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January 16, 2018

VIA FEDERAL EXPRESS

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor
Harrisburg, PA 17120

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PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

Re: PUC Docket No. M-2015-2515691
Phase III Energy Efficiency and Conservation Program Semi-Annual Report for
June 1, 2017 through May 31, 2018 and Demand Response Only Performance
Annual Report

Dear Secretary Chiavetta:

In accordance with Section IV.D.2 of the Commission's Opinion and Order Letter dated March 17, 2016 (Docket No. M-2015-2515691), enclosed is PECO's ("PECO" or "the Company") Phase III Semi-Annual Energy Efficiency & Conservation Report for the period June 1, 2017 through May 31, 2018.

PECO is providing a copy of the report to the Act 129 Statewide Evaluator (NMR Group) and is also posting the report on the PECO website.

Also, enclosed is the Annual Report of PECO Energy Company ("PECO" or "the Company") concerning the performance of its Act 129 Phase III demand response ("DR") programs for June 1, 2017 to September 30, 2017.¹ For your convenience PECO is providing the DR verified impact results in the final Annual Report template, which include the evaluation findings, as required.

As is reflected in the Annual Report, the performance data presented show that, for each of the three curtailment events in PY9, PECO did not meet the Commission requirement that the Company obtain at least 85% of its peak demand reduction target of 161 MW (137 MW). Specifically, PECO achieved a reduction of 96MW (June 13), 119MW (July 20) and 107MW (July 21) during each of the three curtailment events called in PY9.

PECO has been a thought and performance leader with respect to Act 129's energy efficiency

¹ The performance of the Company's energy efficiency programs during program year nine (June 1, 2017 to May 31, 2018) ("PY9") will be documented in a separate filing on November 15, 2018.

Rosemary Chiavetta, Secretary
January 16, 2018
Page 2

program targets. Consistent with this history of performance, PECO's concerted efforts were directed to meeting or exceeding the June 1, 2017 to September 30, 2017 DR target (the "DR target"). Indeed, the Company kept Commission Staff apprised of its efforts through several meetings and as part of its conservation service provider contract filings.

PECO has initiated an investigation into why it did not meet the DR target. The scope of this investigation includes: 1) the reasons for the challenges the Company faced when seeking resources sufficient to achieve the DR target through multiple requests for proposals ("RFPs") for DR resources; 2) potential implementation problems during the curtailment events; and 3) the quality and granularity of the data available to develop this Annual Report. If data quality issues are identified during this investigation, PECO respectfully reserves the right to file an amended Annual Report that more accurately represents the performance of its DR resources during PY9. Upon completion of its investigation, PECO will share with the Commission its findings and corrective actions.

Please note that the Company is committed to addressing any implementation issues that are identified to improve the performance of its DR resources in future years. In addition, PECO will address any issues that affected the performance of the Company's existing DR resources. PECO also intends to issue new RFPs to obtain additional DR resources to remedy the PY9 underperformance.

In conclusion, PECO is committed to providing any additional information that may be useful to the Commission to demonstrate its efforts to fully meet its energy consumption reduction and demand response curtailment obligations in connection with Act 129 Phase III. Moreover, PECO is focused on meeting its June 1, 2018 to September 30, 2018 DR target and the Company's overall Phase III DR target.

Kindly return a time-stamped copy of this cover letter in the self-addressed, stamped envelope that is enclosed. If you have any questions regarding this filing, please do not hesitate to contact me at 215.841.5777.

Sincerely,



Richard G. Webster, Jr.
Vice President
Regulatory Policy & Strategy

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Page 3

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Semiannual Report to the Pennsylvania Public Utility Commission

Phase III of Act 129

Program Year 9

(June 1, 2017 - May 31, 2018)

For Pennsylvania Act 129 of 2008

Energy Efficiency and Conservation Plan

Prepared for:



An Exelon Company

Submitted by:

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January 15, 2018

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TABLE OF CONTENTS

1. Introduction	1
2. Summary of Achievements	2
2.1 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.....	7
2.4.1 Residential EE Program	9
2.4.2 Low-Income EE Program	11
2.4.3 Small C&I EE Program	13
2.4.4 Large C&I EE Program	14
2.4.5 Combined Heat and Power Program.....	16
2.4.6 Residential DR Program	17
2.4.7 Small C&I DR Program.....	18
2.4.8 Large C&I DR Program.....	19
3. Updates and Findings	21
3.1 Implementation Updates and Findings.....	21
3.2 Evaluation Updates and Findings.....	22
4. Summary of Participation by Program	24
5. Summary of Energy Impacts by Program	27
6. Summary of Demand Impacts by Program	29
6.1 Energy Efficiency	29
6.2 Demand Response	30
7. Summary of Finances	32
7.1 Program Financials.....	32
7.2 Cost Recovery	33
Appendix A. Detailed Customer Segment and Carve-out Tables	A-1
A.1 Portfolio	A-2
A.2 Residential EE Program.....	A-4
A.3 Low-Income EE Program	A-11
A.4 Small C&I EE Program.....	A-14
A.5 Large C&I EE Program	A-20
A.6 CHP EE Program	A-25
A.7 DR Programs	A-26

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	5
Figure 2-5. EE&C Plan Performance Against Phase III G/E/NP Compliance Target.....	6
Figure 5-1. PYTD Reported Gross Energy Savings by Program.....	27
Figure 5-2. PSA Energy Savings by Program for Phase III	28
Figure 6-1. PYRTD Gross Demand Savings by EE Program.....	29
Figure 6-2. PSA Demand Savings by EE Program for Phase III	30

TABLES

Table 2-1. Summary of Demand Savings for DR Sector by Customer Segment	7
Table 2-2. PY9 Summary Statistics by Customer Segment	8
Table 2-3. PY9 Summary Statistics by Carve-Out.....	8
Table 2-4. Phase III Summary Statistics by Customer Segment.....	8
Table 2-5. Phase III Summary Statistics by Carve-Out	9
Table 2-6. PY9 Residential EE Program by Customer Segment.....	9
Table 2-7. PY9 Residential EE Program by Carve-Out	10
Table 2-8. Phase III Residential EE Program by Customer Segment	10
Table 2-9. Phase III Residential EE Program by Carve-Out.....	10
Table 2-10. PY9 Low-Income EE Program by Customer Segment.....	11
Table 2-11. PY9 Low-Income EE Program by Carve-Out	11
Table 2-12. Phase III Low-Income EE Program by Customer Segment	12
Table 2-13. Phase III Low-Income EE Program by Carve-Out.....	12
Table 2-14. PY9 Low-Income EE Program Customer Segment Supplement	12
Table 2-15. PY9 Small C&I EE Program by Customer Segment	13
Table 2-16. PY9 Small C&I EE Program by Carve-Out.....	13
Table 2-17. Phase III Small C&I EE Program by Customer Segment.....	14
Table 2-18. Phase III Small C&I EE Program by Carve-Out.....	14
Table 2-19. PY9 Large C&I EE Program by Customer Segment	15
Table 2-20. PY9 Large C&I EE Program by Carve-Out.....	15
Table 2-21. Phase III Large C&I EE Program by Customer Segment.....	15
Table 2-22. Phase III Large C&I EE Program by Carve-Out	15
Table 2-23. PY9 CHP EE Program by Customer Segment	16
Table 2-24. PY9 CHP EE Program by Carve-Out	16
Table 2-25. Phase III CHP EE Program by Customer Segment	16
Table 2-26. Phase III CHP EE Program by Carve-Out	17
Table 2-27. PY9 Residential DR Program by Customer Segment	17
Table 2-28. Phase III Residential DR Program by Customer Segment.....	18
Table 2-29. PY9 Small C&I DR Program by Customer Segment	18
Table 2-30. Phase III Small C&I DR Program by Customer Segment.....	19
Table 2-31. PY9 Large C&I DR Program by Customer Segment.....	19
Table 2-32. Phase III Large C&I DR Program by Customer Segment	20
Table 4-1. EE&C Plan Participation by Program	24
Table 5-1. Energy Savings by Program (MWh)	28

Table 6-1. Peak Demand Savings by EE Program (MW) 30

Table 6-2. Summary of Demand Savings for DR Programs by Customer Segment 31

Table 7-1. PYTD Financials 32

Table 7-2. Phase III to Date Financials 33

Table 7-3. EE&C Plan Expenditures by Cost Recovery Category 34

Table A-1. PY9 EE Portfolio Statistics by Customer Segment and Carve-Out A-2

Table A-2. Phase III EE Portfolio Statistics by Customer Segment and Carve-Out A-3

Table A-3. PY9 Residential EE Program by Customer Segment and Carve- Out A-4

Table A-4. Residential EE Program Lighting, Appliance & HVAC Solution by Customer Segment and Carve-Out A-5

Table A-5. PY9 Residential EE Program Appliance Recycling Solution by Customer Segment and Carve-Out A-6

Table A-6. PY9 Residential EE Program Whole Home Solution by Customer Segment and Carve-Out A-7

Table A-7. PY9 Residential EE Program New Construction Solution by Customer Segment and Carve-Out A-8

Table A-8. PY9 Residential EE Program Behavioral Solution by Customer Segment and Carve-Out ... A-9

Table A-9. PY9 Residential EE Program Multifamily Targeted Market Segment by Customer Segment and Carve-Out A-10

Table A-10. PY9 Low-Income EE Program by Customer Segment and Carve-Out A-11

Table A-11. PY9 Low-Income EE Program Lighting Solution by Customer Segment and Carve-Out .. A-12

Table A-12. PY9 Low-Income EE Program Whole Home Solution by Customer Segment and Carve-Out A-13

Table A-13. PY9 Small C&I EE Program by Customer Segment and Carve-Out A-14

Table A-14. PY9 Small C&I EE Program Equipment and Systems Solution by Customer Segment and Carve-Out A-15

Table A-15. PY9 Small C&I EE Program New Construction Solution by Customer Segment and Carve-Out A-16

