



Semiannual Report to the Pennsylvania Public Utility Commission Phase III of Act 129

**Program Year 12
(June 1, 2020 - May 31, 2021)**

**For Pennsylvania Act 129 of 2008
Energy Efficiency and Conservation Plan**

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Table of Contents

1. Introduction	1
2. Summary of Achievements	2
2.1 The Carryover Savings from Phase II of Act 129	2
2.2 Phase III Energy Efficiency Achievements to Date	3
2.3 Phase III DR Achievements to Date	6
2.4 Phase III Performance by Customer Segment.....	8
3. Updates and Findings.....	10
3.1 Implementation Updates and Findings	10
3.2 Evaluation Updates and Findings	12
4. Summary of Participation by Program	14
5. Summary of Energy Impacts by Program	15
6. Summary of Demand Impacts by Program	18
6.1 Energy Efficiency.....	18
6.2 Demand Response.....	21
7. Summary of Finances	23
7.1 Program Financials	23
7.2 Cost Recovery.....	24
Appendix A. Participation Counts	A-1

List of Figures

Figure 2-1. Carryover Savings from Phase II of Act 129.....	2
Figure 2-2. Customer Segment-Specific Carryover from Phase II	3
Figure 2-3. EE&C Plan Performance toward Phase III Portfolio Compliance Target	4
Figure 2-4. EE&C Plan Performance toward Phase III Low-Income Compliance Target ⁽¹⁾	5
Figure 2-5. EE&C Plan Performance against Phase III G/E/NP Compliance Target.....	6
Figure 2-6. PY12 Event Performance Compared to 85% Per-Event Target	8
Figure 5-1. PYTD Reported Gross Energy Savings by Program	15
Figure 5-2. PSA Energy Savings by Program for Phase III	16
Figure 6-1. PYRTD Gross Demand Savings by EE Program	19
Figure 6-2. PSA Demand Savings by EE Program for Phase III.....	20

List of Tables

Table 2-1. Phase III to Date DR Performance by Event	7
Table 2-2. PY12 Summary Statistics by Customer Segment.....	9
Table 2-3. PY12 Summary Statistics by Carve-Out.....	9
Table 2-4. Phase III Summary Statistics by Customer Segment	9
Table 2-5. Phase III Summary Statistics by Carveout.....	9
Table 4-1. EE&C Plan Participation by Program	14
Table 5-1. Energy Savings by Program and Solution (MWh/yr).....	17
Table 6-1. Peak Demand Savings by EE Program and Solution (MW).....	20
Table 6-2. PY12 DR PYVTD Performance by Event	22
Table 7-1. PYTD Financials	23
Table 7-2. Phase III to Date Financials	24
Table 7-3. EE&C Plan Expenditures by Cost Recovery Category	25
Table A-1. Overview of Participation Definitions.....	A-1

Acronyms

AC	Air Conditioner
BMS	Building Management System
CAC	Central Air Conditioner
C&I	Commercial and Industrial
CAP	Customer Assistance Program
CDO	Commercial Date of Operation
CF	Coincidence Factor
CFL	Compact Fluorescent Lamp
CHP	Combined Heat and Power
CI	Confidence Interval
CRAC	Computer Room Air Conditioning
CSP	Conservation Service Provider, Curtailment Service Provider
CV	Coefficient of Variation
DLC	Direct Load Control
DR	Demand Response
DRA	Demand Response Aggregator
EDC	Electric Distribution Company
EDT	Eastern Daylight Time
EE	Energy Efficiency
EE&C	Energy Efficiency and Conservation
EEMF	Energy Efficiency Marketing Firm
EFLH	Effective Full Load Hour
EM&V	Evaluation, Measurement, and Verification
EPA	US Environmental Protection Agency
EUL	Effective Useful Life
FPL	Federal Poverty Level
G/E/NP	Government/Education/Non-Profit
HER	Home Energy Report
HERS	Home Energy Rating System
HIM	High Impact Measure
HOU	Hours of Use
HSPF	Heating Seasonal Performance Factor
HVAC	Heating, Ventilating, and Air Conditioning
ICSP	Implementation Conservation Service Provider
IMP	Interim Measure Protocols
kW	Kilowatt
kWh	Kilowatt-Hour
LAH	Lighting, Appliances & HVAC
LDV	Lagged Dependent Variable

LED	Light-Emitting Diode
LIURP	Low-Income Usage Reduction Program
M&V	Measurement and Verification
MSRP	Manufacturer Suggested Retail Price
MW	Megawatt
MWh	Megawatt-Hour
MWh/yr	Megawatt-Hour per Year
NPV	Net Present Value
NTG	Net-to-Gross
O&M	Operations and Maintenance
P3TD	Phase III to Date
PA PUC	Pennsylvania Public Utility Commission
PILD	PECO Instant Lighting Discounts
PSA	Phase III to Date Preliminary Savings Achieved; equal to VTD + PYRTD
PSA+CO	PSA Savings plus Carryover from Phase II
PSD	Performance Systems Development
PUF	Part-Use Factor
PY	Program Year—e.g., PY8, from June 1, 2016, to May 31, 2017
PYRTD	Program Year Reported to Date
PYVTD	Program Year Verified to Date
QC	Quality Control
RCT	Randomized Control Trial
RTD	Phase III to Date Reported Gross Savings
RTO	Regional Transmission Organization
RUL	Remaining Useful Lifetime
SEER	Seasonal Energy Efficiency Ratio
SF	Single-Family
SIDS	Smart Ideas Data System
SKU	Stock Keeping Unit
SSMVP	Site-Specific Measurement and Verification Plan
SWE	Statewide Evaluator
T&D	Transmission and Distribution
TRC	Total Resource Cost
TRM	Technical Reference Manual
UEC	Unit Energy Consumption
UPS	Uninterruptible Power Supply
VFD	Variable Frequency Drive
VTD	Phase III to Date Verified Gross Savings
VTD + CO	Phase III to Date Verified Gross Savings plus Carryover from Phase II

Types of Savings

Gross Savings: The change in energy consumption and/or peak demand that results directly from program-related actions taken by participants in an Energy Efficiency and Conservation (EE&C) program, regardless of why they participated.

Net Savings: The total change in energy consumption and/or peak demand that is attributable to an EE&C program. Depending on the program delivery model and evaluation methodology, the net savings estimates may differ from the gross savings estimate due to adjustments for the effects of free riders, changes in codes and standards, market effects, participant and nonparticipant spillover, and other causes of change in energy consumption or demand not directly attributable to the EE&C program.

Reported Gross: Also referred to as ex ante (Latin for “beforehand”) savings. The energy and peak demand savings values calculated by the electric distribution company (EDC) or its program implementation conservation service providers (ICSPs) and stored in the program tracking system.

Verified Gross: Also referred to as ex post (Latin for “from something done afterward”) gross savings. The energy and peak demand savings estimates reported by the independent evaluation contractor after the gross impact evaluation and associated measurement and verification (M&V) efforts have been completed.

Verified Net: Also referred to as ex post net savings. The energy and peak demand savings estimates reported by the independent evaluation contractor after applying the results of the net impact evaluation. Typically calculated by multiplying the verified gross savings by a net-to-gross (NTG) ratio.

Annual Savings: Energy and demand savings expressed on an annual basis, or the amount of energy and/or peak demand an EE&C measure or program can be expected to save over the course of a typical year. Annualized savings are noted as MWh/yr or MW/yr. The Pennsylvania Technical Reference Manual (TRM) provides algorithms and assumptions to calculate annual savings, and Act 129 compliance targets for consumption reduction are based on the sum of the annual savings estimates of installed measures or behavior change.

Lifetime Savings: Energy and demand savings expressed in terms of the total expected savings over the useful life of the measure. Typically calculated by multiplying the annual savings of a measure by its effective useful life. The total resource cost (TRC) test uses savings from the full lifetime of a measure to calculate the cost-effectiveness of EE&C programs.

Program Year Reported to Date (PYRTD): The reported gross energy and peak demand savings achieved by an EE&C program or portfolio within the current program year. PYTD values for energy efficiency will always be reported gross savings in a semiannual or preliminary annual report.

Program Year Verified to Date (PYVTD): The verified gross energy and peak demand savings achieved by an EE&C program or portfolio within the current program year as determined by the impact evaluation findings of the independent evaluation contractor.

Phase III to Date (P3TD): The energy and peak demand savings achieved by an EE&C program or portfolio within Phase III of Act 129. Reported in several permutations described below.

1. **Phase III to Date Reported (RTD):** The sum of the reported gross savings recorded to date in Phase III of Act 129 for an EE&C program or portfolio.
2. **Phase III to Date Verified (VTD):** The sum of the verified gross savings recorded to date in Phase III of Act 129 for an EE&C program or portfolio, as determined by the impact evaluation finding of the independent evaluation contractor.
3. **Phase III to Date Preliminary Savings Achieved (PSA):** The sum of the verified gross savings (VTD) from previous program years in Phase III where the impact evaluation is complete plus the reported gross savings from the current program year (PYTD).
4. **Phase III to Date Preliminary Savings Achieved + Carryover (PSA+CO):** The sum of the verified gross savings from previous program years in Phase III plus the reported gross savings from the current program year plus any verified gross carryover savings from Phase II of Act 129. This is the best estimate of an EDC's progress toward the Phase III compliance targets.

Per guidance from the Pennsylvania Statewide Evaluator (SWE), all demand savings that were achieved from energy efficiency measures are shown in this report without line losses (i.e., at the meter). All demand savings that were achieved from demand response (DR) measures are shown in this report with line losses (i.e., at the generator).

Note that all values in the report are summed prior to rounding. Therefore, table totals may not equal the sum of all rows.

