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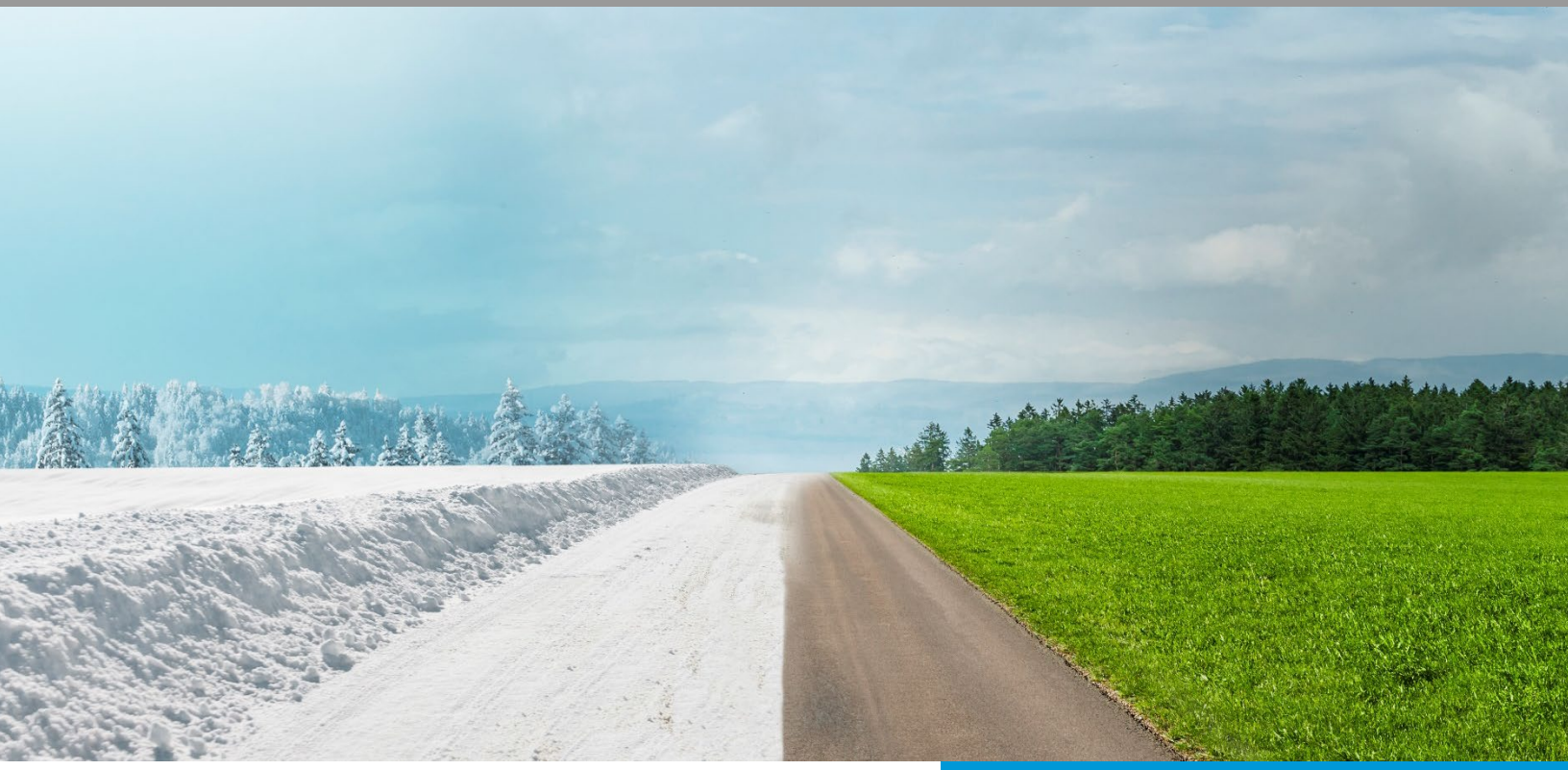
2024 Annual Evaluation Report – Volume I Executive Summary



Prepared for PSEG Long Island

By Demand Side Analytics

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PREFACE

GLOSSARY OF TERMS

Key Term	Definition
MWh Beneficial Electrification (MWh_{be})	The increase in weather-normalized annual electric energy consumption attributable to beneficial electrification measures.
MWh Energy Efficiency (MWh_{ee})	The reduction in weather-normalized annual electric energy consumption attributable to energy efficiency programs or measures.
Delta MWh	The total change in annual electric energy consumption. Equal to $MWh_{ee} – MWh_{be}$. Energy Efficiency measures, MWh_{ee}, typically result in a reduction in a customer's annual electric consumption and are reported as positive impacts. Beneficial Electrification measures, MWh_{be}, result in an increase in the customer's annual electric consumption. A negative value of Delta MWh indicates the measure or program increases electric consumption on the PSEG Long Island system. A positive value of Delta MWh indicates the measure or program reduces electric consumption on the PSEG Long Island system.
Discount Rate	The time value of money used to calculate the present value of future benefits and costs. PSEG Long Island uses a weighted average cost of capital supplied by LIPA that represents the cost of borrowing to build additional capacity to meet the service territory's future supply needs. Based on these factors, we used a nominal discount rate of 5.66% in the 2023 evaluation.
Ex-Ante Gross Savings	The energy and demand savings recorded by the implementation contractor in the program tracking database. Ex-ante gross savings are sometimes referred to as claimed savings. These savings are calculated using planning assumptions and algorithms.
Ex-Post Gross Savings	The energy and demand savings estimated by the evaluation team, using the best methods and data available at the time of the evaluation.
Ex-Post Net Savings	The savings realized by the program after independent evaluation determines ex-post gross savings and applies NTGRs and line losses. The evaluation team uses the ex-post net impacts in the cost-effectiveness calculation to reflect the current best industry practices.

Key Term	Definition
Gross Impacts	The change in energy consumption or demand directly due to the participants' program-related actions, regardless of why they participated. These impacts include coincidence factors (CFs) for demand, waste-heat factors, and installation rates. Gross impacts presented in this report do not include line losses and, therefore, represent the energy and demand savings as would be measured at the customers' meters.
kW Impacts (Demand or Capacity)	The reduction in demand coincident with system peaking conditions due to energy efficiency measures. For Long Island, system peaking conditions typically occur on non-holiday summer weekdays. This report's peak demand savings values are based on system coincident demand impacts between 4 pm and 5 pm on non-holiday weekdays from June to August.
Levelized Cost of Capacity	To operate the electric grid, the system operator needs installed, operable capacity to meet peak demand conditions. The levelized cost of capacity is a metric that allows planners to compare the costs of different resources to meet (or lower) peak demand. The metric is typically expressed in terms of $kW/year.
Levelized Cost of Energy	The equivalent cost of energy (kWh) over the life of the equipment that yields the same present value of costs, using a nominal discount rate of 6.16%. The levelized cost of energy is a measure of the program administrator's program costs in a form that planners can compare to the cost of supply additions.
Line Loss Factor	The evaluation team applies line losses of 5.67% on energy consumption (resulting in a multiplier of 1.0601 = [1 ÷ (1 – 0.0567)]) and of 7.19% on peak demand (resulting in a multiplier of 1.0775 = [1 ÷ (1 – 0.0719)]) to estimate energy and demand savings at the power plant.
MMBtu Beneficial Electrification ($MMBtu_{be}$)	For fuel-switching measures, the reduction in site-level fossil fuel consumption minus the site level increase in the electric consumption (MWh_{be}) converted to MMBtu at 3.412 MMBtu per MWh.
MMBtu Energy Efficiency ($MMBtu_{ee}$)	The reduction in site-level energy consumption due to energy efficiency expressed on a common MMBtu basis. $MMBtu_{ee}$ impacts are calculated by multiplying the MWh_{ee} impacts by a static 3.412 MMBtu per MWh conversion factor and adding any fossil fuel conservation attributable to the measure. Secondary fossil fuel impacts, such as the waste heat penalty associated with LED lighting, are also deducted from the $MMBtu_{ee}$ estimates.
Net Impacts	The change in energy consumption or demand that results directly from program-related actions taken by customers (both program participants and non-participants) that would not have occurred absent the program. The difference between the gross and net impacts is the application of the net-to-gross ratio (NTGR) and line losses. Net impacts presented in this report also include line losses and, therefore, represent the energy and demand savings as would be measured at the generator. Net impacts are used for cost-effectiveness analysis.

Key Term	Definition
Net-to-Gross Ratio (Free-Ridership and Spillover)	The factor that, when multiplied by the gross impacts, provides the net impacts for a program before any adjustments for line losses. The NTGR is defined as the savings attributable to programmatic activity after accounting for free-ridership (FR) and spillover (SO). Free-ridership reduces the ratio to account for those customers who would have installed an energy-efficient measure without a program. The free-ridership component of the NTGR can be viewed as a measure of naturally occurring energy efficiency. Spillover increases the NTGR to account for non-participants who install energy-efficient measures or reduce energy use due to the actions of the program. The NTGR is generally expressed as a decimal and quantified through the following equation: NTGR = 1 – FR + SO
Realization Rate	The ratio of ex-post gross to ex-ante gross impacts. This metric expresses the evaluation savings as a percentage of ex-ante savings claimed by PSEG Long Island or the implementation contractor. The Home Energy Management program is implemented by Uplight on behalf of PSEG Long Island. TRC and its subcontractors implement the remainder of the portfolio.
Ratepayer Impact Test (RIM)	A test that estimates the impact of conservation programs on rates due to changes in utility revenue as result of program activities. The RIM considers the cost-effectiveness from the perspective of a non-participating ratepayer. Energy efficiency programs will typically not pass the RIM test because measures lead to a reduction in utility revenue. Conversely, BE programs often pass the RIM test because the increased consumption allows the utility to spread its fixed costs across more units of energy.
Societal Cost Test (SCT)	A test that measures a program's net costs as a resource option based on benefits and costs to New York. Rebate costs are not included in this test because they are assumed to be a societal transfer. To maintain consistency with the most current version of the New York Benefit-Cost Analysis Handbook, we applied the SCT as a primary method of determining cost-effectiveness using the same assumptions as those used by PSEG Long Island's resource planning team.
Technical Reference Manual (TRM)	A collection of algorithms and assumptions used to calculate resource impacts of PSEG Long Island's Energy Efficiency Portfolio. The PSEG Long Island TRM aligns with the New York State TRM in many respects but includes Long Island specific parameters and assumptions where available from saturation studies or prior evaluation research.
Total MMBtu Impact	The primary performance metric since program year 2020. Equal to the sum of $MMBtu_{be}$ and $MMBtu_{ee}$. This metric represents the change in site-level fuel consumption attributable to the measure or program. This metric does not consider the amount of MMBtu required to generate a kWh of electricity – only the embedded energy in the delivered electricity.

Key Term	Definition
Utility Cost Test (UCT)	A test that measures the net costs of a program as a resource option, based on the costs that the program administrator incurs (including incentive costs) and excluding any costs incurred by the participant beyond what is subsidized by the program. To allow for direct comparison with PSEG Long Island's assessment of all supply-side options and consistent with previous evaluation reports, we continue to show the UCT as a secondary method of determining cost-effectiveness.
Verified Ex-Ante Gross Savings	A key question is if the ex-ante gross energy impacts claimed by the implementation contractors were calculated consistently using the calculations and assumptions approved by PSEG Long Island and LIPA and used to develop annual savings goals. To verify claimed savings, the evaluation team independently calculates the saving using the calculations and assumptions pre-approved by PSEG Long Island. These savings estimates are used to determine if PSEG Long Island achieves its annual scorecard goals.

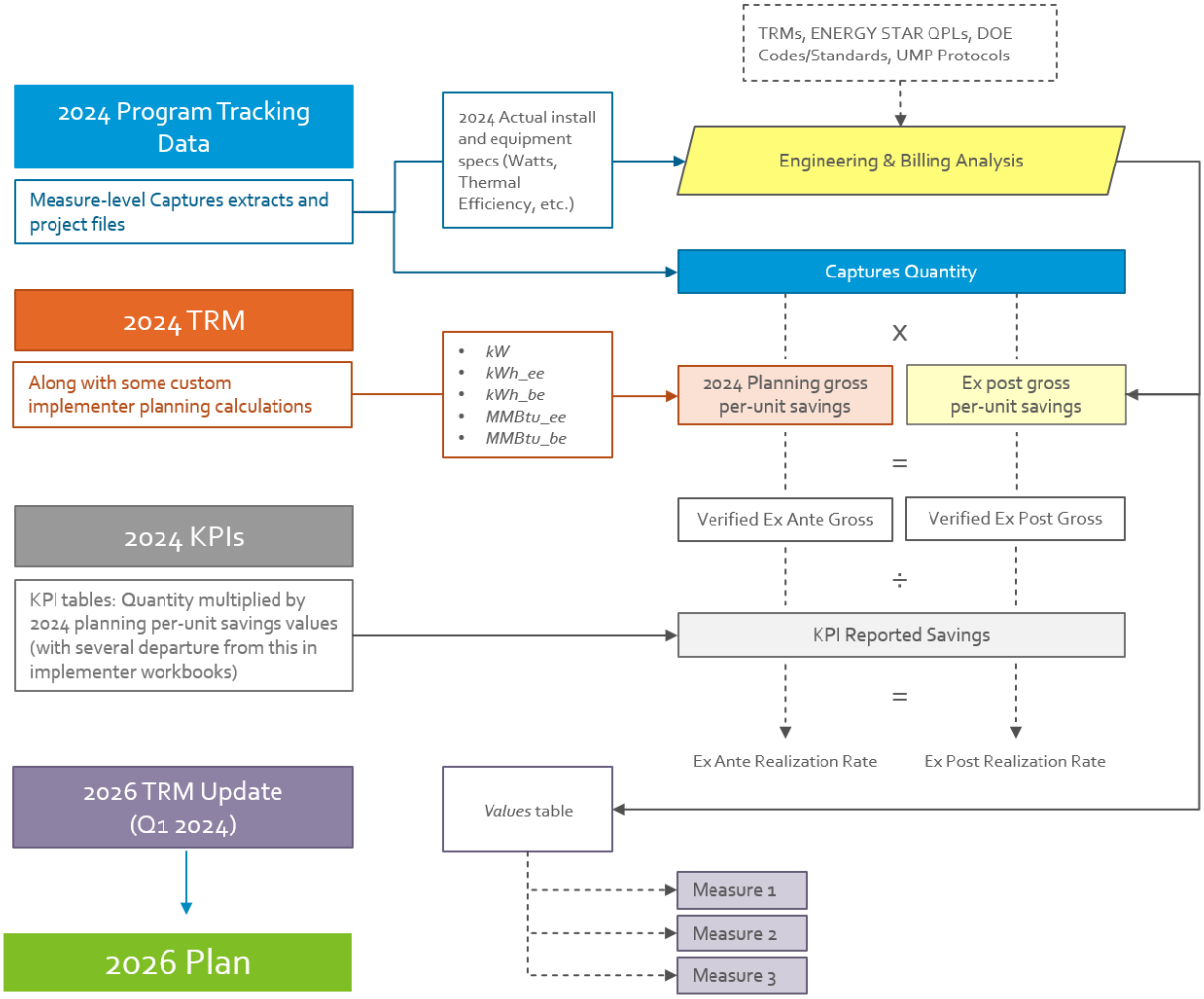
ANNUAL EVALUATION TASKS AND CYCLE TIMELINE

Figure 1 outlines the annual energy efficiency and beneficial electrification programming timeline for planning, verified ex-ante, and verified ex-post and the resources that inform assumptions for each deliverable. The verified ex-ante audit asks if the ex-ante gross energy impacts claimed by the implementation contractors were computed consistently with the calculations and assumptions approved by PSEG Long Island. To verify claimed savings, the evaluation team independently calculates the savings using the calculations and assumptions pre-approved by PSEG Long Island. These savings estimates are used to determine if PSEG Long Island achieves its annual scorecard goals, and results are submitted in the Verified Ex-Ante Memo, Appendix D.

Volumes I and II of this report outline the results from the ex-post evaluation. The ex-post evaluation estimates energy and summer peak demand savings for the portfolio using the most current methods and data available at the time of the evaluation. Assumptions and algorithms from the most up-to-date TRMs, Federal Codes and Standards, and actual equipment specifications are utilized in this portion of the evaluation. The output informs recommendations for future planning cycles.

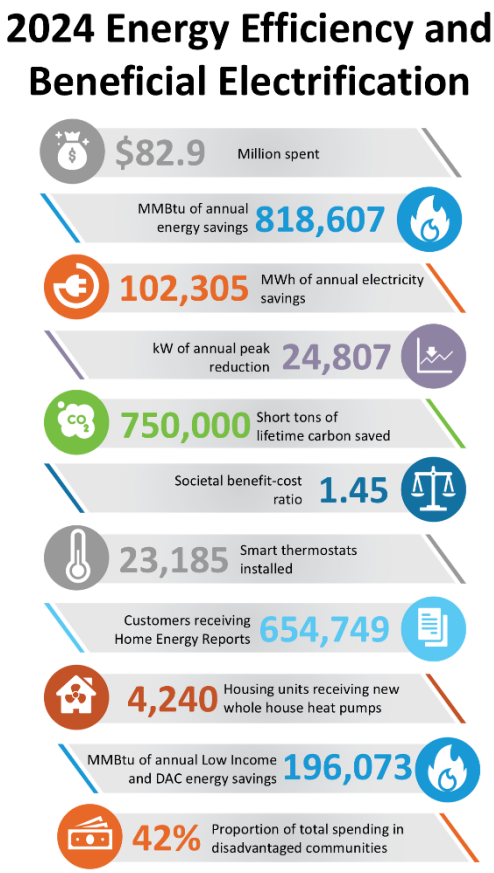
It is important to note that the feedback loop is a two-year cycle. PSEG Long Island has already established 2025 goals and planning assumptions, therefore findings and recommendations from the 2024 ex-post evaluation will not be reflected in the 2025 program claimed savings methodology. The findings and recommendations of this 2024 impact evaluation will be reflected in 2026 planning assumptions, goal setting, and ex-ante savings values. Additionally, any major drivers in differences between ex-post and claimed ex-ante savings discovered in the 2023 evaluation were expected to persist in the 2024 evaluation results.

Figure 1: Annual Evaluation Data Flow



1 INTRODUCTION

PSEG Long Island's Energy Efficiency and Beneficial Electrification programs offer an array of incentive and rebate opportunities to PSEG Long Island residential and commercial customers. These opportunities assist customers in either reducing their energy usage through energy efficiency, thereby lowering their energy bills, or in electrifying their homes and avoiding fossil fuel-based costs through beneficial electrification. The Energy Efficiency and Beneficial Electrification Portfolio is administered by PSEG Long Island and its subcontractor, TRC, on behalf of the Long Island Power Authority (LIPA). The sole exception is the residential behavioral program, Home Energy Management (HEM), which was administered by Bidgely for the 2024 Program Year. This report presents the 2024 Energy Efficiency and Beneficial Electrification Portfolio program evaluation ex-post gross results and covers the period from January 1, 2024, to December 31, 2024.



The Demand Side Analytics evaluation team produced two volumes that together compose the entire Annual Evaluation Report. This document, the 2024 Annual Evaluation Report (Volume I), provides an overview of the portfolio-level evaluation findings. The 2024 Program Guidance Document (Volume II) provides detailed program-by-program impact analysis results.

In 2024, PSEG Long Island spent $82.9 million implementing the Energy Efficiency and Beneficial Electrification Portfolio. The investment led to 818,607 MMBtu of total savings and avoided three quarters of a million short tons of CO_2 emissions – the equivalent of removing approximately 159,000 combustion engine cars for one year.[1] PSEG Long Island's efforts led to over $53.0 million in net societal benefits, with a societal benefit-cost ratio of 1.45.