Table A-16. PY9 Small C&I EE Program Whole Building Solution by Customer Segment and Carve-Out A-17

Table A-17. PY9 Small C&I EE Program Data Centers Targeted Market Segment by Customer Segment and Carve-Out A-18

Table A-18. PY9 Small C&I EE Program Multifamily Targeted Market Segment by Customer Segment and Carve-Out A-19

Table A-19. PY9 Large C&I EE Program by Customer Segment and Carve-Out A-20

Table A-20. PY9 Large C&I EE Program Equipment and Systems Solution by Customer Segment and Carve-Out A-21

Table A-21. PY9 Large C&I EE Program New Construction Solution by Customer Segment and Carve-Out A-22

Table A-22. PY9 Large C&I EE Program Data Centers Targeted Market Segment by Customer Segment and Carve-Out A-23

Table A-23. PY9 Large C&I EE Program Multifamily Targeted Market Segment by Customer Segment and Carve-Out A-24

Table A-24. PY9 CHP EE Program by Customer Segment and Carve-Out A-25

Table A-25. PY9 DR Programs by Customer Segment A-26

Table A-26. DR Programs Verified Gross Demand Savings (MW) A-26

ACRONYMS

AC	Air Conditioner
BDR	Behavioral Demand Response
C&I	Commercial and Industrial
CFL	Compact Fluorescent Lamp
CHP	Combined Heat and Power
CSP	Conservation Service Provider or Curtailment Service Provider
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
EM&V	Evaluation, Measurement, and Verification
EPA	Environmental Protection Agency
EUL	Effective Useful Life
G/E/NP	Government/Education/Non-Profit
HVAC	Heating, Ventilation, and Air Conditioning
ICSP	Implementation Conservation Service Provider
kW	Kilowatt
kWh	Kilowatt-Hour
LED	Light-Emitting Diode
LI	Low-Income
LIURP	Low-Income Usage Reduction Program
M&V	Measurement and Verification
MW	Megawatt
MWh	Megawatt-Hour
NTG	Net-to-Gross
P3TD	Phase III to Date
PA PUC	Pennsylvania Public Utility Commission
PSA	Phase III to Date Preliminary Savings Achieved; Equal to VTD + PYTD
PSA+CO	PSA plus Carryover from Phase II
PY	Program Year: e.g., PY8, from June 1, 2016, to May 31, 2017
PYRTD	Program Year Reported to Date
PYTD	Program Year to Date
PYVTD	Program Year Verified to Date
RTD	Phase III to Date Reported Gross Savings
RTO	Regional Transmission Organization
SKU	Stock Keeping Unit

SWE	Statewide Evaluator
T&D	Transmission and Distribution
TRC	Total Resource Cost
TRM	Technical Reference Manual
VTD	Phase III to Date Verified Gross Savings

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 estimate 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 changes 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 provider (ICSP), 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 application of 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 megawatt-hours (MWh) or megawatts (MW). 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.

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 (EUL). 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.

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.

- **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.
- **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.
- **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). For Program Year 9 (PY9), the PSA savings will equal the PYTD savings and the verified savings from PY8.
- **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 9 (PY9), 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 PY9. Compliance with Act 129 savings goals will ultimately be based on verified gross savings. PECO has retained Navigant Consulting, Inc. (Navigant) as an independent evaluation contractor for Phase III of Act 129. Navigant is responsible for the measurement and verification (M&V) of the savings and the calculation of verified gross savings. The verified gross savings for PY9 EE programs will be reported in the final annual report to be filed on November 15, 2018.

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 four 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 PY9 and the cumulative DR performance of the EE&C program to date for Phase III of Act 129.

2. SUMMARY OF ACHIEVEMENTS

2.1 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 Order³ 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.⁴ PECO carried over 0 MWh of G/E/NP and 0 MWh of low-income

¹ Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Implementation Order*, at Docket No. M-2014-2424864, (*Phase III Implementation Order*), entered June 11, 2015.

² Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Compliance Order*, at Docket No. M-2012-2289411, (*Phase II Compliance Determination Order*), entered August 3, 2017.

³ Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Implementation Order*, at Docket No. M-2014-2424864, (*Phase III Implementation Order*), entered June 11, 2015.

⁴ Proportionate to those savings achieved by dedicated low-income programs in Phase III.

customer segment savings.⁵ Figure 2-2 shows the calculation of carryover savings for the low-income and G/E/NP targets.⁶

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



Sources: PECO's eTrack database, CSP tracking data

2.2 Phase III Energy Efficiency Achievements to Date

Since the beginning of PY9 on June 1, 2017, PECO has claimed:

- 196,492 MWh of reported gross electric energy savings (PYRTD)
- 21.0 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:

- 408,024 MWh of reported gross electric energy savings (RTD)
- 41.8 MW of reported gross peak demand savings (RTD) from EE programs
- 411,898 MWh 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 PY9
- 42.4 MW of gross peak demand savings (PSA) from EE programs

Including carryover savings from Phase II, PECO has achieved:

- 411,898 MWh of PSA+CO energy savings recorded to date in Phase III

⁵ Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Compliance Order*, at Docket No. M-2012-2289411, (*Phase II Compliance Determination Order*), entered August 3, 2017.

⁶ Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Compliance Order*, 2017.

- This represents 21.0% of the May 31, 2021 energy savings compliance target of 1,962,659 MWh

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

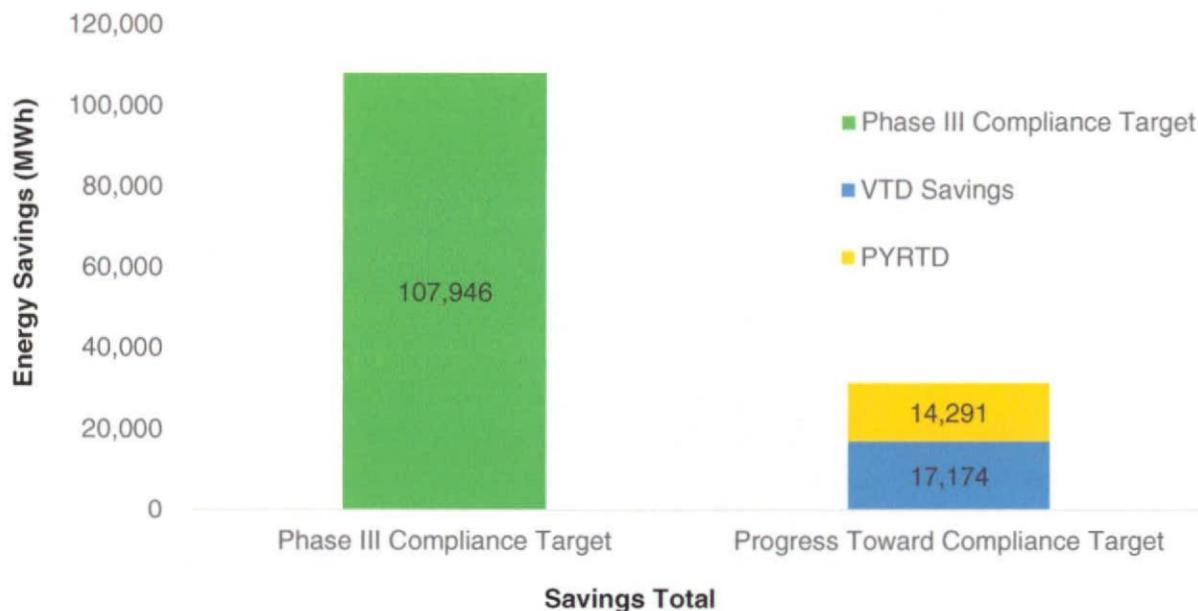


Sources: PECO's eTrack, CSP tracking data

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 29.1% of the Phase III low-income energy savings target.

Figure 2-4. EE&C Plan Performance Toward Phase III Low-Income Compliance Target



Sources: PECO's eTrack database, CSP tracking data

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 38.0% 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



Sources: PECO's eTrack database, CSP tracking data

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 PY9, PECO called three DR events, one on June 13, July 20, and July 21. The average performance for these three events is presented in Table 2-1.

Table 2-1. Summary of Demand Savings for DR Sector by Customer Segment

		Program Year					
		PY8	PY9	PY10	PY11	P Y1 2	Phase III to Date
Reported Gross Demand Savings (MW)	Residential						
	Small C&I						
	Large C&I	N/A	105				105
	Total	N/A	105				105
Verified Gross Demand Savings (MW)	Residential						
	Small C&I						
	Large C&I	N/A	93				93
	Total	N/A	93				93
Demand Savings RR	Residential						
	Small C&I						
	Large C&I						
Total							

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

2.4 Phase III Performance by Customer Segment

Table 2-2 presents the participation, savings, and spending by customer sector for PY9. 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 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. The G/E/NP customer segment will include customers who are part of the small C&I or large C&I rate classes. 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 savings, spending, and participation values for the low-income and G/E/NP customer segment carve-outs only.