1. Introduction

Pennsylvania Act 129 of 2008, signed on October 15, 2008, mandated energy savings and demand reduction goals for the largest electric distribution companies (EDCs) in Pennsylvania for Phase I (2008 through 2013). Phase II of Act 129 began in 2013 and concluded in 2016. In late 2015, each EDC filed a new Energy Efficiency and Conservation (EE&C) Plan with the Pennsylvania Public Utility Commission (PA PUC) detailing the proposed design of its portfolio for Phase III. These plans were updated based on stakeholder input and subsequently approved by the PUC in 2016.

Implementation of Phase III of the Act 129 programs began on June 1, 2016. This report documents the progress of the Phase III EE&C accomplishments for PECO in Program Year 12 (PY12), as well as the cumulative accomplishments of the Phase III programs since inception. This report also documents the energy savings carried over from Phase II. The Phase II carryover savings count toward EDC savings compliance targets for Phase III.

This report details the participation, spending, and reported gross impacts of the energy efficiency (EE) programs in PY12. Compliance with Act 129 savings goals will ultimately be based on verified gross savings. PECO has retained Guidehouse Inc. (Guidehouse), as an independent evaluation contractor for Phase III of Act 129. Guidehouse is responsible for the measurement and verification (M&V) of the savings and the calculation of verified gross savings. The verified gross savings for PY12 EE programs will be reported in the final annual report to be filed on November 15, 2021.

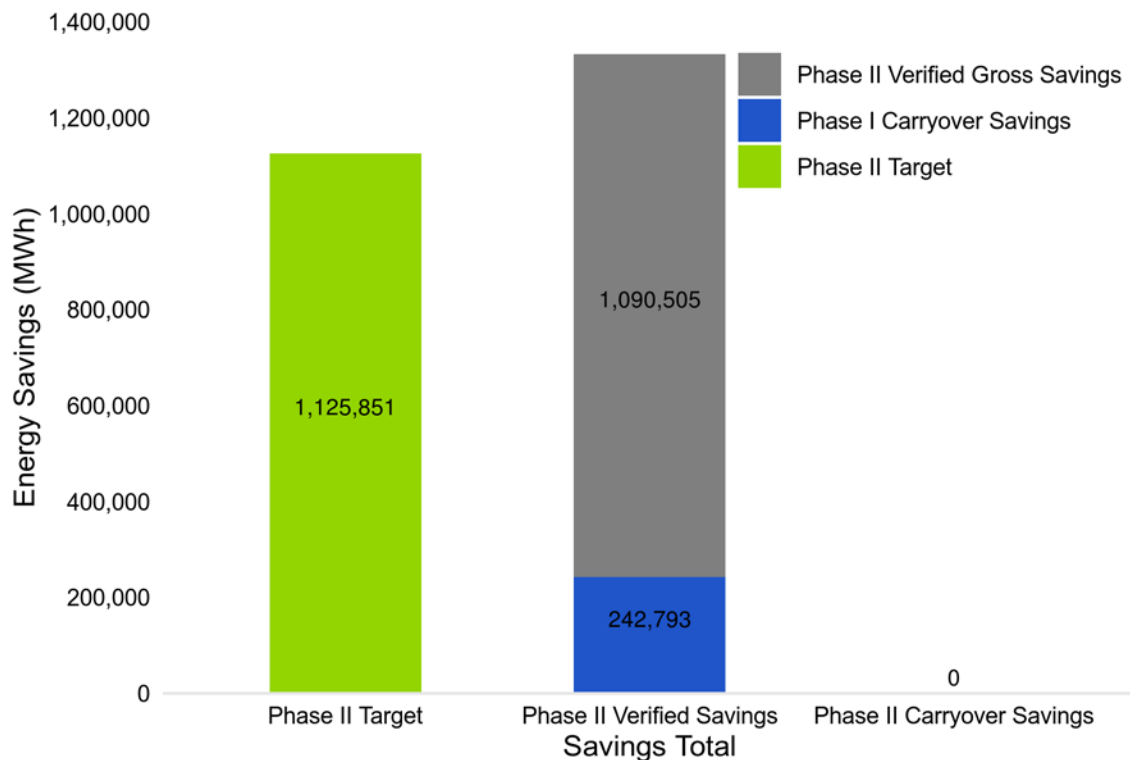
Phase III of Act 129 includes a demand response (DR) goal for PECO. DR events are limited to the months of June through September, which are the first 4 months of the Act 129 program year. Because the DR season is completed early in the program year, it is possible to complete the independent evaluation of verified gross savings for DR sooner than is possible for EE programs. Section 6.2 of this report includes the verified gross DR impacts for PY12 and the cumulative DR performance of the EE&C program to date for Phase III of Act 129. Guidehouse worked with the Statewide Evaluator (SWE) throughout the report's development to address questions related to compliance as they arose and appreciates the SWE's collaboration to ensure this final report is accurate and agreeable to relevant parties.

2. Summary of Achievements

2.1 The Carryover Savings from Phase II of Act 129

PECO has reported zero portfolio-level carryover savings from Phase II to Phase III. The Commission’s Phase III Implementation Order¹ allowed EDCs to carryover savings achieved within Phase II that were in excess of the Phase II portfolio savings target. Phase I carryover savings cannot be counted in the calculation of Phase II carryover savings. Figure 2-1 compares PECO’s Phase II verified gross savings total to the Phase II compliance target to illustrate the carryover calculation. Because PECO’s Phase II verified gross savings did not exceed PECO’s Phase II target, they were not eligible to carry over savings from Phase II toward their Phase III overall compliance target.²

Figure 2-1. Carryover Savings from Phase II of Act 129



Sources: PECO’s eTrack database, Conservation Service Provider (CSP) tracking data

The Commission’s Phase III Implementation Order also allowed EDCs to carry over savings in excess of the Phase II government, educational, and non-profit (G/E/NP) savings goal and excess savings from the low-income customer segment.³ PECO carried over 0 MWh/yr of

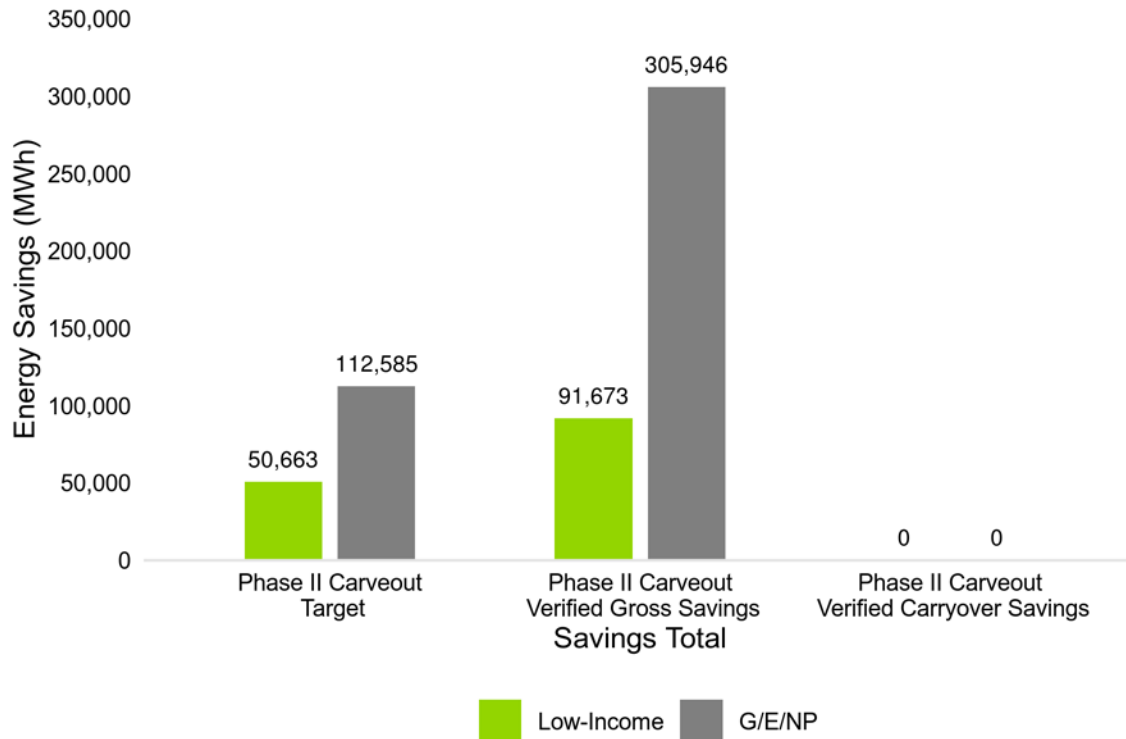
¹ PA PUC, *Energy Efficiency and Conservation Program Implementation Order*, at Docket No. M-2014-2424864, (Phase III Implementation Order), June 11, 2015.

² PA PUC, *Energy Efficiency and Conservation Program Compliance Order*, at Docket No. M-2012-2289411, (Phase II Compliance Determination Order), August 3, 2017.

³ Proportionate to those savings achieved by dedicated low-income programs in Phase III.

G/E/NP and 0 MWh/yr of low-income customer segment savings.⁴ Figure 2-2 shows the calculation of carryover savings for the low-income and G/E/NP targets.