New York has established many statewide energy efficiency and emission reduction targets. The Climate Leadership and Community Protection Act (CLCPA) set the overall goal of reducing GHG emissions by 40% by 2030 and 85% by 2050. In 2018, New Efficiency: New York set a statewide energy efficiency target of 185 TBtu in energy savings by the end of 2025. By laying out these targets, New York established fuel-neutral metrics to incorporate beneficial electrification in the building and

[1] The EPA estimates 4.29 metric tons of carbon per vehicle-year, the equivalent of 4.73 short tons per vehicle-year. Weblink

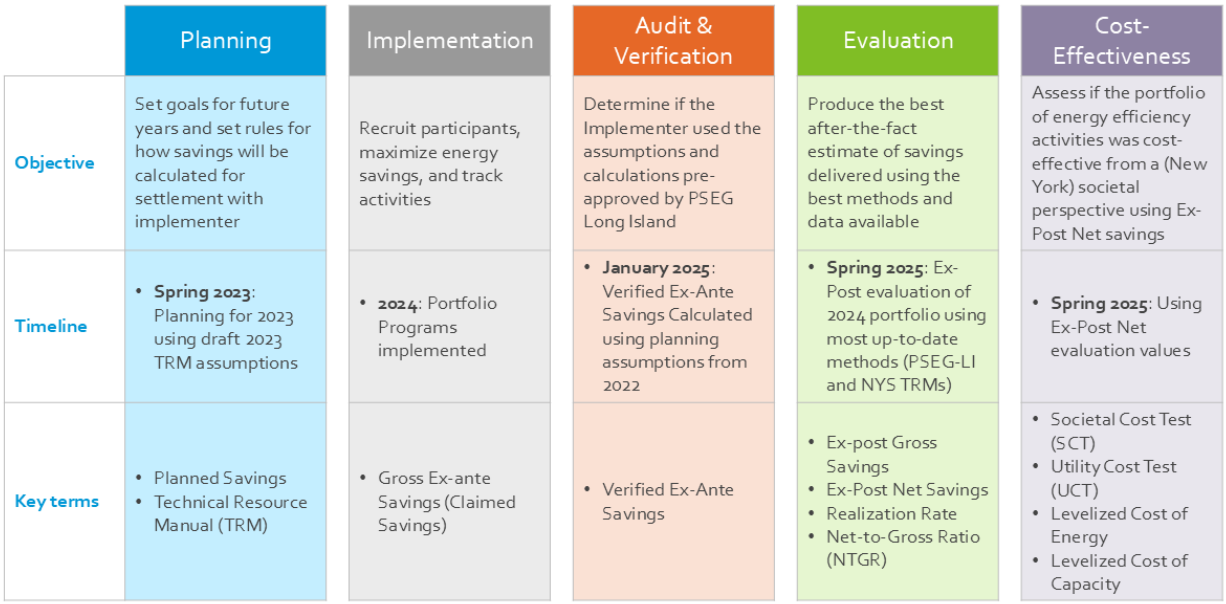
transportation sectors, which is necessary to achieve the State's carbon reduction goals. In response, PSEG Long Island:

- **Changed its primary performance metric from electric energy (kWh) and peak demand (kW) to MMBtu.** The switch, which took place prior to the 2020 program year, allows PSEG Long Island to pursue beneficial electrification measures like heat pumps that increase electric consumption but lower overall energy consumption and emissions. The MMBtu performance metric is "MMBtu at the site" meaning saved or increased kWh is converted to MMBtu using a static factor of 3.412 MMBtu per MWh. The thermal efficiency of the electric power generation fleet does not affect the calculations.
- **Incorporated and continues to expand beneficial electrification measures in its offerings.** PSEG Long Island has continued to pioneer efforts to expand their energy efficiency programs to include rebates and incentives for customers to install measures that supply beneficial electrification to the grid, such as heat pumps, and allow customers to save on their fossil fuel-based costs. 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 shifts investment towards more non-lighting opportunities.
- **Adopted a 7.85 TBtu by 2025 target, their portion of the overarching 185 TBtu goal.** PSEG Long Island is responsible for reporting their progress towards 7.85 TBtu of energy savings by the end of 2025. For consistency with New York investor-owned utilities (IOUs), the impacts counted towards this target are calculated excluding fossil fuel heating penalties. PSEG Long Island includes fossil fuel penalties in their ex-post evaluation of MMBtu impacts. Through 2024, PSEG Long Island has acquired 6.75 TBtu. Based on current projections of 0.75 TBtu for 2025, the company will fall approximately 4% short of the 7.85 TBtu target.

Energy efficiency and beneficial electrification programs undergo a yearly cycle including planning, implementation, audit and verifications, evaluation, and cost-effectiveness. At each stage, the term "energy savings" is used, leading to the need to be precise about the type of savings. Because energy efficiency has a unique lexicon, we include a comprehensive Glossary of Terms with definitions and encourage readers who are less familiar with the key terms to review them.

Figure 2 below shows the energy efficiency program cycle, the main objectives at each step, and the key terms. The feedback loop is nearly a two-year cycle. The planning activities for 2024 were conducted in 2023 and set the goals, rules, and algorithms for calculating energy savings. The 2023 energy efficiency and beneficial electrification measures were not evaluated until the spring of 2024, meaning 2024 programs were already being implemented before performance metrics were available from the 2023 evaluation. Considering this lag, we expected any major drivers in differences between claimed savings and ex-post impacts that were discussed in the 2023 evaluation to persist into 2024. Additionally, most of the findings and recommendations of this 2024 impact evaluation will be reflected in 2026, not 2025, planning assumptions, goal setting, and ex-ante savings values since PSEG Long Island has already established 2025 goals and planning assumptions.

Figure 2: Energy Efficiency Cycle, Objectives, and Key Terms



PSEG Long Island exceeded its planning goals for 2024 on both a verified ex-ante and ex-post basis thanks to strong performance from residential programs and the addition of new non-lighting offerings in the commercial sector. High home prices and interest rates on Long Island mean homeowners are planning fewer moves and are more willing to invest in their home energy efficiency. Homeowners were able to stack tax incentives and energy efficiency rebates offered by the state-run Inflation Reduction Act's (IRA) programs on top of PSEG Long Island incentives in 2024. In 2025 and beyond, IRA funding will be subject to political uncertainty and New York will be restructuring its statewide programming. Section 5: Trends in Energy Efficiency and Beneficial Electrification discusses the policy uncertainty and other industry trends that will invariably impact PSEG Long Island's Energy Efficiency and Beneficial Electrification Portfolio in the second half of this decade. In 2024, PSEG Long Island administered eight programs, which are described in Table 1.

Table 1: Energy Efficiency and Beneficial Electrification Program Descriptions

Program	Description
Commercial Efficiency Program	The program assists non-residential customers in saving energy by offering rebates and incentives to install energy conservation measures as well as beneficial electrification measures. Technical Assistance rebates are available under CEP to offset the cost of engineering and design services for qualifying projects. Starting in 2024, horticultural lighting rebates and incentives were added to the CEP Custom measure mix, and free energy-waste training was made available through the CEP building operator certification (BOC) measure.

Program	Description
Multi-Family	The Multifamily program was launched in October 2020. At launch, the Multifamily program targeted New Construction Multifamily developments. In 2021, the Multifamily Program expanded to include Existing Building Multifamily properties. The Multifamily program offers rebates for common area lighting (indoor and outdoor), efficient heat pump systems for cooling and heating, and in-unit appliances.
Energy Efficiency Products	The program's objective is to increase the purchase and use of energy-efficient appliances among PSEG Long Island residential customers. Through upstream and downstream promotions, the program provides rebates or incentives for many efficient technologies including smart thermostats, dehumidifiers, air purifiers, and appliances. This program also supports beneficial electrification measures such as heat pump pool heaters and heat pump water heaters. The program supports the stocking, sale, and promotion of efficient residential products at retail locations.
Home Energy Management	Home energy reports are behavioral interventions designed to encourage energy conservation by leveraging behavioral psychology and social norms. These paper or electronic reports compare a customer's energy consumption to similar neighboring households and provide targeted tips on reducing energy use.
Home Comfort	The Residential Home Comfort program offers rebates to residential customers for purchasing and installing energy-efficient air-source heat pumps (ASHP), ductless mini-split heat pumps, and ground-source heat pumps (GSHP). These heat pumps are typically two to three times more efficient than traditional fossil fuel heating. The program seeks to promote whole house solutions to both market and income-eligible customers.
Home Performance	The Home Performance program serves residential customers and has two components: Home Energy Assessments (HEAs) and Home Performance with ENERGY STAR (HPwES). The primary objective of the Home Performance program is to make high efficiency choices part of the decision-making process for PSEG Long Island customers when upgrading their homes. The overall goal of the Home Performance program is to reduce the carbon footprint of both market and income-eligible customers who utilize electricity, oil, or propane as a primary heating source.
Residential Energy Affordability Partnership	The program is designed for income-eligible customers and aims to save energy, provide education, help participants reduce electric bills, and make their homes healthier and safer. This program encourages whole-house improvements to existing homes by promoting home energy surveys and comprehensive home assessment services, identifying potential efficiency improvements at no cost to the customer.

Program	Description
All Electric Homes	The All Electric Homes program is an extension of New York State policy goals to reduce reliance on fossil fuel combustion appliances in homes. This program offers incentives and rebates to developers who build single-family all-electric homes or convert existing single-family homes from fossil fuel heating and appliances to all-electric. The All Electric Homes program is not part of the 2025 Energy Efficiency and Beneficial Electrification portfolio.

The remainder of the portfolio report presents the results and key findings. Section 2 summarizes energy savings and performance. Section 2.2 presents the portfolio cost-effectiveness. Section 4 outlines economic impacts. Finally, Section 5 discusses trends and upcoming changes in beneficial electrification and energy efficiency planning considerations.

2 ENERGY SAVINGS AND PERFORMANCE

Table 2 compares planned, claimed, verified, and ex-post gross savings under the primary performance metric, MMBtu. At the portfolio level, the claimed and verified ex-ante values exceeded planning targets. Implementation contractor performance is to be judged using the verified ex-ante metric. For the verified ex-ante metric, the evaluation team independently verified that the main contractor, TRC, calculated the savings consistently with the algorithms and assumptions used for planning. The results of the Verified Ex-Ante Memo can be reviewed in Appendix D. The MMBtu totals for CEP in Table 2 differ from the Verified Ex-Ante Memo due to the exclusion of a 3,783 MMBtu custom electric submetering project. The evaluation team removed the project from the ex-ante and ex-post totals for 2024 based on data availability and recommends that it be revisited during the 2025 evaluation once TRC can work with the participant to collect performance data for analysis.

Table 2: Summary of 2024 Energy Program Performance

Sector	Program	Planned Savings (Goals)	Ex-Ante Gross Savings (Claimed)	Verified Ex-Ante Gross Savings	Ex-Post Gross Savings (Evaluated)
		MMBtu	MMBtu	MMBtu	MMBtu
Commercial	Commercial Efficiency Program (CEP)	259,011	271,975	270,436	229,152
	Multi-Family	46,382	38,664	38,664	37,204
Residential	Energy Efficiency Products (EEP)	153,269	177,654	177,610	189,384
	Home Comfort (HC)	107,678	164,552	164,552	181,730
	Home Performance	35,014	36,593	36,593	22,377
	Home Energy Management (HEM)	177,816	106,265	105,330	145,329
	Residential Energy Affordability Program (REAP)	11,980	12,285	12,234	12,902
	All Electric Homes	574	609	543	530
Subtotal Commercial		**305,393**	**310,639**	**309,100**	**266,356**
Subtotal Residential		**486,332**	**497,958**	**496,862**	**552,251**
Total Portfolio		**791,725**	**808,597**	**805,962**	**818,607**

Figure 3 and Figure 4 visualize the program performance. Because the goals are based on MMBtu gross savings, the appropriate comparisons are between MMBtu planned, claimed, and ex-post gross savings. Appendix B presents the energy (MWh) and peak demand (kW) savings achievements for each of the eight programs. We caution that measures that reduce fossil fuel use, such as heat pumps and heat pump water heaters, can increase overall electricity consumption and peak demand metrics.

Figure 3: Portfolio MMBtu Savings

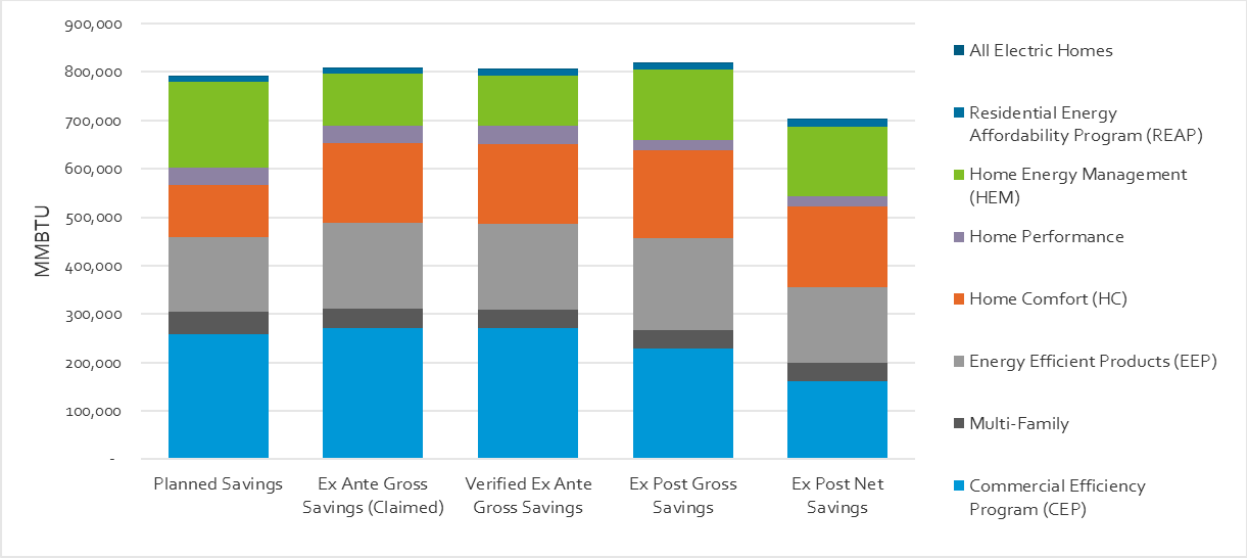
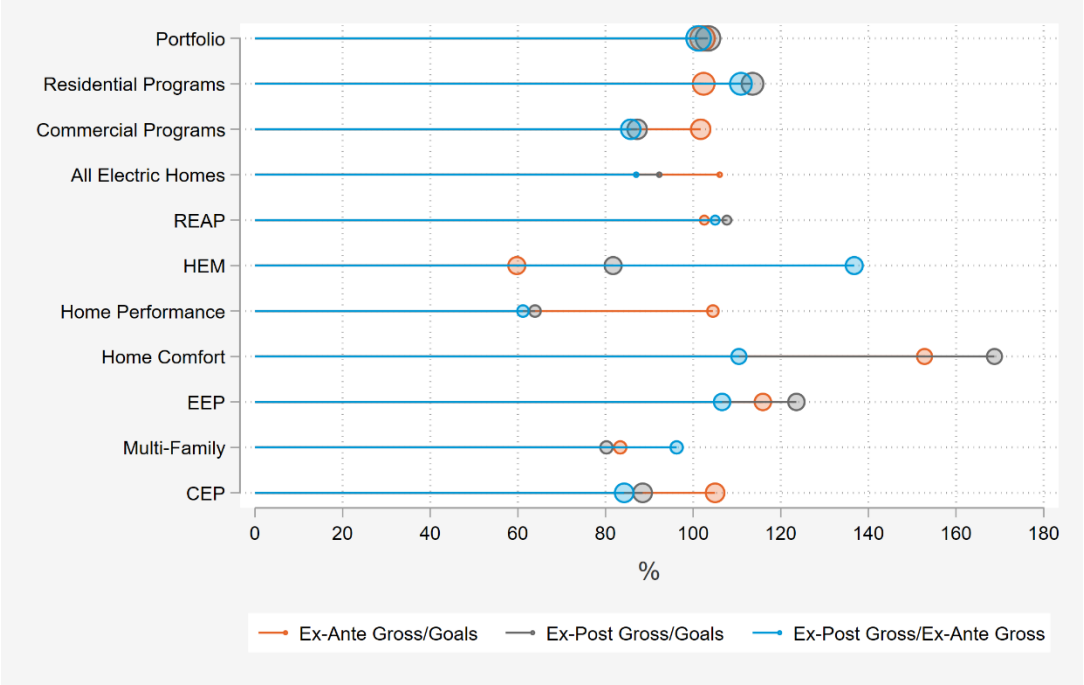


Figure 4 visualizes the key ratios (or realization rates) for the 2024 evaluation. The orange bars compare the ex-ante claimed savings to planning goals, and the grey bars compare ex-post gross savings to goals. The blue bars compare ex-post gross savings to the ex-ante savings claimed by PSEG Long Island and its implementation contractors. The size of each circle is scaled based on the goals for the program. At the portfolio level, the ex-post gross savings were 103% of planned savings. For residential programs, the ex-post gross savings were 114% of planned savings while the ex-post gross savings for commercial programs were 87% of planned savings.

Figure 4: Portfolio Performance Metrics



As Figure 4 shows, most programs had realization rates very close to 100% when comparing claimed and ex-post gross savings. Table 3 summarizes the primary reasons why portfolio ex-post gross (evaluated) savings departed from the planned and claimed savings. The overall portfolio realization rate is 101.2% with a total difference of 10,010 MMBtu between claimed ex-ante and verified ex-post impacts. This indicates that in aggregate, the verified savings are closely aligned with claimed savings for the 2024 program year. However, there is more variation between the claimed ex-ante and verified ex-post MMBtu impacts by program and/or certain measure groups.

Table 3: Summary of Differences between Ex-Post and Ex-Ante

Portfolio Component	Difference Between Ex-Ante Gross and Ex-Post MMBtu Savings	Summary of Savings Difference
Home Energy Management (HEM)	▪ Difference of 39,999 MMBtu savings for an overall realization rate of 137%.	▪ The consumption analysis found similar savings per household as in 2023, but the claimed ex-ante savings were lower in 2024 relative to 2023 due to delayed program delivery and fewer reports issued. The delays were due to the transition to the new program implementation contractor (Bidgely).
Home Performance Consumption Analysis	▪ The consumption analysis showed significantly fewer savings than claimed, resulting in a program realization rate of 61%.	▪ The consumption analysis relies on modeling techniques that compare electric consumption changes amongst HPwES participants to a comparison group of homes that received only the Home Energy Assessment kit. ▪ Since PSEG Long Island is an electric utility, the consumption analysis is limited to kWh savings, which are predominantly assumed to occur during the summer cooling season. The observed underperformance of the insulation, air sealing, and duct repair measures during the cooling season is applied to the claimed fossil fuel savings in the heating season.
Home Comfort Heat Pumps	▪ Difference of 14,389 MMBtu in the non-cold climate heat pump categories drove the overall program realization rate of 113%.	▪ We included beneficial electrification impacts for non-cold climate ASHP installations that replaced fossil fuel heating systems. In contrast, the ex-ante gross savings claims for these units were based on a code-minimum electric ASHP baseline.

Portfolio Component	Difference Between Ex-Ante Gross and Ex-Post MMBtu Savings	Summary of Savings Difference
EEP	▪ Difference of 11,730 MMBtu for an overall program realization rate of 107%.	▪ The Linear LED lighting measure category had an 18% realization rate (-5,405 MMBtu) due to the smaller average fixture sizes in 2024 relative to historic product sized used for planning. The weighted average Wattage differential between baseline and efficient fixtures (8W) was only 31% of the planning assumption (26W). ▪ Smart thermostats were by far the largest measure in EEP, and evaluation results drove the program realization rate up (+15,478 MMBtu). The updated heating and cooling energy savings factors used in the ex-post savings calculations were larger than planning assumptions.
CEP Comprehensive and Fast Track Lighting	▪ Difference of -31,797 MMBtu for comprehensive lighting (realization rate = 79%) ▪ Difference of -6,829 MMBtu for fast track lighting (realization rate = 81%)	▪ Most of the discrepancies can be attributed to the exclusion of fossil fuel interactive heating penalties in the ex-ante calculations. Since their lighting programs are classified as electric efficiency programs, New York IOUs report only kWh and kW savings. For 2024, PSEG Long Island chose to claim ex-ante savings consistently with the IOUs. In contrast, the evaluation team incorporated waste heat factors in the ex-post analysis to reflect fossil fuel heating penalties. ▪ In some of the analyzed building types, the assumed operating hours differed from the values specified in the PSEG-LI TRM.
CEP Custom	▪ Difference of -5,133 MMBtu for a realization rate of 90% for the Custom program component	▪ We evaluated a sample of five custom horticultural lighting sites. For two of the sites, the assumed baseline lighting efficiencies were significantly lower than the minimum values required by New York State for legal cultivation of recreational marijuana. Correcting this baseline discrepancy led to a reduction in ex-post savings.

2.1 OVERVIEW OF IMPACTS BY DISADVANTAGED COMMUNITY AND LOW INCOME IDENTIFIERS

Table 4 shows the impacts per program split into four segments: 1) Non-Disadvantaged Community & Non-Low Income, 2) Disadvantaged Community (DAC) Only, 3) Low Income Only, and 4) DAC & Low Income. Under the CLCPA, New York Utilities are required to direct 35 to 40% of their portfolio benefits to Low Income or DAC identified customers. The effort to identify DAC and Low Income impacts aligns with PSEG Long Island's efforts to track progress towards these requirements. The method used to identify DAC and Low Income impacts aligns with the definitions of the two categories outlined by the

Climate Justice Working Group (CJWG). DACs are identified geographically by census tract groups that meet criteria outlined by the CJWG. Any impacts counted towards DACs represent projects that are located within the list of DAC Census Tract Groups produced by NYSERDA and the CJWG. A Low Income identifier is assigned to any participant with an income that falls at or below 60% of the state-median income. MMBtu savings from projects completed by income-qualified participants count towards the carve-out goal. Additionally, 42% of all rebates and incentives were issued within DACs or to Low-Income households. This exceeds the 35% goal established for 2024.

