budget plan in 2019 due to fewer incidents with meter pans than forecasted.

For capital, PSEG Long Island accelerated \$6.9 million to 2018 to allow PSEG Long Island to accelerate the overall timeline of meter installations. PSEG Long Island anticipates that due to this more efficient deployment, the company will fall below the total capital budget by \$2.3 million (about 1% of the overall capital budget) due to lower installation labor costs as well as lower IT costs for integration of the Meter Data Management System with the Company information management system. The team is also shifting a small portion of their labor funds to purchase vehicles in 2020 to avoid overhead costs of leasing vehicles throughout the project.

Overall, additional forecasted costs reflect an increase in resources needed to complete the AMI Core scope compared to what was originally budgeted, but no additional scope has been added to the effort. Going forward in 2020-2022, PSEG Long Island identified need for an additional \$1.8 million for O&M costs, including to fund:

- The identified additional radio frequency technicians;
- One FTE in 2021 and two FTEs in 2022 to support a projected increase in exceptions handling;
- Costs for the Meter Data Management System (MDMS) that are higher than forecasted during deployment years due to the accelerated deployment schedule;⁵⁶ and
- Improvements to the Outage Management System (OMS) to minimize nuance outage alerts sent from the MDMS to the OMS, such as from known outages (e.g. building power off for maintenance) or momentary events.

Table B-8. Budget Overview: Meter Deployment (2018-2022)

Meter Reading and Meter Services		Capital (\$M)	O&M (\$M)
2019	Budget	50.06	1.02
	Actual	50.19	1.18
	Variance⁵⁷	(0.13)	(0.16)
2018-2022	Original Budget	196.29	7.53
	Updated Forecast	193.99	9.50
	Variance	2.30	(1.97)

⁵⁵ It is common to find intermittent issues with the wireless mesh communication networks that allow the two-way communication with customer endpoints. This work is vital to driving long term reliability of AMI communications which directly impacts on core data gathering and system health functionalities.

⁵⁶ These costs are accrued on an annual per meter basis. Since deployment is ahead of schedule, the total cost in the early years, when deployment is happening, are higher than forecasted. Once full deployment is reached, annual costs remain stable.

⁵⁷ Budget variance calculated as Budget minus Actual. Negative values are represented in parentheses.

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AMI-Enabled Capabilities costs include Remote Connect Switch for Meter Services and Revenue Protection, Outage Management, C&I Portal costs, and Customer Engagement IT (to support system enhancement across IT technologies). The AMI-Enabled Capabilities programs spent 66% of their capital budget and 44% of their O&M budget for 2019. During 2019, the AMI-Enabled Capabilities focused on standing up the technology and capabilities to ensure that the projects will produce the intended benefits in future years resulting in costs being below projections for that year.

The 2019 capital and O&M budget for Customer Engagement Information Technology (IT) is intended to support Customer Technology channels (such as My Account, Interactive Voice Response, and the mobile app) integrating AMI data with systems as well as current projects and platforms, such as the Customer Portal, Remote Connect Switch automation, and Outage Management. It also includes funding for Green Button Connect. Some Green Button Connect funds have been pushed to 2020 to complete the project, and the scope of the project should be complete mid-2020.

Due to unexpected delays in other capabilities, as described herein, \$1.5 million in capital was rolled over from 2019 to 2020. These funds are being planned to support continuous improvement, enhancements, and communication channels of the 2019 capabilities (Remote Connect Switch, AMI-OMS Integration, and the C&I Portal) as well as integrating AMI data on self-service channels (e.g. mobile app and voice assistant). Capability-specific variances included:⁵⁸

- Revenue Protection spent more than their original 2019 capital budget because development of the business processes was more complex than originally identified at the time of 2018 Utility 2.0 Plan Filing.
- Outage Management costs exceeded the original 2019 budget for capital due to additional funds required for the creation and development of the parallel operations to integrate the AMI data with the OMS, including labor and consultant support.
- The C&I Portal spent less than their 2019 capital budget due to the procurement delays and data integration difficulties described in the sections above.

For the 2019-2022 period, PSEG Long Island is expecting to spend \$4.03 million more than their original capital budget and \$3.27 million more than their original O&M budget for AMI-Enabled Capabilities. This includes:

- Additional funding to support the User Acceptance Testing environment and OMS stress testing the MDMS, as recommended by the DPS. OMS stress testing is an addition to the original scope of the Outage Management effort.
- A yearly C&I Portal subscription fee that was unknown before the procurement process and not part of the originally requested funds but is necessary in order to maintain the C&I Portal as planned.
- Continuous improvement of the Remote Connect Switch, AMI-OMS integration, and integration of AMI-Enabled Capabilities with digital channels. This includes non-labor costs as well as two FTEs added to support these efforts for the AMI-Enabled Capabilities suite of programs in 2021 and 2022.

⁵⁸ 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.

Table B-9. Budget Overview: AMI-Enabled Capabilities Budget Overview (2019-2022)

AMI-Enabled Capabilities		Capital (\$M)	O&M (\$M)
2019	Budget	5.30	0.59
	Actual	3.52	0.26
	Variance	1.78	0.33
2019-2022	Original Budget	9.80	1.65
	Updated Forecast	13.38	4.92
	Variance	(4.03)	(3.27)

B.4 Data Analytics

Applied analytics are essential to PSEG Long Island's Utility 2.0 vision and to achieving the full value of the AMI-enabled, digital grid. Analytic capabilities unlock value from data in sometimes unexpected ways, delivering insights from granular AMI data, grid data, and other customer data. PSEG Long Island's Data Analytics capabilities are embedded in its business and structured around several AMI-enhanced use cases to best serve customer needs. The Analytics team addresses data intake, data integration, analytics, and visualization and interactions with the data. The Analytics team delivers value through developing use cases in collaboration different departments of PSEG Long Island, such as transmission and distribution operations, customer engagement and experience, energy efficiency programs, and billing. Analytics will continue to support energy efficiency, grid optimization, and customer analytics use cases for current and future Utility 2.0 efforts.

B.4.1 Scope Update

While the function of the Analytics team remains as originally proposed, the repertoire of use cases has grown immensely. New data streams are being added to the data lake, including customer outage data, meter events and customer details on energy efficiency programs.