Figure 2-2. Customer Segment-Specific Carryover from Phase II



Source: Guidehouse analysis

2.2 Phase III Energy Efficiency Achievements to Date

Since the beginning of PY12 on June 1, 2020, PECO has claimed:

- 579,679 MWh/yr of reported gross electric energy savings (PYRTD)
- 67.68 MW of reported gross peak demand savings (PYRTD) from EE programs

Since the beginning of Phase III of Act 129 on June 1, 2016, PECO has achieved:

- 2,026,001 MWh/yr of reported gross electric energy savings (RTD)
- 234.33 MW of reported gross peak demand savings (RTD) from EE programs
- 2,088,615 MWh/yr of gross electric energy savings (PSA)
 - This total includes verified gross savings from all Phase III program years and the PYTD reported gross savings from PY12.
- 273.43 MW of gross peak demand savings (PSA) from EE programs

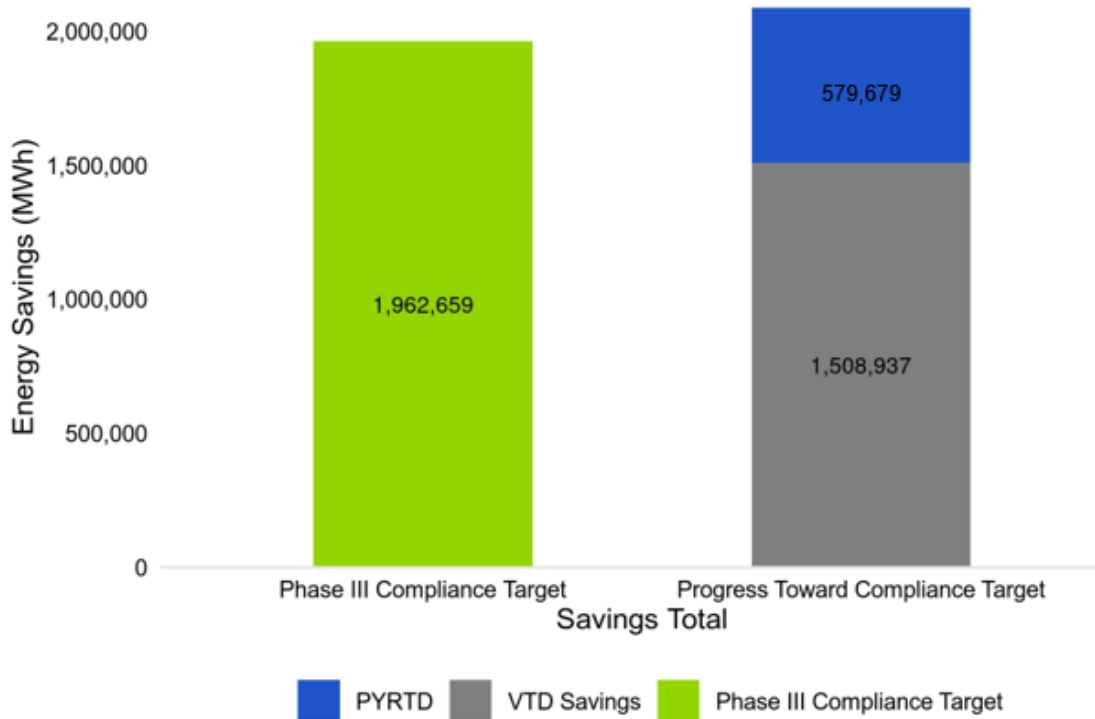
Including carryover savings from Phase II, PECO has achieved:

⁴ PA PUC, *Energy Efficiency and Conservation Program Compliance Order*, at Docket No. M-2012-2289411, August 3, 2017.

- 2,088,615 MWh/yr of PSA+CO energy savings recorded to date in Phase III
 - This represents 106.4% of the May 31, 2021 energy savings compliance target of 1,962,659 MWh/yr

Figure 2-3 summarizes PECO’s progress toward the Phase III portfolio compliance target.

Figure 2-3. EE&C Plan Performance toward Phase III Portfolio Compliance Target

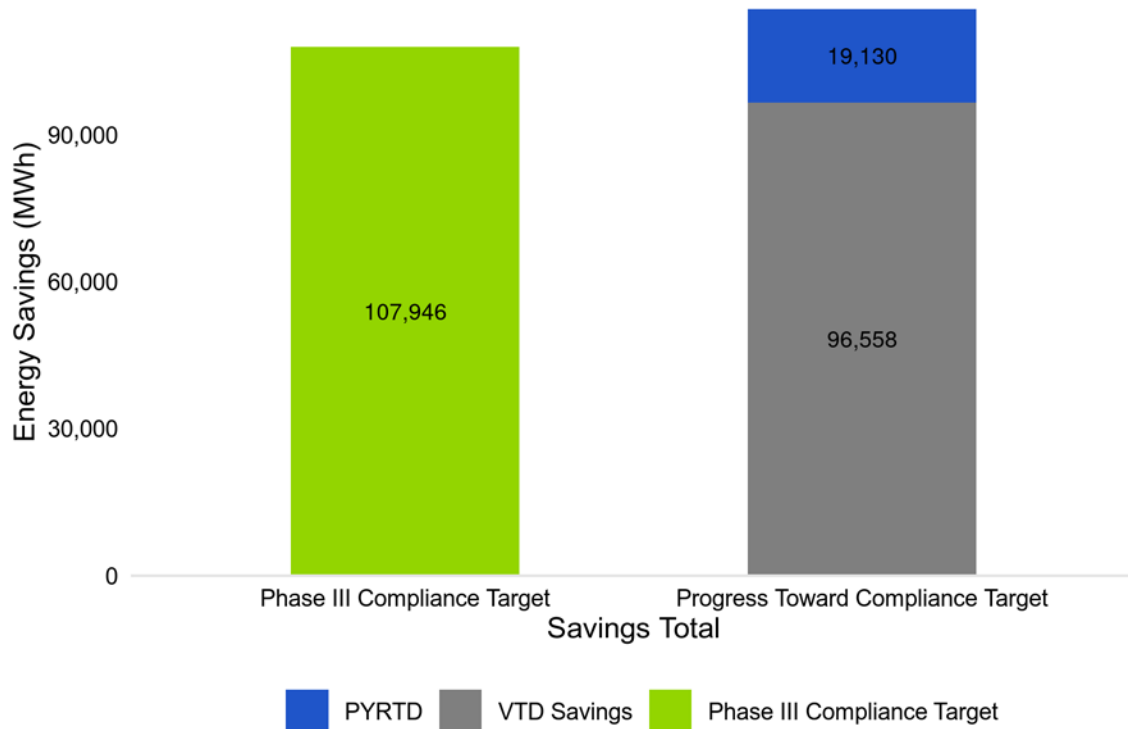


Source: Guidehouse analysis

The Phase III Implementation Order directed EDCs to offer conservation measures to the low-income customer segment based on the proportion of electric sales attributable to low-income households. The proportionate number of measures targeted for PECO is 8.8%. PECO offers a total of 269 EE&C measures to its residential and non-residential customer classes. There are 117 measures available to the low-income customer segment at no cost to the customer. This represents 43.5% of the total measures offered in the EE&C Plan and exceeds the proportionate number of measures target.

The PA PUC also established a low-income energy savings target of 5.5% of the portfolio savings goal. The Phase III low-income savings target for PECO is 107,946 MWh/yr. Figure 2-4 compares the PSA+CO performance to date for the low-income customer segment to the Phase III savings target. Based on the latest available information, PECO has achieved 107.2% of the Phase III low-income energy savings target.

Figure 2-4. EE&C Plan Performance toward Phase III Low-Income Compliance Target^[1]

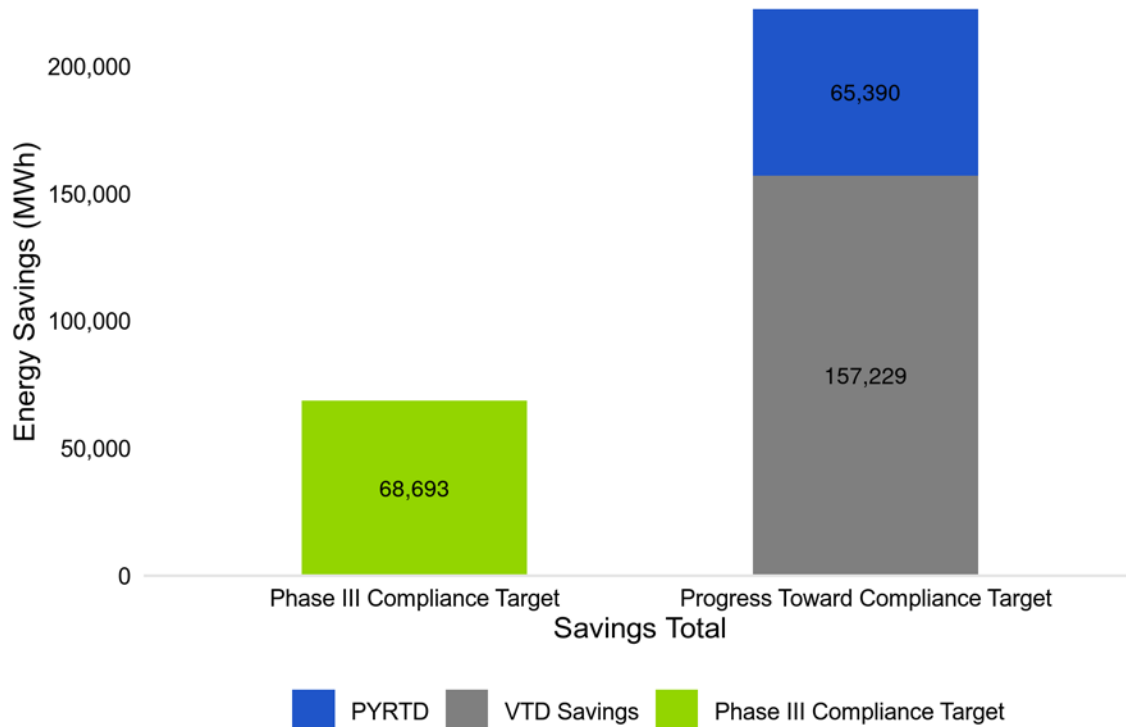


^[1] The PY11 Annual Report included a presentation error showing VTD low-income energy savings of 96,560 MWh/yr instead of 96,558 MWh/yr in one figure. The presentation error is corrected in the figure above. The other figures and tables in the PY11 Annual Report included the correct VTD low-income energy savings.