Table 4: Portfolio Impacts by DAC, Low Income, and Market Rate Customers

	Ex-Post Gross MMBtu				% DAC/ Low Income
Energy Efficiency Program	Non-DAC & Non-Low Income	DAC Only	Low Income Only	DAC & Low Income	
Commercial Efficiency Program (CEP)	176,397	52,755	0	0	23%
Multi-Family	22,188	15,016	0	0	40%
Energy Efficiency Products (EEP)	164,793	24,359	168	64	13%
Home Comfort (HC)	122,608	8,082	45,759	5,281	33%
Home Performance	7,708	977	10,020	3,673	66%
Home Energy Management (HEM)	125,280	20,049	0	0	14%
Residential Energy Affordability Program (REAP)	3,030	1,059	6,270	2,543	77%
All Electric Homes	530	0	0	0	0%
Subtotal Commercial	**198,585**	**67,771**	**0**	**0**	**25%**
Subtotal Residential	**423,949**	**54,525**	**62,216**	**11,561**	**23%**
Total Portfolio	**622,534**	**122,296**	**62,216**	**11,561**	**24%**

2.2 NON-ENERGY METRICS

In addition to energy conservation goals, PSEG Long Island set goals related to the uptake of specific technologies and program activity among historically underserved groups. For the 2024 program year, a goal was specifically set for the total number of unique housing units served by whole home heat pumps. This metric includes the installation of whole house heat pumps through the Home Comfort, Multi-Family, and Home Performance Programs. Two additional goals were established related to spending in Disadvantaged Communities (DACs): (1) PSEG Long Island set a goal that 35% of all rebates and incentives go to program participants in DACs; and (2) 35% of heat pump rebates and incentives go to program participants in DACs. Table 5 compares the verified values for these metrics with the goals and claimed values. Verified values mirror the claimed values, and the goals were exceeded for each metric.

Table 5: Non-Energy Metrics

Metric Description	Goal	Claimed	Verified
Housing Units Served by Whole House Heat Pumps	3,600	4,241	4,240
Total Rebate and Incentive Spending in DACs	35%	43.0%	42.0%
Heat Pump Only Rebate and Incentive Spending in DACs	35%	59.6%	59.7%

2.3 SUMMARY OF PROGRAM SPENDING

PSEG Long Island spent 100% of their planned program-specific budget in 2024 (Table 6) For EEP, Home Comfort, and AEH, the actual spending exceeded the planned budget. CEP, Multi-Family, HEM, and REAP had lower costs than planned. For EEP and Home Comfort, the additional spending correlates to an increase in impacts over planned impacts. HEM and Multi-Family had the lowest ratio of actual to planned spend, and their ex-post gross savings were both lower than planned savings. Home Performance spent almost exactly as planned but underperformed relative to planning due to a low realization rate on building envelope measures.

Table 6: Energy Efficiency and Beneficial Electrification Portfolio Costs (Planned vs. Actual)

Sector	Program	Planned Budget	Actual Spending	Actual/ Planned
Commercial	Commercial Efficiency Program	$32,575,928	$27,844,005	85%
	Multi-Family	$6,525,125	$3,694,888	57%
Residential	Energy Efficiency Products	$9,455,685	$10,220,223	108%
	Home Comfort	$18,395,560	$23,914,345	130%
	Home Performance	$7,684,590	$7,674,610	100%
	Home Energy Management	$3,289,020	$2,441,048	74%
	Residential Energy Affordability Program	$4,171,914	$3,423,593	82%
	All Electric Homes	$503,694	$512,986	102%
Subtotal Commercial		**$39,101,053**	**$31,538,893**	**81%**
Subtotal Residential		**$43,500,464**	**$48,186,805**	**111%**
Advertising and EM&V		N/A	$3,216,297	N/A
Total Energy Efficiency Portfolio		**$82,601,517**	**$82,941,995**	**100%**

3 COST-EFFECTIVENESS

Cost-effectiveness analysis is a widely applied tool designed to allow for direct comparison across resource options and to provide a basis for prioritizing investments. The goal is to facilitate a more efficient allocation of resources by using a common metric – net benefits or the benefit-cost ratio – to compare alternative options. Decision-makers often apply cost-effectiveness analysis on a forward-looking basis to investments with significant upfront costs but with benefits that accrue over multiple years. It also requires a pre-specified perspective (e.g., societal, utility, program participant, non-participating ratepayer), since different parties can view the same outcome differently.

In this report, cost-effectiveness is applied retrospectively to answer the following questions:

- Were 2024 energy efficiency and beneficial electrification activities and investments cost-effective in retrospect?
- How did cost-effectiveness vary by program?
- How sensitive are cost-effectiveness results to key inputs and assumptions?

Typically, cost-effectiveness analysis focuses on whether specific policies or programs lead to overall improvements in welfare for society – whether benefits outweigh costs. When benefits outweigh costs, all relevant stakeholders could be made better off through appropriate redistribution. However, policies and programs often produce winners and losers. What counts as a benefit and as a cost, often depends on the test perspective. For example, lower prices are typically favorable from a customer's perspective but can mean reduced profit margins from a producer's perspective. A widely accepted industry practice is to assess energy efficiency and demand response programs from multiple perspectives. Depending on the perspective, certain benefits do or do not accrue, and costs from one viewpoint can be viewed as transfers from another.

In New York, the primary metric for screening portfolios for cost-effectiveness is the Societal Cost Test (SCT), which includes benefits accrued to New York as a whole. The SCT perspective enables New York to factor in the avoided costs of energy production and delivery and greenhouse gas impacts. It also enables the inclusion of beneficial electrification technologies that increase electricity use but lead to overall lower energy consumption or reduced carbon impacts by shifting energy use from fossil fuels (fuel oil, propane, and natural gas) to electricity. Finally, the SCT considers the full incremental measure costs.[2]

Consistent with PSEG Long Island's Benefit-Cost Analysis (BCA) Handbook, we applied the SCT test as the primary method of determining cost-effectiveness. We also ensured that key assumptions,

[2] Incremental costs are defined as the efficient measure cost (including labor) minus the equipment and labor costs of any baseline measure(s) that would otherwise have been installed. In the few cases where incentives surpass incremental costs, the incentive cost is included in the Societal Cost Test rather than the incremental measure cost.

including avoided costs, discount rates, and line losses, match those used for PSEG Long Island's latest Utility 2.0 filing.

In addition, all calculated benefits and benefit-cost ratios reflect net impacts. Net impacts are the change in energy consumption or demand that results directly from program-related actions taken by customers (both program participants and non-participants) that would not have occurred absent the program. The difference between the gross and net impacts is the application of the net-to-gross ratio (NTGR). Net impacts presented in this report also include line losses and, therefore, represent the energy and demand savings as would be measured at the generator.

Table 7 presents the benefit-cost results for the portfolio and for each program using the primary Societal Cost Test perspective. The portfolio-level SCT values are 1.53 and 1.46 for Commercial and Residential Energy Efficiency and Beneficial Electrification programs, respectively. The full energy efficiency and beneficial electrification portfolio SCT value is 1.45. A benefit/cost ratio greater than 1.0 indicates that portfolio benefits outweigh costs, and from a societal perspective, the Energy Efficiency and Beneficial Electrification Portfolio is cost-effective.

Table 7: Societal Cost Test Results for Energy Efficiency and Beneficial Electrification Portfolio

Sector	Program	NPV Benefits ($1,000)	Costs ($1,000)	B/C Ratio
Commercial	Commercial Efficiency Program	$59,310	$38,255	1.55
	Multi-Family	$9,083	$6,544	1.39
Total Commercial Portfolio		**$42,629**	**$35,893**	**1.19**
Residential	Energy Efficient Products	$37,400	$13,713	2.73
	Home Comfort	$50,144	$42,777	1.17
	Residential Energy Affordability Partnership	$2,917	$3,338	0.87
	Home Performance	$5,513	$7,050	0.78
	All Electric Homes	$201	$794	0.25
	Home Energy Management	$6,142	$2,594	2.37
Total Residential Portfolio		**$102,317**	**$70,266**	**1.46**
Total Portfolio[1]		***$170,709***	***$117,644***	***1.45***

[1] Portfolio costs include $3.2M of advertising and EM&V that were not allocated to individual programs

In the 2024 cost-effectiveness analysis, the marginal emissions rate (tons per MWh) was updated to align with the EPA eGRID Report, increasing the value slightly. Holding all else constant, a higher marginal emissions rate improves cost effectiveness for energy efficiency and decreases cost effectiveness for beneficial electrification. The SCT ratio varies by program, falling below 1.0 for the REAP, Home Performance, and All Electric Homes programs while CEP, Multi-Family, EEP, Home Comfort, and HEM all had SCT ratios above 1. The reasons for the change in SCT relative to prior years vary by program. Some key observations are:

- **CEP:** The SCT ratio for CEP is 1.55 in 2024 compared to 1.19 in 2023. The SCT results for the CEP are driven substantially by incremental costs which are largely a function of project costs. The trend away from lighting and toward beneficial electrification implementation

measures from 2023 continued in 2024, resulting in a further increase in the SCT. As the CEP measure mix evolves beyond lighting, it will be important to watch the influence of new and expanded program components on the SCT ratio.

- **Multi-Family:** The SCT ratio for Multi-Family is 1.39 in 2024 compared to 1.20 in 2023. Like CEP, the Multi-Family program saw a continued increase in beneficial electrification measures in 2024 compared to 2023. For beneficial electrification measures, it is useful to also consider the results of the RIM tests discussed in detail in Volume I.

- **EEP:** EEP continues to be one of the most cost-effective programs in the portfolio with a SCT ratio of 2.73 in 2024 compared to 2.03 in 2023. There was a mix of changes in the EEP program that could have contributed to the increased cost effectiveness. Relative administrative costs decreased from 2023 to 2024, continuing the trend from the prior year. Almost 70% of the MMBtu savings for the EEP program in 2024 came from smart thermostats, which save both electricity and fossil fuel. Even with an incremental cost of over $200 per device, the smart thermostat measure is highly cost effective.

- **Home Comfort:** The SCT ratio for Home Comfort is 1.17 in 2024 compared to 1.50 in 2023. Acquisition costs were higher in 2024 compared to 2023, reflecting the continued shift towards whole home and LMI installations for both ducted and ductless heat pumps. Whole home heat pumps have a higher incremental cost per unit of savings than partial home installations.

- **REAP:** The SCT ratio for REAP is 0.87 in 2024 compared to 0.58 in 2023. Cost-ineffectiveness is not unusual for income-qualified programs, which typically are not required to be cost-effective. In Section 5.2.2, we discuss additional non-energy impacts that can potentially be incorporated into cost effectiveness analysis as low-income benefits. Acquisition costs for first-year savings decreased meaningfully from $323/MMBtu in 2023 to $258/MMBtu in 2024, which contributed to the improvement in the SCT. Additionally, the realization rate for REAP was much higher for the 2024 program year, continuing the trend from the prior year. A higher realization rate increases the SCT benefits and improves cost effectiveness.

- **Home Performance:** The SCT for Home Performance is 0.78 in 2024 compared to 0.84 in 2023. The ratio has been close to 1 since 2020 but dipped below 1.0 in 2023. The types of measures implemented in Home Performance are long-term, capital-intensive investments in the home, so an SCT ratio around 1 is expected. This includes an increase in heat pump adoption through the program. Additionally, an increased focus on weatherization measures such as insulation upgrades and infiltration reduction has the potential to drive down SCT cost effectiveness as these are traditionally high-cost, lower-impact measures. The Home Performance realization rate was lower in 2024 compared to 2023, continuing the trend from the prior year. This lowers the resource savings and SCT benefits, driving cost effectiveness down. For beneficial electrification measures, it is useful to also consider the

results of the RIM test. For energy efficiency it is useful to consider the results of the UCT tests. Both are discussed further in Volume I.

- **All Electric Homes:** The SCT ratio for AEH is 0.25 in 2024 compared to 0.15 in 2023. The improvement is mostly due to the substantial drop in contractor fees.
- **HEM:** The SCT ratio is 2.37 in 2024, a substantial increase compared to 1.62 in 2023. The cost effectiveness increased relative to 2023 due to a relative increase in the avoided cost of electric energy (LBMP).

Figure 5 shows SCT ratios for each program. Note that the size of markers is proportional to the ex-post MMBtu savings for each program.

Figure 5: Societal Cost Test Ratios by Program

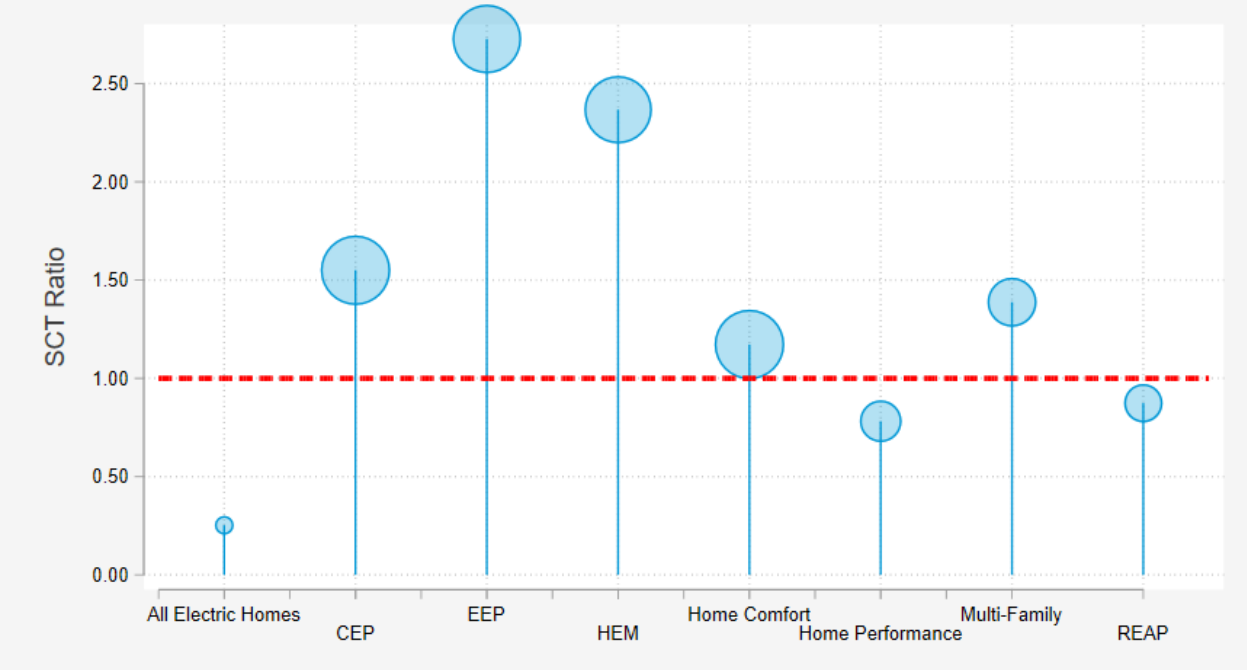


Figure 6 summarizes the benefit and cost categories analyzed and the share each contributed to the SCT. The primary two benefits for the SCT are other fuel impacts at 35% and avoided carbon emissions at 23% of benefits. The combined benefits for capacity (generation, transmission, distribution) together comprise about 11% of societal benefits. From a societal perspective, the largest two cost categories are the measure costs borne by participants and the measure costs borne by the utility in the form of customer rebates and contractor incentives. Incremental measure costs paid by participants net of incentives account for 36% of the Net NPV Cost Shares, and the portion paid by the utility accounts for 36% of the cost shares. Together these two categories comprise the full incremental cost of efficiency measures over baseline measures. Program administration costs, including utility labor, advertising, and implementation vendor fees, comprise about 27% of societal costs.

Figure 6: Portfolio Net Present Value Benefit and Cost Shares by Category

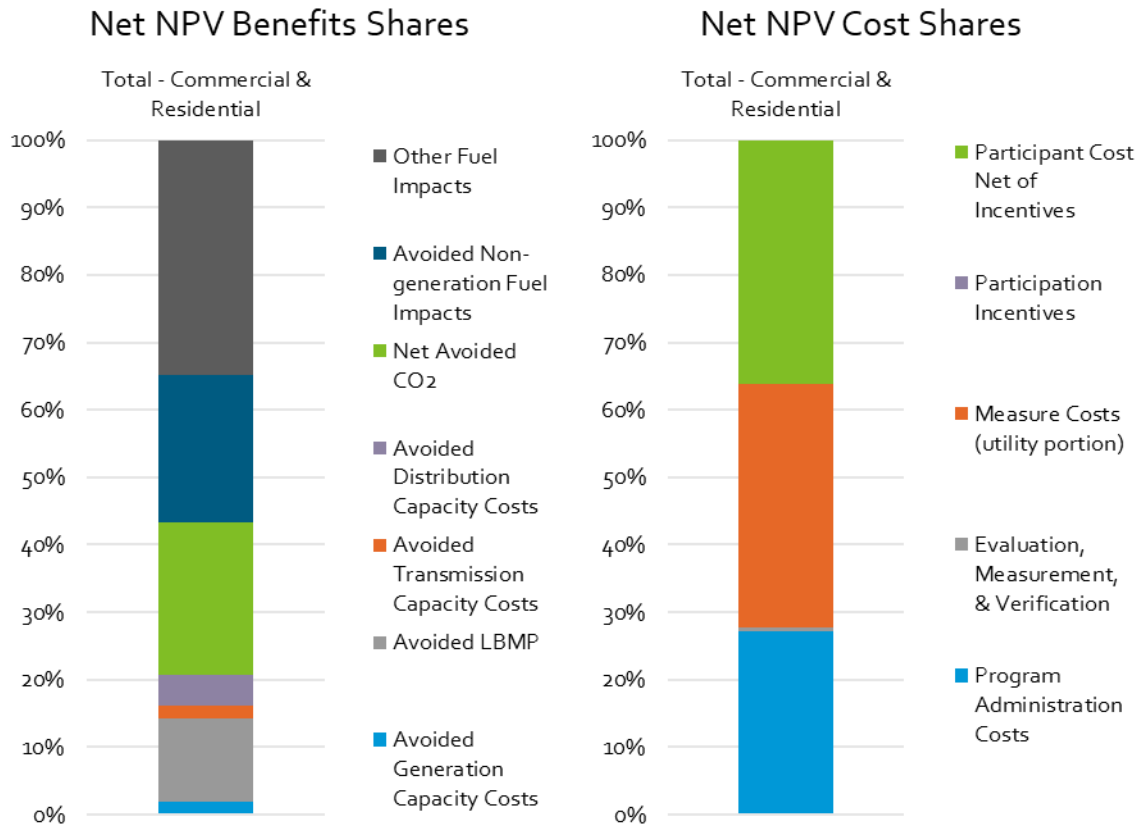


Table 8 shows the distribution of SCT benefits for beneficial electrification measures, Table 9 shows the distribution of SCT benefits for energy efficiency measures, and Table 10 shows the distribution of SCT benefits for the portfolio as a whole. The cells highlighted in orange are the top three benefit categories for each group. These tables show that most of the benefits fall into fuel categories such as avoided natural gas and delivered fuel impacts. As the portfolio shifts towards more beneficial electrification, we can expect to see this trend continue. While PSEG Long Island is an electric utility and the cost of its programs is funded through electric rates, most of the portfolio benefits come from fossil fuel savings and avoided greenhouse gas emissions.

Table 8: Beneficial Electrification Detailed Benefits Breakout

	Avoided LBMP	Avoided Capacity Costs (G+T+D)	Net Avoided CO_2	Avoided Natural Gas Impacts	Delivered Fuel Impacts
Total - Commercial	$532	$454	$3,420	$7,537	$3,929
Total - Residential	$9,611	$338	$7,773	$21,015	$47,510
Total - Portfolio	**$9,079**	**$792**	**$11,194**	**$28,552**	**$51,438**

Table 9: Energy Efficiency Detailed Benefits Breakout

	Avoided LBMP	Avoided Capacity Costs (G+T+D)	Net Avoided CO_2	Avoided Natural Gas Impacts	Delivered Fuel Impacts
Total - Commercial	$23,448	$11,262	$19,036	$31	$1,195
Total - Residential	$6,797	$2,163	$8,289	$8,855	$9,187
Total - Portfolio	**$30,245**	**$13,425**	**$27,326**	**$8,824**	**$7,992**

Table 10: Total Portfolio (EE and BE) Detailed Benefits Breakout

	Avoided LBMP	Avoided Capacity Costs (G+T+D)	Net Avoided CO_2	Avoided Natural Gas Impacts	Delivered Fuel Impacts
Total - Commercial	$23,980	$11,716	$22,457	$7,506	$2,734
Total - Residential	$2,815	$2,501	$16,062	$29,870	$56,696
Total - Portfolio	**$21,165**	**$14,217**	**$38,519**	**$37,376**	**$59,430**

3.1.1 Cost Effectiveness Tests: Resource of Interest and Best Test to Measure Cost Effectiveness

While the SCT is the primary cost test for the Energy Efficiency and Beneficial Electrification portfolio, it is worth exploring the information provided by both the Utility Cost Test (UCT) and Ratepayer Impact Test (RIM). The UCT is a good secondary test for Energy Efficiency measures, whereas the RIM is a useful secondary test for the Beneficial Electrification measures. The RIM Test views cost-effectiveness from the perspective of non-participating ratepayers and assesses whether the change in electric rates due to program activity outweighs the costs of operating the programs.