Table 2-2. PY9 Summary Statistics by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Residential	975,944	133,469	11.7	13.8	6,809
Small C&I	1,102	21,873	3.2	0.8	885
Large C&I	235	41,149	6.1	92.6	1,863
Total	977,281	196,492	21.0	107.2	9,557

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-3. PY9 Summary Statistics by Carve-Out

Carve-Out	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Low-Income	81,312	14,291	1.7	0.0	365
G/E/NP	117	14,256	1.9	0.0	801

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

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	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Residential	2,160,979	301,983	25.6	13.8	14,832
Small C&I	1,982	42,798	6.7	0.8	1,664
Large C&I	405	67,118	10.1	92.6	2,877
Total	2,163,366	411,898	42.4	107.2	19,374

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-5. Phase III Summary Statistics by Carve-Out

Carve-Out	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Low-Income	145,697	31,464	3.6	0.0	716
G/E/NP	203	26,127	3.8	0.0	1,356

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

2.4.1 Residential EE Program

PECO designed the Residential EE Program to offer residential customers opportunities to save energy across all their electric end uses, and to market those opportunities in ways that minimize lost savings opportunities. The solutions in the Residential EE Program include approaches that cut across major channels for communicating with customers or trade allies and reflect the various ways a customer may take advantage of the EE opportunities available. Five solutions and one targeted market segment make up the Residential EE Program:

- Lighting, Appliances & HVAC Solution
- Appliance Recycling Solution
- Whole Home Solution
- New Construction Solution
- Behavioral Solution
- Multifamily Targeted Market Segment

The residential, non-low-income customer segment is a subset of the residential customer class. However, some Residential EE Program savings may occur in the small C&I or large C&I customer sectors due to customers on small C&I or large C&I meters participating in a solution within the Residential EE Program, such as residential occupants living in multifamily, master-metered buildings that recycle an appliance. Table 2-6 shows the combined program achievements of these solutions by customer sector, inclusive of all low-income and G/E/NP participation. Table 2-7 shows the combined program achievements of these solutions for the low-income and G/E/NP customer segment carve-outs only. Detailed performance of the Residential EE Program solutions can be found in Appendix A.2.

Table 2-6. PY9 Residential EE Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Residential	894,633	119,540	10.0	0.0	3,606
Small C&I	158	120	0.0	0.0	9
Large C&I	15	4	0.0	0.0	0
Total	894,806	119,664	10.1	0.0	3,615

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-7. PY9 Residential EE Program by Carve-Out

Carve-Out	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Low-Income	0	0	0.0	0.0	0
G/E/NP	0	0	0.0	0.0	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-8 and Table 2-9 summarize plan performance by sector and customer segment carve-outs since the beginning of Phase III.

Table 2-8. Phase III Residential EE Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Residential	2,015,293	268,668	21.8	0.0	8,273
Small C&I	372	3,908	0.8	0.0	17
Large C&I	26	7	0.0	0.0	1
Total	2,015,691	272,584	22.6	0.0	8,291

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-9. Phase III Residential EE Program by Carve-Out

Carve-Out	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Low-Income	0	0	0.0	0.0	0
G/E/NP	0	0	0.0	0.0	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

2.4.2 Low-Income EE Program

The PECO Low-Income EE Program is designed to offer PECO's income-qualified customers opportunities to save energy across all their electric end uses. The Low-Income EE Program encompasses two solutions to achieve this goal: the Lighting Solution and the Whole Home Solution.

The residential low-income customer segment is a subset of the residential customer class; however, some low-income savings may occur on a small or large C&I meter due to participation of low-income occupants living in multifamily, master-metered buildings. Table 2-10 shows the combined program achievement of these solutions by customer sector, inclusive of all low-income and G/E/NP participation.

Table 2-10. PY9 Low-Income EE Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Residential	81,311	13,929	1.7	0.0	365
Small C&I	1	361	0.1	0.0	0
Large C&I	0	0	0.0	0.0	0
Total	81,312	14,291	1.7	0.0	365

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

PECO takes actions to limit non-low-income participation in the Low-Income Lighting Solution by focusing on stores likely to have a high percentage of income-qualified patrons; however, some participation from non-income-qualified customers can (and does) happen because any customer can purchase a bulb in the stores where low-income-specific incentives are offered. Per the PY8 evaluation plan, Navigant will identify the portion of savings coming from non-low-income participants through evaluation efforts and remove them from the verified low-income carve-out savings. Savings from these customers will be applied to the Low-Income EE Program but will not count toward the low-income carve-out. Table 2-11 shows the combined reported program achievements of the Low-Income EE Program solutions for the low-income and G/E/NP customer segment carve-outs only. Detailed performance of the Low-Income EE Program solutions can be found in Appendix A.3.

Table 2-11. PY9 Low-Income EE Program by Carve-Out

Carve-Out	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Low-Income	81,312	14,291	1.7	0.0	365
G/E/NP	0	0	0.0	0.0	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-12 and Table 2-13 summarize plan performance by sector and customer segment carve-outs since the beginning of Phase III.

Table 2-12. Phase III Low-Income EE Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Residential	145,686	33,315	3.8	0.0	716
Small C&I	11	361	0.1	0.0	0
Large C&I	0	0	0.0	0.0	0
Total	145,697	33,676	3.9	0.0	716

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-13. Phase III Low-Income EE Program by Carve-Out

Carve-Out	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Low-Income	145,697	31,464	3.6	0.0	716
G/E/NP	0	0	0.0	0.0	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

The eligible population for the PECO Low-Income EE Program is PECO residential electric customers with a household income of less than or equal to 150% of the federal poverty level. PECO also specifically targets electric customers with a household income of less than or equal to 50% of the federal poverty level. Table 2-14 shows savings from households earning less than 50% of the federal poverty level.

Table 2-14. PY9 Low-Income EE Program Customer Segment Supplement

Customer Segment	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Residential Low-Income 0-50% ^a	804	1,951	0.2	0.0	0
Total^a	804	1,951	0.2	0.0	0

^a The incentive spending shown in this table does not include direct-install or product giveaway costs due to the Act 129 definition of incentive spending. The total Low-Income EE Program spending on the residential low-income customers with household incomes of less than or equal to 50% of the federal poverty level is \$497,366.

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

2.4.3 Small C&I EE Program

The purpose of the Small C&I EE Program is to offer a comprehensive and cross-cutting array of opportunities to assist small C&I customers in reducing their energy consumption and costs. The program encompasses a variety of energy solutions and measures to achieve this goal. The Small C&I EE Program is made up of three solutions and two targeted market segments:

- Equipment and Systems Solution
- New Construction Solution
- Whole Building Solution
- Data Centers Targeted Market Segment
- Multifamily Targeted Market Segment

PECO's EE&C Plan also includes a Small C&I Behavioral Solution, which has not yet launched in Phase III. Several solutions cut across multiple programs.

Table 2-15 shows the combined program achievement of these solutions by customer sector, inclusive of all low-income and G/E/NP participation. Table 2-16 shows the combined program achievements of these solutions for the low-income and G/E/NP customer segment carve-outs only. Detailed performance of the Small C&I EE Program solutions and targeted market segments can be found in Appendix A.4.

Table 2-15. PY9 Small C&I EE Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Residential	0	0	0.0	0.0	0
Small C&I	943	21,392	3.1	0.0	760
Large C&I	0	0	0.0	0.0	0
Total	943	21,392	3.1	0.0	760

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-16. PY9 Small C&I EE Program by Carve-Out

Carve-Out	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Low-Income	0	0	0.0	0.0	0
G/E/NP	65	3,801	0.4	0.0	234

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-17 and Table 2-18 summarize plan performance by sector and customer segment carve-outs since the beginning of Phase III.

Table 2-17. Phase III Small C&I EE Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Residential	0	0	0.0	0.0	0
Small C&I	1,599	38,529	5.9	0.0	1,410
Large C&I	0	0	0.0	0.0	0
Total	1,599	38,529	5.9	0.0	1,410

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-18. Phase III Small C&I EE Program by Carve-Out

Carve-Out	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Low-Income	0	0	0.0	0.0	0
G/E/NP	109	5,398	0.7	0.0	318

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

2.4.4 Large C&I EE Program

The Large C&I EE Program is designed to offer PECO's large C&I customers opportunities to save energy across all their electric end uses and to market those opportunities in a way that minimizes lost savings opportunities. The EE solutions in the Large C&I EE Program include approaches that cut across major channels for communicating with customers or trade allies and reflect the various ways a large business customer may take advantage of the EE opportunities available. The program encompasses a variety of energy solutions and measures to achieve this goal. Two solutions and two targeted market segments make up the Large C&I EE Program:

- Equipment and Systems Solution
- New Construction Solution
- Data Centers Targeted Market Segment
- Multifamily Targeted Market Segment.

Table 2-19 shows the combined program achievements of these solutions by customer sector, inclusive of all low-income and G/E/NP participation. Table 2-20 shows the combined program achievements of these solutions for the low-income and G/E/NP customer segment carve-outs only. Detailed performance of the Large C&I EE Program solutions and targeted market segments can be found in Appendix A.5.

Table 2-19. PY9 Large C&I EE Program by Customer Segment

Customer Segment	No. of Participants	Parameter			Incentives (\$1,000)
		PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	
Residential	0	0	0.0	0.0	0
Small C&I	0	0	0.0	0.0	0
Large C&I	220	41,145	6.1	0.0	1,862
Total	220	41,145	6.1	0.0	1,862

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-20. PY9 Large C&I EE Program by Carve-Out

Carve-Out	No. of Participants	Parameter			Incentives (\$1,000)
		PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	
Low-Income	0	0	0.0	0.0	0
G/E/NP	52	10,455	1.5	0.0	567

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-21 and Table 2-22 summarize plan performance by sector and customer segment carve-outs since the beginning of Phase III.

Table 2-21. Phase III Large C&I EE Program by Customer Segment

Customer Segment	No. of Participants	Parameter			Incentives (\$1,000)
		PSA MWh	PSA MW (EE)	PSA MW (DR)	
Residential	0	0	0.0	0.0	0
Small C&I	0	0	0.0	0.0	0
Large C&I	379	67,111	10.1	0.0	2,876
Total	379	67,111	10.1	0.0	2,876

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-22. Phase III Large C&I EE Program by Carve-Out

Carve-Out	No. of Participants	Parameter			Incentives (\$1,000)
		PSA MWh	PSA MW (EE)	PSA MW (DR)	
Low-Income	0	0	0.0	0.0	0

G/E/NP	136	31,004	4.7	0.0	1,509
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Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

2.4.5 Combined Heat and Power Program

PECO designed the Combined Heat and Power (CHP) Program to influence customer behavior and purchasing decisions. The program encourages installing CHP projects that maximize operational savings and minimize operational and maintenance costs. The CHP Program makes project economics attractive by providing incentives and technical assistance to customers who install CHP technologies to reduce facility energy use. The eligible population for the CHP Program is all PECO small C&I and large C&I rate class electric customers, including customers in the G/E/NP sector and those who reside in master-metered multifamily buildings. While applicable to a wide swath of customers, the program encompasses a single energy solution: the CHP Solution. Table 2-23 shows the combined program achievements by customer sector, inclusive of all low-income and G/E/NP participation. Table 2-24 shows the combined program achievements for the low-income and G/E/NP customer segment carve-outs only.