Source: Guidehouse analysis

The Phase III Implementation Order established a G/E/NP energy savings target of 3.5% of the portfolio savings goal. The G/E/NP savings target for PECO is 68,693 MWh/yr. Figure 2-5 compares the PSA+CO performance to date for the G/E/NP customer segment to the Phase III savings target. Based on the latest available information, PECO has achieved 324.1% of the Phase III G/E/NP energy savings target.

Figure 2-5. EE&C Plan Performance against Phase III G/E/NP Compliance Target



Source: Guidehouse analysis

2.3 Phase III DR Achievements to Date

The Phase III DR performance target for PECO is 161 MW. Compliance targets for DR programs are based on average performance across events and are established at the system level, which means the load reductions measured at the customer meter must be escalated to reflect transmission and distribution (T&D) losses.

Act 129 DR events are triggered by PJM’s day-ahead load forecast. When the day-ahead forecast is above 96% of the peak load forecast for the year, a DR event is initiated for the following day.

In PY12, PECO called five DR events: July 20, July 27, July 29, August 25, and August 27.⁵ The average performance for these five events is presented in Table 2-1.⁶ The full methodology and results are available in the standalone PY12 DR report, submitted to the SWE on March 15, 2021. Table 2-1 shows a summary of the DR performance to date.

⁵ PECO voluntarily implemented PY12 DR activities per PA PUC. *Petition to Amend the Commission’s June 19, 2015 Implementation Order. M-2014-2424864*. May 21, 2020. <https://www.puc.pa.gov/pcdocs/1665150.docx>. Because of the voluntary nature of the program, PECO chose to run 2-hour, rather than 4-hour, events for the Residential and Small C&I DR programs in PY12. The Large C&I program continued with 4-hour events.

⁶ For the Residential and Small C&I DR Programs, the event performance in PY12 is the average over the 2 hours of curtailment. Previous year performances are the average over 4 hours of curtailment.

Table 2-1. Phase III to Date DR Performance by Event

PY	Event Date	Residential DR (MW) ^[1]	Small C&I DR (MW) ^[1]	Large C&I DR (MW) ^[2]	Portfolio (MW)	Relative Precision at 90% CI
PY9	June 13, 2017	39.53	0.00	127.97	167.50	10.9%
PY9	July 20, 2017	33.48	0.00	121.89	155.37	11.0%
PY9	July 21, 2017	23.34	0.00	140.83	164.17	10.3%
PY10	July 2, 2018	38.93	0.00	149.25	188.18	10.2%
PY10	July 3, 2018	33.84	0.00	144.67	178.51	10.7%
PY10	August 6, 2018	25.07	1.15	175.12	201.34	10.6%
PY10	August 28, 2018	30.69	0.92	159.52	191.12	11.3%
PY10	September 4, 2018	29.99	0.77	137.79	168.55	11.4%
PY10	September 5, 2018	29.52	0.84	129.54	159.91	11.9%
PY11	July 17, 2019	34.36	0.86	120.04	155.26	6.1%
PY11	July 18, 2019	11.06	1.02	121.63	133.71	5.9%
PY11	July 19, 2019	34.93	1.18	120.89	157.00	5.8%
PY11	August 19, 2019	24.90	0.98	126.17	152.05	5.6%
PY12	July 20, 2020	30.24	1.08	147.31	178.63	7.5%
PY12	July 27, 2020	28.58	0.66	139.01	168.25	8.2%
PY12	July 29, 2020	27.48	0.46	150.48	178.42	6.7%
PY12	August 25, 2020	23.07	0.90	117.09	141.06	8.4%
PY12	August 27, 2020	25.82	0.33	110.17	136.32	9.2%
PYVTD - Average PY12 DR Event Performance (Voluntary)		27.04	0.69	132.81	160.54	7.9%
PY9-PY11 – Average Phase III DR Event Performance (Compliance)		29.97	0.59	136.56	167.13	10.0%
P3TD - Average Phase III DR Event Performance (Voluntary and Compliance)		29.16	0.62	135.52	165.30	9.5%

^[1] For the Residential and Small C&I DR programs, the event performance in PY12 is the average over the 2 hours of curtailment. Previous year performances are the average over the 4 hours of curtailment.

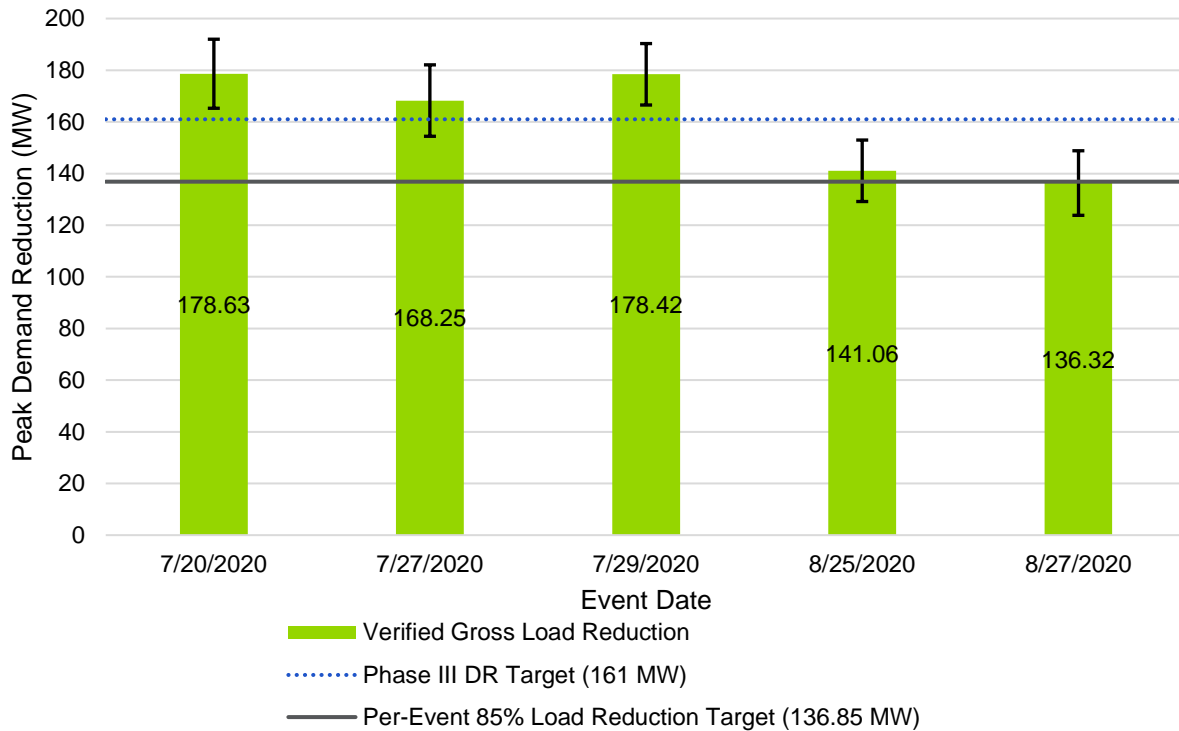
^[2] Verified impacts for the Large C&I DR Program for PY9, PY10, and PY11 have been revised based on corrected interval data provided by PECO. In January 2020, PECO notified Guidehouse of potential issues with the interval data provided for the PY9 through PY11 evaluations, where certain data may not represent actual consumption because of unique meter configurations at different participant sites. After a review of all sites and activities to date, the evaluation team found that 16, 25, and six sites were affected in PY9, PY10, and PY11, respectively. At the request of PECO and in consultation with the SWE, Guidehouse applied evaluation methods prescribed for PY11 to revise verified impacts for the affected sites; impacts for unaffected sites remain unchanged. These revisions increased the PY9-PY11 average performance by 1.6 MW (1.0%).

Source: Guidehouse analysis

The Commission's Phase III Implementation Order also established a requirement that EDCs achieve at least 85% of the Phase III compliance reduction target in each DR event. For PECO,

this translates to a 136.9 MW minimum for each DR event. Figure 2-6 compares the performance of each of the DR events in PY12 to the event-specific minimum and average targets. PECO's voluntary curtailment efforts in PY12 exceeded the 85% minimum target for all events except for the final event on August 27, 2020. The August 27 event fell short of the 85% target by 0.5 MW, which appears to be driven by decreased curtailment from Large C&I customers compared with the three July events. The 85% target is within the margin of error of the verified impacts for the final event.

Figure 2-6. PY12 Event Performance Compared to 85% Per-Event Target



Source: Guidehouse analysis

2.4 Phase III Performance by Customer Segment

Table 2-2 presents the participation, savings, and spending by customer sector for PY12.⁷ The residential, small commercial and industrial (C&I), and large C&I sectors are defined by EDC tariff, and the residential low-income and G/E/NP customer segment carve-outs are defined by statute (66 Pa. C.S. § 2806.1). The residential low-income segment is a subset, and not additive, of the residential customer class; however, some low-income savings may occur on a small C&I or large C&I meter due to participation of low-income occupants living in multifamily, master-metered buildings. Similar to the low-income segment, the G/E/NP customer segment will include customers who are part of the small C&I or large C&I rate classes and is not additive to the portfolio. Table 2-2 represents the cumulative savings, spending, and participation by customer sector, inclusive of all low-income and G/E/NP participation. Table 2-3 represents the

⁷ Phase III close out activities remain active at the time of this report's filing. PECO anticipates quantities, particularly financial numbers, shown within this section's tables will experience minor changes as a result of Phase III activities extending beyond the last day of the phase (e.g., EM&V and administrative costs occurring after June 30, 2021). All quantities will be finalized in the November 15, 2021 Annual Report.

savings, spending, and participation values for the low-income and G/E/NP customer segment carve-outs only.