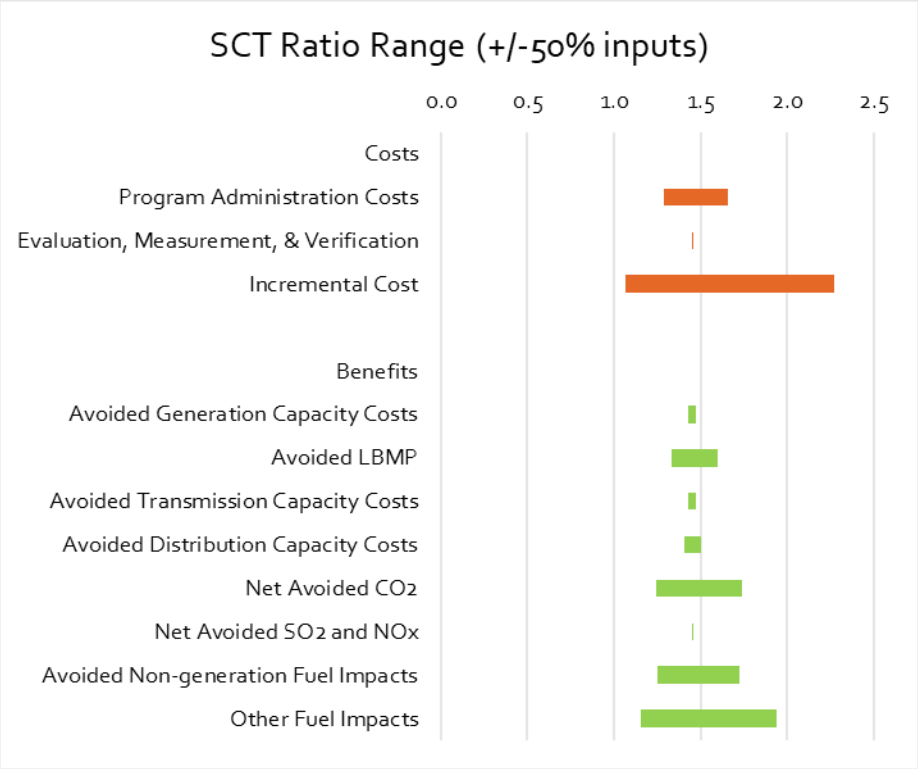
At the portfolio level, the UCT ratio is 0.43, however when evaluated only for Energy Efficiency impacts the UCT ratio increases to 1.02. Specifically, programs with higher concentration of energy efficiency measures, such as EEP, see higher cost effectiveness ratios under the UCT compared to programs consisting of mostly beneficial electrification measures. Alternatively, the RIM ratio is 0.41 at the portfolio level, but when evaluated for Beneficial Electrification measures, the RIM ratio increases to 0.99. Programs consisting of mostly beneficial electrification, such as Home Comfort, have highly cost-effective RIM results. This indicates that the beneficial electrification measures are cost effective from the non-participating ratepayer perspective.

Appendix C provides additional details on the UCT and RIM results.

3.2 SENSITIVITY ANALYSIS

When considering the prospective implications of a cost-effectiveness analysis, it is important to assess how sensitive results may be to assumptions about cost and benefit inputs. Figure 7 shows the range of portfolio SCT ratios when each cost and benefit category is independently varied up and down by 50%. For example, if incremental costs were 50% higher, the portfolio SCT would be about 1.07. If incremental costs are 50% lower, the portfolio SCT ratio would be about 2.27. Similarly, if the avoided cost of carbon was 50% lower, the portfolio SCT would be 1.25, but if avoided carbon costs were 50% higher, the portfolio SCT ratio would be 1.74. The sensitivity analysis demonstrates that the SCT cost-effectiveness results are primarily driven by incremental cost assumptions, followed by administrative costs, other fuel impacts, and avoided carbon costs. This finding is logical given that these components comprise the largest shares of costs and benefits, respectively.

Figure 7: Portfolio SCT Ratio Sensitivity to +/-50% Changes in Costs & Benefits



In addition to varying cost and benefit inputs up and down, we conducted a sensitivity analysis to explore the effects of declining carbon intensity of the power supply. As the electric generation mix decarbonizes, every MWh saved produces fewer avoided tons of CO_2. This means that it will be somewhat less cost-effective to save the same unit of electricity, holding all else constant. Conversely, every additional MWh consumed results in less CO_2 emitted than would have been the case at a higher emissions rate. This means that as the carbon intensity of the power supply decreases, it will be somewhat more cost-effective to deploy beneficial electrification measures which result in increased electricity consumption.

The marginal carbon emissions rate is constant over time in the base scenario analysis. To explore sensitivity to declining emissions, marginal emissions were decreased annually to reach the carbon emissions rate implied by reaching the 70% renewables by 2030 goal of the Climate Leadership and Community Protection Act.[3] Table 11 shows the program and portfolio SCT results for this sensitivity scenario. The SCT ratio dropped from 1.45 to 1.41. On a relative basis, this drop is smaller compared to last year. This is expected as beneficial electrification measures become more prevalent in the portfolio and the assumed marginal carbon emissions decrease. For example, programs relying primarily on energy savings show modestly lower SCT ratios. In contrast, the Home Comfort program, which relies primarily on beneficial electrification, shows a modest increase in the SCT.

Table 11: Societal Cost Test Results for Declining Emissions Sensitivity

Sector	Program	NPV Benefits ($1,000)	Costs ($1,000)	SCT Ratio (Sensitivity)	SCT Ratio (Base)
Commercial	CEP	$51,793	$38,255	1.35	1.55
	Multi-Family	$9,065	$6,544	1.39	1.39
Total Commercial Portfolio		**$60,857**	**$44,800**	**1.36**	**1.53**
Residential	Energy Efficient Products	$37,018	$13,713	2.70	2.73
	Home Comfort	$52,824	$42,777	1.23	1.17
	REAP	$2,793	$3,338	0.84	0.87
	Home Performance	$5,697	$7,050	0.81	0.78
	All Electric Homes	$206	$794	0.26	0.25
	Home Energy Management	$6,142	$2,594	2.37	2.37
Total Residential Portfolio		**$104,681**	**$70,266**	**1.49**	**1.46**
Total Portfolio [1]		***$165,538***	***$117,644***	***1.41***	***1.45***

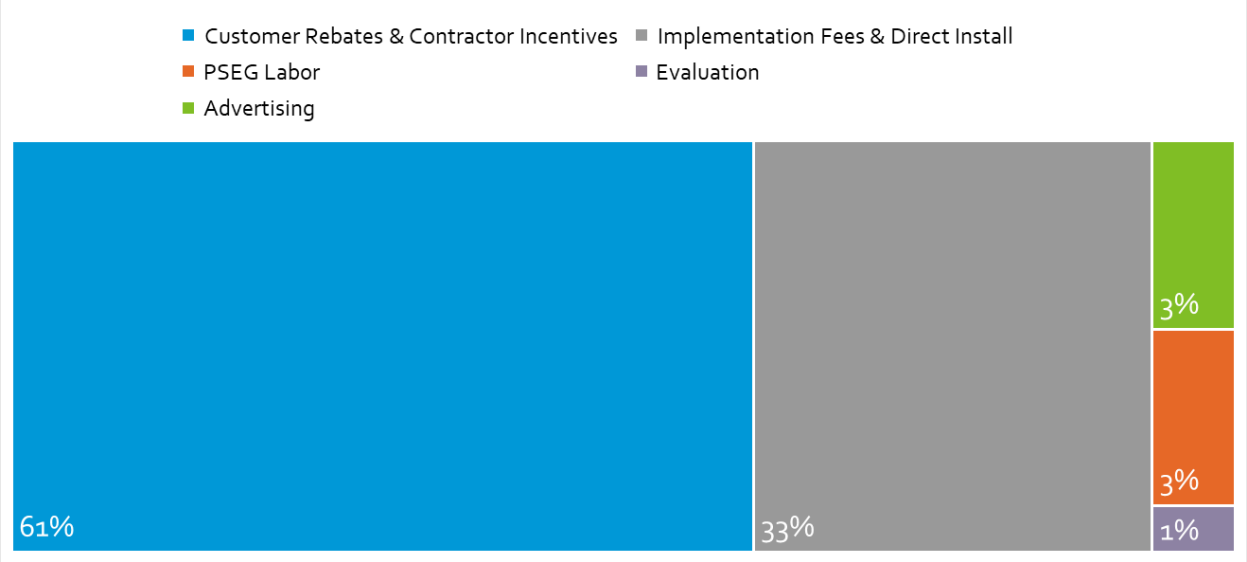
[1] Portfolio costs include $3.2M of advertising and EM&V that were not allocated to individual programs

3.3 2024 EXPENDITURE SUMMARY

PSEG Long Island spent $82.94 million on the Energy Efficiency and Beneficial Electrification Portfolio in 2024, compared to $85.55 million in 2023. Figure 8 summarizes spending related to implementation, management, and evaluation of programs in the 2024 Portfolio by type of expenditure. Customer "Rebates" consist of payments made to participating customers, and Contractor "Incentives" consist of payments made to participating contractors (e.g., heating, ventilation, and air conditioning (HVAC) installers).

[3] New York State Climate Action Council. 2022. "New York State Climate Action Council Scoping Plan." Weblink

Figure 8: 2024 PSEG Long Island Expenditures for the EE and BE Portfolio



4 ECONOMIC IMPACT MODELING

Table 12 summarizes the estimated changes to Long Island's overall economic output and employment resulting from PSEG Long Island's 2024 Energy Efficiency and Beneficial Electrification portfolio investments. Over 25 years (from 2024 through 2048), the investments made in 2024 are projected to return $475.4 million in total economic benefits to the regional economy (in 2024 dollars), with an employment benefit of 1,003 full-time equivalent employees (FTEs). Full-time equivalents represent the number of total hours worked divided by the number of compensable hours in a full-time schedule. An FTE of 1.0 means that the workload is equivalent to a full-time employee for 1 year, but could be done, for example, by two people each working full-time for 6 months.

Table 12: Economic Impact of 2024 Energy Efficiency and Beneficial Electrification Portfolio

2024 Energy Efficiency Portfolio Investments	2024 Economic Impact	2024-2048 Economic Impact
Economic Impact		
Total Economic Output (Millions)	$296.0	$475.4
Direct Effects (Millions)	$248.8	$248.8
Indirect & Induced Effects (Millions)	$47.1	$226.5
Employment, Direct FTE	758	1,003
Employment, Indirect FTE	301	429
Total Employment, Direct & Indirect FTE	1,059	1,433
Impact per $1M Investment		
2024 Program Investment (Millions)	$82.9	$82.9
Total Economic Output in Dollars per $1M Investment	$3.57	$5.73
Employment (Total FTE) per $1M Investment	12.8	17.3

Employment is positively correlated to program investment and to increased disposable income from participant energy cost savings. Program Year 2024 investment decreased $3.3 million to $82.9 million from $85.6 million in 2023. Program Year 2024 projected employment decreased commensurately to 758 FTEs, from 784 FTEs in Program Year 2023. The decline in program investment resulted from $9.4 million lower program expenditures for the Energy Efficiency Products program, offset by net increases of $0.9 million for the other residential programs and $5.2 million for the Commercial Efficiency Program. Participant energy cost savings over 25 years are projected to create 245 FTEs in addition to 758 FTEs from Program investment, totaling 1,003 FTEs as shown in Table 12.

The net present value (NPV) of economic output of $475.4 million equals the present value of participant energy costs savings over 25 years of $179.4 million plus the 2024 economic impact of $296.0 million from program investments. A nominal discount rate of 5.66% and an energy price inflation rate of 1.7% were used to calculate the NPV of participant energy cost savings. These assumptions are consistent with PSEG Long Island's Utility 2.0 filing, PSEG Long Island's assumptions for supply-side planning, and the cost-effectiveness analysis presented in the prior section of this report.

5 TRENDS IN ENERGY EFFICIENCY AND BENEFICIAL ELECTRIFICATION

New York has several sweeping and ambitious statewide clean energy goals. In 2018, the New Efficiency: New York (NE:NY) white paper was published. In 2019, building on the initiatives set in NE:NY, the Climate Leadership and Community Protection Act (CLCPA) was signed into law. Through the CLCPA, New York is doubling down on its efforts to create a clean, resilient, and equitable energy grid. In 2022, Governor Hochul announced a plan for two million climate-friendly, electrified or electrification-ready homes by 2030. While great progress has been made, market forces and politics make reaching these goals uncertain.

The Climate Leadership and Community Protection Act aims to:
Reduce Greenhouse Gas emissions 40% by 2030 and 85% by 2050 below the 1990 emissions baseline
Have 70% of energy come from renewable energy by 2030
Achieve an energy efficiency target of 185 TBtu of cumulative site energy savings statewide
Achieve a minimum of 1 million electrified homes and up to 1 million electrification-ready homes by 2030
Deploy 6 GW of Energy Storage capacity and 10 GW of solar by 2030.
Provide 35-40% of benefits of spending on clean energy and energy efficiency programs to disadvantaged communities.

To meet the goals set forth in CLCPA, PSEG Long Island is focused on expanding renewable energy resources, further electrifying and decarbonizing their system, reducing greenhouse gas emissions, and escalating programs in disadvantaged and low-income communities. As the low-hanging fruit of residential LED lighting is no longer available and more stringent codes have required beneficial electrification, utilities in New York have begun to struggle to stay on track with the lofty CLCPA goals. Rising prices due to inflation and tariffs, near certain cuts in federal spending, and delays to new funding sources from Albany mean that, while PSEG Long Island continues to be a leader in expanding beneficial electrification measures in their service area, the State's pathway to meeting its emissions goals is unclear.

The following sections walk through the implications of these statewide clean energy goals and the changing political landscape on PSEG Long Island's Energy Efficiency and Beneficial Electrification Portfolio.

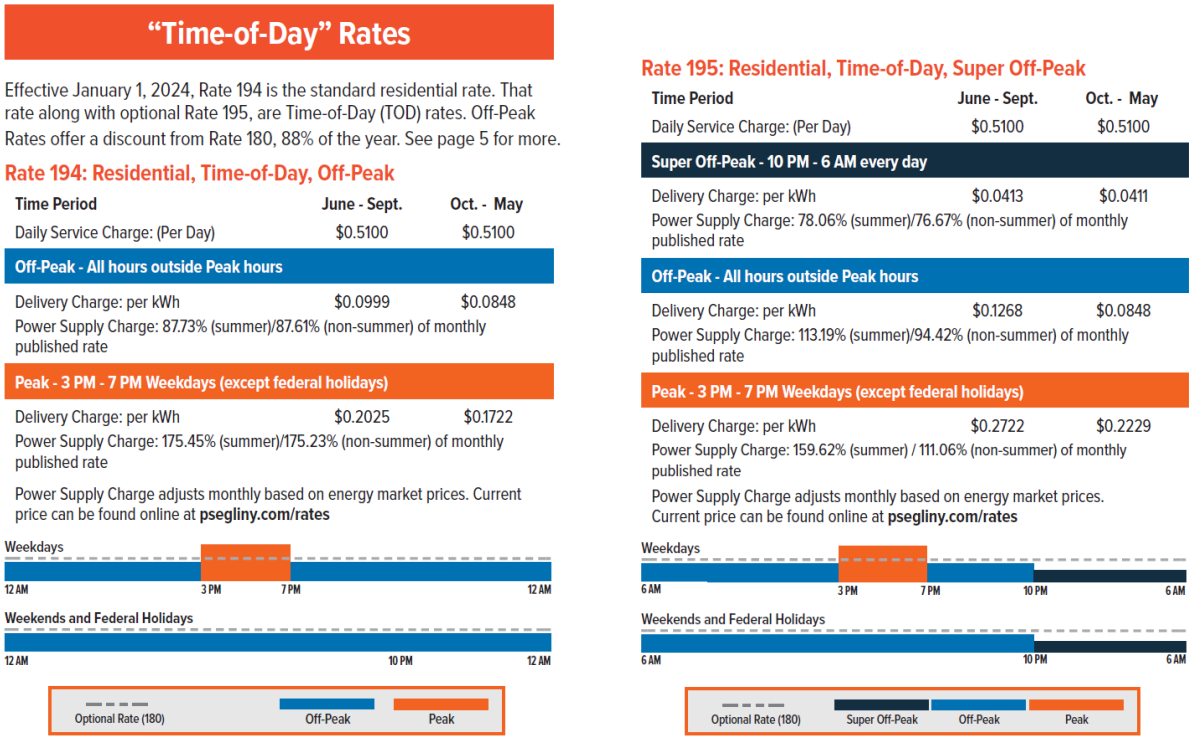
5.1 TIME OF DAY RATES IN 2024

Following investments in smart meter infrastructure over the past several years, PSEG-Long Island launched two new residential Time-of-Day (TOD) rates in November of 2023. TOD rate schedules for residential customers price consumption of electricity differently based on the time of day the consumption occurs. This is important for environmental conservation and economic efficiency because of the unique nature of electricity markets. Until large grid scale batteries become widespread, electricity cannot be stored, so electricity production must meet demand at every moment of every day. When demand is highest during summer weekday afternoons, the grid must dispatch its most expensive, and often emissions-intensive, peaker plants. Being able to meet supply during this peak

makes the grid more expensive to run for everyone, so encouraging consumers to shift their demand away from the peaks reduces the use of these marginal generating units. Creating a flatter daily demand profile will help make room for more renewables like wind that are most productive overnight.

While PSEG Long Island's implementation of TOD rates is not part of their Energy Efficiency and Beneficial Electrification program, its goals of reducing the costs of electricity to consumers and lessening the environmental impact of the grid fit in well, so we present a short summary of progress in this section. The two new rates rolled out in late 2023 were Time-of-Day Off-Peak (Rate 194) and Time-of-Day Super Off-Peak (Rate 195). Rate 194 became the standard residential rate in January of 2024, with a roughly two-to-one ratio of prices from peak (3 to 7 p.m.) to off-peak hours. Figure 9 and Figure 10 provide details on each rate from the 2024 residential rate booklet.

Figure 9: Residential Rate Brochure 2024 Delivery Rates – Rates 194 & 195



"Time-of-Day" Rates

Effective January 1, 2024, Rate 194 is the standard residential rate. That rate along with optional Rate 195, are Time-of-Day (TOD) rates. Off-Peak Rates offer a discount from Rate 180, 88% of the year. See page 5 for more.

Rate 194: Residential, Time-of-Day, Off-Peak

Time Period	June - Sept.	Oct. - May
Daily Service Charge: (Per Day)	$0.5100	$0.5100
Off-Peak - All hours outside Peak hours		
Delivery Charge: per kWh	$0.0999	$0.0848
Power Supply Charge: 87.73% (summer)/87.61% (non-summer) of monthly published rate		
Peak - 3 PM - 7 PM Weekdays (except federal holidays)		
Delivery Charge: per kWh	$0.2025	$0.1722
Power Supply Charge: 175.45% (summer)/175.23% (non-summer) of monthly published rate		

Power Supply Charge adjusts monthly based on energy market prices. Current price can be found online at **psegliny.com/rates**

Weekdays
12 AM 3 PM 7 PM 12 AM

Weekends and Federal Holidays
12 AM 10 PM 12 AM

Optional Rate (180) Off-Peak Peak

Rate 195: Residential, Time-of-Day, Super Off-Peak

Time Period	June - Sept.	Oct. - May
Daily Service Charge: (Per Day)	$0.5100	$0.5100
Super Off-Peak - 10 PM - 6 AM every day		
Delivery Charge: per kWh	$0.0413	$0.0411
Power Supply Charge: 78.06% (summer)/76.67% (non-summer) of monthly published rate		
Off-Peak - All hours outside Peak hours		
Delivery Charge: per kWh	$0.1268	$0.0848
Power Supply Charge: 113.19% (summer)/94.42% (non-summer) of monthly published rate		
Peak - 3 PM - 7 PM Weekdays (except federal holidays)		
Delivery Charge: per kWh	$0.2722	$0.2229
Power Supply Charge: 159.62% (summer) / 111.06% (non-summer) of monthly published rate		

Power Supply Charge adjusts monthly based on energy market prices. Current price can be found online at **psegliny.com/rates**

Weekdays
6 AM 3 PM 7 PM 10 PM 6 AM

Weekends and Federal Holidays
6 AM 10 PM 6 AM

Optional Rate (180) Super Off-Peak Off-Peak Peak

Figure 10: Example of Monthly Power Supply Rates (Seasonal % off flat rate power supply hold)

July 1, 2024 −

The July PSC rate is **$0.108746/kWh.** This is a $0.0088/kWh or 7.47% decrease from the June PSC rate of $0.11752/kWh. The July Power Supply Rate includes the Local Supply Rate of $0.038078/kWh and the Market Supply Rate of $0.07067/kWh (see the table below).

The 12 month (Aug '23-July '24) weighted average market supply rate is $0.0711150/kWh.