Table 2-23. PY9 CHP EE Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Residential	0	0	0.0	0.0	0
Small C&I	0	0	0.0	0.0	0
Large C&I	0	0	0.0	0.0	0
Total	0	0	0.0	0.0	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-24. PY9 CHP EE Program by Carve-Out

Carve-Out	Parameter				
	No. of Participants	PYRTD MWh/year	PYRTD MW/year (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Low-Income	0	0	0.0	0.0	0
G/E/NP	0	0	0.0	0.0	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-25 and Table 2-26 summarize plan performance by sector and customer segment carve-outs since the beginning of Phase III.

Table 2-25. Phase III CHP EE Program by Customer Segment

Customer Segment	Parameter
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	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Residential	0	0	0.0	0.0	0
Small C&I	0	0	0.0	0.0	0
Large C&I	0	0	0.0	0.0	0
Total	0	0	0.0	0.0	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-26. Phase III CHP EE Program by Carve-Out

Carve-Out	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Low-Income	0	0	0.0	0.0	0
G/E/NP	0	0	0.0	0.0	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

2.4.6 Residential DR Program

The PECO Residential DR Program encompasses opportunities designed to engage customers in demand reduction. The eligible population and target markets for the PECO Residential DR Program are all PECO residential electric customers. The program encompasses three solutions:

- Residential Direct Load Control (DLC) Solution
- Smart Thermostat for DR Savings Solution
- Behavioral DR Savings Solution

Only the Residential DLC Solution is currently active.

Table 2-27 shows the combined program achievements through the Residential DLC Solution by customer sector, inclusive of all low-income and G/E/NP participation.

Table 2-27. PY9 Residential DR Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Residential	60,847	0	0.0	13.8	2,838
Small C&I	0	0	0.0	0.0	0
Large C&I	0	0	0.0	0.0	0
Total	60,847	0	0.0	13.8	2,838

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-28 summarizes plan performance by customer segment carve-outs since the beginning of Phase III.

Table 2-28. Phase III Residential DR Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Residential	61,440 ^a	0	0.0	13.8	5,843
Small C&I	0	0	0.0	0.0	0
Large C&I	0	0	0.0	0.0	0
Total	61,440	0	0.0	13.8	5,843

^a DR participation is not additive like other programs since the same participants tend to remain in the program with only small attrition. Therefore, total participation in the DR programs for Phase III is equal to the highest program year participation count.

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

2.4.7 Small C&I DR Program

PECO designed the PECO Small C&I DR Program to engage customers in demand reduction through DLC of major electrical end-use equipment during designated peak load hours. The eligible population and target markets for the Small C&I DR Program are all PECO small C&I customers, which includes customers in the G/E/NP sector. The program encompasses a single solution: the DLC Solution.

Table 2-29 shows the combined program achievements through the Small C&I DLC Solution by customer sector, inclusive of all low-income and G/E/NP participation.

Table 2-29. PY9 Small C&I DR Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Residential	0	0	0.0	0.0	0
Small C&I	1,564	0	0.0	0.8	115
Large C&I	0	0	0.0	0.0	0
Total	1,564	0	0.0	0.8	115

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-30 summarizes plan performance by customer segment carve-outs since the beginning of Phase III.

Table 2-30. Phase III Small C&I DR Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Residential	0	0	0.0	0.0	0
Small C&I	1,586 ^a	0	0.0	0.8	237
Large C&I	0	0	0.0	0.0	0
Total	1,586	0	0.0	0.8	237

^a DR participation is not additive like other programs since the same participants tend to remain in the program with only small attrition. Therefore, total participation in the DR programs for Phase III is equal to the highest program year participation count.

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

2.4.8 Large C&I DR Program

PECO designed the Large C&I DR Program to engage customers in demand reduction through DR aggregation across multiple customers. The eligible population and target markets for the PECO Large C&I DR Program are all PECO large C&I electric customers, including those in the G/E/NP sector. The program encompasses a single solution: the Demand Response Aggregator (DRA) Solution.

Table 2-31 shows the combined program achievements through the DRA Solution by customer sector, inclusive of all low-income and G/E/NP participation.

Table 2-31. PY9 Large C&I DR Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PYRTD MWh	PYRTD MW (EE)	PYVTD MW (DR)	Incentives (\$1,000)
Residential	0	0	0.0	0.0	0
Small C&I	0	0	0.0	0.0	0
Large C&I	261	0	0.0	92.6	0 ^a
Total	261	0	0.0	92.6	0

^a PECO contracts with the program CSPs to obtain the DR resources for the program and does not provide direct participant incentives. Each CSP controls its participant incentives independently, thus the PECO customer incentive amount is zero.

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table 2-32 summarizes plan performance by customer segment carve-outs since the beginning of Phase III.

Table 2-32. Phase III Large C&I DR Program by Customer Segment

Customer Segment	Parameter				
	No. of Participants	PSA MWh	PSA MW (EE)	PSA MW (DR)	Incentives (\$1,000)
Residential	0	0	0.0	0.0	0
Small C&I	0	0	0.0	0.0	0
Large C&I	261 ^a	0	0.0	92.6	0 ^b
Total	261	0	0.0	92.6	0

^a DR participation is not additive like other programs since the same participants tend to remain in the program with only small attrition. Therefore, total participation in the DR programs for Phase III is equal to the highest program year participation count.

^b PECO contracts with the program CSPs to obtain the DR resources for the program and does not provide direct participant incentives. Each CSP controls its participant incentives independently, thus the PECO customer incentive amount is zero.

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

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.

- **Behavioral Solution:** Opower implements the Behavioral Solution and has been active throughout PY8 into PY9. Similar to 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 Ecova also 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 a minority of solution savings.
- **Appliance Recycling Solution:** The Appliance Recycling Solution offered rebates for refrigerators, freezers, and room air conditioners (ACs). The utility offered \$50 rebates per refrigerator or freezer picked up for recycling.
- **Whole Home Solution:** The Whole Home Solution offered participants a low-cost home energy assessment that included direct installation of a range of deemed measures, including lighting, water conservation, smart strips, etc. In addition, the Whole Home Solution provided 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 projects and savings that relate to residential EE occur 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.
- **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 by leveraging the US Environmental Protection Agency's (EPA's) ENERGY STAR Homes certification.
- **Low-Income EE Program:** ARCA and CMC are implementing the Low-Income Whole Home Solution in Phase III, while Ecova is implementing the Low-Income Lighting Solution.
 - The Whole Home Solution includes PECO's Free Home Energy Check Up with free measure direct installation services, low-income multifamily building audit and direct installation, free energy efficient light bulbs, and other measures such as power strips and LED night lights. For customers with electric heat and domestic hot water, measures offered include improving the mechanical systems and the thermal performance of thermal envelope and water heaters. Product giveaways are offered at events targeting low-income households.
 - The Lighting Solution offers LED lighting products at reduced prices through retail stores located in neighborhoods with a high proportion of low-income households.

- Small C&I EE Program:** ICF, Franklin, and SmartWatt have implemented projects in three of the program's solutions and one targeted market segment including the Equipment and Systems Solution, New Construction Solution, Whole Building Solution, and the Multifamily Targeted Market Segment. ICF has recruited 712 Equipment & Systems Solution projects and 18 New Construction Solution projects, including both C&I and G/E/NP customer segments. Franklin has recruited 48 Multifamily Targeted Market Segment projects and SmartWatt has implemented 165 Whole Building Solution projects. The Equipment and Systems Solution comprised approximately 73 percent of the Small C&I EE Program energy savings. The lighting end use comprised approximately 93 percent of program energy savings.
- Large C&I EE Program:** ICF and Franklin have implemented projects in three of the program's solutions and one targeted market segment including the Equipment and Systems Solution, New Construction Solution, Data Center Solution, and the Multifamily Targeted Market Segment. ICF has recruited 179 Equipment & Systems Solution projects, 16 New Construction Solution projects, and 1 Data Center project, including both C&I and G/E/NP customer segments. Franklin has recruited 24 Multifamily Targeted Market Segment projects. The Equipment and Systems Solution comprised over 90 percent of the Large C&I EE Program energy savings. The lighting and custom end uses comprised approximately 58 and 31 percent of program energy savings respectively.
- CHP Program:** PECO is currently accepting and processing applications for CHP projects as part of the Call for Projects strategy. Due to the long lead time associated with CHP installations, PECO does not expect these projects to complete during PY9. However, PECO does intend on claiming savings for several projects that missed the Phase 2 deadline and are currently in operation.
- Residential DR Program:** The Residential DR Program ran three DR events during the summer of 2017: one on June 13, July 20, and July 21. As in years past, the program is implemented by Itron (formerly Comverge). The summer DR events had over 61,000 residential participants. This year, and for the remainder of Phase III, the incentive is \$40 per DLC unit per year.
- Small C&I DR Program:** The Small C&I DR Program ran three DR events during the summer of 2017: one on June 13, July 20, and July 21. As in years past, the program is implemented by Itron (formerly Comverge). The summer DR events had over 1,500 commercial participants. This year, and for the remainder of Phase III, the incentive is \$40 per thermostat per year.
- Large C&I DR Program:** The Large C&I DR Program ran three DR events during the summer of 2017: one on June 13, July 20, and July 21. The program is implemented by two CSPs: CPower and EnerNOC.

3.2 Evaluation Updates and Findings

Navigant has written, received SWE comments, and revised the Phase III evaluation plan and sampling plan for each program and solution. The team has also interviewed PECO staff and CSPs and reviewed program materials, program tracking databases, and engineering files for each solution. These activities inform the design of participant surveys exploring customer satisfaction and experience, and confirm measure installations for specific solutions per the evaluation plan. Navigant is in the middle of impact evaluations for all the solutions. Navigant's progress on each program and solution is summarized below.