Table 2-2. PY12 Summary Statistics by Customer Segment

Customer Segment	No. of Participants	PYRTD MWh/yr	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Residential	1,187,529	199,763	17.17	0.0	\$10,144
Small C&I	3,732	78,095	11.33	0.0	\$5,874
Large C&I	1,674	301,821	39.18	0.0	\$9,951
Total	1,192,935	579,679	67.68	0.0	\$25,968

Source: Guidehouse analysis

Table 2-3. PY12 Summary Statistics by Carve-Out

Carve-Out	No. of Participants	PYRTD MWh/yr	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Low-Income (0-50% of FPL)	1,479	2,324	0.25	0.0	\$0
Low-Income (51-150% of FPL)	6,575	16,806	1.94	0.0	\$123
G/E/NP	3,436	65,390	22.38	0.0	\$6,493

Source: Guidehouse analysis

Table 2-4 and Table 2-5 summarize plan performance by sector and customer segment carve-outs since the beginning of Phase III.

Table 2-4. Phase III Summary Statistics by Customer Segment

Customer Segment	No. of Participants ^[1]	PSA MWh/yr	PSA MW (EE)	PSA MW (DR) ^[2]	Incentives (\$1,000)
Residential	5,690,303	1,154,418	137.82	29.97	\$52,323
Small C&I	14,146	287,066	44.36	0.59	\$16,399
Large C&I	5,970	647,132	91.25	136.56	\$28,098
Total	5,710,419	2,088,615	273.43	167.13	\$96,820

^[1] DR participation and Behavioral participation are not additive like other programs because the same participants tend to remain in the program with only small attrition. Therefore, total participation in the DR and Behavioral programs for Phase III is equal to the highest program year participation count for each of the three programs.

^[2] The DR savings presented are from PY9-PY11 as PY12 DR activities were voluntary (see footnote 5).

Source: Guidehouse analysis

Table 2-5. Phase III Summary Statistics by Carveout

Carve-Out	No. of Participants	PSA MWh/yr	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000) ^[1]
Low-Income (0-50% of FPL)	12,630	14,802	1.66	0.00	\$1
Low-Income (51-150% of FPL)	215,549	100,886	11.84	0.00	\$1,329
G/E/NP	8,837	222,619	45.43	0.00	\$15,796

^[1] Carve-out savings include incentives only. Direct install and give-away pending accounted for as admin.

Source: Guidehouse analysis

3. Updates and Findings

3.1 Implementation Updates and Findings

This section summarizes PECO's EE&C Plan and program implementation updates, as well as findings available at the time of this report's writing. PECO's EE&C Plan remains generally unchanged through the second half of PY12 and the close of Phase III at the end of the program year.

- **Residential EE Program:** The residential program continues to represent the majority of savings in the portfolio in PY12. The program includes multiple solutions that are implemented by ARCA, CLEARResult, Franklin Energy, Oracle, and PSD.
 - **Behavioral Solution:** Oracle implements the Behavioral Solution and has been active since PY8. The Behavioral Solution continues to represent a significant portion of the Residential EE Program reported savings.
 - **Lighting, Appliance & HVAC Solution:** The Lighting, Appliance & HVAC Solution, implemented by CLEARResult, continues to represent a significant portion of the Residential EE Program's reported savings, with the majority of the solution's savings originating from LED measures. CFL offerings were discontinued during PY8. Non-lighting measures, including appliances and HVAC, represent less than 15 percent of solution savings.
 - **Appliance Recycling Solution:** The Appliance Recycling Solution, implemented by ARCA, offers rebates for refrigerators, freezers, and room air conditioners (ACs). The utility offers \$75 rebates for each working refrigerator or freezer picked up for recycling. The utility offers \$10 rebates per room AC recycled with the pickup of a refrigerator or freezer.
 - **Whole Home Solution:** The Whole Home Solution, implemented by CLEARResult, offers participants a low-cost home energy assessment that includes direct installation of a range of deemed measures such as lighting, water conservation, smart strips, etc. In addition, the Whole Home Solution provides incentives for ceiling, attic, and wall insulation, air and duct sealing, and mechanical equipment (e.g., fuel switching from electric heat to natural gas, heat pump water heaters).
 - **Multifamily Targeted Market Segment:** The Multifamily Targeted Market Segment includes projects and savings related to residential EE occurring within the dwellings of multifamily buildings. The projects and savings for master-metered multifamily facilities are allocated to the Small C&I EE and Large C&I EE Programs. Franklin Energy implements the Multifamily Targeted Market Segment.
 - **New Construction Solution:** The Residential New Construction Solution's activities continue to represent a smaller share of the Residential EE Program's savings activities. This solution is intended to accelerate the adoption of EE in the design, construction, and operation of new single-family homes, duplexes, and townhomes by leveraging the US Environmental Protection Agency's

(EPA's) ENERGY STAR Homes certification. The program also includes an additional above-code track (Code-Plus) designed to transition builders toward ENERGY STAR standards. The New Construction Solution is implemented by PSD.

- **Low-Income EE Program:** CMC Energy Services and ARCA, Inc. implement the Low-Income Whole Home Solution in PY12.
 - **Whole Home Solution:** The Whole Home Solution encompasses several activities to deliver energy savings services to income eligible households including PECO's Free Energy Check Up with free measure direct installation, low-income multifamily building audit and measure direct installation, appliance recycling, and distribution of free energy efficiency products at events targeting income eligible households. For customers with electric heat and domestic hot water, Energy Check Up measures include improving mechanical systems, water heaters and the thermal performance of building envelopes. Additionally, the solution supports the Low-Income Usage Reduction Program (LIURP) and Philadelphia Gas Works income-eligible weatherization program providing additional free efficient electric EE products for direct installation.
 - **Lighting Solution:** The Lighting Solution was closed on December 31, 2017.
- **Small C&I EE Program:** ICF, Franklin, and SmartWatt have implemented projects during Phase III in three of the program's solutions and two targeted market segments: Equipment and Systems Solution, New Construction Solution, Whole Building Solution, Multifamily Targeted Market Segment, and the Data Center Targeted Market Segment. Each of these solutions typically includes a mixture of lighting improvements, lighting controls, HVAC, compressed air, refrigeration, and custom projects. The Equipment and Systems Solution targets existing buildings, while the New Construction Solution is for new buildings and major retrofits. The Whole Building Solution encourages direct-install projects that target entire facilities, while the Multifamily Targeted Market Segment focuses on the commercially metered common areas in multifamily residential buildings.
- **Large C&I EE Program:** ICF and Franklin have implemented projects during Phase III in two of the program's solutions and two targeted market segments: Equipment and Systems Solution, New Construction Solution, Multifamily Targeted Market Segment, and the Data Center Targeted Market Segment. Each of these solutions typically includes a mixture of lighting improvements, lighting controls, HVAC, compressed air, refrigeration, and custom projects. The Equipment and Systems Solution targets existing buildings, while the New Construction Solution is for new buildings and major retrofits. The Multifamily Targeted Market Segment focuses on the commercially metered common areas in multifamily residential buildings, while the Data Center Targeted Market Segment primarily targets efficient HVAC projects in data centers and other IT facilities.
- **CHP Program:** The CHP Program had two completed projects in PY12. One other project was on target to be complete in PY12 but was delayed due to COVID-19 and will become operational in Phase IV.
- **Residential DR Program:** The Residential DR Program ran five DR events during the summer of 2020: July 20, July 27, July 29, August 25, and August 27. As in years past,

the program is implemented by Itron. This year, as in PY11, the incentive is \$40 per direct load control (DLC) unit per year.

- **Small C&I DR Program:** The Small C&I DR Program ran five DR events during the summer of 2020: July 20, July 27, July 29, August 25, and August 27. As in years past, the program is implemented by Itron. This year, as in PY11, the incentive is \$40 per thermostat per year.
- **Large C&I DR Program:** The Large C&I DR Program ran five DR events during the summer of 2020: July 20, July 27, July 29, August 25, and August 27. The program is implemented by two CSPs: CPower and Enel X.

3.2 Evaluation Updates and Findings

Guidehouse has written, received SWE comments, and revised the Phase III evaluation plan and sampling plan for each program and solution. The team has conducted interviews with PECO staff and CSPs and is reviewing program tracking databases and engineering files for each solution. These activities inform the design of participant surveys exploring customer satisfaction and experience, and the verification of measure installations for specific solutions per the evaluation plan. Guidehouse's progress on each program and solution is summarized below.

- **Residential EE Program:** Guidehouse updated the evaluation plan ahead of the PY12 activities for the Residential EE Program's solutions. Guidehouse is preparing data collection tools and processes to aid phone verification and survey research anticipated for PY12. Activities from PY11, recent findings and conclusions, and SWE feedback inform the team's research plan updates for PY12 that will support both impact and process evaluation efforts.
- **Low-Income EE Program:** Guidehouse conducted on-site verification visits in PY9 and phone verification in PY10 and PY11. The team updated the evaluation plan for PY12 activities, which will include phone verification. As part of that planning, Guidehouse is preparing to conduct program database reviews and preparing data collection tools and processes to aid the verification research anticipated for PY12. Low-Income EE Program evaluation activities are focused on the Whole Home Solution.
- **Small C&I EE Program:** Guidehouse updated its data collection tools and processes to ensure faster and more robust data collection as well as more collaboration with the SWE. Impact evaluations for all solutions are ongoing. Over the next several months, Guidehouse will continue to review the solution measure data, call and visit sampled project sites, and continue the evaluation process for PY12.
- **Large C&I EE Program:** Guidehouse updated its data collection tools and processes to ensure faster and more robust data collection as well as more collaboration with the SWE. Guidehouse has also worked with ICF and DNVGL to review large and complex projects before incentives are reserved. Impact evaluations for all solutions are ongoing. Over the next several months, Guidehouse will review the solution measure data, call and visit sampled project sites, and continue the evaluation process for PY12.