Residential	Super Off Peak	Off Peak	Peak
190	$0.065248 (60%)	$0.108746 (100%)	$0.225485 (201.68%)
191	$0.065248 (60%)	$0.108746 (100%)	$0.190719 (172.14%)
192	$0.065248 (60%)	$0.108746 (100%)	$0.200680 (178.30%)
193	$0.065248 (60%)	$0.123013 (111.95%)	N/A
194 (S)	N/A	$0.095403 (87.73%)	$0.190795 (175.45%)
194 (W)	N/A	$0.095272 (87.61%)	$0.190556 (175.23%)
195 (S)	$0.084887 (78.06%)	$0.123090 (113.19%)	$0.173580 (159.62%)
195 (W)	$0.083376 (76.67%)	$0.102678 (94.42%)	$0.120773 (111.06%)

Both rates were open for opt-in and opt-out enrollments in 2024, while Rate 194 became the standard rate for new accounts. Most existing residential customers are currently being migrated to Rate 194, beginning with ~30,000 migrations in June 2024 and the remaining eligible customer populations in groups of ~95,000 throughout 2025. A residential flat rate option continues to remain available to customers. Most existing residential customers will be migrated to Rate 194 by the end of 2025, though they can opt out (remain on a flat rate), choose Rate 195, or select any other qualifying available rate option instead. As of March 1st, 2025, over 230,000 customers were enrolled in one of the new TOD rates. These included 85,000 new accounts that were defaulted on to the rates, over 140,000 that were migrated, and 8,300 that opted in to one of the rates. This number is forecast to increase to ~500,000 before the summer of 2025 and over 800,000 residential TOD customers by the end of 2025.

5.1.1 Rate 194 Migrations

Table 13 shows the current migration schedule forecast for eligible residential customers in 2024-2025. Some low-income households are ineligible for migration, as are homes with lifesaving equipment, homes on voluntary TOU Rates (190-193), etc.

Table 13: Planned Migrations to Rate 194 Migrations by Group (as of April 2025)

Group	1	2	3	4	5	6	7	8	9	10
Migration Month	June 2024	Jan 2025	Feb 2025	Mar 2025	Apr 2025	May 2025	Sep 2025	Oct 2025	Nov 2025	Dec 2025
n	30,000	50,000	70,000	95,000	95,000	95,000	100,000	100,000	100,000	90,000

Customers in each group in Table 13 were randomly selected for migration to Rate 194. Given the planned, phased migrations, PSEG Long Island and DSA also randomly drew control groups alongside Groups 1, 2, and 3 for comparison. This allows for an impact analysis of the new rates using a Randomized Controlled Trial (RCT), generally the strongest research design for causal inference. The majority of Group 1, 2, and 3 control group customers will be migrated to TOD rates after summer 2024, as part of groups 8-10.

Group 1 customers' rate changes provide insight into the later groups' migrations. Approximately 31,000 customers were randomly selected for Group 1 within several key segment targets (general use, net metering, low income, and electric vehicles). Most (29,000) were either migrated in June or opted in early to a TOD rate, including some that chose the Super Off-Peak Rate (195).

Table 14: Rate Codes as of November 15, 2024 by Group

	180 or 580 (Flat Rates)	194	195	Inactive
Group 1	712	28,456	534	1,296
Control Group	29,213	99	347	1,337

Roughly 1,300 accounts that were assigned to the group in advance of migration, ~5 months for pre-migration communication and activities, became inactive (deactivated) prior to June and therefore were not migrated. These inactive deactivations occurred at roughly the same rate in both Group 1 and the control group, highlighting the strength of the control group assignments. Only 712 (about 2%) of the Group 1 customers opted out of the TOD rates to stay on a flat rate and 180 of those transitioned to the 580 electric heating rate). Some control group customers also opted into a TOD rate, showing interest in the rates beyond the planned migrations. More Group 1 customers selected Rate 195 than the control group due to outreach on the new TOD rates or the June migrations to Rate 194.

5.1.2 Initial TOD Impact Estimates

DSA estimated initial TOD impacts for Group 1 customers for Summer 2024 (July, August, and September). Since both the control group and the TOD migration Group 1 were selected randomly, the two groups should be the same on average, except for the addition of the TOD rate. To provide unbiased impact estimates, all customers selected for Group 1 were studied, even if they opted out of the TOD rates.

Usage during peak hours (3 to 7 p.m.) decreased by approximately 1%. Scaling this up to the population of Long Island homes that are like Group 1 (about 650,000 customers), the TOD migrations for this population would be expected to save ~11 MW during an average peak hour. In total, 44 MWh of usage would be moved out of the peak hours on an average summer weekday, with an insignificant amount of daily savings across all hours.

Several subgroups were targeted for analysis in Group 1 and control group selections. Of these, larger impacts (2% peak reductions) were found for EV owners and "neutral non-benefiters", customers that based on past usage patterns were not forecast to benefit (-$12 to -$60 annually) on the new rate if no action was taken to shift energy from higher cost peak hours to lower cost discount off-peak or super off-peak hours. Customers who, based on past usage patterns, were forecast to save $60 or more annually on the new rates before taking additional load shifting options, had smaller reactions (0.5%). Larger impacts were also found for peak load days on Long Island (25 MW reductions projected for the 650,000 eligible customers).

Analysis for Groups 1, 2, and 3 will continue throughout 2025, including non-summer TOD impacts, second-summer impacts for Group 1, first summer for Groups 2 and 3 (larger total customer counts), and impacts for "non-benefiters" (customers expected to lose $60 or more annually on the TOD rates). PSEG Long Island and DSA will produce an interim report on the Summer 2024 load impacts in 2025, with a full report on impacts through Summer 2025 by the end of the first quarter of 2026.

5.2 A DISCUSSION ON NE:NY, CLCPA, AND POLITICAL UNCERTAINTY

5.2.1 A New Strategic Framework in 2026

State regulators are pushing for fundamental changes in how the energy system operates. In April 2018, the New Efficiency: New York (NE:NY) white paper set a statewide target of 185 TBtu in energy efficiency savings from 2019-2025. For PSEG Long Island, this translates to 7.85 TBtu of total savings by 2025. The following year, the Climate Leadership and Community Protection Act (CLCPA) was signed into law which set a target of reducing greenhouse gas emissions 40% by 2040 and 85% by 2050 from 1990 levels. To achieve this, utilities and state agencies will be focusing on 1) increasing renewables and clean energy sources on the grid and 2) decoupling homes and commercial buildings from fossil fuel consumption. Currently, PSEG Long Island's Energy Efficiency and Beneficial Electrification program can have the most impact on item 2, decoupling buildings from fossil fuels.

Initially, utilities focused on low-cost, high-yield measures such as LED lighting. As this low-hanging fruit becomes increasingly scarce, emissions savings must come from more expensive options like complex building envelope upgrades and conversion of fossil fuel systems to electric heat pumps. This new focus was codified in a July 2023 New York Public Service Commission Order[4] with directions for the Energy Efficiency and Building Electrification portfolios of NYS Utilities for 2026-2030 as they pertained to the New Efficiency: New York (NE:NY) and Clean Energy Fund Portfolios. The July 2023 NE:NY order established a Strategic Framework categorizing Energy Efficiency and Beneficial

[4] Link to July 2023 Order: Weblink

Electrification measures under three categories: 1) strategic, 2) neutral, and 3) non-strategic. At a high level, the Order encouraged utilities to expand measures that fall under the strategic category and phase out non-strategic measures. The guidelines established around this strategic framework require that 85% of the budget in 2026 is to be put towards strategic measures, none will be applied to non-strategic measures, and up to 15% towards neutral measures. Measures falling under the non-strategic category, and therefore not allowed after 2025, include:

- **Natural gas-fired equipment:** Equipment such as residential natural gas space heating, domestic hot water, natural gas fireplace, and other natural gas equipment.
- **Lighting Equipment:** Including fixtures and lamps for interior and exterior spaces. Streetlighting and horticultural lighting are specifically listed as non-strategic. Advanced lighting controls may be allowed in commercial buildings when installed with other strategic measures.
- **Appliances:** Electric plug-in appliances such as refrigerators, freezers, clothes washers, or any other residential or commercial equipment not permanently connected to the building. This includes heat pump pool heaters, heat pump clothes dryers, and induction cooktops despite their beneficial electrification potential. Appliance recycling programs are also categorized as non-strategic.
- **Home energy reports:** HERs cannot be supported with EE/BE budgets.
- **Marketplaces:** Program administrators who plan to operate an online marketplace post-2025 would need to provide justification for the continued support of the marketplace.

The IOUs each filed draft 2026-2030 program plans in 2024 and awaited approval or requested modifications to those plans from the New York State Public Service Commission. The Commission released Final Orders authoring EE-BE plans for 2026-2030 on May 15, 2025. Separate Orders were issued for LMI and non-LMI programming.[5,6]

The Non-LMI Order reinforces the Strategic Framework proposed in July 2023 with few exceptions and emphasizes deep building improvements, strategic electrification, and better coordination between the IOUs and NYSERDA. The Commission makes clear that post-2025, EE-BE funding must transition away from legacy technologies like lighting and gas-fired appliances, and toward electrification and envelope-first retrofits. The May 2025 Non-LMI Order codifies that program administrators must now allocate at least 85% of their portfolios to "strategic" measures that directly support emissions reductions and energy system benefits. Funding is strictly prohibited for "non-strategic" measures beginning in 2026, including commercial lighting, plug-in appliances, and Home Energy Reports. Electrification projects must install heat pumps as the primary heating source to qualify for funding.

[5] May 2025 Order Authorizing Non-LMI Portfolios 2026-2030. Weblink
[6] May 2025 Order Authorizing LMI Portfolios 2026-2030. Weblink

The Commission also mandated a comprehensive restructuring of weatherization efforts. Utility-led proposals were found insufficient, and instead, utilities are required to jointly develop "Regional Residential Weatherization Programs." Upstate and Downstate utility groupings must submit consolidated filings that standardize program design, leverage shared services, and coordinate with NYSERDA's initiatives. Gas utilities must allocate at least 50% of their program budgets to small residential weatherization, and electric utilities must allocate at least 25%.

Significant reforms are also in store for the NYS Clean Heat Program. Beginning in 2026, the program will focus exclusively on one- to four-family homes. By March 2026, heat pump incentives will be tiered based on whether a project meets minimum weatherization thresholds. By March 2028, achieving those weatherization standards will become mandatory for program eligibility. The Commission capped electric utility spending on electrification programs at 50%. Together, these weatherization and electrification policies signal a shift toward integrated retrofit strategies that prioritize weatherization of the state's housing stock to promote long-term affordability and emissions reductions.

The May 2025 LMI Order introduces significant administrative and programmatic changes to income-qualified programming in New York. The Order designates NYSERDA as the sole administrator for LMI one- to four-family programs across the state. Beginning in 2026, the IOUs will no longer deliver direct services in this segment but will be responsible for identifying eligible customers, referring them to NYSERDA, and supporting outreach and enrollment. While this change does not apply to LIPA, the Commission strongly encourages LIPA to work with NYSERDA to align their LMI programs.

Downstate utilities must jointly administer affordable multifamily programs with NYSERDA, while LIPA and NYSERDA must coordinate to align product offerings on Long Island. Utilities must also collaborate with NYSERDA on shared customer data systems, explore joint application processes, and ensure streamlined participation for building owners. Electrification-readiness and comprehensive retrofit strategies are prioritized, with utilities expected to shift incentives away from gas equipment and instead support envelope-first electrification, particularly in areas with grid constraints or high energy burdens.

The Strategic Framework adopted in the LMI Order mirrors the structure in the non-LMI portfolio, requiring that at least 85 percent of budgets support Strategic measures. However, the Commission allows exceptions for certain LMI-targeted interventions—such as lighting, refrigerators, and gas efficiency tune-ups—when they directly advance energy affordability. Notably, partial or hybrid electrification strategies may be considered Strategic if they displace more than 50 percent of a building's heating or water heating load, or if they prevent reinvestment in fossil fuel systems. Utilities are expected to develop program models that align with these classifications while reporting on both direct and indirect savings, tenant outcomes, and service levels in Disadvantaged Communities.

While LIPA is not subject to the May 2025 Orders, the Commission encourages LIPA to adopt the Strategic Framework and coordinate with NYSERDA and the Downstate Utilities for a consistent approach for the 2026-2030 period. Assuming LIPA wishes to align its conservation programming with the New York utilities subject to the May 2025 Orders, PSEG Long Island's EE and BE portfolio must

undergo a major shift between the 2025 and 2026 program years. With the sunset of highly cost-effective program measures, and increased emphasis on more expensive measures like heat pumps and weatherization, it will become much more expensive to yield the same level of impacts as prior program years. Given these significant changes, PSEG Long Island is reimagining its whole Energy Efficiency and Beneficial Electrification portfolio. They are developing customer journey maps for each legacy program and looking for ways to streamline shared processes. As a result of this effort, program names and measure taxonomies will likely change.

The residential Energy Efficiency Products Program (EEP) will continue to see significant changes. EEP was the home of PSEG Long Island's retail lighting measures, which incentivized millions of LED lamps each year until changes to federal standards in 2023 removed screw-based lighting as an eligible measure. EEP has consistently been among the highest saving and most cost-effective programs in the portfolio, but the designation of appliances as non-strategic will further limit the applicability of current measure offerings. Alternatively, weatherization and heat pump offerings currently promoted via the Home Performance and Home Comfort programs will both grow and increase focus on LMI households.

Non-residential programs will be similarly affected by the loss of LED lighting measures. In 2024, LED lighting accounted for approximately 70% of ex-post gross MMBtu savings in the Commercial Efficiency Program. The strategic measures of interest for 2026 will require more program investment per MMBtu than lighting according to every planning study our team has reviewed. There will also be workforce challenges associated with the transition. Long Island does not currently have enough workers and contractors trained in weatherization upgrades to support the State's goal of weatherizing one million homes by 2030.

In addition to the expected changes above, the current operating agreement of the LIPA system also ends in December 2025, as does TRC's contract to implement the Energy Efficiency and Beneficial Electrification Program and Demand Side Analytics' contract to evaluate it. Clearly, 2026 will be a significant transition year for Long Island and the rest of New York with respect to energy conservation programming.

5.2.2 Emphasis on Disadvantaged Communities

New York's CLCPA established that utilities must ensure that at least 35% of the benefits of spending on clean energy and energy efficiency programs go to disadvantaged communities, with a goal of 40%. This DAC goal is proving to be a major factor in shaping future Portfolio planning efforts. PSEG Long Island has already significantly increased its collective LMI offerings under the Home Performance, REAP, and Home Comfort Programs. LMI budget allocation increased from about $5 million in 2022 to $19.6 million in 2023 to $22.5 million in 2024. After the CLCPA set the threshold at 60% of the state median income, just 25% of Long Island households either reside in a designated Disadvantaged Community (DAC) or qualify as low-income households. Long Island may be the only region in the state with less than 35% of households qualifying under these conditions.

Historically, PSEG Long Island's REAP program had an income less than or equal to 80% of the area median income, but in 2023 the standard was changed to 80% of the state median income, decreasing

the pool of eligible REAP customers. Additionally, since the CLCPA is set at 60% of the state median income, this identified the REAP program as a low-to-moderate income program, so not all participants will be counted towards the CLCPA goals. A smaller target population presents challenges with meeting the standards established in the CLPCA.

Additional federal funding for energy conservation entered the picture in 2024 from the Inflation Reduction Act (IRA). On May 30th, 2024 the first phase of the Home Electrification and Appliance Rebates (HEAR) program was launched with $158 million in IRA funding, followed closely by the Home Efficiency Rebates program with $159 million in IRA funding (both programs would be rebranded as EmPower+).[7] This money was made only available to low and middle income households, and ultimately would help New York meet the lofty equity goals set forth in CLCPA.

With these challenges also come opportunities to explore additional, non-energy system impacts and benefits that low-income programs bring to the community. Non-energy system impacts (NEIs) can cover categories such as health, safety, comfort, operations and maintenance costs, energy security, and others. NYSERDA explored non-utility system impacts of low-income programs in depth in a 2017 study.[8] The National Standard Practice Manual for Benefit-Cost Analysis (NSPM)[9] includes NEI consideration as part of their 5-step process. We would recommend that PSEG Long Island consider incorporating non- energy impacts into their benefit-cost analysis. However, there are certain challenges in both quantifying these benefits and assigning monetary values to these benefits. New Jersey has started to explore the possibility of adding NEIs to their cost tests as percentage adders in an extensive review of adders included in other States' cost tests published March 2023.[10] However, given the emphasis on LMI programming in New York, we recommend PSEG Long Island consider inclusion of additional LMI-specific benefit streams. This would help capture a more rounded picture of the benefits realized by low-income households and improve performance towards benefits-based LMI requirements.

Invariably when outside funding is available, questions will arise about the attribution of impacts to the different program administrators who co-fund projects. We recommend PSEG Long Island explore collecting data on braided funding through the application process for measure offerings that are likely to also receive state or federal incentives. This would allow for more accurate benefit-cost analysis of PSEG Long Island's portfolio and facilitate reporting metrics around leveraging of outside funding.

5.2.3 Uncertain Federal Policies

Over $300 million in funding was made available statewide from the IRA, and the EmPower+ programs have begun funding energy audits and rebates towards the cost of energy efficiency improvements for

[7] Department of Energy, May 30 2024, archived: Weblink
[8] Quantification of Non-Energy Impacts for Residential Programs. Phase I: Final Report. March 2017. Weblink
[9] NSPM for Benefit-Cost Analysis of Distributed Energy Resources: Weblink
[10] Non-Energy Benefits/ Non-Energy Impacts (NEBs/NEIs): Analysis of Alternatives for Updates for the State of New Jersey: Weblink

low and middle income households.[11] In addition, the IRA provides tax credits (without means testing) for home efficiency improvements such as heat pumps and heat pump water heaters. While these programs are still available in 2025, the continued availability of federal funding for energy conservation programming is uncertain. Although the tax incentives and Department of Energy home efficiency grants are written into law in the IRA, the current federal administration could choose to rescind or impound these types of grants. This uncertainty from other program administrators may result in more being asked of PSEG Long Island's Energy Efficiency and Beneficial Electrification portfolio to meet state goals.

In May 2025, the US Environmental Protection Agency announced plans to shut down the ENERGY STAR program.[12] PSEG Long Island, like most program administrators, uses ENERGY STAR certification as a criterion for certain equipment incentives. While this change does not prevent utilities from incentivizing high efficiency units, it creates confusion regarding efficiency requirements and raises questions about the adoption and enforcement of planned updates to other federal energy standards.

Import tariffs have been a major news story in the first half of 2025. While energy efficiency and beneficial electrification labor is necessarily local, much of the efficient equipment is imported and potentially subject to cost increases due to tariffs. The cost of efficient equipment has direct implications on project economics for participants and indirect consequences for the incentive levels offered by PSEG Long Island. If the program design calls for subsidizing 50% of the upfront cost of a heat pump or buying down the upfront cost to a price point where the payback to the participant is less than five years, an increase in the price of heat pumps will increase PSEG Long Island's incentive costs for heat pumps. If equipment prices increase and incentives do not, participation will likely slump because the out-of-pocket cost of participation is higher. Increased equipment costs due to tariffs and removal of outside incentives and tax credits would be a worst-case scenario for PSEG Long Island in terms of output per program dollar invested.

5.2.4 Progress on CLCPA Goals and Future Funding Sources

In October 2024, the state announced, as expected, that New York met its goal for 6GW of distributed solar generation one year early, and that it was on track to reach the goal of 10GW by 2030.[13] Other CLCPA goals are behind schedule, however. In July of 2024, NYSERDA reported that New York was on track to have 53% of its electricity come from renewables by 2030, short of its 70% goal.[14] The report blamed higher than expected costs of building new renewables and a growth in baseline energy demand from AI, new semiconductor manufacturing, beneficial electrification, and electric cars for putting the 70% goal out of reach. Since that report, the outlook has dimmed further after the Trump Administration withdrew all permits for offshore wind development, a critical source of future renewable electricity. The ability for New York, and Long Island, to meet the 40% emissions reductions

[11] NYSERDA: Weblink
[12] CNN: Weblink
[13] NYSERDA, Oct 17, 2024: Weblink
[14] NYSERDA, July 1, 2024: Weblink

by 2030 is also uncertain. The most recent State report has estimated that New York's total emissions in 2022 were 9.3% lower than in 1990.[15] These supply-side considerations have implications for the effectiveness of beneficial electrification programming because the increased electricity consumption from heat pumps is more emissions-intensive than planned.

In January of 2025, Governor Hochul announced $1 Billion of new spending for, among other things, home retrofits and heat pumps.[16] The Governor has not yet provided details on how this money will be spent on home energy retrofits, but leadership in the State Assembly has proposed that about one third of it, or $330 million, should be spent on EmPower+. This will be a substantial increase in state funding, but it may not be enough to reach CLCPA goals. Political observers have interpreted the Governor's proposed $1 Billion one-time investment in climate investments to be the replacement for New York Cap-and-Invest (NYCI) cap-and-trade program, announced by Governor Hochul in 2023, and do not expect NYCI to move forward.[17] This leaves utility-run energy efficiency programs in a place of uncertainty in terms of how much of the state's statutorily required emissions reductions of 70% by 2030 they will be asked to deliver and how impactful their beneficial electrification efforts will be.

5.3 EXPANDING HEAT PUMP DEPLOYMENT

Heat pumps are a critical technology for electrification efforts. This umbrella term includes heat pumps for space heating and cooling, heat pump pool heaters, and heat pump water heaters. Heat pumps use electricity to move heat in buildings and can replace technologies like furnaces or boilers that burn fossil fuel to produce heat. With advancements in heat pump technologies, homes in cold climate regions, like Long Island, can rely on the heating capabilities of heat pumps through freezing temperatures in the winter. New York has a statewide target of 1 million homes heated with electric heat pumps and an additional one million electrification-ready homes by 2030. For Long Island, this translates to a goal of about 67,000 dwellings with whole house heat pumps between 2023 and 2030.