- Residential EE Program:** The team completed its surveying of 700 Behavior Solution participants as part of that solution's process evaluation activities. Per Navigant's agreement with the SWE, those results are prepared separately from the PY8 Annual Compliance Report. Navigant is preparing samples for the Whole Home Solution in anticipation of upcoming field

verification activities. The Whole Home Solution has a 2-year evaluation schedule for PY8 and PY9. Navigant is moving forward with other PY9 evaluation activities with implementation data representing the first half of PY9.

- **Low-Income EE Program:** Navigant collaborated with PECO to analyze household incomes in the geographic regions surrounding PECO's participating Lighting Solution retailers in PY8. In PY9, Navigant will apply the estimated participant incomes to reported savings from each retailer. Navigant is also working on the PY9 Whole Home impact evaluation, including planning for onsite verifications.
- **Small C&I EE Program:** Navigant revised its data collection tools and processes to ensure faster and more robust data collection as well as more collaboration with the SWE. The team also updated customer satisfaction questions to include in onsite and phone verification reviews to better gauge customer experience with the solutions. Impact evaluations for all solutions are ongoing. Over the next several months, Navigant will continue to review the solution measure data, call and visit sampled project sites, and continue the evaluation process for PY9.
- **Large C&I EE Program:** Navigant revised its data collection tools and processes to ensure faster and more robust data collection as well as more collaboration with the SWE. The team also updated customer satisfaction questions to include in onsite and phone verification reviews to better gauge customer experience with the solutions. Navigant has also been working with ICF to review large and complex projects before incentives will be reserved. Impact evaluations for all solutions are ongoing. Over the next several months, Navigant will review the solution measure data, call and visit sampled project sites, and continue the evaluation process for PY9.
- **CHP Program:** The CHP Program does not currently have any participants. Navigant performed a review of the new program materials, conducted market research, and provided feedback on increasing participation.
- **Residential DR Program:** The team evaluated peak load reductions for DR events on three summer days in 2017. Navigant also fielded post-event surveys to participants. Peak load reduction achievements and process 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 three summer days in 2017. Navigant also fielded post-event surveys to participants. Peak load reduction achievements and process 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 three summer days in 2017. Navigant also fielded post-season surveys to participants. Peak load reduction achievements and process 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 PY9 and Phase III. Solution-level participation is captured in Appendix A. Certain programs define participation differently depending on the program delivery channel and data tracking practices.

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

Program	PYTD Participation	P3TD Participation
Residential EE	894,806	2,015,691
Low-Income EE	81,312	145,697
Small C&I EE	943	1,599
Large C&I EE	220	379
CHP	0	0
Residential DR	60,847	61,440 ^a
Small C&I DR	1,564	1,586 ^a
Large C&I DR	261	261 ^a
Portfolio Total	1,039,953	2,226,653

^a DR participation is not additive like other programs since the same participants tend to remain in the program with only small attrition. Therefore, total participation in the DR programs for Phase III is equal to the highest program year participation count for each of the three programs.

Sources: PECO's eTrack database, CSP tracking data

Five solutions and one targeted market segment make up the Residential EE Program: Lighting, Appliance & HVAC Solution, Appliance Recycling Solution, Whole Home Solution, New Construction Solution, Behavioral Solution, and the Multifamily Targeted Market Segment. PECO has defined participation counts in each solution as follows:

- For Lighting, Appliance & HVAC, upstream lighting participation is defined as the sum of the stock keeping unit (SKU) sales. A SKU describes a sold lighting product, which can be a single bulb or a multi-pack of bulbs. For the appliance and HVAC participants, participation is defined as the total number of non-adjusted records in PECO's tracking data. A record may represent one or more rebated items (e.g., a single participant purchasing multiple thermostats during the same purchase event).
- For Appliance Recycling, a participant is a customer who schedules a pickup for one or more units. If the same customer initiates multiple pickup orders during the year, each order is counted as an individual participant. However, if a customer initiates more than one order in the same day it counts as a single participant.
- For Residential Whole Home, a participant is considered a unique project number for non-adjusted records with a project type that does not include "Other Installations" or "CAC Other Installations."
- For Residential New Construction, a participant is a new home.
- For Behavioral, a participant is a utility account included in the program's treatment group.
- For the Multifamily Targeted Market Segment, a participant is a unique project number.

Two solutions make up the Low-Income EE Program: the Lighting Solution and the Whole Home Solution. Low-income participants are those participants with incomes at or below 150% of the federal poverty level. PECO has defined participation counts in each solution as follows:

- For Lighting, participation is defined as a package of one or more light bulbs identified by a unique SKU⁷ number.
- For Low-Income Whole Home, a participant is considered:
 - A unique audit number (for both multifamily and single-family audits).
 - A low-income appliance recycling customer who schedules a pickup for one or more units. If the same customer initiates multiple pickup orders during the year, each order is counted as an individual participant. However, if a customer initiates more than one order in the same day it counts as a single participant.
 - Product giveaways are also part of the Whole Home Solution but are not included in the participant count.

Four solutions and two targeted market segments make up the Small C&I EE Program: Equipment and Systems Solution, Whole Building Solution, Behavioral Solution, New Construction Solution, Data Centers Targeted Market Segment, and Multifamily Targeted Market Segment. The Behavioral Solution is not currently active. PECO has defined participation counts in each active solution as follows:

- For Small C&I Equipment and Systems, participation is defined as an activity with a unique project number. More than one measure per participant is permitted, with the impact sample defined on the project level.
- For Small C&I Whole Building, participation is defined as an activity with a unique project number. More than one measure per participant is permitted, with the impact sample defined on the project level.
- For Small C&I New Construction, participation is defined as an activity with a unique project number. More than one measure per participant is permitted, with the impact sample defined on the project level.
- For the Data Centers Targeted Market Segment, participation is defined as an activity with a unique project number. More than one measure per participant is permitted, with the impact sample defined on the project level.
- For the Multifamily Targeted Market Segment, participation is defined as an activity with a unique account ID (meter number). More than one measure per participant is permitted, with the impact sample defined on the meter level.

Two solutions and two targeted market segments make up the Large C&I EE Program: Equipment and Systems Solution, New Construction Solution, Data Centers Targeted Market Segment, and Multifamily Targeted Market Segment. PECO has defined participation counts in each solution as follows:

- For Large C&I Equipment and Systems, participation is defined as an activity with a unique project number. More than one measure per participant is permitted, with the impact sample defined on the project level.

⁷ A SKU describes a sold lighting product that can be a single bulb or a multi-pack of bulbs.

- For Large C&I New Construction, participation is defined as an activity with a unique project number. More than one measure per participant is permitted, with the impact sample defined on the project level.
- For the Data Centers Targeted Market Segment, participation is defined as an activity with a unique project number. More than one measure per participant is permitted, with the impact sample defined on the project level.
- For the Multifamily Targeted Market Segment, participation is defined as an activity with a unique project number. More than one measure per participant is permitted, with the impact sample defined on the project level.

The CHP Program consists of the CHP Solution only. PECO has defined participation counts in the solution as follows:

- For CHP, participation is defined as an activity with a unique project number.

Three solutions make up the Residential DR Program; however, only the DLC Solution is currently active. PECO has defined participation counts in the solution as follows:

- For Residential DLC, a participant is defined as a unique account number where device status is install or swap, and the measure code is CACS (central air conditioner switch). One participant may have more than one DLC device installed at the home. The categories not included in the participant count include disconnect, opt-out, and removal.

The Small C&I DR Program consists of the Small C&I DLC Solution. PECO has defined participation counts in the solution as follows:

- For Small C&I DLC, a participant is defined as a unique account number where device status is install or swap, and the measure code is PCT (program controlled thermostat). One participant may have more than one DLC device installed on the premise. The categories not included in the participant count include disconnect, opt-out, and removal.

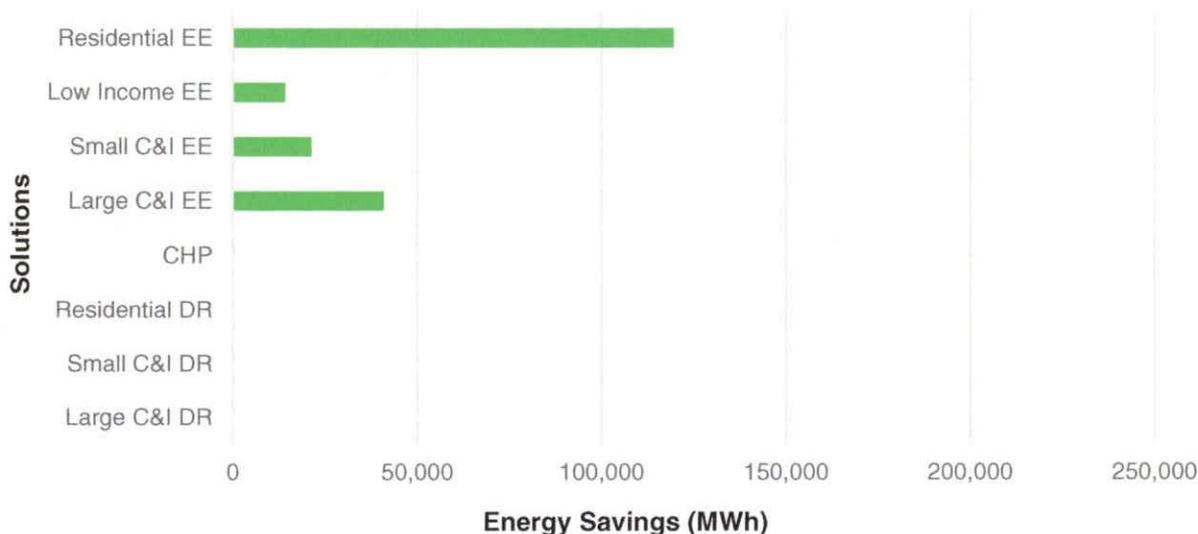
The Large C&I DR Program consists of the DRA Solution. PECO has defined participation counts in the solution as follows:

- For DRA, a participant is defined as a Large C&I customer (defined by PECO account number) enrolled with a DR program CSP for at least 1 hour of at least one event occurring in any given program year.