- **CHP Program:** The CHP Program had two completed projects in PY12. Two other projects that were on target to be complete in PY12 were delayed due to COVID-19 and will become operational in Phase IV.
- **Residential DR Program:** The team evaluated peak load reductions for DR events on all summer event days in 2020. Peak load reduction evaluation findings are reported in the separate DR Annual Report.
- **Small C&I DR Program:** The team evaluated peak load reductions for DR events on all summer event days in 2020. Peak load reduction evaluation findings are reported in the separate DR Annual Report.
- **Large C&I DR Program:** The team evaluated peak load reductions for DR events on all summer event days in 2020. Peak load reduction evaluation findings are reported in the separate DR Annual Report.

4. Summary of Participation by Program

Table 4-1 provides the current participation totals for PY12 and Phase III. Certain programs and solutions define participation differently depending on the delivery channel and data tracking practices. Appendix A includes an overview of the different participation definitions by program and solution.

Table 4-1. EE&C Plan Participation by Program

Program and Solution	PYTD Participation	P3TD Participation
LAH	806,303	4,807,228
Appliance Recycling	10,943	70,207
Whole Home	2,961	22,119
New Construction	1,432	3,894
Behavioral ^[1]	354,258	466,381
Multifamily Targeted	4,121	32,880
Residential EE Program	1,180,018	5,402,709
Whole Home	8,054	61,121
Lighting	0	167,058
Low-Income EE Program	8,054	228,179
Equipment and Systems	2,920	8,840
Whole Building	163	1,130
New Construction	59	275
Data Center Targeted	0	2
Multifamily Targeted	88	537
Small C&I EE Program	3,230	10,784
Equipment and Systems	1,567	4,997
New Construction	39	182
Data Center Targeted	0	4
Multifamily Targeted	25	182
Large C&I EE Program	1,631	5,365
CHP Program	2	8
Residential DR Program^[1]	50,919	61,440
Small C&I DR Program^[1]	1,517	1,586
Large C&I DR Program^[1]	356	356
Portfolio Total	1,245,727	5,710,427

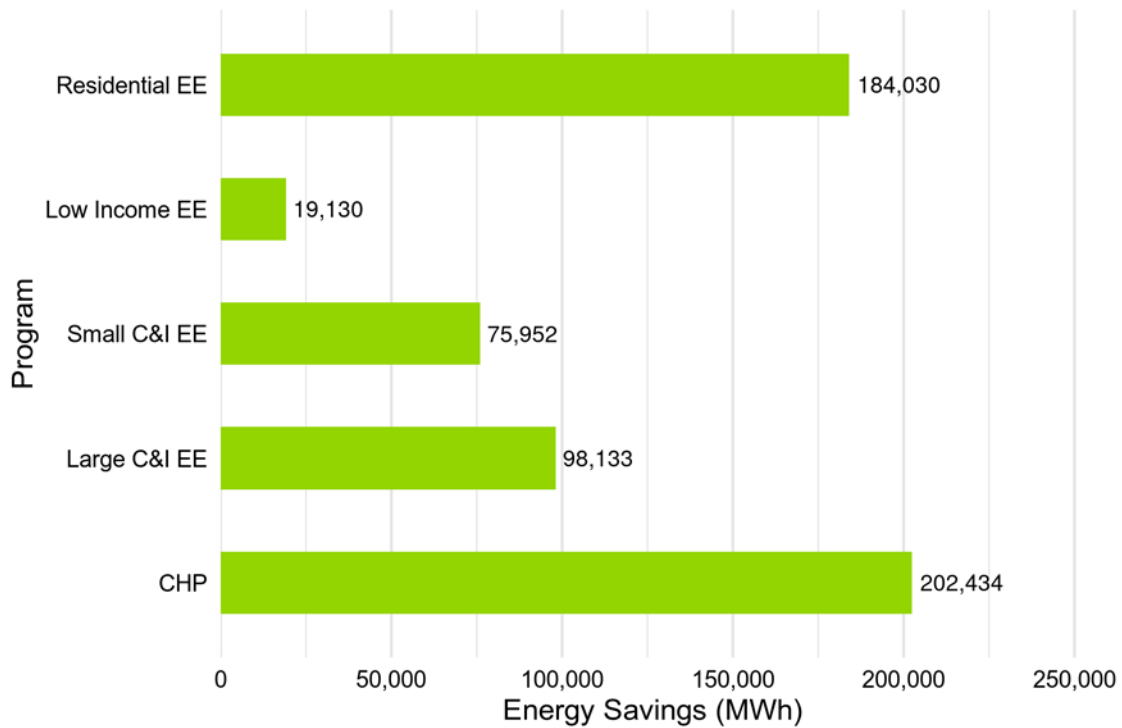
^[1] DR participation and Behavioral participation are not additive like other programs because the same participants tend to remain in the program with only small attrition. Therefore, total participation in the DR and Behavioral programs for Phase III is equal to the highest program year participation count for each program.

Sources: PECO's eTrack database, CSP tracking data

5. Summary of Energy Impacts by Program

Figure 5-1 presents a summary of the PYTD reported gross energy savings by program for PY12. The energy impacts in this report are presented at the meter level and do not reflect adjustments for T&D losses.

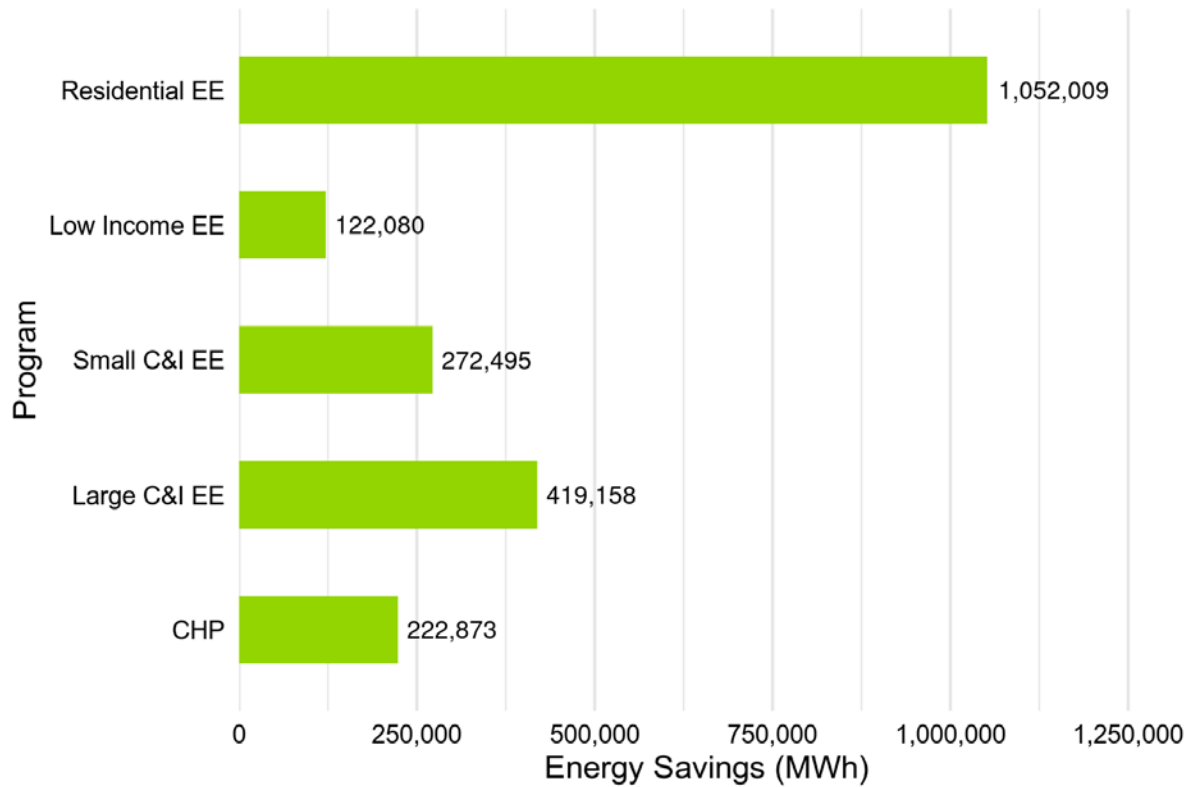
Figure 5-1. PYTD Reported Gross Energy Savings by Program



Source: PECO's eTrack database, CSP tracking data

Figure 5-2 presents a summary of the PSA gross energy savings by program for Phase III of Act 129. PSA savings include verified gross savings from previous program years and the PYTD savings from the current program year.

Figure 5-2. PSA Energy Savings by Program for Phase III



Source: PECO's eTrack database, CSP tracking data

Table 5-1 presents a summary of energy impacts by program and solution through the current reporting period.