B.4.2 Schedule Update

Although the analytics platform was established within the first half of 2019, recruiting new resources for the analytics team took more time than expected and continues to be a challenge. For the time being, consultants have provided the services needed to stay on schedule.

Based on the timing of procurement, the Amazon Web Services (AWS) Data Analytics platform was implemented in May 2019.

B.4.3 Performance Reporting

While there are no direct projected KPIs or benefits for the Analytics team, initiatives led by the team are beginning to accumulate benefits from the use cases it supported, as described in the Progress Update.

B.4.4 Funding Reconciliation

While the Data Analytics team spent 55% of their capital budget and 8% of their O&M budget in 2019, the remaining funds are expected to be spent in later years. The 2019 variance for O&M and capital

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correspond with implementing the AWS Data Analytics platform in mid-year rather than at the beginning of the year as well as the fact that fewer AWS platform services were required than expected. For O&M costs, initial costs were based on fewer AWS platform services, fewer data sources, and lower data volumes than future years due to the number of meters deployed in the first year of AMI deployment.

In addition, the labor costs (both capital and O&M) for 2019 were 82% lower than expected due to delays in finding skilled candidates and subsequent delays in hiring. PSEG Long Island continues to recruit, and onboard resources based on specific skills and experiences in 2020 to meet an accelerated rate of adoption of data analytics and the data lake, leading to net labor costs tracking the original budget for 2019-2022.

Table B-10. Budget Overview: Data Analytics (2019-2022)

Data Analytics		Capital (\$M)	O&M (\$M)
2019	Budget	3.80	1.05
	Actual	2.08	0.09
	Variance	1.72	0.96
2019-2022	Original Budget	5.10	4.70
	Updated Forecast	5.26	4.71
	Variance	(0.16)	(0.01)

An increase in platform services (database, compute power, storage, etc.) and scale (volume of data, additional data sources) will result in increased vendor O&M costs for 2020 through 2022. Additional non-labor O&M data lake platform support costs are also required for 2020, including full time data lake support resource (expected to be contractor labor). In 2020, PSEG Long Island will also incur additional non-labor O&M costs associated with new applications and associated subscription costs, which are expected to be funded by the remaining 2019 O&M budget.

PSEG Long Island plans to use the remaining 2019 capital budget in 2020-2022 to continue to build out analytics use cases and support continuous improvements. The funds are expected to help migrate existing Customer Data Warehouse to the Enterprise Data Lake and support the Foundational Customer Analytics project, which will provide further insights on customer patterns and demographics.

B.5 Customer Experience and Engagement

The Customer Engagement program aims to inform customers of the AMI installation process and actively promote and incorporate feedback. PSEG Long Island engages and informs local communities about smart meter and AMI-enabled benefits through education sessions and marketing material to ensure customers can access the benefits of AMI.

B.5.1 Scope Update

Scope included communication to inform customers about the upcoming activities related to AMI deployment and the associated benefits. This scope remains as originally proposed, however the tactics used to address that scope (i.e., changes in number of touchpoints) has evolved based on current customer feedback resulting in changed budget forecast.

B.5.2 Schedule Update

Both digital and non-digital communication is on schedule. There were delays in the launch of the My Smart Energy Lab and the Customer Intelligence Research which are not expected to impact forward-going schedule.

AMI Customer Engagement efforts closely follow the AMI deployment schedule, and therefore PSEG Long Island expects post-installation engagement to complete between mid-to-end of 2022 following the last meter installations.

B.5.3 Performance Reporting

As of the end of 2019, PSEG Long Island had sent over 1.1 million individual communications to customers (Figure B-2). This volume is lower than originally planned as a response to customer feedback about their preference on the frequency of communication.

Figure B-2. Customer Engagement by Type and Customer Segment



Even though no direct benefits were projected in the AMI business case, the Customer Engagement effort has resulted in its objective of a low opt-out rate (see AMI discussion). Also, the volume of AMI related requests registered by call center, digital and social media channels remained low, suggesting little to no increase in customer concerns regarding AMI. These findings indicate that PSEG Long Island is positively educating customers about the benefits of AMI.

B.5.4 Funding Reconciliation

The updated 2019-2022 plan of \$8.72 million reflects the actual spending in 2019 as well as the costs needed to complete PSEG Long Island’s AMI Customer Engagement efforts through the remainder of deployment given the reduced number of customer touchpoints (Table B-11).

In response to customer feedback requesting a reduction in the number of touchpoints pre- and post-meter installation, PSEG Long Island was able to realize savings on its budget for 2019. The Marketing team was also able to secure printing costs reductions from their vendor for printed communications. In addition, spending on the My Smart Energy Lab launch and Customer Intelligence Research ramped up slower than expected due to delays in launch and contracting with the vendor, respectively.

Due to these changes, which are expected to continue through the timeline of this effort, PSEG Long Island is expected to spend less than their original 2019-2022 O&M budget. 2020 spending on the My Smart Energy Lab is also expected to fall below the original budget, since operation of the My Smart Energy Lab has been suspended during the coronavirus pandemic to support public health and safety measures.

Table B-11. Budget Overview: Customer Engagement (2019-2022)

Customer Engagement		Capital (\$M)	O&M (\$M)
2019	Budget	-	4.24
	Actual	-	1.01
	Variance	-	3.23
2019-2022	Original Budget	-	15.29
	Updated Forecast	-	8.72
	Variance	-	6.57

B.6 Rate Modernization

PSEG Long Island's Rate Modernization initiative will offer simple, easy to understand, customer-centric rate options and tools that aim to improve the customer experience and reduce peak demand. A new Advanced Billing Engine will process the new rates and a web-based platform will enable customers to compare and select among the rate options. Initial rate choices will include multiple time-of-use pricing plan options including three 3-block plans (with different combinations of peak, off peak, and super off-peak times) and a 2-block plan (daytime/overnight times) options for residential as well as a 3-block option for small business.

B.6.1 Scope Update

Scope remains as originally proposed.

B.6.2 Schedule Update

The schedule for the Rate Modernization effort has been shifted one year due to a delay in procurement of the Advanced Billing Engine. PSEG Long Island expects to launch the new rates, as well as the customer-facing web pages and tools, in the first quarter of 2021 and pilots will run through 2023, one year later than originally planned.

B.6.3 Performance Reporting

There were no benefits projected in the business case for 2019. Due to the schedule shift, Rate Modernization benefits will begin accumulating, and KPIs will be tracked, after the expected launch in 2021 and will be reported on in the 2022 Utility 2.0 Plan.