5. SUMMARY OF ENERGY IMPACTS BY PROGRAM

Figure 5-1 presents a summary of the PYTD reported gross energy savings by program for PY9. The energy impacts in this report are presented at the meter level and do not reflect adjustments for T&D losses.

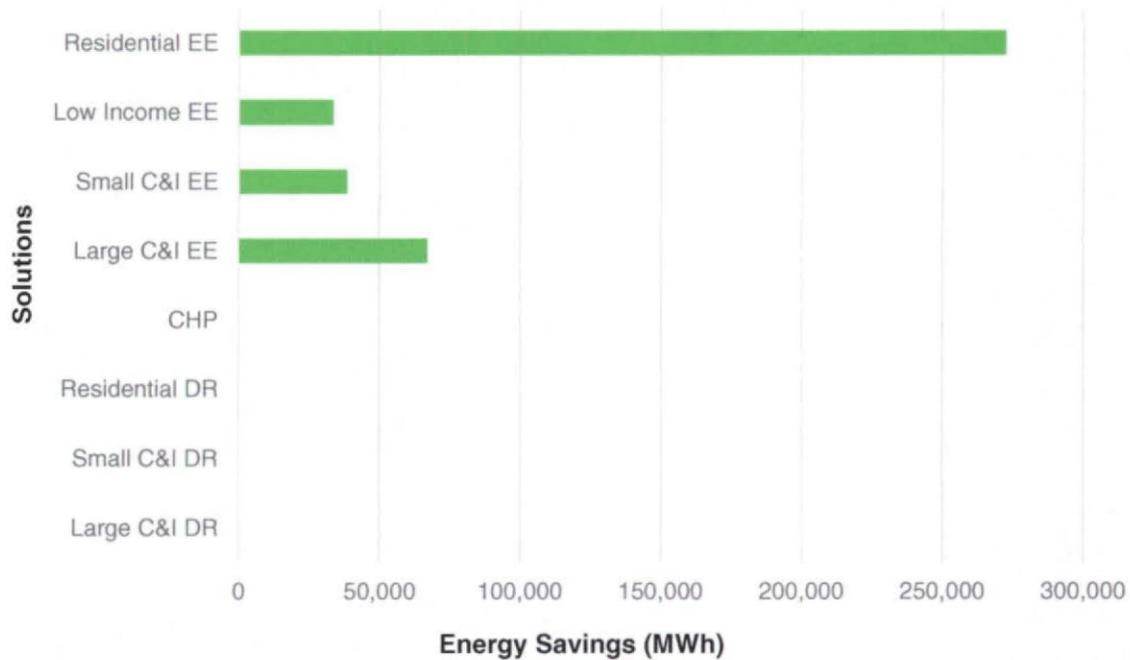
Figure 5-1. PYTD Reported Gross Energy Savings by Program



Sources: 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



Sources: PECO's eTrack database, CSP tracking data

Table 5-1 presents a summary of energy impacts by program through the current reporting period. Appendix A presents the solution-level savings.

Table 5-1. Energy Savings by Program (MWh)

Program	PYRTD	RTD	VTD	PSA
Residential EE	119,664	267,583	152,920	272,584
Low-Income EE	14,291	34,155	19,385	33,676
Small C&I EE	21,392	39,175	17,137	38,529
Large C&I EE	41,145	67,111	25,965	67,111
CHP	0	0	0	0
Residential DR	0	0	0	0
Small C&I DR	0	0	0	0
Large C&I DR	0	0	0	0
Portfolio Total	196,492	438,144	0	411,898

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

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. 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 PY9.

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 through the current reporting period. Appendix A presents the solution-level savings.

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

Program	PYRTD	RTD	VTD	PSA
Residential EE	10.1	21.8	12.5	22.6
Low-Income EE	1.7	4.0	2.2	3.9
Small C&I EE	3.1	5.9	2.8	5.9
Large C&I EE	6.1	10.1	3.9	10.1
CHP	0.0	0.0	0.0	0.0
Portfolio Total	21.0	41.8	21.4	42.4

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

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 is no PY8 peak demand reduction target. Phase III DR events are initiated according to the following guidelines:

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.
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.⁸ PECO uses the following line loss percentages/multipliers by sector.

- Residential = 7.4% or 1.0799
- Small C&I = 7.4% or 1.0799
- Large C&I = 7.4% or 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. The Phase III to date column is calculated as an average of all events to date, so years with more or fewer events will not be weighted disproportionately. Hourly demand savings are reported in Appendix A.7.

Table 6-2. Summary of Demand Savings for DR Programs by Customer Segment

Customer Segment	Program Year					P3TD
	PY8	PY9	PY10	PY11	PY12	
Residential	N/A	13.8				13.8
Small C&I	N/A	0.8				0.8
Large C&I	N/A	92.6				92.6
Total	N/A	107.2				107.2

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding. N/A is provided when no DR events were called during that program year.

Source: Navigant analysis

⁸ 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.

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.

7.1 Program Financials

Program-specific and portfolio total finances for PY9 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 template⁹ 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. Appendix A presents the solution-level spending.

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)	EM&V (\$1,000)	Total Cost (\$1,000)
Residential EE	3,615	2,659	4,307	0	10,581
Low-Income EE	365	37	3,480	0	3,883
Small C&I EE	760	1,610	1,755	0	4,125
Large C&I EE	1,862	29	2,010	0	3,902
CHP	0	0	4	0	4
Residential DR	2,838	0 ^a	601	0	3,440
Small C&I DR	115	0	18 ^a	0	133 ^a
Large C&I DR	0 ^e	0	574 ^b	0	574
Common Portfolio Costs^c					5,620
Portfolio Total	9,557	4,335	12,750	0	32,262
SWE Costs ^d	N/A	N/A	N/A	N/A	N/A
Total	9,557	4,335	12,750	0	32,262

^a This value was adjusted down from the value presented in the January Semiannual report due to reallocations across DR programs.

^b The accounting records were made to account for PECO's payment obligation to both vendors even if no events are called (since program officially starts in PY9).

^c Includes the administrative CSP (rebate processing), tracking system, general administration, and clerical costs; EDC program management; CSP program management; general management; oversight of major accounts; and technical assistance.

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

^e PECO contracts with the program CSPs to obtain the DR resources for the program and does not provide direct participant incentives. Each CSP controls its participant incentives independently, thus the PECO customer incentive amount is zero.

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

⁹ <http://www.puc.pa.gov/pcdocs/1372426.doc> Section 10

Sources: PECO's eTrack database, CSP tracking data

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

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)	EM&V (\$1,000)	Total Cost (\$1,000)
Residential EE	8,291	8,117	14,175	0	30,583
Low-Income EE	716	111	10,070	0	10,897
Small C&I EE	1,410	3,826	4,273	0	9,509
Large C&I EE	2,876	160	5,923	0	8,959
CHP	0	0	19	0	19
Residential DR	5,843	31	1,518	0	7,392
Small C&I DR	237	2	0	0	239
Large C&I DR	0 ^c	61	2,255	0	2,316
Common Portfolio Costs^a					14,572
Portfolio Total	19,374	12,309	38,233	0	84,487
SWE Costs ^b	N/A	N/A	N/A	N/A	700
Total	19,374	12,309	38,233	0	85,187

^a Includes the administrative CSP (rebate processing), tracking system, general administration, and clerical costs; EDC program management; CSP program management; general management; oversight of major accounts; and technical assistance.

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

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

^c PECO contracts with the program CSPs to obtain the DR resources for the program and does not provide direct participant incentives. Each CSP controls its participant incentives independently, thus the PECO customer incentive amount is zero.

Sources: PECO's eTrack database, CSP tracking data.

Cost-effectiveness testing for Act 129 EE&C programs is performed using the TRC test. Benefit-cost modeling is conducted annually using verified gross and verified net savings once the results of the independent impact evaluation are completed. TRC test results for PY9 will be presented in the final annual report to the PA PUC on November 15, 2018 along with a more granular breakdown of portfolio costs.

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 Category¹⁰

Cost Recovery Sector	Rate Classes Included	PYTD Spending (\$1,000)	P3TD Spending (\$1,000)
Residential	R, RH, and CAP	20,380	55,830
Small C&I	GS	5,531	12,567
Large C&I	PD, HT, and EP	6,334	16,047
Municipal	SLE, AL, and TLCL	17	45
Portfolio Total		32,262	84,489

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: PECO

¹⁰ Includes SWE costs.

APPENDIX A. DETAILED CUSTOMER SEGMENT AND CARVE-OUT TABLES

The following tables provide additional detail on the portfolio-, program-, and solution-level performance by customer segments and savings carve-outs. These tables provide additional detail beyond that shown in the previous sections. PECO categorizes projects by customer segment, sector carve-out, solution, and program to ensure each project is properly tracked. These tables are provided to show where there is overlap in participation between the various customer segments (residential, small C&I, and large C&I) and the carve-outs (low-income and G/E/NP) because these are not mutually exclusive categories.