New York State is in the process of updating the residential State Energy Code primarily based on the 2024 IECC and ASHRAE 90.1-2022 with state-specific amendments with a target adoption date in 2025. One of the key state-specific amendments is the prohibition of fossil fuel combustion appliances in new residential construction. While this change will accelerate the adoption of heat pumps in the state, it changes the program opportunity for PSEG Long Island. Beginning in 2026, the PSEG Long Island TRM assumes a code-minimum air source heat pump baseline for heat pumps installed in newly constructed residences. This lowers the per-unit MMBtu savings significantly and makes the measure purely energy efficiency since the electrification is required by code. While the *per-unit* savings are reduced, the *number of units* could increase sharply since all newly built homes on Long Island will have heat pumps. PSEG Long Island should leverage its relationships with builders and HVAC contractors to ensure these heat pumps are high-efficiency cold-climate units that exceed the state energy code. The incremental cost for this type of installation is lower because only the difference in cost between a high-efficiency

[15] December 2024: Weblink
[16] NYSERDA, January 14, 2025: Weblink
[17] New York Focus, March 12, 2025: Weblink

and code minimum unit is considered so per-unit incentive levels could be reduced relative to historic rebate amounts.

While heat pump adoption is important, ultimately heat pump utilization is what will determine the emissions impact of New York's beneficial electrification efforts. While PSEG Long Island has transitioned to almost exclusively whole home heat pump installations, participants have been allowed to retain their legacy fossil fuel systems. In this type of installation, how customers operate the two heating systems together is critically important regarding fossil fuel displacement and emissions avoidance.

- ***Integrated controls*** attempt to limit use of the fossil fuel system to certain outdoor or indoor temperature conditions, so the heat pump(s) satisfy as much of the heating load as possible. We recommend PSEG Long Island conduct additional research on the effectiveness of integrated control strategies to assess the viability of the current options and determine if any programmatic requirements around integrated controls should be adopted.
- ***Decommissioning*** is the alternative. Other program administrators in New York and other states offer elevated rebate amounts when the fossil fuel system is totally removed or decommissioned. This approach may be a barrier to some participants but helps ensure that program-supported heat pumps will be used as the primary heating source in the home and deliver fossil fuel and emissions savings.

While there has been a high historical uptake of heat pump pool heaters through the programs, uptake of heat pump water heaters has been low (n=247 in 2024). As the second largest load in most residential homes, domestic hot water will be a key end use to target and expand program activity in for 2026 and beyond. PSEG Long Island has increased incentive levels for heat pump water heaters and is expanding outreach activities with plumbing and hydronic contractors to bolster participation.

5.4 ECONOMICS OF ELECTRIFICATION AND DECARBONIZATION

The economics of electrification are complex, and it is important to track the impacts of decarbonizing the grid both at the source and at site. The prior section touched on the broad goals New York state has established for reducing the emissions intensity of its generation mix. In this section we examine the key inputs and assumptions that affect the cost-effectiveness of electrification for participants, program administrators, and society.

5.4.1 VALUE OF AVOIDED CO_2 EMISSIONS

The other key element in the economics of electrification is the value of avoided CO_2 emissions. The social cost of carbon is ultimately a policy decision. In 2024, avoided CO_2 emissions was the second largest benefits category, representing 23% of all SCT benefits.

- The current social cost of carbon assumed in the PSEG Long Island Cost Effectiveness evaluation is $63.60 per metric ton, or $57.70 per short ton, and the portfolio SCT is 1.45.

- In neighboring Pennsylvania, the 2021 Act 129 Total Resource Cost Test Order[18] directs utilities to set the value at $0. If PSEG Long Island used an avoided cost of carbon of zero, the portfolio SCT would decrease to 1.31.
- In November 2023, the EPA Interagency Working Group published guidance[19] that established a central cost of carbon of $190/metric ton in 2020 dollars. If our avoided cost of carbon was updated to match this guidance, the portfolio benefit cost ratio would be 1.73.
- New York's proposed Cap-and-Invest system has studied a price ceiling between $14 and $23 per ton.

The social cost of carbon is not a technical metric, it's a policy decision. As an evaluator we cannot determine which value is correct, but we would recommend PSEG Long Island review this key assumption with LIPA. It's an important driver of cost-effectiveness results for both energy efficiency and beneficial electrification.

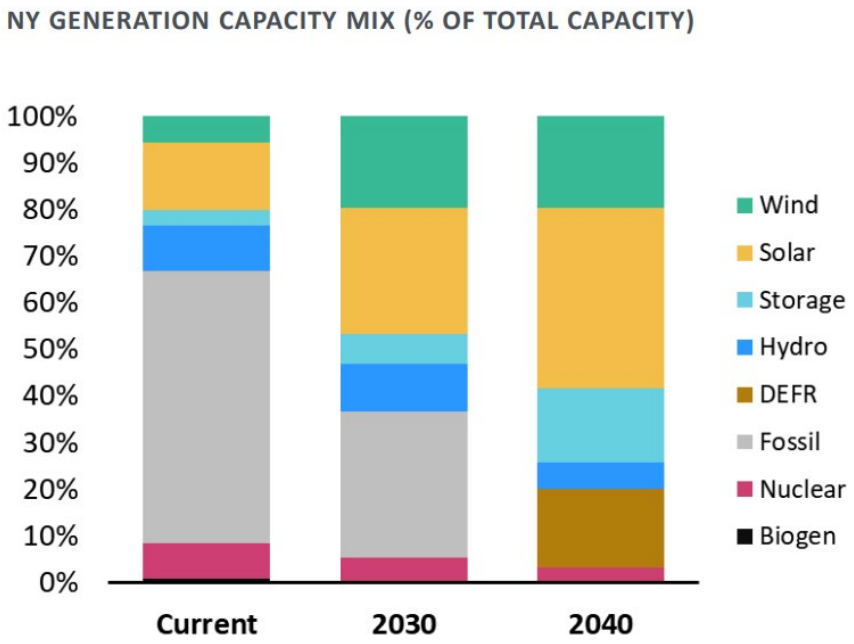
5.4.2 Marginal Emissions Rate

As described in Section 2.2, current modeling practices in New York use a marginal emissions rate that is static over time. As New York completes aggressive energy transition projects, the overall emissions rate of the grid will drop sharply and the differences across the year will become more pronounced. Figure 11 comes from a 2025 Grid Flexibility Potential Study developed for NYSERDA and the New York Department of Public Service shows projections of New York's electric generation capacity mix over time.[20] As large amounts of solar generation come online, the emissions rate of the grid should drop to zero in the middle of the day. As New York's aggressive decarbonization efforts start to materialize, PSEG Long Island may want to consider time-differentiating its marginal emissions rate assumptions to

[18] 2026 TRC Test Final Order. Weblink
[19] US Environmental Protection Agency Weblink: Table ES.1
[20] New York's Grid Flexibility Potential. January 2025. Weblink

make sure energy efficiency and beneficial programming targets offerings that will maximize emissions reductions in a highly decarbonized electric grid.

Figure 11: Projected Power Supply for New York



Note: Current capacity mix is based on NYISO 2024 Summer Installed capacity.[38] Solar includes utility-scale and BTM resources. 2030 and 2040 forecasts are based on the NYSERDA Integration Analysis "Scenario 2: Strategic Use of Low-Carbon Fuels," which is a CLCPA policy compliant case.[39] DEFRs are dispatchable emissions-free resources that encompass a collection generation technologies such as long-duration storage, small modular nuclear reactors, and hydrogen-powered generations that will need to be developed to provide clean, reliable grid services.

5.4.3 Cost of Natural Gas

Currently, natural gas generation is the predominant marginal generation source in downstate New York. This means that when a natural gas furnace is replaced by an electric heat pump, the primary shift is from fossil fuel combustion in the home to fossil fuel combustion at a power plant. From an emissions standpoint, this is useful because heat pumps are quite efficient at converting electricity to heat. However, as the electric generation mix includes more renewable resources on the margin, the differential in CO_2 emissions will grow considerably. In today's electric power system, the marginal cost of electricity is highly correlated with the cost of natural gas because natural gas is the dominant fuel source for power generation. As the electric generation mix decarbonizes, the marginal cost of electricity should become increasingly decoupled from the avoided cost of fossil fuel.

5.5 CONSUMPTION ANALYSIS IMPLICATIONS FOR A CHANGING PORTFOLIO

Regression analysis of electric meter data has been a key evaluation technique for several residential programs in PSEG Long Island's energy efficiency portfolio for many years. Evaluations of the Home Performance and Home Energy Management programs rely on modeling techniques that compare electric consumption changes amongst participating homes following program services to a comparison group of homes without intervention. On one hand, this is arguably the most robust evaluation technique across the portfolio because ex-post savings come from real measurements at the revenue meter. Consumption analysis is an IPMVP[21]-adherent measurement and verification technique (IPMVP Option C) and does not require numerous assumptions like a TRM-based engineering analysis. The rollout of AMI across Long Island has allowed us to analyze more granular electricity consumption data and transition monthly models to daily or even hourly models. However, the evolution of PSEG Long Island's portfolio also creates challenges which call into question the suitability of consumption analysis for evaluation for some programs. Key issues include:

- **PSEG Long Island can only provide electric meter data.** As an electric utility, PSEG Long Island has rich electricity consumption data but no access to natural gas or delivered fuel consumption data. When program interventions primarily target electricity savings, this is of little concern. However, with the transition to MMBtu as the primary performance metric and the prioritization of weatherization in New York, PSEG Long Island's programs increasingly target fossil fuel savings. Table 15 shows the split of electric versus fossil fuel savings on a MMBtu basis for the three primary weatherization measures within the Home Performance with ENERGY STAR program component. Over three-quarters of the claimed savings are fossil fuel heating savings that are invisible to the electric meter.

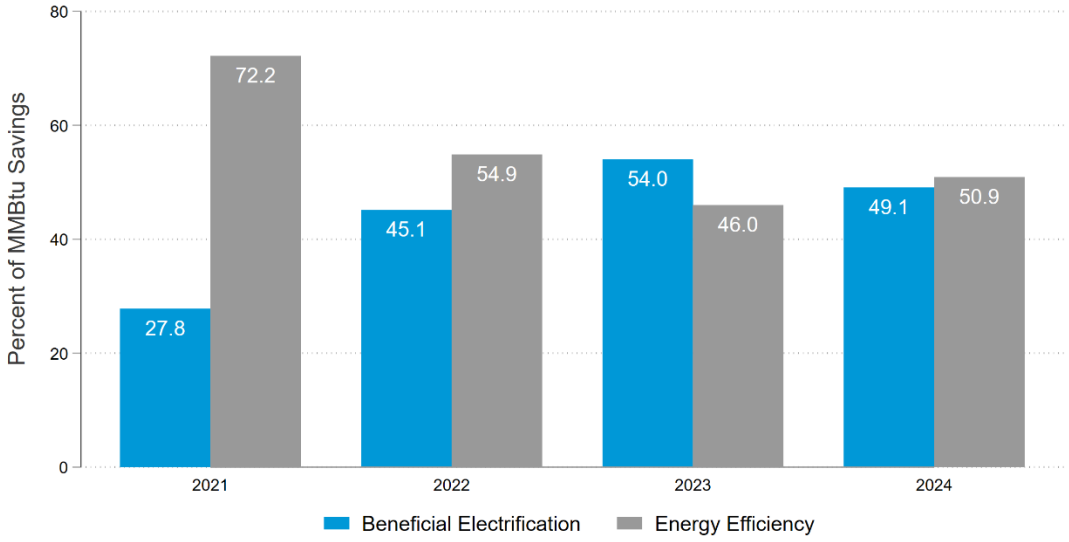
Table 15: 2024 HPwES Ex-Ante Weatherization Savings by Fuel

HPwES Measure Type	MMBtu Total	MMBtu Electric	MMBtu Fossil Fuel
Duct Sealing	3,084	1,025	2,058
Air Sealing	4,379	914	3,465
Envelope	9,312	1,672	7,639
Weatherization Total	**16,775**	**3,612 (21.5%)**	**13,163 (78.5%)**

- **Beneficial electrification is becoming a larger component of the Home Performance program.** Figure 12 shows the share of MMBtu coming from EE and BE measures for the last four years. Since 2022, approximately half of the MMBtu savings have come from BE, which limits the sample size of the consumption analysis and leads to noisier results.

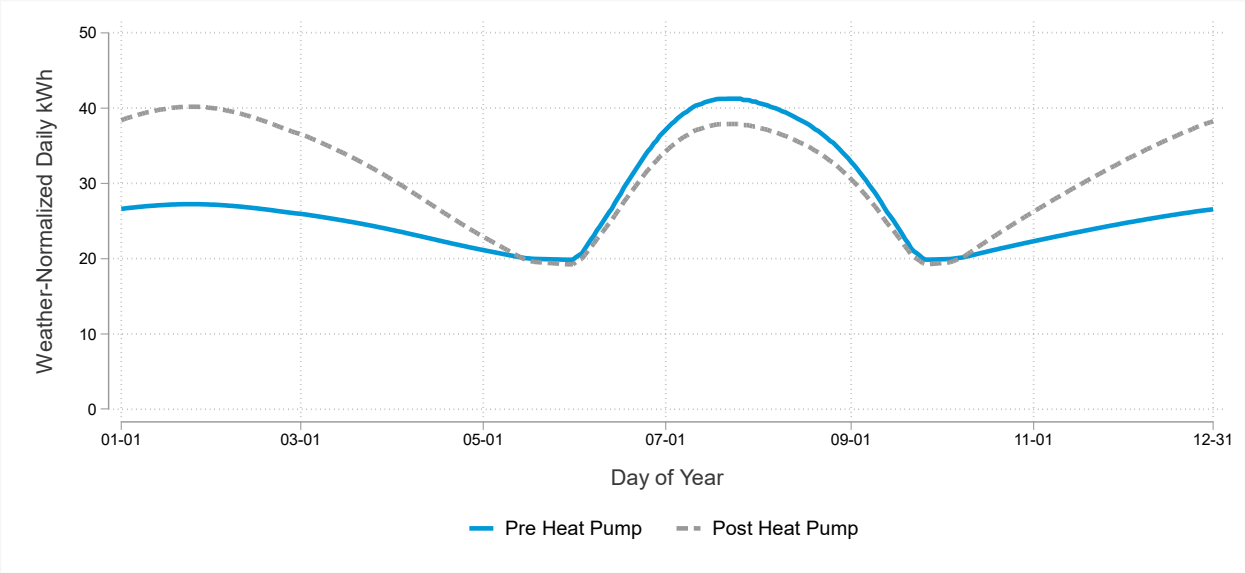
[21] International Performance Measurement and Verification Protocol. Weblink

Figure 12: Home Performance Ex-Ante MMBtu Savings by Year and Measure Type



- **Promotion of heat pumps leads to increases in electric consumption that make it hard to detect energy efficiency.** Beneficial electrification and the promotion of heat pump technologies are a top policy priority on Long Island and across New York. Figure 13 shows the typical impact of a heat pump at the electric meter. Heat pumps generally save electricity in summer because they air condition more efficiently than the units they replace. In the winter, they lead to a sharp increase in electric consumption relative to fossil fuel heat. This complicates consumption analyses due to the need for assumptions about fossil fuel displacement and introduces uncertainties that can skew the accuracy of evaluations. Our current evaluation approach is to omit homes with BE measures from the consumption analysis. Some jurisdictions use increased winter electric consumption measured via consumption analysis as a proxy for fossil fuel heating savings, but this analysis requires several assumptions and would create significant evaluation risk for PSEG Long Island relative to the current TRM-based method used for Home Comfort and Home Performance heat pump projects.

Figure 13: Residential Heat Pump Impact Time-Series



- **Consumption analysis results are inherently noisy and carry more evaluation risk.** The precision of each consumption analysis is a function of the effect size and the number of homes analyzed. The HEM program has a huge estimation sample with over 600,000 treated households and 100,000 control group homes. However, the average impact per home is less than 1%, so the margin of error is ±9% or approximately 13,000 MMBtu. Home Performance is also afflicted by the effect size issue. Because most participants only completed a Home Energy Assessment and received kit measures, the average ex-ante kWh savings represented just 3.2% of pre-retrofit annual billed electric consumption. If we removed HEA participants from the consumption analysis (along with BE homes), the estimation pool for Home Performance shrinks to a few hundred homes.
- **The metric used to measure goal achievement matters.** If the ex-post results are used to assess as a metric for goal achievement, the consumption analysis challenges described above become magnified. The alternative to consumption analysis is engineering analysis – where evaluators combine assumptions about equipment efficiency and operating characteristics algebraically to calculate savings. These equations and inputs are generally documented during planning and rarely change during ex-post evaluation. Consider the hours of use assumptions within the CEP Lighting program. Once these assumptions are established in the PSEG Long Island TRM and followed correctly during implementation, there is minimal risk that ex-post evaluation results will depart from ex-ante claims in a material way. If the TRM assumes 3,463 operating hours for a retail business, evaluators will use 3,463 hours to compute both verified ex-ante and ex-post savings. Consumption analysis is analogous to an ex-post evaluation procedure where actual lighting hours of use are measured and used to claim ex-post savings. Such an approach would clearly be more rigorous, but it would also create significantly more risk for departures between ex-post and

ex-ante. Currently, that risk is largely concentrated in the programs which rely on consumption analysis.

Based on the considerations above, and the fact that over half of the ex-ante MMBtu savings in 2024 came from connected thermostats controlling fossil fuel heating systems, DSA did not utilize consumption analysis in the REAP program evaluation in 2024. The realization rate for REAP in 2024 was 105%, which is a significant increase from the 62% realization rate in the 2023 evaluation. Although we chose not to use consumption analysis REAP in 2024, the evaluation team included a derate factor of 25% for the REAP and Home Performance weatherization measures in the 2026 PSEG Long Island TRM. The derate factor is intended to reflect the historic underperformance of weatherization measures when analyzed via consumption analysis. This underperformance is not specific to Long Island, as recent evaluations of residential weatherization programs administered by Con Edison and National Grid New York returned similar results. The evaluation of Con Edison's Residential Weatherization program resulted in a 55% realization rate on electric savings and a 40% realization rate on gas savings.[22] The evaluation of National Grid New York's Total Home Comfort program resulted in a 28% realization rate on gas savings.[23] Derating the algorithmic estimates used for planning and ex-ante savings claims should lead to better alignment when consumption analysis is used for evaluation and more defensible ex-post estimates when engineering calculations are used by evaluators.

[22] Residential Weatherization Impact Evaluation – Final Report. Weblink

[23] Downstate New York Weatherization Program Residential Sector Impact and Process Evaluation: Final Report. Weblink

APPENDIX A ABBREVIATIONS

ASHP	Air-source heat pump
BTU	British Thermal Unit
CEP	Commercial Efficiency Program
CF	Coincidence Factor
CLCPA	Climate Leadership and Community Protection Act
DAC	Disadvantaged Community
EEP	Energy Efficiency Products
EISA	Energy Independence and Security Act
EPA	U.S. Environmental Protection Agency
FR	Free-ridership
FTE	Full-Time Equivalent Employees
GSHP	Ground-source heat pump
HEM	Home Energy Management
HER	Home Energy Report
HPwES	Home Performance with ENERGY STAR
HVAC	Heating, Ventilation, and Air Conditioning
IOU	Investor-Owned Utility
IRA	Inflation Reduction Act
kW	Kilowatt
kWh_{ee}	Kilowatt Hour Energy Efficiency
kWh_{be}	Kilowatt Hour Beneficial Electrification
kWh	Kilowatt Hour
MMBtu	Million British thermal unit
$MMBtu_{ee}$	Million British thermal unit Energy Efficiency
$MMBtu_{be}$	Million British thermal unit Beneficial Electrification
LED	Light-Emitting Diode
LIPA	Long Island Power Authority
LMI	Low- to moderate-income
NEB	Non-Energy Benefit
NE:NY	New Efficiency: New York
NTGR	Net-to-Gross Ratio
NYSERDA	New York State Energy Research and Development Authority
RIM	Ratepayer Impact Test
REAP	Residential Energy Affordability Partnership
SCT	Societal Cost Test
SO	Spillover
TRM	Technical Reference Manual
TOD	Time of Day
UCT	Utility Cost Test
VEA	Verified Ex -Ante

APPENDIX B ELECTRICITY ENERGY (MWH) AND DEMAND SAVINGS (KW)

Although the primary reporting metric for 2024 evaluation results is site-level MMBtu savings for consistency with goals, we also report fuel-specific results for several reasons.

- PSEG Long Island is an electric utility, so the MWh and kW impacts of the Portfolio have discrete implications for a host of forecasting and system planning functions.
- Consistency with prior reports. We believe it is important for readers to have the ability to compare the results of the 2024 evaluation with PSEG Long Island evaluations completed prior 2020 and evaluations conducted by New York IOUs, which report fuel-specific results (MWh, kW, therms).
- While site-level MMBtu is useful as a single metric for all conservation programming, the benefit-cost analysis requires us to keep track of resources separately. The avoided cost of one MMBtu of delivered electricity is much higher than the avoided cost of one MMBtu of fossil fuel. The emissions per MMBtu also vary by resource, because generators combust 2-3 MMBtu of fossil fuel to generate power[24] to deliver one MMBtu of electricity to a Long Island home.