B.6.4 Funding Reconciliation

Due to the schedule change, PSEG Long Island intends to shift unused funds allocated for 2019 to 2020, as well as shifting funds for subsequent years and use them as originally planned. Table B-12 shows the funding requests through 2023, accounting for the timeline extension.

Table B-12. Budget Overview: Rate Modernization (2019-2023)

Rate Modernization		Capital (\$M)	O&M (\$M)
2019	Budget	9.50	6.14
	Actual	1.59	0.57
	Variance	7.91	5.57
2019-2023	Original Budget	9.50	17.97
	Updated Forecast	10.06	16.12
	Variance	(0.56)	1.85

The overall capital budget for this project is expected to slightly exceed the original plan costs in 2022-2023 to account for the addition of one FTE to provide Customer Technology support in 2021-2023. PSEG Long Island does have risk and contingency in its budgets and is reserving those funds within this forecast since there are still several years of this project.

The overall O&M budget is expected to fall below the original plan by about 10% due to a reduction in forecasted costs for contracted IT support for the Advanced Billing Engine. The Advanced Billing Engine IT costs been refined since the 2018 Utility 2.0 Plan, and PSEG Long Island was able to successfully secure vendor support at lower than budgeted cost.

B.7 Program Implementation Support

The Utility 2.0 Steering Committee is responsible for oversight of the Utility 2.0 initiatives in their entirety and oversee Program Implementation Support. Initial focus has been on targeted support of high-value projects, such as AMI and enabled capabilities, and establishing a progress reporting system for key stakeholders. Project support included business process design and change management to launch core AMI functionality while a quarterly program dashboard has been built and shared quarterly with stakeholders. As this function evolves into a Project Management Office (PMO), it will take on an increasing role to provide larger program governance, budget oversight and management of project health.

B.7.1 Scope Update

The scope for the Project Implementation Support, including business process design, change management, and reporting, is as originally proposed.

B.7.2 Schedule Update

The schedule remains as proposed.

B.7.3 Performance Reporting

While there are no direct projected KPIs or quantifiable benefits for this support, it is tied to the 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. For example, in 2019, the focus on remote connect switch and AMI to OMS integration functionalities was due to their significant near-term and longer run benefits stemming from reducing individual truck rolls and shortening the duration of outages.

B.7.4 Funding Reconciliation

Program Implementation Support spent 82% of their capital funds and none of their O&M funds in 2019 (Table B-13). The lower capital costs were mainly due to PSEG Long Island’s efficient use of vendor resources to stand up the project management functions and support business process design and reporting for projects in 2019. The remaining funds are not forecasted to supplement 2020-2022 PMO efforts and will instead be used to fund instances of costs required to support other projects. O&M spend was not required to support the change management efforts in 2019. Overall, funding needed for change management efforts is expected to be lower than the original O&M budget, leading to an updated O&M plan of \$0.55 million instead of \$1.00 million.

Table B-13. Budget Overview: Program Implementation Support (2019-2022)

	PMO and Change Management	Capital (\$M)	O&M (\$M)
2019	Budget	2.00	0.25
	Actual	1.64	-
	Variance	0.36	0.25
2019-2022	Original Budget	8.00	1.00
	Updated Forecast	7.64	0.55
	Variance	0.36	0.45

As this initiative progresses, PSEG Long Island expects to shift some of the capital funded activities from vendor-supported management to a new internal FTE in 2021 and two additional FTEs in 2022. This enables PSEG Long Island to utilize the vendor solely for specific benefit-cost analysis and advanced consulting. The costs of these additional FTEs are expected to be offset by lower vendor costs, not impacting overall budget and scope while transitioning functionality to be more internal.

B.8 EV Programs

The current EV programs consist of EV outreach and marketing, a Residential Charging incentive program, a Workplace Charging program, a Direct Current Fast Charging (DCFC) program and will soon include the Off-Peak Rewards program. The program aims to enhance penetration of EVs on Long Island, align EV customer adoption strategy with reducing greenhouse gas emissions, empower customers, animate the EV charging infrastructure market, improve system efficiency, and deploy smart EV charging systems to encourage off-peak charging.

B.8.1 Scope Update

The scope of the EV programs remain as proposed with the exception of the Residential Charger Rebate. Further, the programs participation forecast was modified to reflect recent sales activity and vehicle registrations and provide a more realistic view of EV sales in the coming years.

B.8.2 Schedule Update

The schedule was delayed in 2019 for the launch of the Public DCFC Incentive program and Residential Off-Bill Charging Rewards program. This was due in part because of the commission’s extended approval process into the end of 2018.

Due to slower EV adoption on Long Island than originally forecasted, PSEG Long Island intends to extend its timeline through 2023 for the Off-Peak Charging Rewards program and will extend its marketing and delivery of the Public DCFC Incentive program and Residential Smart Charger rebates through 2025, in coordination with DPS recommendations.

B.8.3 Performance Reporting

The 2019 target for Residential Smart Charging program participants was calculated based on the 9,681 EVs projected to be sold on Long Island. However, there were only about half that many new EVs registered on Long Island in 2019, resulting in the realized participation rate was also lower than expected.

That said, while the number of participants is lower than the target for 2019, the realized take-rate is higher than expected. Existing EV owners on Long Island, which were not included in the original projections, may have participated in the program resulting in the slightly higher realized take-rate.

At year-end 2019, there were 5,871 battery electric vehicles (BEV) and 8,268 plug-in hybrid electric vehicles (PHEV) registered on Long Island (14,139 EVs total). New EV registrations for 2019 (as of the June 12 2020 EValueNY dataset) are 2,312 BEVs and 2,361 PHEVs, for a total of 4,673, resulting in about 6% lower sales in 2019 than in 2018 (Table B-14).

Table B-14. Performance KPIs: EV Programs

Metric	Target 2019	Realized 2019	Variance
EVs Sold on Long Island	9,681	4,673	(5,008)
Residential Smart Charging Program Participants	968	624	(344)
Number of Ports Deployed in Workplace Charging Program	100	105	+5
Program Take-Rate	10%	13%	3%
DCFC Program Ports Committed	72 ⁵⁹	31	(41)

Table B-15 offers a side-by-side comparison of the original EV forecast, 2019 results, and the updated forecasting assumptions. The Original Planning Assumptions, the first section in the table, contains the

⁵⁹ Calculated as one-fifth of the 5-year goal of 360 ports.