A.1 Portfolio

Table A-1. PY9 EE Portfolio Statistics by Customer Segment and Carve-Out

Customer Segment	Carve-Outs		Parameter			
			No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)
Residential	Non-G/E/NP	Non-Low-Income	894,633	119,540	10.0	3,606
		Low-Income	81,311	13,929	1.7	365
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		81,311	13,929	1.7	365
	Sector Total		975,944	133,469	11.7	3,971
Small C&I	Non-G/E/NP	Non-Low-Income	1,036	17,711	2.7	536
		Low-Income	1	361	0.1	0
	G/E/NP	Non-Low-Income	65	3,801	0.4	234
		Low-Income	0	0	0.0	0
	G/E/NP Total		65	3,801	0.4	234
	Low-Income Total		1	361	0.1	0
	Sector Total		1,102	21,873	3.2	770
Large C&I	Non-G/E/NP	Non-Low-Income	183	30,694	4.7	1,296
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	52	10,455	1.5	567
		Low-Income	0	0	0.0	0
	G/E/NP Total		52	10,455	1.5	567
	Low-Income Total		0	0	0.0	0
	Sector Total		235	41,149	6.1	1,863
Total	Non-G/E/NP	Non-Low-Income	895,852	167,945	17.3	5,437
		Low-Income	81,312	14,291	1.7	365
	G/E/NP	Non-Low-Income	117	14,256	1.9	801
		Low-Income	0	0	0.0	0
	G/E/NP Total		117	14,256	1.9	801
	Low-Income Total		81,312	14,291	1.7	365
	Total		977,281	196,492	21.0	6,603

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-2. Phase III EE Portfolio Statistics by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PSA MWh/year	PSA MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	2,015,293	270,880	22.0	8,273
		Low-Income	145,686	31,103	3.6	716
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		145,686	31,103	3.6	716
	Sector Total		2,160,979	301,983	25.6	8,989
Small C&I	Non-G/E/NP	Non-Low-Income	1,862	37,039	6.0	1,109
		Low-Income	11	361	0.1	0
	G/E/NP	Non-Low-Income	109	5,398	0.7	318
		Low-Income	0	0	0.0	0
	G/E/NP Total		109	5,398	0.7	318
	Low-Income Total		11	361	0.1	0
	Sector Total		1,982	42,798	6.7	1,427
Large C&I	Non-G/E/NP	Non-Low-Income	311	46,388	7.0	1,838
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	94	20,729	3.1	1,038
		Low-Income	0	0	0.0	0
	G/E/NP Total		94	20,729	3.1	1,038
	Low-Income Total		0	0	0.0	0
	Sector Total		405	67,118	10.1	2,877
Total	Non-G/E/NP	Non-Low-Income	2,017,466	354,307	35.0	11,221
		Low-Income	145,697	31,464	3.6	716
	G/E/NP	Non-Low-Income	203	26,127	3.8	1,356
		Low-Income	0	0	0.0	0
	G/E/NP Total		203	26,127	3.8	1,356
	Low-Income Total		145,697	31,464	3.6	716
Total		2,163,366	411,898	42.4	13,293	

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

A.2 Residential EE Program

Table A-3. PY9 Residential EE Program by Customer Segment and Carve- Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	894,633	119,540	10.0	3,606
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		894,633	119,540	10.0	3,606
Small C&I	Non-G/E/NP	Non-Low-Income	158	120	0.0	9
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		158	120	0.0	9
Large C&I	Non-G/E/NP	Non-Low-Income	15	4	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		15	4	0.0	0
Total	Non-G/E/NP	Non-Low-Income	894,806	119,664	10.1	3,615
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		894,806	119,664	10.1	3,615

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-4. Residential EE Program Lighting, Appliance & HVAC Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	457,075	60,018	8.2	2,895
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		457,075	60,018	8.2	2,895
Small C&I	Non-G/E/NP	Non-Low-Income	63	16	0.0	4
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		63	16	0.0	4
Large C&I	Non-G/E/NP	Non-Low-Income	12	1	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		12	1	0.0	0
Total	Non-G/E/NP	Non-Low-Income	457,150	60,035	8.2	2,899
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		457,150	60,035	8.2	2,899

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-5. PY9 Residential EE Program Appliance Recycling Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	7,510	7,540	1.0	401
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		7,510	7,540	1.0	401
Small C&I	Non-G/E/NP	Non-Low-Income	95	104	0.0	6
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		95	104	0.0	6
Large C&I	Non-G/E/NP	Non-Low-Income	3	3	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		3	3	0.0	0
Total	Non-G/E/NP	Non-Low-Income	7,608	7,647	1.1	407
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		7,608	7,647	1.1	407

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-6. PY9 Residential EE Program Whole Home Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	2,209	2,719	0.3	165
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		2,209	2,719	0.3	165
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	2,209	2,719	0.3	165
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		2,209	2,719	0.3	165

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-7. PY9 Residential EE Program New Construction Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	192	550	0.2	144
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		192	550	0.2	144
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	192	550	0.2	144
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		192	550	0.2	144

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-8. PY9 Residential EE Program Behavioral Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	423,651	46,574	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		423,651	46,574	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	423,651	46,574	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		423,651	46,574	0.0	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-9. PY9 Residential EE Program Multifamily Targeted Market Segment by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	3,996	2,139	0.3	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		3,996	2,139	0.3	0
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	3,996	2,139	0.3	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		3,996	2,139	0.3	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

A.3 Low-Income EE Program

Table A-10. PY9 Low-Income EE Program by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0	0
		Low-Income	81,311	13,929	1.7	365
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		81,311	13,929	1.7	365
Sector Total		81,311	13,929	1.7	365	
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	1	361	0.1	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		1	361	0.1	0
Sector Total		1	361	0.1	0	
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
Sector Total		0	0	0.0	0	
Total	Non-G/E/NP	Non-Low-Income	0	0	0	0
		Low-Income	81,312	14,291	1.7	365
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		81,312	14,291	1.7	365
Total		81,312	14,291	1.7	365	

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-11. PY9 Low-Income EE Program Lighting Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs		Parameter			
			No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	77,156	4,084	0.5	331
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		77,156	4,084	0.5	331
Sector Total		77,156	4,084	0.5	331	
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
Sector Total		0	0	0.0	0	
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
Sector Total		0	0	0.0	0	
Total	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	77,156	4,084	0.5	331
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		77,156	4,084	0.5	331
Total		77,156	4,084	0.5	331	

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-12. PY9 Low-Income EE Program Whole Home Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	4,155	9,846	1.2	34
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		4,155	9,846	1.2	34
	Sector Total		4,155	9,846	1.2	34
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	1	361	0.1	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		1	361	0.1	0
	Sector Total		1	361	0.1	0
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	4,156	10,207	1.2	34
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		4,156	10,207	1.2	34
	Total		4,156	10,207	1.2	34

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

A.4 Small C&I EE Program

Table A-13. PY9 Small C&I EE Program by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	878	17,591	2.6	526
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	65	3,801	0.4	234
		Low-Income	0	0	0.0	0
	G/E/NP Total		65	3,801	0.4	234
	Low-Income Total		0	0	0.0	0
	Sector Total		943	21,392	3.1	760
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	878	17,591	2.6	526
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	65	3,801	0.4	234
		Low-Income	0	0	0.0	0
	G/E/NP Total		65	3,801	0.4	234
	Low-Income Total		0	0	0.0	0
Total		943	21,392	3.1	760	

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-14. PY9 Small C&I EE Program Equipment and Systems Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs		Parameter			
			No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	663	12,125	1.7	496
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	49	3,405	0.4	222
		Low-Income	0	0	0.0	0
	G/E/NP Total		49	3,405	0.4	222
	Low-Income Total		0	0	0.0	0
	Sector Total		712	15,530	2.1	718
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	663	12,125	1.7	496
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	49	3,405	0.4	222
		Low-Income	0	0	0.0	0
	G/E/NP Total		49	3,405	0.4	222
	Low-Income Total		0	0	0.0	0
	Total		712	15,530	2.1	718

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-15. PY9 Small C&I EE Program New Construction Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	13	487	0.1	27
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	5	112	0.0	12
		Low-Income	0	0	0.0	0
	G/E/NP Total		5	112	0.0	12
	Low-Income Total		0	0	0.0	0
	Sector Total		18	600	0.1	39
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	13	487	0.1	27
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	5	112	0.0	12
		Low-Income	0	0	0.0	0
	G/E/NP Total		5	112	0.0	12
	Low-Income Total		0	0	0.0	0
	Total		18	600	0.1	39

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-16. PY9 Small C&I EE Program Whole Building Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	154	3,203	0.6	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	11	284	0.1	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		11	284	0.1	0
	Low-Income Total		0	0	0.0	0
	Sector Total		165	3,487	0.7	0
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	154	3,203	0.6	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	11	284	0.1	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		11	284	0.1	0
	Low-Income Total		0	0	0.0	0
	Total		165	3,487	0.7	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-17. PY9 Small C&I EE Program Data Centers Targeted Market Segment by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		0	0	0.0	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-18. PY9 Small C&I EE Program Multifamily Targeted Market Segment by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	48	1,776	0.2	4
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		48	1,776	0.2	4
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	48	1,776	0.2	4
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		48	1,776	0.2	4

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

A.5 Large C&I EE Program

Table A-19. PY9 Large C&I EE Program by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Large C&I	Non-G/E/NP	Non-Low-Income	168	30,691	4.7	1,296
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	52	10,455	1.5	567
		Low-Income	0	0	0.0	0
	G/E/NP Total		52	10,455	1.5	567
	Low-Income Total		0	0	0.0	0
	Sector Total		220	41,145	6.1	1,862
Total	Non-G/E/NP	Non-Low-Income	168	30,691	4.7	1,296
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	52	10,455	1.5	567
		Low-Income	0	0	0.0	0
	G/E/NP Total		52	10,455	1.5	567
	Low-Income Total		0	0	0.0	0
	Total		220	41,145	6.1	1,862

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-20. PY9 Large C&I EE Program Equipment and Systems Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Large C&I	Non-G/E/NP	Non-Low-Income	131	27,419	4.3	1,167
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	48	9,986	1.4	512
		Low-Income	0	0	0.0	0
	G/E/NP Total		48	9,986	1.4	512
	Low-Income Total		0	0	0.0	0
	Sector Total		179	37,405	5.7	1,679
Total	Non-G/E/NP	Non-Low-Income	131	27,419	4.3	1,167
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	48	9,986	1.4	512
		Low-Income	0	0	0.0	0
	G/E/NP Total		48	9,986	1.4	512
	Low-Income Total		0	0	0.0	0
	Total		179	37,405	5.7	1,679