Table 5-1. Energy Savings by Program and Solution (MWh/yr)

Program and Solution	PYRTD	RTD	VTD	PSA
LAH	90,360	573,013	489,817	580,177
Appliance Recycling	10,779	69,839	59,575	70,354
Whole Home	4,502	28,064	22,208	26,710
New Construction	1,836	7,991	5,921	7,756
Behavioral	74,126	294,115	277,963	352,089
Multifamily Targeted	2,427	15,182	12,495	14,923
Residential EE Program	184,030	988,203	867,979	1,052,009
Whole Home	19,130	120,616	93,869	112,999
Lighting	0	9,086	9,081	9,081
Low-Income EE Program	19,130	129,702	102,950	122,080
Equipment and Systems	57,686	196,815	147,318	205,004
New Construction	4,602	16,932	12,907	17,509
Whole Building	9,598	36,192	25,895	35,493
Data Centers Targeted	0	119	50	50
Multifamily Targeted	4,066	15,656	10,373	14,439
Small C&I EE Program	75,952	265,714	196,543	272,495
Equipment and Systems	89,807	365,477	281,058	370,865
New Construction	5,224	32,165	27,382	32,607
Data Centers Targeted	0	546	529	529
Multifamily Targeted	3,102	15,310	12,056	15,158
Large C&I EE Program	98,133	413,498	321,025	419,158
CHP Program	202,434	228,883	20,440	222,873
Portfolio Total	579,679	2,026,001	1,508,937	2,088,615

Sources: PECO's eTrack database, CSP tracking data

6. Summary of Demand Impacts by Program

PECO's Phase III EE&C programs achieve peak demand reductions primarily in two ways. The first is through coincident reductions from EE measures and the second is through dedicated DR offerings that exclusively target temporary demand reductions on peak days. EE reductions coincident with system peak hours are reported and used in the calculation of benefits in the Total Resource Cost (TRC) test but do not contribute to Phase III peak demand reduction compliance goals. Phase III peak demand reduction targets are exclusive to DR programs.

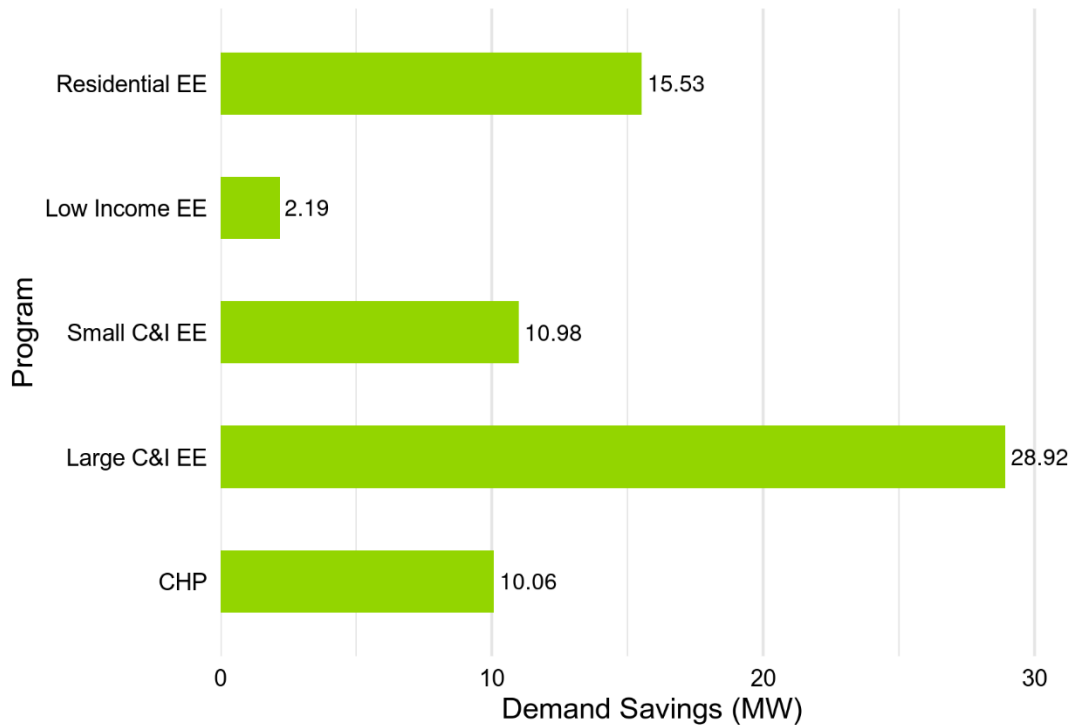
The two types of peak demand reduction savings are also treated differently for reporting purposes. Peak demand reductions from EE are generally additive across program years, meaning that the P3TD savings reflect the sum of the first-year savings in each program year. Conversely, DR goals are based on average portfolio impacts across all events, so cumulative DR performance is expressed as the average performance of each of the DR events called in Phase III to date.⁸ Because of these differences, demand impacts from EE and DR are reported separately in Sections 6.1 and 6.2.

6.1 Energy Efficiency

Act 129 defines peak demand savings from EE as the average expected reduction in electric demand from 2:00 p.m. to 6:00 p.m. EDT on non-holiday weekdays from June to August. The peak demand impacts from EE in this report are presented at the meter level and do not reflect adjustments for T&D losses. Figure 6-1 presents a summary of the PYRTD reported gross peak demand savings by EE program for PY12.

⁸ For the Residential and Small C&I DR programs, the event performance in PY12 is the average over the 2 hours of curtailment. Previous year performances are the average over 4 hours of curtailment.

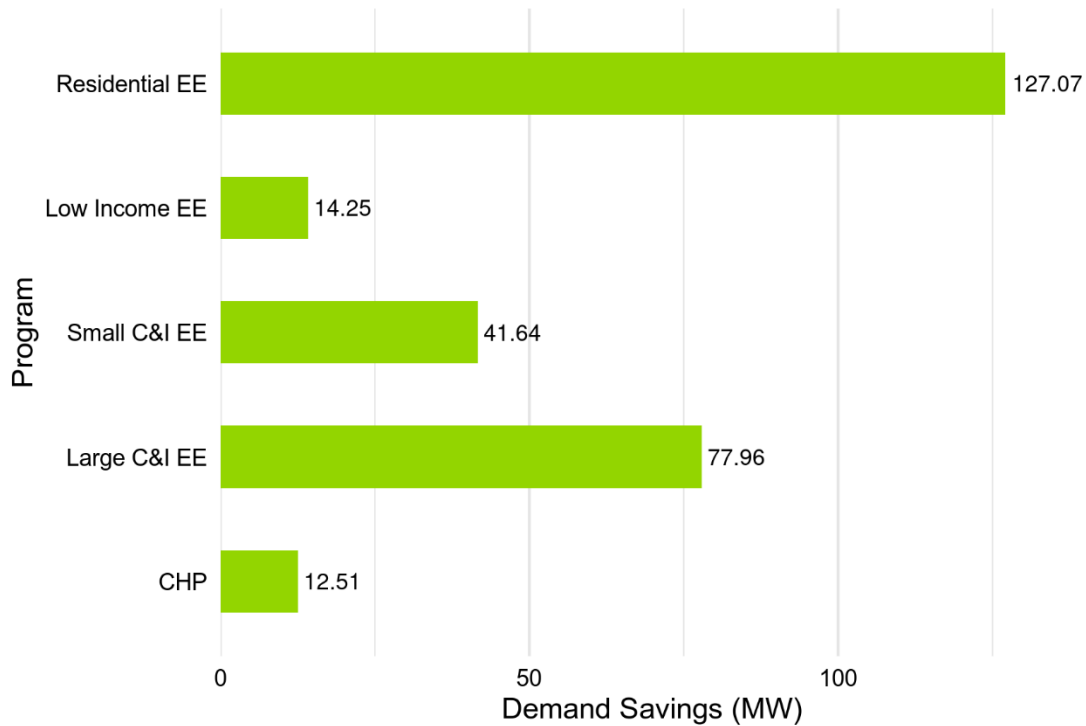
Figure 6-1. PYRTD Gross Demand Savings by EE Program



Sources: PECO's eTrack database, CSP tracking data

Figure 6-2 presents a summary of the PSA gross demand savings by EE program for Phase III of Act 129.

Figure 6-2. PSA Demand Savings by EE Program for Phase III



Sources: PECO's eTrack database, CSP tracking data

Table 6-1 presents a summary of the peak demand impacts by EE program and solution through the current reporting period.

Table 6-1. Peak Demand Savings by EE Program and Solution (MW)

Program and Solution	PYRTD	RTD	VTD	PSA
LAH	12.34	75.03	65.23	77.57
Appliance Recycling	1.47	10.03	8.43	9.90
Whole Home	0.60	3.45	2.68	3.28
New Construction	0.83	2.86	1.93	2.76
Behavioral	0.00	0.00	31.73	31.73
Multifamily Targeted	0.29	1.92	1.54	1.83
Residential EE Program	15.53	93.29	111.54	127.07
Whole Home	2.19	14.11	10.99	13.18
Lighting	0.00	1.07	1.07	1.07
Low-Income EE Program	2.19	15.18	12.06	14.25
Equipment and Systems	8.10	27.78	22.90	31.00
New Construction	0.76	3.00	2.23	2.99
Whole Building	1.79	7.26	4.46	6.25
Data Centers Targeted	0.00	0.02	0.01	0.01
Multifamily Targeted	0.34	1.52	1.06	1.40

Program and Solution	PYRTD	RTD	VTD	PSA
Small C&I EE Program	10.98	39.57	30.66	41.64
Equipment and Systems	27.70	67.30	42.72	70.42
New Construction	0.84	4.18	4.82	5.65
Data Centers Targeted	0.00	0.04	0.04	0.04
Multifamily Targeted	0.39	1.91	1.47	1.86
Large C&I EE Program	28.92	73.42	49.04	77.96
CHP Program	10.06	12.86	2.45	12.51
Portfolio Total	67.68	234.33	205.75	273.43

Sources: PECO's eTrack database, CSP tracking data

6.2 Demand Response

Act 129 defines peak demand savings from DR as the average reduction in electric demand during the hours when a DR event is initiated. Act 129 peak demand reduction targets were set for PY9 through PY12; there was no PY8 peak demand reduction target; PY12 targets were made voluntary.⁹ Phase III DR events are initiated according to the following guidelines:¹⁰

1. Curtailment events shall be limited to the months of June through September.
2. Curtailment events shall be called for the first 6 days of each program year (starting in PY9) in which the peak hour of PJM's day-ahead forecast for the PJM regional transmission organization (RTO) is greater than 96% of the PJM RTO summer peak demand forecast for the months of June through September.
3. Each curtailment event shall last 4 hours. AC Saver (Residential and Small C&I sector) curtailment events were 2 hours for the voluntary PY12.
4. Each curtailment event shall be called such that it will occur during the day's forecast peak hour(s) above 96% of PJM's RTO summer peak demand forecast.
5. Once six curtailment events have been called in a program year, the peak demand reduction program shall be suspended for that program year.