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PEV sales forecast and the program participation forecast that was used in the Utility 2.0 EV programs' BCA. It is important to note that this projection is not technically a sales forecast but is a planning scenario associated with a path to various state goal assumptions, essentially estimating the sales needed to achieve policy goals. The Updated Forecasting Assumptions uses a different methodology - incorporating recent sales activity and vehicle registrations and provide a more realistic view of EV sales in the coming years. The latter forecast will be used for reporting against KPIs in the future.

Table B-15. Residential Smart Charging Program Planning Assumptions

	2019	2020	2021	2022	2023	2024	2025
Original Planning Assumptions							
Number of EVs Sold	9,681	15,248	22,363	29,580	N/A	N/A	N/A
Expected Program Participants	968	1,525	3,354	5,916	N/A	N/A	N/A
Actual Results (2019 Only)							
Number of EVs Sold	4,763	N/A	N/A	N/A	N/A	N/A	N/A
Program Participants	624	N/A	N/A	N/A	N/A	N/A	N/A
Updated Planning Assumptions							
Number of EVs Sold	N/A	5,252	6,338	7,906	10,470	13,822	18,241
Expected Program Participants	N/A	765	1,022	1,407	1,861	2,610	3,648

In the 2018 business case, PSEG Long Island defined the benefits of the EV programs as the benefits associated with any EV sales that occurred above this target baseline projection in their Integrated Resource Plan. Because actual EV adoption has been below the baseline forecast, the forecast and benefits methodology has proven to be inaccurate. Additionally, of the EV sales that took place in 2019, it is difficult to parse out the impact of utility incentives from other drivers without additional research.

Due to these factors, PSEG Long Island has instead estimated the benefits based on the number of residential smart charging program participants as a proxy for the uplift in EV adoption as influenced by the program. PSEG Long Island understands that this methodology is not perfectly aligned with the original business case which estimated adoption above-and-beyond the number of chargers installed to capture secondary market effects. Because of this, the calculated benefits in Table B-16 should not be compared with the projected benefits in the EV Program business case filed in 2018.

With the benefit of EVs added on the road in 2019 associated with the number of program participants, PSEG Long Island customers saved fuel and maintenance costs, and these EVs also generated added revenue for PSEG Long Island through charging. These benefits are shown as realized for the program participants in 2019 compared to the benefits projected for the targeted number of participants (Table B-16).⁶⁰

⁶⁰ This estimate is based on the full retail of \$0.21/kWh (Rate 180). Approximately 60% of this rate is a net revenue benefit to PSEG Long Island and the remaining is delivery charges.

**Table B-16. Benefit of Electrification of Transportation
Associated with Target and Actual Program Participants**

Benefit Category	Projected 2019 (\$M)	Realized 2019 (\$M)	Variance
Participant Benefit	0.33	0.21	(0.12)
Added Revenue	0.59	0.37	(0.21)
Avoided Fuel Emissions	0.15	0.10	(0.10)
Total	1.07	0.68	(0.39)

B.8.4 Funding Reconciliation

The EV programs spent approximately one quarter of their \$2.26 million O&M budget for 2019 (Table B-17). Project costs were incurred in line with the actual timeline of the programs which was delayed for the Public DCFC Incentive Program and Residential Off-Peak Charging Rewards program. Additionally, although the offer take rate for the Residential Smart Charger rebate was high, the number of eligible customers (EV owners) was lower than forecasted, leading to fewer overall incentives being distributed. Most of the unused funds are expected to be used in the upcoming years of the program.

With the extended timeline through 2025, PSEG Long Island is expected to stay below its O&M budget for the remainder of the program (Table B-17). This is largely due to the Off-Peak Charging Rewards program being shifted to be managed in-house, reducing program costs to residential off-bill time-of-use incentive payouts only.

Table B-17. Budget Overview: EV Programs (2019-2025)

	EV Program	Capital (\$M)	O&M (\$M)
2019	Budget	-	2.26
	Actual	-	0.63
	Variance	-	1.64
2020-2025	Original Budget	-	15.15
	Updated Forecast	-	12.82
	Variance	-	2.32

B.9 Behind-the-Meter (BTM) Storage

The BTM Storage program is implementing a solicitation opportunity for third-party aggregators to install batteries for customers using a 10-year tariff incentive. This is designed to alleviate overloading in targeted areas, increase customer engagement and energy literacy, and support state energy storage goals.

B.9.1 Scope Update

The scope of the BTM storage program, including the launch and marketing of the DLM tariff program, remains as originally proposed.

B.9.2 Schedule Update

The DLM tariff was launched on schedule; however, benefits lag due to no participation in 2019.

B.9.3 Performance Reporting

The BTM storage 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. While there were no systems participating in the DLM program in 2019, customer applications for solar PV paired with battery storage have exceeded 2019 targets. Despite not realizing the load reduction in 2019, PSEG Long Island is encouraged by these interconnections because it shows customers are interested in storage, even if they were able to participate in 2019. Further, PSEG Long Island expects these systems to yield benefits in later years.

Table B-18. Performance KPIs: BTM Storage

Metric	Target 2019	Realized 2019	Variance
Interconnection Applications for Solar +Storage	90	159	69
Average Load Reduction per Customer (kW) ⁶¹	360	0	(360)

To realize the benefits forecasted for the BTM storage program in 2019, aggregators would have needed to enroll the installed projects in the DLM program that would run through the summer. Due to the timing of the launch of the tariff and its sign-up deadline, no aggregators participated in the program in 2019. As such, there were no benefits realized for that calendar year.

Table B-19. Benefit Reporting: BTM Storage

Benefit Category	Projected 2019 (\$M)	Realized 2019 (\$M)	Variance
Avoided FP&P Costs	0.02	-	(0.02)
Avoided Capital Costs (Non-Labor)	0.03	-	(0.03)
Total	0.05	-	(0.05)

B.9.4 Funding Reconciliation

PSEG Long Island a portion of its 2019 budget on marketing of the program. The team tapered their marketing expenditures in 2019 until the developers and installers were able to respond to the customer demand for BTM Energy Storage System installations. PSEG Long Island does not plan to need the remaining 2019 funds to supplement their 2020 budget, though it expects to use the full marketing budget in 2020, closing out the project budget (Table B-20).