While the evaluation team elected to report fuel-specific results, we highlight that, due to beneficial electrification, measures that reduce fossil fuel use also increase electricity consumption and demand. Thus, some program MWh and kW impact results show negative electricity savings.

[24] The marginal unit in downstate New York will typically be a combined-cycle natural gas plant or a natural gas combustion turbine. According to EIA data (Weblink) the average heat rate of these two generator types in 2023 were 7,549 Btu/kWh and 11,010 Btu/kWh respectively. This translates to an electrical efficiency of 45.2% and 31.0%.

Table 16: Energy Efficiency and Beneficial Electrification MWh Impacts by Program

Sector	Energy Efficiency Program	Ex-Ante Gross Savings (Claimed)[1]	Ex-Post Gross Savings (Evaluated)	Ex-Post Net Savings
		MWh	MWh	MWh
Commercial	Commercial Efficiency Program	69,447	68,160	46,568
	Multi-Family Program	726	496	526
Residential	Energy Efficiency Products	10,240	6,074	4,897
	Home Comfort	(15,812)	(15,981)	(15,564)
	Home Performance	(531)	(955)	(942)
	Home Energy Management	31,144	42,594	45,154
	Residential Energy Affordability Program	1,662	1,932	2,048
	All Electric Homes	(3.402)	(14.79)	(15)
Subtotal Commercial		70,173	68,655	47,094
Subtotal Residential		26,701	33,649	35,579
Total Portfolio		**96,874**	**102,305**	**82,673**

[1] MWh Ex-Ante Gross Savings (Claimed) in table might not match KPI scorecard values. Table values include all Energy Efficiency Savings as well as negative MWh savings from Beneficial Electrification, while KPI scorecard reports Energy Efficiency Savings only.

Table 17: Energy Efficiency and Beneficial Electrification Summer kW Impacts by Program

Sector	Energy Efficiency Program	Ex-Ante Gross Savings (Claimed)	Ex-Post Gross Savings (Evaluated)	Ex-Post Net Savings
		kW	kW	kW
Commercial	Commercial Efficiency Program	14,099	12,866	9,324
	Multi-Family Program	123	150	162
Residential	Energy Efficiency Products	1,056	636	574
	Home Comfort	50	262	262
	Home Performance	-	125	101
	Home Energy Management [1]	8,268	10,515	11,329
	Residential Energy Affordability Program	199	244	262
	All Electric Homes	13	10	10
Subtotal Commercial		14,222	13,016	9,486
Subtotal Residential		9,586	11,791	12,539
Total Portfolio		**23,808**	**24,807**	**22,025**

[1] HEM kW savings are not claimed by PSEG-LI. The 8,628 kW value represents the evaluation team's recommended energy-to-demand factor applied to the ex-ante MWh savings

APPENDIX C ADDITIONAL COST-EFFECTIVENESS PERSPECTIVES AND METRICS

In New York, the primary metric for screening portfolios for cost-effectiveness is the Societal Cost Test (SCT), which includes benefits accrued to New York as a whole. This perspective enables New York to factor in the societal benefits of reduced emissions, as well as the avoided costs of energy production and delivery. It also enables the inclusion of beneficial electrification technologies that increase electricity use but lead to overall lower energy consumption or reduced carbon impacts by shifting energy use from fossil fuels (fuel oil, propane, and natural gas) to electricity.

UTILITY COST TEST RESULTS

The Utility Cost Test (UCT) and the SCT are similar in most respects but consider slightly different benefits and costs in determining a benefit/cost ratio.[25] The UCT measures the net costs of an energy efficiency program as a resource option based on the costs incurred by the program administrator, including all program delivery costs and any rebate and incentive costs, but excludes costs incurred by the participant. The UCT only includes benefits that accrue to the utility and, therefore, does not include the benefits of non-electric (i.e., natural gas and fuel oil) energy savings or increases, or greenhouse gas emissions. Because both costs and benefits are different than those considered from the societal perspective, the UCT benefit-cost ratio is also different.

As shown in Table 18, the UCT ratio was 0.43 for the Energy Efficiency and Beneficial Electrification Portfolio. This indicates that the portfolio is not cost-effective from the utility perspective. Notably, the Home Comfort and Home Performance UCT ratios are negative, indicative of the increase in electricity associated with electrification measures such as heat pumps. Essentially, these programs raise the cost of operating the electric system. While electrification produces societal benefits in the form of reduced carbon emissions and reduced non-electric fuel consumption (e.g., natural gas and fuel oil), it increases electricity consumption to serve the newly electrified end uses. From the perspective of an electric utility, such as PSEG Long Island, the increased electricity costs are not offset by fuel and carbon reductions, which only accrue from the societal perspective. Table 19 displays this point further by showing what the UCT ratio is when Beneficial Electrification Measures are removed from the UCT. Without Beneficial Electrification measures, the portfolio UCT ratio is cost-effective at 1.02. In contrast, the Home Comfort SCT ratio is 1.17, indicating that from the societal perspective, benefits do outweigh costs associated with this program comprised primarily of electrification measures.

[25] The Utility Cost Test is also commonly known as the Program Administrator test.

Table 18: Utility Cost Test Results for Energy Efficiency and Beneficial Electrification Portfolio

Sector	Program	NPV Benefits ($1,000)	Costs ($1,000)	B/C Ratio
Commercial	Commercial Efficiency Program	$35,354	$28,237	1.25
	Multi-Family	$342	$3,840	0.09
Total Commercial Portfolio		**$35,696**	**$32,077**	**1.11**
Residential	Energy Efficient Products	$2,418	$10,197	0.24
	Home Comfort	($7,713)	$23,980	-0.32
	Residential Energy Affordability Partnership	$881	$3,338	0.26
	Home Performance	($511)	$7,662	-0.07
	All Electric Homes	$7	$515	0.01
	Home Energy Management	$4,604	$2,594	1.77
Total Residential Portfolio		**($313)**	**$48,286**	**-0.01**
Total Portfolio[1]		***$35,382***	***$82,942***	***0.43***

[1] Portfolio costs include $3.2M of advertising and EM&V that were not allocated to individual programs

Table 19: Utility Cost Test Results without Beneficial Electrification Measures

Sector	Program	NPV Benefits ($1,000)	Costs ($1,000)	B/C Ratio
Commercial	Commercial Efficiency Program	$32,355	$22,838	1.42
	Multi-Family	$2,355	$1,058	2.23
Total Commercial Portfolio		**$34,710**	**$23,896**	**1.45**
Residential	Energy Efficient Products	$3,281	$7,294	0.45
	Home Comfort	$0	$0	NA
	Residential Energy Affordability Partnership	$881	$3,338	0.26
	Home Performance	$193	$4,013	0.05
	All Electric Homes	$0	$0	NA
	Home Energy Management	$4,604	$2,594	1.77
Total Residential Portfolio		**$8,960**	**$17,239**	**0.52**
Total Portfolio[1]		***$43,670***	***$42,711***	***1.02***

[1] Portfolio costs include $3.2M of advertising and EM&V that were not allocated to individual programs

RATEPAYER IMPACT TEST RESULTS

Another relevant metric in the context of electrification measures is the Ratepayer Impact test (RIM). This test considers the perspective of non-participating ratepayers and reflects the impact of programs on rates. The benefits and costs considered are like those considered from the utility perspective, in that participant costs and societal benefits are not considered. The key difference is that changes in utility revenue are considered, and increases in revenue are viewed as a benefit. This is the key component for assessing the impact on rates. Electricity rates are determined, in part, by allocating the fixed costs of maintaining and operating the electric grid across the units of energy sold. The primary

metric for allocating costs across most ratepayers is consumption, as measured by kWh. Because consumption is the denominator for determining rates, volumetric rates increase as total consumption decreases, and volumetric rates decrease as total consumption increases. To the extent that energy efficiency results in reduced consumption, it places upward pressure on rates, while electrification places downward pressure on rates by increasing total consumption.

As shown in Table 20, the RIM ratio was 0.41 for the Energy Efficiency and Beneficial Electrification Portfolio. This indicates that the portfolio is not cost-effective from the ratepayer perspective. This is to be expected since most of the portfolio is comprised of energy efficiency measures, which decrease consumption. In contrast, Home Comfort was the only program with a RIM ratio greater than 1.0, indicative of the increase in electricity associated with electrification measures such as heat pumps. Essentially, the net benefits for electrification from the ratepayer perspective are positive in this case, after factoring in program costs. Table 21 further reinforces this by showing the RIM ratio when energy efficiency is removed. The RIM ratio is nearly cost-effective (much closer to 1.0) at 0.99 for Beneficial Electrification measures only. Home Comfort, Home Performance, and Multifamily are all cost-effective under this filter. For CEP, the Custom category was allocated to Beneficial Electrification because most measures in this group were heat pumps. Installation of heat pumps both saves kWh in the summer and adds kWh in the winter. There were also energy efficiency measures in the Custom category. When saved kWh and added kWh are roughly equal, as they were for CEP, neither the RIM nor the UCT ratios will look favorable.

Table 20: Ratepayer Impact Test Results for Energy Efficiency and Beneficial Electrification Portfolio

Sector	Program	NPV Benefits ($1,000)	Costs ($1,000)	B/C Ratio
Commercial	Commercial Efficiency Program	$37,087	$159,993	0.23
	Multi-Family	$11,001	$15,419	0.71
Total Commercial Portfolio		**$48,089**	**$175,412**	**0.27**
Residential	Energy Efficient Products	$8,563	$25,548	0.34
	Home Comfort	$43,374	$32,163	1.35
	Residential Energy Affordability Partnership	$881	$6,571	0.13
	Home Performance	$3,939	$8,867	0.44
	All Electric Homes	$93	$542	0.17
	Home Energy Management	$4,604	$13,389	0.34
Total Residential Portfolio		**$61,453**	**$87,079**	**0.71**
Total Portfolio[1]		***$109,542***	***$265,070***	***0.41***

[1] Portfolio costs include $3.2M of advertising and EM&V that were not allocated to individual programs

Table 21: Ratepayer Impact Test Results without Energy Efficiency Measures

Sector	Program	NPV Benefits ($1,000)	Costs ($1,000)	B/C Ratio
Commercial	Commercial Efficiency Program	$4,732	$18,906	0.25
	Multi-Family	$8,647	$4,795	1.80
Total Commercial Portfolio		**$13,379**	**$23,701**	**0.56**
Residential	Energy Efficient Products	$4,501	$3,767	1.19
	Home Comfort	$43,374	$32,163	1.35
	Residential Energy Affordability Partnership	$0	$0	NA
	Home Performance	$3,746	$4,356	0.86
	All Electric Homes	$93	$542	0.17
	Home Energy Management	$0	$0	NA
Total Residential Portfolio		**$51,713**	**$40,828**	**1.27**
Total Portfolio[1]		***$65,092***	***$65,530***	***0.99***

[1] Portfolio costs include $3.2M of advertising and EM&V that were not allocated to individual programs

FIRST-YEAR AND LEVELIZED COSTS

In addition to benefit-cost ratios, there are two metrics which can be of value for assessing the performance of a program or portfolio. These are the first-year, or acquisition cost, of energy and the levelized, or lifetime, cost of energy. In budget planning and goal setting, the planned budget is compared to planned gross energy impacts, (which do not include line losses or net-to-gross ratios). The actual first-year cost is comparable to this planning metric in that it compares actual spending to actual gross energy impacts. Importantly, gross impacts are considered to ensure comparability to planned budgets and energy targets. Table 22 shows the first-year cost for demand (kW), electricity (kWh), and the energy-agnostic MMBtu planning metric. Both the utility and societal perspective are shown. The difference between the two is that the societal perspective includes the full incremental measure costs. Program or portfolio acquisition costs can be compared with acquisition costs for other utility programs or portfolios. As with the UCT benefit cost ratio, the first-year cost per kWh for the Home Comfort program and Home Performance are negative. Additionally, the first-year cost per kWh for the All Electric Homes program is also negative. This is the nature of electrification measures that increase, rather than reduce electricity consumption.

Table 22: First-Year Costs for Energy Efficiency and Beneficial Electrification Portfolio

Sector	Program	2024 Ex-Post Gross UCT First-Year Acquisition Cost			2024 Ex-Post Gross SCT First-Year Acquisition Cost		
		$/MMBtu	$/kW-year	$/kWh	$/MMBtu	$/kW-year	$/kWh
Commercial	Commercial Efficiency Program	$123	$2,146	$0.43	$208	$3,640	$0.73
	Multi-Family Program	$103	$25,608	$7.74	$176	$43,640	$13.20
Subtotal Commercial Portfolio		**$120**	**$2,410**	**$0.49**	**$204**	**$4,090**	**$0.82**
Residential	Energy Efficient Products	$54	$16,360	$1.75	$87	$26,430	$2.83
	Home Comfort	$132	$91,381	($1.50)	$249	$172,420	($2.83)
	Residential Energy Affordability Partnership	$258	$13,702	$1.72	$258	$13,702	$1.72
	Home Performance	$360	$85,387	($6.00)	$378	$89,592	($6.30)
	All Electric Homes	$973	$51,025	($34.84)	$1,557	$81,639	($55.74)
	Home Energy Management	$18	$247	$0.06	$18	$247	$0.06
Subtotal Residential Portfolio		**$88**	**$4,112**	**$1.46**	**$139**	**$6,515**	**$2.31**
Total Portfolio		***$106***	***$3,330***	***$0.84***	***$171***	***$5,362***	***$1.35***

Levelized cost is another useful metric, which essentially divides costs by the lifetime net energy impacts (which include line losses and net to gross ratios). Net impacts are used to compare the cost of energy efficiency programs more directly with energy or capacity costs from other sources. Because levelized costs are expressed as $/kW-year and $/kWh, planners can readily compare them to the cost of alternative supply options. Table 23 shows the levelized cost for demand (kW), electricity (kWh), and the energy-agnostic MMBtu planning metric. Both the utility and societal perspective are shown. The difference between the two is that the societal perspective includes the full incremental measure costs. Levelized costs can be compared with marginal costs for other resources. As with the UCT benefit cost ratio, the first-year cost per kWh for the Home Comfort program and Home Performance is negative. Additionally, the first-year cost per kWh for the All Electric Homes program is also negative. This is the nature of electrification measures that increase rather than reduce electricity consumption.

Table 23: Levelized Costs for Energy Efficiency and Beneficial Electrification Portfolio

Sector	Program	2024 Ex-Post Net UCT Levelized Costs			2024 Ex-Post Net SCT Levelized Costs		
		$/MMBtu	$/kW-year	$/kWh	$/MMBtu	$/kW-year	$/kWh
Commercial	Commercial Efficiency Program	$16.44	$290	$0.06	$22.27	$393	$0.08
	Multi-Family Program	$10.00	$2,711	$1.05	$17.04	$4,620	$1.80
Subtotal Commercial Portfolio		**$15.26**	**$325**	**$0.07**	**$23.86**	**$459**	**$0.11**
Residential	Energy Efficient Products	$7.22	$2,083	$0.28	$9.70	$2,801	$0.38
	Home Comfort	$41.71	$17,846	($0.43)	$74.41	$31,835	($0.76)
	Residential Energy Affordability Partnership	$32.86	$2,093	$0.26	$32.86	$2,093	$0.26
	Home Performance	$116.87	$20,886	($1.87)	$107.53	$19,216	($1.72)
	All Electric Homes	$81.88	$3,695	($2.46)	$126.16	$5,693	($3.79)
	Home Energy Management	$16.84	$229	$0.06	$16.84	$229	$0.06
Subtotal Residential Portfolio		**$20.85**	**$2,455**	**$1.44**	**$30.35**	**$3,572**	**$2.10**
Total Portfolio		***$20.56***	***$709***	***$0.16***	***$29.17***	***$1,005***	***$0.23***

APPENDIX D VERIFIED EX-ANTE MEMO

Demand Side Analytics
DATA DRIVEN RESEARCH AND INSIGHTS

2024 VERIFIED EX-ANTE SAVINGS MEMO

Date: January 31, 2025

To: Dan Zaweski, Mike Voltz, Dimple Gandhi, Ronan Murphy, and Gabrielle Scibelli (PSEG Long Island)

CC: Brian Levite and Louisa Chan (LIPA)

From: 2024 Evaluation Team (Demand Side Analytics, DNV, Mondre Energy, and BrightLine Group)

Re: 2024 Verified Ex-Ante Savings for Energy Efficiency and Beneficial Electrification Programs

Background

PSEG Long Island asked the Demand Side Analytics evaluation team to verify ex-ante energy and peak demand savings as part of its evaluation of PSEG Long Island's 2024 energy efficiency and beneficial electrification programs. This memorandum defines "verified ex-ante" (VEA) savings and presents the 2024 verified ex-ante savings for each program.

Definition of Verified Ex-Ante

The verified ex-ante calculations seek to answer the question, "were the ex-ante gross energy impacts claimed by the implementation contractors calculated consistently with approved calculations and assumptions?" To answer this question, we independently calculated program impacts using the methods and assumptions approved by PSEG Long Island and compared the results to the ex-ante gross values submitted by the implementation contractors, TRC and Bidgely. The ratio of these two values is the verified ex-ante realization rate.

The details of the verified ex-ante calculations vary by program and measure. Some measures are assigned static per-unit impacts in the planning assumptions, so the verified ex-ante calculation only requires counting the number of units stored in the program tracking data and multiplying that total by the per-unit savings assumption used for planning. Other measures are more dynamic and require the use of algorithms and project-specific parameter values. PSEG Long Island generally uses a static set of algorithms and assumptions for a given calendar year. However, projects have varying lead times and processing lag, so it is not uncommon for a project to begin in one year and complete in the following calendar year. In practice, this means a subset of 2024 projects were completed using 2023 application workbooks with 2023 savings assumptions. For the purposes of VEA, we consider these "carryover" projects verified as long as 2023 algorithms and assumptions were correctly implemented. In the ex-post evaluation, we will use the latest available inputs and assumptions so carryover projects can be a source of realization rate volatility. Carryover projects were more common in 2024 than in any of the previous four years that Demand Side Analytics was the EM&V contractor for PSEG Long Island.

The verified ex-ante savings are the first milestone of the 2024 evaluation. They are a separate and distinct performance metric from the evaluated ex-post savings, which will be delivered later this spring. Both the claimed ex-ante and verified ex-ante savings are expressed on a gross basis – meaning

they do not reflect adjustments for net-to-gross factors or line losses. The primary reporting metric for 2024 VEA is gross MMBtu savings, but we also report on several additional metrics of interest.

MMBtu Results

Table 1 summarizes the 2024 verified ex-ante savings for MMBtu. The verified ex-ante savings were 99.7% of the claimed ex-ante gross savings. The evaluation team's independent measure counts were nearly identical to the claimed measure counts. Per-unit MMBtu savings calculations and assumptions matched the approved values almost perfectly for nearly all measures. Any calculations and assumptions that deviated from approved values are documented in Appendix A: Supplemental Detail.

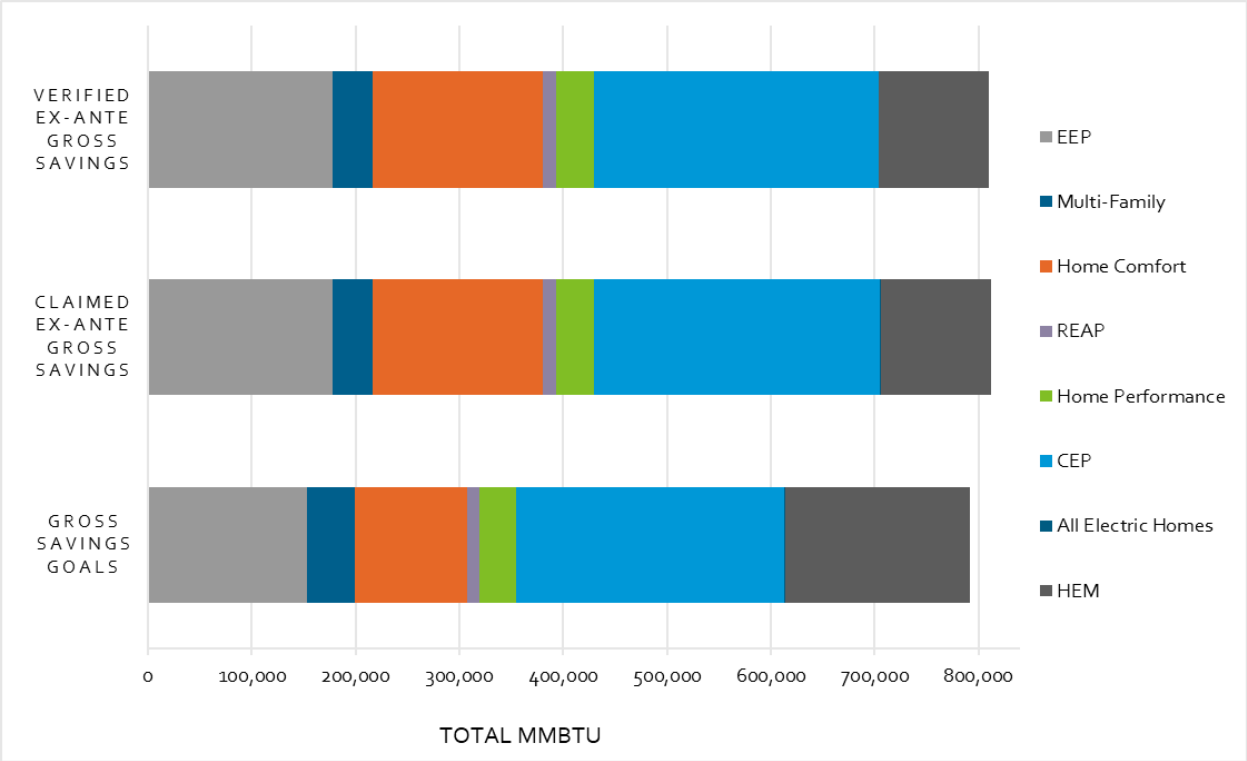
In a departure from prior years, note the claimed and verified ex-ante MMBtu savings in Table 1 do not incorporate fossil fuel heating penalties for lighting measures. This change was made to align PSEG Long Island with New York's other investor-owned utilities (IOUs) which operate fuel-specific energy efficiency programs where electric programs only report electric impacts and natural gas programs only report natural gas impacts. Excluding the fossil fuel waste heat penalties allows for a more balanced comparison between PSEG Long Island and the other IOUs in New York. It also allows for a simpler view of PSEG Long Island's contribution toward the state's New Efficiency: New York statewide goal of 185 million MMBtu in energy savings by 2025.