The peak demand impacts from DR in this report are presented at the system level and reflect adjustments to account for T&D losses. The PA 2016 Technical Reference Manual (TRM) specified the T&D line loss adjustment factors that each EDC must use for Act 129 Phase III.¹¹ PECO uses the following line loss multipliers by sector.

- Residential = 1.0799

⁹ PECO voluntarily implemented PY12 DR activities per PA PUC. *Petition to Amend the Commission's June 19, 2015 Implementation Order. M-2014-2424864*. May 21, 2020. <https://www.puc.pa.gov/pcdocs/1665150.docx>

¹⁰ PA PUC, *Energy Efficiency and Conservation Program Implementation Order*, at Docket No. M-2014-2424864, (Phase III Implementation Order), entered June 11, 2015.

¹¹ 2016 PA TRM. *Pennsylvania Public Utility Commission Technical Reference Manual; State of Pennsylvania Act 129 Energy Efficiency and Conservation Program and Act 213 Alternative Energy Portfolio Standards*. Section 1.14 Transmission and Distribution System Losses. June 2016, Errata Update February 2017.

- Small C&I = 1.0799
- Large C&I = 1.0799

Table 6-2 summarizes the demand reductions for each of the DR programs in PECO’s EE&C Plan and for the DR portfolio as a whole. Verified gross demand savings are the average performance across all Phase III DR events independent of how many events occurred in a given program year.

Table 6-2. PY12 DR PYVTD Performance by Event

PY	Event Date	Residential DR (MW) ^[1]	Small C&I DR (MW) ^[1]	Large C&I DR (MW)	Portfolio (MW)	Relative Precision at 90% CI
PY12	July 20	30.24	1.08	147.31	178.63	7.5%
PY12	July 27	28.58	0.66	139.01	168.25	8.2%
PY12	July 29	27.48	0.46	150.48	178.42	6.7%
PY12	August 25	23.07	0.90	117.09	141.06	8.4%
PY12	August 27	25.82	0.33	110.17	136.32	9.2%
PYVTD – Average PY12 DR Event Performance (Voluntary)		27.04	0.69	132.81	160.54	7.9%

^[1] For the Residential and Small C&I DR programs, the event performance in PY12 is the average over the 2 hours of curtailment.

Source: Guidehouse analysis

7. Summary of Finances

Section 7 provides an overview of the expenditures associated with PECO's portfolio and the recovery of those costs from ratepayers.¹²

7.1 Program Financials

Program-specific and portfolio total finances for PY12 are shown in Table 7-1. The columns in Table 7-1 and Table 7-2 are adapted from the Direct Program Cost categories in the Commission's EE&C Plan template¹³ for Phase III. EDC Materials, Labor, and Administration includes costs associated with an EDC's own employees. ICSP Materials, Labor, and Administration includes both the program implementation contractor and the costs of any other outside vendors EDCs employ to support program delivery.

Table 7-1. PYTD Financials

Program	Incentives to Participants and Trade Allies (\$1,000)	EDC Materials, Labor, and Administration (\$1,000)	ICSP Materials, Labor, and Administration (\$1,000)	Total Costs (\$1,000)
Residential EE	\$7,702	\$6,668	\$10,220	24,590
Low-Income EE	\$103	\$80	\$3,663	3,845
Small C&I EE	\$5,751	\$2,927	\$4,759	13,436
Large C&I EE	\$7,920	\$1,277	\$4,966	14,163
CHP	\$2,028	\$0	\$9	2,037
Residential DR	\$2,373	\$4	\$884	3,261
Small C&I DR	\$92	\$0	\$25	117
Large C&I DR	\$0	\$8	\$4,990	4,998
Common Portfolio Costs ^[1]				8,434
Portfolio Total	\$25,968	\$10,963	\$29,515	74,881
SWE Costs ^[2]	N/A	N/A	N/A	300
Total	\$25,968	\$10,963	\$29,515	75,181

^[1] Includes the administrative CSP, tracking system, general administration, and clerical cost; EDC program management; CSP program management; general management; oversight of major accounts; and technical assistance.

^[2] Statewide evaluation costs are outside of the 2% spending cap.

Sources: PECO's eTrack database, CSP tracking data

Table 7-2 shows program-specific and portfolio total finances since the inception of Phase III.

¹² Phase III close out activities remain active at the time of this report's filing. PECO anticipates quantities, particularly financial numbers, shown within this section's tables will experience minor changes as a result of Phase III activities extending beyond the last day of the phase (e.g., EM&V and administrative costs occurring after June 30, 2021). All quantities will be finalized in the November 15, 2021 Annual Report.

¹³ <http://www.puc.pa.gov/pdocs/1372426.doc> Section 10.

Table 7-2. Phase III to Date Financials

Program	Incentives to Participants and Trade Allies (\$1,000)	EDC Materials, Labor, and Administration (\$1,000)	ICSP Materials, Labor, and Administration (\$1,000)	Total Costs (\$1,000)
Residential EE	\$37,796	\$30,539	\$55,064	\$123,397
Low-Income EE	\$1,307	\$1,166	\$34,066	\$36,539
Small C&I EE	\$15,721	\$11,861	\$20,275	\$47,858
Large C&I EE	\$24,898	\$4,960	\$23,427	\$53,284
CHP	\$3,171	\$0	\$101	\$3,273
Residential DR	\$13,393	\$37	\$5,529	\$18,960
Small C&I DR	\$534	\$3	\$157	\$694
Large C&I DR	\$1	\$74	\$18,220	\$18,295
Common Portfolio Costs ^[1]				\$46,787
Portfolio Total	\$96,820	\$48,641	\$156,839	\$349,087
SWE Costs ^[2]	N/A	N/A	N/A	\$2,200
Total	\$96,820	\$48,641	\$156,839	\$351,287

^[1] Includes the administrative CSP, tracking system, general administration, and clerical cost; EDC program management; CSP program management; general management; oversight of major accounts; and technical assistance.

^[2] Statewide evaluation costs are outside of the 2% spending cap.

Sources: PECO's eTrack database, CSP tracking data

7.2 Cost Recovery

Act 129 allows Pennsylvania EDCs to recover EE&C Plan costs through a cost recovery mechanism. PECO's cost recovery charges are organized separately by four customer sectors to ensure that the electric rate classes that finance the programs are the rate classes that receive the direct energy and conservation benefits. Cost recovery is necessarily tied to the way customers are metered and charged for electric service. Readers should be mindful of the differences between Table 7-3 and Section 2. For example, the low-income customer segment is a subset of PECO's residential tariff(s) and may also include low-income customers in master-metered, multifamily facilities and is, therefore, not listed in Table 7-3.

Table 7-3. EE&C Plan Expenditures by Cost Recovery Category¹⁴

Cost Recovery Segment	Rate Classes Included	PYTD Spending (\$1,000)	P3TD Spending (\$1,000)
Residential	R, RH, and CAP	\$34,576	\$195,686
Small C&I	GS	\$14,609	\$57,774
Large C&I	PD, HT, and EP	\$24,630	\$93,141
Municipal	SLE, AL, and TLCL	\$1,065	\$2,486
Portfolio Total		\$74,881	\$349,087

Source: PECO

¹⁴ Excludes SWE costs.

Appendix A. Participation Counts

Across PECO's portfolio, there are differences in how participation is calculated across solutions and CSPs. Table A-1 provides an overview of the different participation definitions by program and solution.

Table A-1. Overview of Participation Definitions

Program	Solution	Conservation Service Provider	Participation Definition
Residential	LAH (Lighting)	CLEAResult	Sum number of total lamp packs sold
	LAH (Appliances and HVAC)	CLEAResult	Count of unique customers
	Whole Home	CLEAResult	Count of unique premise ID
	Appliance Recycling	ARCA	Count of unique customers
	New Construction	PSD	Sum No. of participants
	Behavioral	Oracle	Sum No. of participants
	Multifamily Targeted Market Segment	Franklin	Distinct count of utility account ID by program, solution, and invoice number
Low-Income	Whole Home	CMC	Count of unique premise numbers for component 1 and 2
	Whole Home	ARCA	Count of all orders on distinct days
	Whole Home	ECA	Count unique premise numbers
Small C&I	Equipment and Systems	ICF	Count of unique project number
	New Construction	ICF	Count of unique project number
	Whole Building	SmartWatt	Count of unadjusted projects
	Multifamily Targeted Market Segment	Franklin	Distinct count of utility account ID by program, solution, and invoice number
Large C&I	Equipment and Systems	ICF	Count of unique project number
	New Construction	ICF	Count of unique project number
	Data Centers Targeted Market Segment	ICF	Count of unique project number
	Multifamily Targeted Market Segment	Franklin	Distinct count of utility account ID by program, solution, and invoice number
CHP		Varies by participant	Count of unique Project Number

Program	Solution	Conservation Service Provider	Participation Definition
Residential DR		Itron	Count of unique Account Number with device status as installed or swapped and the measure code is CACS (central air conditioner switch)
Small C&I DR		Itron	Count of unique Account Number with device status as installed or swapped and the measure code is CACS (central air conditioner switch)
Large C&I DR		CPower and EnelX	Large C&I customer (defined by Account Number) enrolled for at least 1 hour of at least one event

Source: Guidehouse analysis

guidehouse.com