⁶¹ Load reduction is only counted for capacity that participates in the DLM tariff. Though there were projects installed in 2019, none were able to be counted for load reduction based on these requirements.

Table B-20. Budget Overview: BTM Storage (2019-2022)

	BTM Storage	Capital (\$M)	O&M (\$M)
2019	Budget	-	0.10
	Actual	-	0.06
	Variance	-	0.04
2019-2022	Original Budget	-	0.20
	Updated Forecast	-	0.16
	Variance	-	0.04

B.10 Super Savers

Super Savers is a non-wires solution (NWS) seeking to reduce peak by 4 MW to defer traditional capital investment. As opposed to other NWS programs in New York State which are contracted to third parties under performance-based agreements, this program is administered by PSEG Long Island and seeks to increase savings for customers within the targeted area by offering increased incentives on energy efficiency in addition to outreach for existing program offerings.

This initial offering in North Bellmore is 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 team will determine whether similar measures can be used as a viable NWS in other areas, such as the Patchogue Super Savers which is set to launch in 2020.

Figure B-3. North Bellmore Super Savers Area



B.10.1 Scope Update

The scope of North Bellmore Super Savers, to reduce peak load in this area, remains as originally proposed, with the removal of the standard offer in response to recommendations by the DPS. PSEG Long Island continues to refine its tactics to achieve this scope, as described in the progress update.

The scope of Patchogue Super Savers remains as originally proposed.

B.10.2 Schedule Update

The scheduled targets for Super Savers North Bellmore remain as proposed. Spending was shifted corresponding with the launch of the enhanced offerings of the program which came later in 2019 in response to lessons learned on customer outreach and incentives.

Further, based on input from LIPA in its approval of the program, the launch of the Patchogue Super Savers was deferred by one year to 2020. The Patchogue Super Savers program is now planned to span 3 years, 2020-2022.

B.10.3 Performance Reporting

The North Bellmore Super Savers program achieved a portion of its peak demand reduction targets for 2019. PSEG Long Island also realized energy savings from several efficiency initiatives that were part of the program, as shown in Table B-21.

Table B-21. Performance KPIs: Super Savers North Bellmore

Metric	Target 2019	Realized 2019	Variance
Peak Demand Reduced (Annual Average)	2.19 MW	1.07 MW	(1.12 MW)
Peak Demand Reduced (Year-End)	3.05 MW	1.56 MW	(1.49 MW)
Energy Savings	2,870 MWh	2,736 MWh	(134 MWh)
Unique HERs Mailed	-	1,280,285	
New Thermostats (\$100 Code)	-	36,138	
Smart Savers Enrollment	-	0.0	
(\$20 Code) LED Common	-	3,616 kWh	
(\$20 Code) LED Specialty	-	4,407 kWh	
Refridge Recycle - pre 2001	-	39,888 kWh	
Refridge Recycle -post 2001	-	28,014 kWh	
Incremental Pool Pump Rebate	-	65,826 kWh	
Commercial Efficiency Upgrades	-	1,047,211 kWh	
CSRP & DLRP Enrollment	-	261 kWh	
ThinkEco SmartAC kits	-	199,703 kWh	
Thermostat Direct Install	-	30,836 kWh	

Based on participation levels to date, PSEG Long Island was able to realize a portion of the projected benefits, as shown in Table B-22, based annual average peak demand reduction (due to the timing of when the measures were installed). The program's peak demand reduction yields realized benefits from avoided generation capacity costs and avoided transmission capacity infrastructure, while energy efficiency yields benefits from avoided energy costs and CO₂ savings.

Table B-22. Benefit Reporting: Super Savers North Bellmore

Benefit Category	Projected 2019 (\$M)	Realized 2019 (\$M)	Variance
Avoided FP&P Costs	0.28	0.14	(0.14)
Avoided Capital Costs (Non-Labor)	0.07	0.03	(0.04)
Total	0.35	0.17	(0.18)

B.10.4 Funding Reconciliation

PSEG Long Island spent a portion of its budget in 2019 and plans to carry over the remaining funds to future years (Table B-23). This variance was a result of:

- Fewer than anticipated rebate and incentive payments resulting from low customer participation rates
- Delayed launch of enhanced offerings (in response to low participation of original offerings)
- Removal of the Standard Offer in 2019, in response to DPS recommendations
- Lower than expected measurement and verification budget since the program did not have a full year of AMI data to analyze in year 1
- Administrative labor funds that were not needed

Table B-23. Budget Overview: Super Savers (2019-2022)

	Super Savers	Capital (\$M)	O&M (\$M)
2019	Budget	-	1.99
	Actual	-	0.48
	Variance	-	1.51
2019-2022	Original Budget	-	3.48
	Updated Forecast	-	3.46
	Variance	-	0.02

A portion of the remaining 2019 funds will be used to continue the Super Savers program in North Bellmore to capture more energy savings. Even with the timeline extension, PSEG Long Island forecasts that there will still be remaining budget for the Super Savers program. The balance of remaining funds is being distributed over 2020-2022 for the Patchogue Super Savers program.

B.11 NWS Planning Tool

The NWS Planning Tool will offer PSEG Long Island the ability to more comprehensively calculate the feasibility of a NWS as an alternative to a planned capital construction project by computing achievable customer penetration percentages of different customer sited capacity reduction measures based upon known customer data for that circuit and price elasticity for customer percentage of measure(s) cost. The tool will leverage outputs from the Locational Value Study and other customer inputs (usage data, prior program participation) to forecast whether a solution set could be expected to be bid by a third-party

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contractor, which would meet the savings load shape necessary to defer a planned capital construction project.

B.11.1 Scope Update

The scope is as originally proposed.

B.11.2 Schedule Update

There were delays in the launch of the tool development due to procurement delays. This has since been resolved and the tool is expected to be completed in 2020.

B.11.3 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.

B.11.4 Funding Reconciliation

PSEG Long Island did not spend any of their 2019 budget due to delays in the procurement process. The project is expected to spend a portion of the 2019 budget in 2020 to complete the tool; the forecast is below the original budget due to lower than projected costs for vendor support for the project. (Table B-24).