TABLE 1: SUMMARY OF 2024 VERIFIED EX-ANTE MMBTU SAVINGS AND GOALS

Program		2024 Gross Savings Goals	Ex-Ante Gross Savings	Verified Ex-Ante Gross Savings	Verified Ex-Ante Realization Rate	Verified as % of Goals
		MMBtu	MMBtu	MMBtu	%	%
Commercial	Commercial Efficiency Program (CEP)	259,011	275,758	274,219	99.4%	105.9%
	Multi-Family Homes	46,382	38,664	38,664	100.0%	83.4%
Residential	Energy Efficient Products (EEP)	153,269	177,654	177,610	100.0%	115.9%
	Home Comfort	107,678	164,552	164,552	100.0%	152.8%
	Residential Energy Affordability Partnership (REAP)	11,980	12,285	12,234	99.6%	102.1%
	Home Performance (HPwES & HEA)	35,014	36,593	36,593	100.0%	104.5%
	All Electric Homes (AEH)	574	609	543	89.2%	94.6%
	Home Energy Management (HEM)	177,816	106,265	105,330	99.1%	59.2%
Total Commercial		**305,393**	**314,422**	**312,883**	**99.5%**	**102.5%**
Total Residential		**486,332**	**497,958**	**496,862**	**99.8%**	**102.2%**
Total EE and BE Portfolio		**791,725**	**812,380**	**809,745**	**99.7%**	**102.3%**

Figure 1 visualizes MMBtu contributions by program. The Energy Efficient Products, Commercial Efficiency Program, and Home Comfort programs were the top three contributing programs, together comprising 76% of verified ex-ante savings in 2024.

FIGURE 1: MMBTU CONTRIBUTIONS BY PROGRAM



In addition to comparing verified ex-ante savings with claimed ex-ante savings, we also compared verified ex-ante savings with the established annual savings goals. The portfolio verified ex-ante gross savings were 102% of the 2024 savings goals, exceeding PSEG Long Island's goals by 18,020 MMBtu. Residential programs exceeded their 2024 goal by 10,530 MMBtu, while the Commercial programs exceeded their goal by 7,490 MMBtu. The Home Energy Management program fell about 72,000 MMBtu short of its goal due to issues related to the transition between program implementers, but this shortfall was buoyed by the EEP and Home Comfort programs which combined to exceed their relative goals by approximately 81,000 MMBtu.

MWh and MW Results

Table 2 shows the claimed ex-ante and verified ex-ante MWh savings. Both the claimed ex-ante and verified ex-ante savings are expressed on a gross basis, meaning they do not reflect adjustments for net-to-gross factors or line losses. In this context, gross MWh savings represent just the Energy Efficiency MWh (MWh_{ee}) value. Increased MWh consumption from Beneficial Electrification (MWh_{be}) are not considered in the ex-ante savings. This is different from the ex-post evaluation where we will report delta MWh impacts (representing the difference between MWh_{ee} and MWh_{be}).

All programs had realization rates around 100%. At the portfolio level, the realization rate was 99.9%. Drivers for minor differences between claimed and verified ex-ante savings are discussed in Appendix A: Supplemental Detail.

TABLE 2: SUMMARY OF 2024 VERIFIED EX-ANTE MWH SAVINGS

Program		Claimed Ex-Ante Gross Savings	Verified Ex-Ante Gross Savings	Verified Ex-Ante Realization Rate
		MWh_{ee}	MWh_{ee}	%
Commercial	Commercial Efficiency Program (CEP)	70,555	70,572	100.0%
	Multi-Family Homes Rebate	4,025	4,119	102.3%
Residential	Energy Efficient Products (EEP)	12,116	12,152	100.3%
	Home Comfort	3,012	3,012	100.0%
	Residential Energy Affordability Partnership (REAP)	1,661	1,662	100.0%
	Home Performance (HPwES & HEA)	1,636	1,636	100.0%
	All Electric Homes	24.9	26.0	104.3%
	Home Energy Management (HEM)	31,145	30,870	99.1%
Total Commercial		**74,581**	**74,690**	**100.1%**
Total Residential		**49,595**	**49,359**	**99.5%**
Total EE and BE Portfolio		**124,176**	**124,049**	**99.9%**

Table 3 shows claimed ex-ante and verified ex-ante peak demand (MW) values. Like with ex-ante MWh savings, ex-ante MW savings are not adjusted for net-to-gross factors or line losses. PSEG-LI does not claim MW savings for HEM, so we did not calculate verified ex-ante MW savings for this program. MW savings will be provided in the ex-post evaluation. Ex-ante peak demand savings are driven by the commercial programs which account for 89% of the claimed savings and 88% of the verified ex-ante savings. CEP is the only program with a realization rate below 99% and is the driver of the overall portfolio realization rate of 91%.

TABLE 3: SUMMARY OF 2024 VERIFIED EX-ANTE MW SAVINGS

Program		Claimed Ex-Ante Gross Savings	Verified Ex-Ante Gross Savings	Verified Ex-Ante Realization Rate
		MW	MW	%
Commercial	Commercial Efficiency Program (CEP)	14.54	13.09	90.0%
	Multi-Family Homes	0.12	0.13	108.2%
Residential	Energy Efficient Products (EEP)	1.06	1.07	100.9%
	Home Comfort	0.05	0.05	100.0%
	Residential Energy Affordability Partnership (REAP)	0.20	0.20	99.8%
	Home Performance (HPwES & HEA)	0.41	0.41	100.0%
	All Electric Homes	0.01	0.01	100.0%
	Home Energy Management (HEM)	n/a	n/a	n/a
Total Commercial		**14.66**	**13.22**	**90.2%**
Total Residential		**1.73**	**1.73**	**100.5%**
Total EE and BE Portfolio		**16.38**	**14.95**	**91.3%**

Non-Energy Metrics

In addition to energy conservation goals, PSEG Long Island set goals related to the uptake of specific technologies and program activity among historically underserved groups. For the 2024 program year, a goal was specifically set for the total number of unique housing units served by whole home heat pumps. This metric includes the installation of Whole House heat pumps through the Home Comfort, Multi-Family and Home Performance Programs. Two additional goals were established related to spending in Disadvantaged Communities (DACs). Specifically, PSEG Long Island set a goal that 35% of all rebates and incentives go to program participants in DACs and 35% of heat pump rebates and incentives go to program participants in DACs. This weblink provides additional information on New York state's official definition of DACs and their geographic locations.

Table 4 compares the verified values for these metrics with the goals and claimed values. Verified values mirror the claimed values and the goals were exceeded for each metric. Additional details regarding the rebate and incentive spending in DACs are shown in Table 5 and Table 6.

Further detail on what drives the differences between the claimed and verified counts and enrollments can be found in Appendix A: Supplemental Detail. Additionally, Appendix B: Validation of DAC Assignments contains more information on DAC boundaries.

Table 4: Summary of Verified Ex-Ante Non-Energy Metrics

Metric Description	Goal	Claimed	Verified
Housing Units Served by Whole House Heat Pumps	3,600	4,241	4,240
Total Rebate and Incentive Spending in DACs	35%	43.0%	42.0%
Heat Pump Only Rebate and Incentive Spending in DACs	35%	59.6%	59.7%

Table 5 and Table 6 show more granular breakouts for the DAC spending metrics. Table 5 shows claimed and verified rebate and incentive totals by program. Claimed and verified values show strong alignment. In most cases, differences between the claimed and verified values are due to disagreements between PSEG Long Island's master DAC assignment file and DAC status recorded in the Captures data. Additional details are provided in Appendix A: Supplemental Detail.

Table 6 also shows strong alignment between claimed and reported heat pump rebate totals. The small difference in claimed and verified totals is due to a commercial project that was incorrectly included in the total heat pump rebates and incentives value that served as the denominator of the claimed number.

Table 5: Summary of 2024 Rebate and Incentive Spending by Program and DAC Status

Program	Claimed Rebates and Incentives			Verified Rebates and Incentives		
	Total ($)	DAC ($)	% DAC	Total ($)	DAC ($)	% DAC
CEP	19,817,591	5,469,651	28%	19,820,407	5,209,800	26%
Multi-Family Homes	2,434,699	741,830	30%	2,434,699	466,965	19%
Energy Efficient Products	5,121,158	649,989	13%	5,121,651	657,906	13%
Home Comfort	17,376,355	8,893,658	51%	17,376,105	8,905,542	51%
REAP	3,458,477	2,659,416	77%	3,443,989	2,648,275	77%
Home Performance	5,620,902	4,742,752	84%	5,624,752	4,773,820	85%
All Electric Homes	80,806	0	0%	80,806	0	0%
Total Commercial	**22,252,290**	**6,211,481**	**28%**	**22,255,106**	**5,676,765**	**26%**
Total Residential	**31,657,698**	**16,945,815**	**54%**	**31,647,302**	**16,985,543**	**54%**
Total Portfolio	**53,909,988**	**23,157,296**	**43%**	**53,902,408**	**22,662,308**	**42.0%**

Table 6: Summary of 2024 Heat Pump Only Rebate and Incentive Spending

Metric	Rebates and Incentives		% DAC
	Total ($)	DAC ($)	
Claimed	16,460,549	9,817,394	59.6%
Verified	16,456,950	9,817,394	59.7%

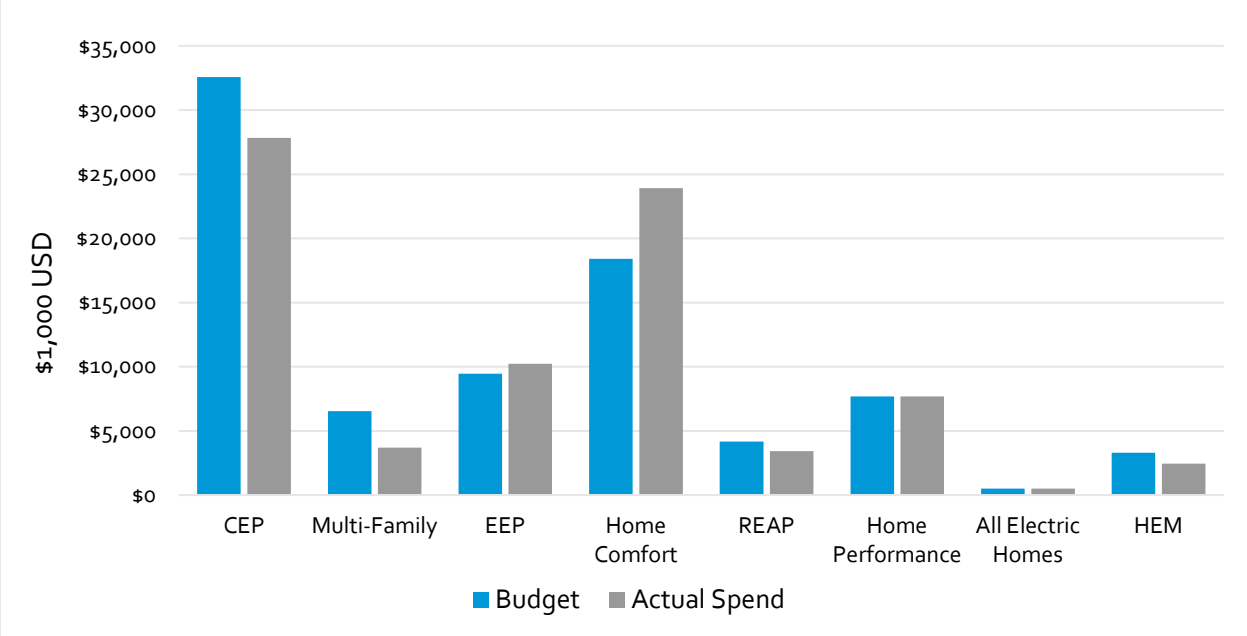
Table 7 compares budgets and actual spending by program and Figure 2 visualizes the comparison. Actual spending for commercial programs was about 80% of the planned budget but VEA MMBtu savings for the commercial programs still exceeded their combined MMBtu goal for the year. Actual spending for Home Comfort was approximately 30% higher than planned and VEA MMBtu savings for this program exceeded the goal by more than 50%.

TABLE 7: SUMMARY OF 2024 BUDGET VERSUS ACTUAL SPENDING BY PROGRAM

Program		Budget	Actual Spend	Spending Ratio
		$1,000	$1,000	%
Commercial	Commercial Efficiency Program (CEP)	$32,576	$27,844	85.5%
	Multi-Family Homes	$6,525	$3,695	56.6%
Residential	Energy Efficient Products (EEP)	$9,456	$10,220	108.1%
	Home Comfort	$18,396	$23,914	130.0%
	Residential Energy Affordability Partnership (REAP)	$4,172	$3,424	82.1%
	Home Performance (HPwES & HEA)	$7,685	$7,675	99.9%
	All Electric Homes	$504	$513	101.8%
	Home Energy Management (HEM)	$3,289	$2,441	74.2%
Total Commercial		**$39,101**	**$31,539**	**80.7%**
Total Residential		**$43,500**	**$48,187**	**110.8%**
***Total EE and BE Portfolio**		**$82,602**	**$79,726**	**96.5%**

* Portfolio totals exclude $2.58M of advertising and $638k of EM&V expense.

FIGURE 2: SUMMARY OF 2024 BUDGET VERSUS ACTUAL SPENDING BY PROGRAM



Appendix A: Supplemental Detail

The evaluation team verified the calculations and inputs for hundreds of measures. The table below shows additional detail on nuances observed in the data from Captures as well as the calculations and assumptions used that drove the realization rate away from 100%. Captures is the project tracking database used by the program implementer TRC.

Program	Sub-Component	Description	Implications
CEP	Refrigeration	▪ Ex-Ante kW was significantly overstated for six refrigerated case door retrofit measures.	▪ 6% kW realization rate for refrigeration
	Multi-Family Homes Rebate	▪ During the verification process, we identified that MWh and MW savings were underreported for 11 projects which included ENERGY STAR Clothes Washers, ENERGY STAR Refrigerators and ENERGY STAR Dishwashers.	▪ A 102% MWh realization rate and 108% MW realization rate for multi-family program.
EEP	ES Linear Fixture	▪ The in-service rate assumption of 97% was doubly applied to kWh and kW for 67,017 units.	▪ Under-reported 51 MWh and 9 kW leading to 103% RR for those metrics. ▪ MMBtu RR is unaffected at 100%
	EEP Most Efficient Clothes Washer	▪ Rounding error on kWh	▪ Under-reported 12 kWh (RR of 100%)
	Heat Pump Pool Heater	▪ 1 project used 2022 planning assumptions	▪ Over-reported 15 kWh (RR of 99.5%) and 49 MMBtu (RR of 99.9%)
	Heat Pump Water Heater	▪ 2 projects used 2022 planning assumptions ▪ 1 project used unknown planning assumptions	▪ Under-reported 100 kWh (RR of 100%) and 4 MMBtu (RR of 100%)

Program	Sub-Component	Description	Implications
All Electric Homes	Appliances	▪ An application workbook reference error leads to inflated savings for ENERGY STAR Refrigerators. The workbook referenced the EUL (14) rather than the per unit MMBtu savings for ENERGY STAR refrigerators (0.1605).	▪ 1.1% MMBtu realization rates for ENERGY STAR Refrigerator measure in AEH.
	Thermostats	▪ Fossil fuel equivalent full load hours (EFLH) assumptions were used for Smart Thermostats instead of heat pump EFLH.	▪ Increase in heating and cooling EFLH values led to 142.2% EE kWh & MMBtu realization rates for the Smart Thermostat measure.
Home Energy Management	Number of reports delivered	▪ The VEA claim for HEM is based on an expected savings level per paper report delivered and the number of paper reports that were delivered in 2024. ▪ The lookback report provided to the evaluation team by Bidgely showed 2,155,676 reports delivered in 2024. There were issues with the first batch of reports delivered in 2024, affecting 82,440 reports. After removing these reports from our count, there were 2,073,236 paper reports delivered. The claimed value is based on 2,091,640 reports.	▪ The MMBtu and MWh realization rates were less than 100% since the verified report count was less than the claimed report count. ▪ HEM does not claim peak demand savings, so the MW metric is unaffected.

In addition to energy savings impacts, PSEG Long Island has goals related to the number of housing units served by whole house heat pumps and the percentage of rebate and incentive dollars that go towards participants living in DACs or low-to-moderate income participants regardless of location within the territory. The table below further defines each metric and describes drivers of any differences between the reported values and our verified values.

Count Metric	Metric Definition	Description of Differences
Number of Whole Home Heat Pumps Installed	▪ This metric represents the number of housing units where whole house heat pumps were installed through the Home Comfort, Multi-Family, or Home Performance programs. ▪ Goal of 3,600 housing units in 2024	▪ For single family housing units, we counted 3,062 homes compared to TRC's 3,063. The difference is one home that had two unique projects in 2024. ▪ For multifamily units, our count matched TRC's count.
Rebate and Incentive Spending in DACs	▪ The metric represents the percentage of portfolio rebates and incentives that go towards customers living in DACs (or sold through stores located in DACs) ▪ Note the DAC definition includes geographic areas and any participants with incomes that fall at or below 60% of the state-median income ▪ Goal of 35% in 2024	▪ PSEG Long Island's master list of DAC designation by account number was merged into our tracking data extracts before calculating the verified numbers. A small number of accounts were flagged as DAC in the Captures data but non-DAC in the master list and vice-versa. We treated the PSEG Long Island master list as ground truth. ▪ Related to the point above, two Multi-Family projects accounting for approximately $275,000 in rebates and incentives were reclassified from DAC to non-DAC after we merged in the master list. ▪ For EEP online marketplace rebates, it seems the reported total for DACs did not include participants with incomes that fall at or below 60% of the state-median income.
Heat Pump Rebate and Incentives in DACs	▪ The metric represents the percentage of portfolio rebates and incentives for heat pumps only that go towards customers living in DACs ▪ Goal of 35% in 2024	▪ There was a discrepancy of about $3,600 in the reported and verified totals. The reported number included a commercial project that should not have been included because the performance metric is limited to the Home Comfort, Home Performance, and Multi-Family programs.

Appendix B: Validation of DAC Assignments

PSEG Long Island is committed to supporting New York state's goal of delivering at least 35% of Energy Efficiency and Clean Energy benefits to residential and business customers in DACs or in income-qualified households. PSEG-LI tracks and reports savings and spending accrued to households in DACs by flagging a "DAC" field in Captures. The evaluation team reviewed three stages of DAC data tracking and confirmed that DAC projects were tracked accurately during 2024.

- Each measure-level Captures record includes a "DAC" field that is either flagged Yes or No. This field is thoroughly populated and checked against PSEG Long Island's master list of DAC designations by account for all 1.3 million residential accounts. There were a small number of instances where the Captures data flagged a site as DAC, but the master list did not (or vice versa), but the two sources agreed on DAC status approximately 98% of the time. Our verified numbers reflect the DAC status from the master list.
- The geographic data for each DAC-designated location included in the master list was plotted against the DAC shapefile polygons available from NYSERDA to ensure that DAC-designated locations are within the DAC-designated census tracts. This exercise gave the evaluation team confidence that the master list was sound. When the evaluation team mapped the 205,059 DAC-designated locations with valid latitude and longitude attributes alongside the DAC shapefile, all but 10 of the DAC-designated locations are confirmed to fall within the DAC boundaries. Table 8 presents a summary and Figure 3 is a section of map including a sample of 200,000 locations.

TABLE 8: LOCATION COUNTS

Location Designation	Count
Locations in PSEG-LI master list	1,332,465
DAC-designated locations	207,617
DAC-designated locations with valid lat/long data	205,059
DAC-designated locations within DAC polygons	205,049
DAC-designated locations outside DAC polygons	10

FIGURE 3: SAMPLE OF DAC-DESIGNATED LOCATIONS AND DAC BOUNDARIES