Table B-24. Budget Overview: Non-Wires Planning Tool (2019-2022)

NWS Planning Tool		Capital (\$M)	O&M (\$M)
2019	Budget	-	0.50
	Actual	-	-
	Variance	-	0.50
2019-2022	Original Budget	-	0.50
	Updated Forecast	-	0.20
	Variance	-	0.30

B.12 Utility of the Future

The Utility of the Future (UoF) team serves one of the PSEG Long Island core business functions and proactively drives REV-related capabilities and objectives. The UoF group 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. The UoF team leverages best practices from the industry and the New York Joint Utilities.

B.12.1 Scope Update

The scope to support customer-centric DSP-related initiatives remains the same as originally proposed.

B.12.2 Schedule Update

There were delays in the first half of 2019 with the launch of the UoF team due to the timing required to recruit and hire the team members. This has since been resolved and is not expected to impact forward-going schedule.

B.12.3 Performance Reporting

While there are no direct projected KPIs or benefits for the UoF team, the team in 2019 achieved most of the deliverables stated in the 2018 Utility 2.0 Plan, as described in the progress update. These initiatives will indirectly contribute to benefits through the programs and projects the UoF team supports.

B.12.4 Funding Reconciliation

PSEG Long Island was under budget for their capital and O&M spending for the UoF effort, which included Joint Utilities membership and CVR study for 2019, and most of the remaining funds are expected to be spent in 2020 (Table B-25). Since it took several months to finalize the addition of new UoF team members, labor costs, as well as costs associated with the CVR pilot, were reduced corresponding to this schedule. Also, PSEG Long Island did not have a paid membership for the Joint Utilities in 2019, generating savings from that line item.

Going forward, the UoF team shifted funds from capital to O&M for 2021-2022, as seen in Table B-25. This is because the UoF team found that their work has a higher ratio of O&M to capital categorized work than originally planned for efforts such as the CVR simulation studies.

PSEG Long Island also requests additional funding for higher than planned Joint Utilities membership fees, net of savings in 2019, and is contingent upon becoming members.

Table B-25. Budget Overview: Utility of the Future, CVR and Joint Utilities Membership (2019-2022)

Utility of the Future / CVR		Capital (\$M)	O&M (\$M)
2019	Budget	0.30	0.80
	Actual	0.26	0.16
	Variance	0.04	0.64
2019-2022	Original Budget	1.60	3.66
	Updated Forecast	1.05	4.52
	Variance	0.55	(0.86)

B.13 Locational Value Study

The Locational Value Study involves a granular and locational analysis of load information vis-à-vis T&D system limitation. It provides more precise information needed to incentivize DER solutions and evaluate the potential of NWS projects. The UoF team is currently working on building the tool to provide these enhancements for assessing NWS projects.

B.13.1 Scope Update

The scope remains as originally proposed. PSEG Long Island intends to use 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.

B.13.2 Schedule Update

This effort remains on schedule, PSEG Long Island expects the final report and Locational Value Tool to be completed in third quarter of 2020.

B.13.3 Performance Reporting

Although the Locational Value Study does not have any projected direct KPIs or benefits, the study/tool will be used as an input to evaluate NWS aimed at deferring capital projects.

B.13.4 Funding Reconciliation

The Locational Value Study had a surplus in 2019 out of its capital budget due to outside consultant costs being lower than anticipated. The budget surplus from 2019 will be used in 2020 to fund additional project requirements such as building the Locational Value Tool which can be used to evaluate NWS projects aimed at deferring capital projects.

Table B-26. Budget Overview: Locational Value Study (2019-2022)

	Locational Value Study	Capital (\$M)	O&M (\$M)
2019	Budget	1.00	-
	Actual	0.20	-
	Variance	0.80	-
2019-2022	Budget	1.00	-
	Actual	0.50	0.18
	Variance	0.50	(0.18)

B.14 Interconnection Online Application Portal – Phase 1

The Interconnection Online Application Portal (IOAP) project was approved as part of the 2018 Utility 2.0 Plan and was subsequently deferred to 2020. The IOAP will help PSEG Long Island adequately prepare for the greater amounts of distributed generation deployment expected in accordance with the NYS Climate Leadership & Community Protection Act (CLCPA) Initiatives. The IOAP will ensure timely and efficient processing of the applications, documents, and payments related to the interconnection of DER.

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This portal is designed to improve customer service by making it easy for interconnection customers to apply online, upload required documents and obtain real-time status update on the interconnection projects. It also provides automated customer communication at various stages of the project. With the portal implemented, the interconnection customers will have visibility and transparency into the status of their proposed project.

B.14.1 Scope Update

The scope of this initiative remains as originally proposed.

B.14.2 Schedule Update

The IOAP Phase 1 effort was delayed from 2019 to 2020 in LIPA's final determination of the 2018 Utility 2.0 Plan. This project is now ahead of schedule. Phase 1 is expected to be completed in October 2020, ahead of the December deadline.

B.14.3 Performance Reporting

Although there are no direct benefits projected, the IOAP supports a streamlined interconnection process for DER, which is critical to PSEG Long Island's vision of a DSP. In addition, the portal will also enhance customer experience by providing more information and visibility to the interconnection customers into the status of their application/project.

B.14.4 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. PSEG Long Island expects to spend the full capital budget but anticipates being below budget for O&M costs (Table B-27).

O&M savings were able to be realized by changing the IT architecture for the solution and reducing licensing costs. The original project design prior to detailed design assumed a front end with Salesforce that required many employees to have Salesforce licenses. The revised architecture uses Sitecore for the front end and Salesforce only for backend internal communications, requiring far fewer licenses and lowering overall O&M costs. With these changes, PSEG Long Island reduced and capitalized the licensing costs for the software leading to minimal O&M need for 2020 and future years.

Table B-27. Budget Overview: IOAP Phase 1 (2019-2022)

	IOAP Phase 1	Capital (\$M)	O&M (\$M)
2019	Budget	-	-
	Actual	-	-
	Variance	-	-
2019-2022	Budget	2.27	2.25
	Actual	2.27	0.10
	Variance	-	2.15

B.15 Utility-Scale Storage

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.

B.15.1 Scope Update

The scope, to develop an energy storage project of 2.5 MW/12.5 MWh, remains as originally proposed.

B.15.2 Schedule Update

The project is currently on schedule with the RFP decision to be made in the second half of 2020. Once the vendor is on-boarded, the design/permitting process will begin for completion of the battery in 2022. There are certain challenges associated with the battery due to the uniqueness of the own and operate model for a new technology and the associated learning curve which can pose as risk to delaying project's schedule in the future.

B.15.3 Performance Reporting

No benefits were projected in 2019 for the Utility-Scale Storage. PSEG Long Island will begin tracking KPIs and realizing benefits for Utility-Scale storage when it is implemented and operational. This project is expected to provide direct benefits, such as deferring the need to install a transformer bank at Miller Place Substation.

B.15.4 Funding Reconciliation

Due to the schedule change, PSEG Long Island did not spend the full allocated budget for 2019 within the calendar year and intends to shift unused funds allocated for 2019 to later years (Table B-28). Additionally, PSEG Long Island has refined the project cost estimates based on storage industry costs, previous projects on Long Island and with internal estimating procedures/methodology.

It is to be noted that the costs below are estimated cost and will be updated once the contract negotiations with the energy storage vendor are finalized. The total cost in 2021 also includes the effort associated with issuance of RFPs for additional battery storage projects.

Table B-28. Budget Overview: Utility Scale Storage (2019-2022)

	Utility Scale Storage	Capital (\$M)	O&M (\$M)
2019	Budget	-	0.30
	Actual	0.09	0.00
	Variance	(0.09)	0.30
2019-2022	Original Budget	4.91	0.71
	Updated Forecast	10.75	1.04
	Variance	(5.83)	(0.34)

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Appendix B. 2019 Progress Update and Funding Reconciliation

Overall, the updated O&M plan is slightly above the original budget, which is the net effect of:

- Reduced O&M for grid engineering and permitting costs that were reclassified as capital
- Additional O&M costs for substation maintenance, technical support, and contracting support, including one FTE of labor to support battery operations (included in O&M above)
- Added O&M cost associated with issuance of RFP for Sayville and Centereach in 2021

The Utility Storage Miller Place capital budget is expected to increase the capital budget for 2019-2022, including costs for:

- Interconnection of the battery to the existing switchgear at the substation
- Alignment with the industry energy storage prices and internal alignment with PSEG Long Island estimating process/methodology
- Risk and contingency funding for the battery system and the interconnection to the substation

Appendix C. Related Initiatives Outside of Utility 2.0

This appendix summarizes initiatives that are delivered outside the Utility 2.0 Plan, but support PSEG Long Island's Utility 2.0 Vision and Strategy. In the future, PSEG Long Island may request funding to further support these or other related initiatives.

C.1 Empowering Customer Initiatives

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 Mobile Application Rollout

The mobile application is set to launch in fall 2019 and will allow customers to view their usage, view their bill, make payments, report and view outages, login to My Account, and in general be able to access all fundamental My Account features--all with the ease and convenience of smartphones. Eventually, enhancements to the mobile application will include integrating it to the Enhanced Marketplace and process rebates within the mobile application.

C.1.2 Introducing Voice Assistant Channel – Alexa Skill

Alexa Skill launched in November of 2018 and allows My Account customers to pay bills, review usage history, get bill summary, check meter reading dates, and get energy saving and safety tips through voice activation of their Amazon Alexa device.

C.1.3 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 Exploring New Innovative Offering Initiatives

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 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 V2G pilot is based upon 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 the Energy Concierge.

PSEG Long Island also received submissions that it may consider for future efforts, including ideas related to stationary BTM storage and EE programs. For example, PSEG Long Island is considering a partnership with Sealed to offer Long Island customers Sealed's HomeAdvance Program.

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 Evolving to a Customer-Centric Distributed System Platform Initiatives

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) in South Fork in 2018, which is the fastest growing region on Long Island with an approximate 2.4% 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 fuel-based peaker units, which currently provide most of the peak generation capacity on Long Island.

Going forward, PSEG Long Island's Power Markets group is planning a bulk solicitation for energy storage in the second half of 2020. 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 ~\$400 million capital investment, including:

- Advanced asset management
- Operational data lake implementation on the Amazon Web Service platform
- Ongoing DSCADA implementation
- AMI-OMS integration for advanced outage management

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 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.

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Appendix C: Related Initiatives Outside of Utility 2.0

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:

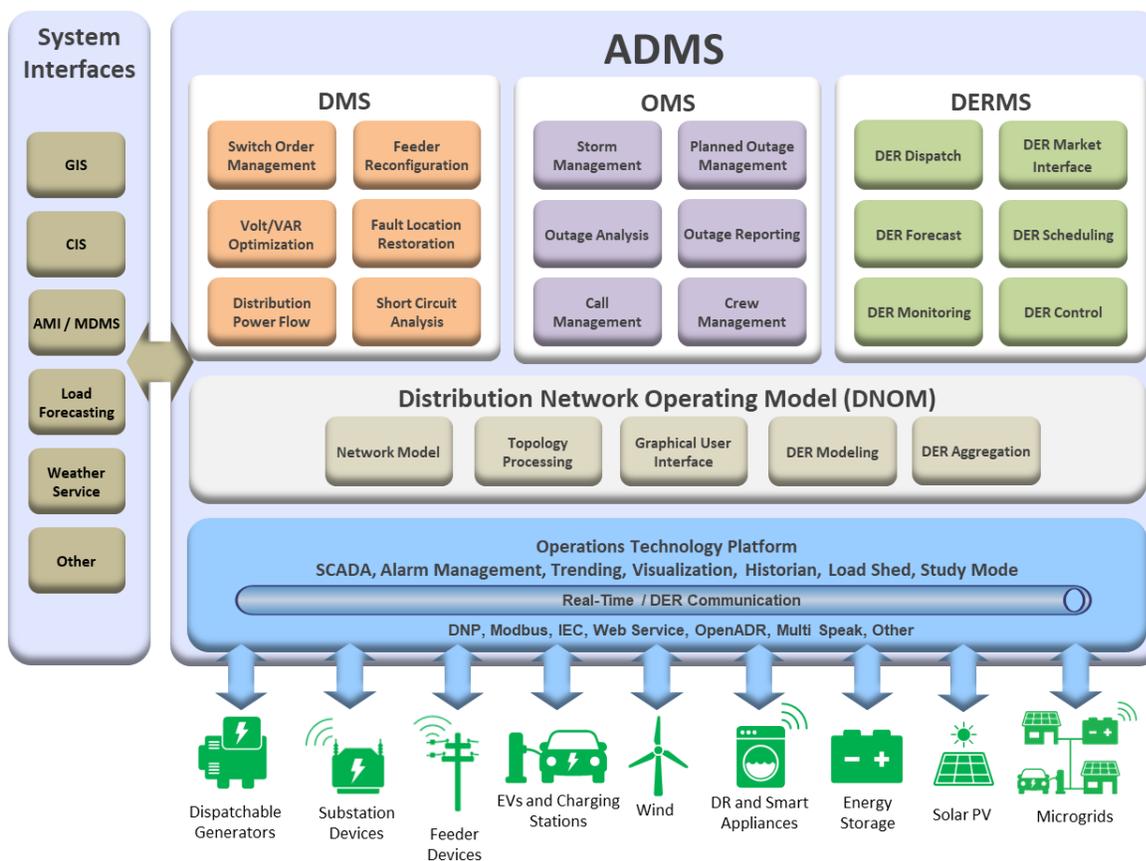
- Distribution power flow to identify real-time voltage, capacity, and operational limit violations
- Distribution state estimator
- Short circuit analysis
- Fault location, isolation and service restoration (FLISR), to locate faults and determine the switching steps required to isolate damaged equipment and restore service to un-faulted sections

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Appendix C: Related Initiatives Outside of Utility 2.0

- 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 approach 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 2020 Utility 2.0 Plan, PSEG Long Island applied the justifications shown in Table D-1.

Table D-1. Justifications for Utility 2.0 Investments

Proposed Initiative	Benefit-Cost Analysis (BCA)	Experimental Design	Enabling Initiative
C&I Demand Alert Pilot		✓	
FlexPay Pilot		✓	
On-Bill Financing Pilot		✓	
Enhanced Marketplace	✓		
EV Make-Ready Program	✓		
NWS Process Development			✓
Hosting Capacity Maps Stage 3			✓
DER Visibility			✓
CVR Program	✓		

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.

Benefit Stream	Definition
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.
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 (e.g., for Energy Concierge).
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 NO _x	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.

Benefit Stream	Definition
Net Avoided CO2	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 SO2 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.
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 EVs) 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.

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Appendix D. Business Case Methodology

Cost Stream	Definition
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.
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)

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

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- 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.

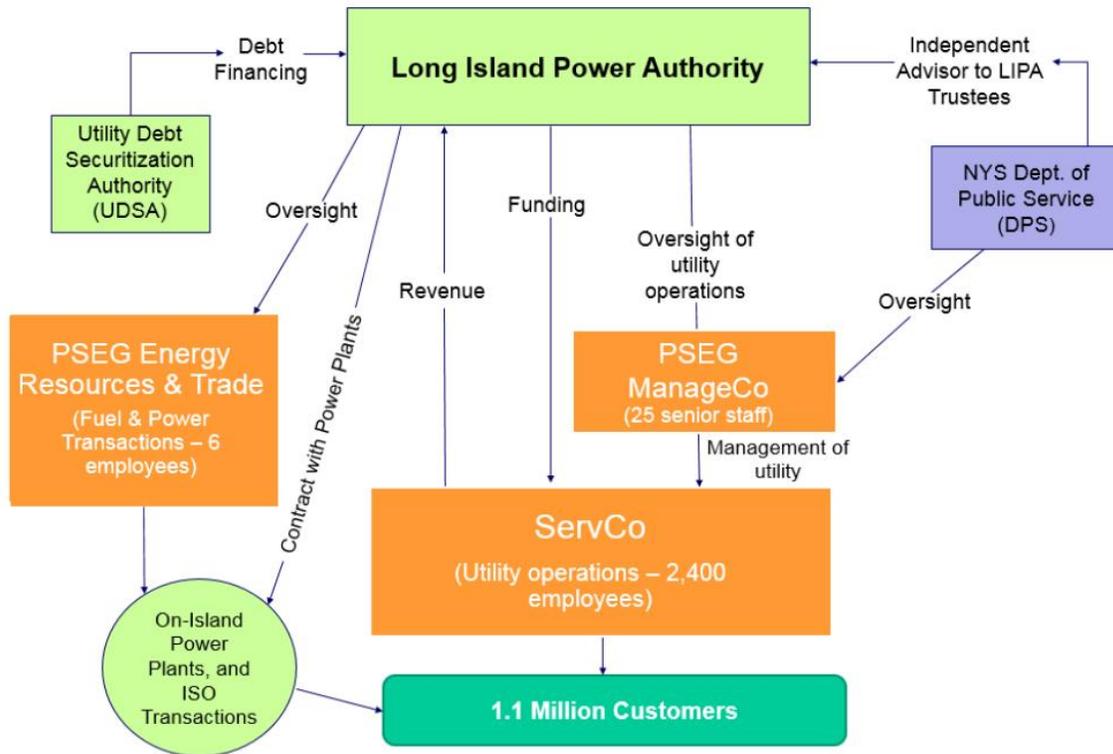
E.4 New York DPS

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
AWS	Amazon Web Services
BCA	Benefit-Cost Analysis
BTM	Behind-the-Meter
Btu	British thermal unit
C&I	Commercial and Industrial
CAPEX	Capital Expenditure
CLCPA	Climate Leadership and Community Protection Act
CRM	Customer Relationship Management
CSRP	Commercial System Relief Program
CVR	Conservation Voltage Reduction
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
EE	Energy Efficiency
EEDR	Energy Efficiency and Demand Response
EEP	Energy Efficient Products
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FTE	Full-Time Equivalent
GIS	Geographic Information System
HEFPA	Home Energy Fair Practices Act
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
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
OMS	Outage Management System
PAC	Program Administrator Cost
PHEV	Plug-in Hybrid EV
PM	Project Management
PMO	Program Management Office
PPE	Personal Protection Equipment
PSC	Public Service Commission
PSEG	Public Service Enterprise Group Incorporated

PV	Photovoltaics
QA/QC	Quality Assurance/Quality Control
REAP	Residential Energy Affordability Partnership
REV	Reforming the Energy Vision
RFI	Request for Information
RFP	Request for Proposal
RIM	Ratepayer Impact Measure
SCADA	Supervisory Control and Data Acquisition
SCT	Societal Cost Test
STS	Suffolk Transportation Services
T&D	Transmission and Distribution
TBtu	Trillion British thermal units
UCT	Utility Cost Test
UoF	Utility of the Future
US	United States
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