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-21. PY9 Large C&I EE Program New Construction Solution by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Large C&I	Non-G/E/NP	Non-Low-Income	12	1,380	0.1	90
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	4	469	0.0	55
		Low-Income	0	0	0.0	0
	G/E/NP Total		4	469	0.0	55
	Low-Income Total		0	0	0.0	0
	Sector Total		16	1,849	0.2	145
Total	Non-G/E/NP	Non-Low-Income	12	1,380	0.2	90
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	4	469	0.0	55
		Low-Income	0	0	0.0	0
	G/E/NP Total		4	469	0.0	55
	Low-Income Total		0	0	0.0	0
	Total		16	1,849	0.2	145

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-22. PY9 Large C&I EE Program Data Centers Targeted Market Segment by Customer Segment and Carve-Out

Customer Segment	Carve-Outs		Parameter			
			No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Large C&I	Non-G/E/NP	Non-Low-Income	1	475	0.0	24
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		1	475	0.0	24
Total	Non-G/E/NP	Non-Low-Income	1	475	0.0	24
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		1	475	0.0	24

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

Table A-23. PY9 Large C&I EE Program Multifamily Targeted Market Segment by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Large C&I	Non-G/E/NP	Non-Low-Income	24	1,416	0.2	15
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		24	1,416	0.2	15
Total	Non-G/E/NP	Non-Low-Income	24	1,416	0.2	15
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		24	1,416	0.2	15

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

A.6 CHP EE Program

Table A-24. PY9 CHP EE Program by Customer Segment and Carve-Out

Customer Segment	Carve-Outs	Parameter				
		No. of Participants	PYRTD MWh/year	PYRTD MW (EE)	Incentives (\$1,000)	
Residential	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Small C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Large C&I	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Sector Total		0	0	0.0	0
Total	Non-G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP	Non-Low-Income	0	0	0.0	0
		Low-Income	0	0	0.0	0
	G/E/NP Total		0	0	0.0	0
	Low-Income Total		0	0	0.0	0
	Total		0	0	0.0	0

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data

A.7 DR Programs

Table A-25 shows details of each DR program's customer segment.

Table A-25. PY9 DR Programs by Customer Segment

Customer Segment	Parameter		
	No. of Participants	PYVTD MW (DR)	Incentives (\$1,000)
Residential	60,847	13.8	2,838
Small C&I	1,564	0.8	115
Large C&I	261	92.6	0 ^a
Total	62,672	107.2	2,953

^a PECO contracts with the program CSPs to obtain the DR resources for the program and does not provide direct participant incentives. Each CSP controls its participant incentives independently, thus the PECO customer incentive amount is zero.

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Sources: PECO's eTrack database, CSP tracking data.

Table A-26 summarizes the peak load reductions contributed by each DR program, by hour, by event, and by sector.

Table A-26. DR Programs Verified Gross Demand Savings (MW)

Program Year	Event	Hour Ending (HE)	Residential DR Program	Small C&I DR Program	Large C&I DR Program	Portfolio
PY9	Event 1 June 13, 2017	HE15	13	3	70	86
		HE16	11	3	95	109
		HE17	9	3	95	106
		HE18	8	3	71	81
		Average Event Impact by Program	10	3	83	96
	Event 2 July 20, 2017	HE15	20	-0.3	96	115
		HE16	20	0.0	106	126

Program Year	Event	Hour Ending (HE)	Residential DR Program	Small C&I DR Program	Large C&I DR Program	Portfolio
		HE17	18	0.1	112	131
		HE18	18	0.2	87	105
		Average Event Impact by Program	19	0.0	100	119
		HE14	12	-0.9	81	92
		HE15	9	-0.6	102	110
	Event 3	HE16	12	-0.5	97	109
	July 21, 2017	HE17	16	0.0	99	115
		Average Event Impact by Program	12	-0.5	95	107
Average Program Year Impact			14	0.8	93	108
PY10	Events TBD					
PY11	Events TBD					
PY12	Events TBD					

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis



Annual Report to the Pennsylvania Public Utility Commission; Demand Response Performance Report Only

Phase III of Act 129

Program Year 9

(June 1, 2017 - May 31, 2018)

This report only covers the demand response PY9 performance period of June 1, 2017 through September 30, 2017. The energy efficiency performance will be documented through the final annual report filing on November 15, 2018.

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January 15, 2018

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TABLE OF CONTENTS

1. Introduction.....	1
2. Summary of Achievements.....	2
2.1 Carryover Savings from Phase II of Act 129	2
2.2 Phase III EE Achievements to Date	3
2.3 Phase III DR Achievements to Date	3
2.4 Phase III Performance by Customer Segment.....	5
2.5 Summary of Participation by Program.....	6
2.6 Summary of Impact Evaluation Results	7
2.7 Summary of Energy Impacts by Program	8
2.8 Summary of Demand Impacts by Program	8
2.8.1 Energy Efficiency	8
2.8.2 Demand Response	9
2.9 Summary of Fuel Switching Impacts	10
2.10 Summary of Cost-Effectiveness Results	10
2.11 Comparison of Performance to Approved EE&C Plan.....	10
2.12 Findings and Recommendations	13
3. Evaluation Results by Program.....	14
3.1 Residential EE Program	16
3.2 Residential Low-Income EE Program	16
3.3 Small C&I EE Program	16
3.4 Large C&I EE Program.....	16
3.5 CHP Program	16
3.6 Residential DR Program.....	16
3.6.1 Participation and Reported Savings by Customer Segment	17
3.6.2 Gross Impact Evaluation.....	18
3.6.3 Process Evaluation	20
3.6.4 Cost-Effectiveness Reporting	22
3.6.5 Status of Recommendations	22
3.7 Small C&I DR Program.....	23
3.7.1 Participation and Reported Savings by Customer Segment	23
3.7.2 Gross Impact Evaluation.....	25
3.7.3 Process Evaluation	27
3.7.4 Cost-Effectiveness Reporting	29
3.7.5 Status of Recommendations	29
3.8 Large C&I DR Program	29
3.8.1 Participation and Reported Savings by Customer Segment	29
3.8.2 Gross Impact Evaluation.....	31
3.8.3 Process Evaluation	35
3.8.4 Cost-Effectiveness Reporting	36
3.8.5 Status of Recommendations	36
4. Cost Recovery.....	37
Appendix A. Upstream Lighting Cross Sector Sales.....	A-1

Appendix B. Site Inspection Summary B-1
Appendix C. HER Impact Evaluation Detail C-1
Appendix D. Residential EE Program D-1
Appendix E. Residential Low-Income EE Program..... E-1
Appendix F. Small C&I EE Program F-1
Appendix G. Large C&I EE Program G-1
Appendix H. Multifamily Targeted Market Segment H-1
Appendix I. Demand Response Programs I-1
Appendix J. Program- and Solution-Level Tables J-1

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. Event Performance Compared to 85% Per-Event Target 4
 Figure 3-1. Residential DR Satisfaction with PECO (n=286) 21
 Figure 3-2. Residential DR Satisfaction with Program Components 21
 Figure 3-3. Likelihood to Recommend AC Saver Program: Residential (n=288) 21
 Figure 3-4. Residential DR Reported Home Comfort During Events (n=292) 22
 Figure 3-5. Commercial DR Satisfaction with PECO (n=51) 28
 Figure 3-6. Small C&I DR Satisfaction with Program Components 28
 Figure 3-7. Likelihood to Recommend AC Saver: Commercial (n=51)..... 28
 Figure 3-8. Baseline Method Selection 33
 Figure 3-9. Large C&I DR Satisfaction with Program (n=7) 36

TABLES

Table 2-1. PY9 DR PYVTD Performance by Event 4
 Table 2-2. Summary Statistics for DR Programs by Customer Segment 5
 Table 2-3. Summary of Demand Savings for DR Programs by Customer Segment 5
 Table 2-4. EE&C Portfolio Participation by Program 6
 Table 2-5. Impact Evaluation Results Summary 7
 Table 2-6. Summary of Demand Savings by DR Program 9
 Table 2-7. Comparison of Expenditures to Phase III EE&C Plan by Program 10
 Table 2-8. Comparison of DR Savings to Phase III EE&C Plan by Program 11
 Table 2-9. Summary of Evaluation Recommendations..... 13
 Table 3-1. Evaluation Activity Matrix 14
 Table 3-2. Summary Statistics for Residential DR Program by Customer Segment..... 17
 Table 3-3. Summary of Demand Savings for Residential DR Program by Customer Segment..... 17
 Table 3-4. Residential DR Program Gross Impact Sample Design for PY9 19
 Table 3-5. Residential DR Program Gross Demand Savings Impact Evaluation Results for PY9 19
 Table 3-6. Residential DR Post-Event Survey Completes 20

Table 3-7. Summary of Findings and Recommendations for Residential DR Program	22
Table 3-8. Summary Statistics for Small C&I DR Program by Customer Segment.....	24
Table 3-9. Summary of Demand Savings for Small C&I DR Program by Customer Segment.....	24
Table 3-10. Small C&I DR Program Gross Impact Sample Design for PY9.....	26
Table 3-11. Small C&I Program Gross Demand Savings Impact Evaluation Results for PY9	27
Table 3-12. Residential DR Post-Event Survey Completes.....	27
Table 3-13. Summary of Findings and Recommendations for Small C&I DR Program	29
Table 3-14. Summary Statistics for Large C&I DR Program by Customer Segment.....	30
Table 3-15. Summary of Demand Savings for Large C&I DR Program by Customer Segment	30
Table 3-16. Large C&I DR Program Event Days	34
Table 3-17. Large C&I DR Program Gross Impact Sample Design for PY9.....	34
Table 3-18. Large C&I DR Program Gross Demand Savings Impact Evaluation Results for PY9.....	34
Table 3-19. Summary of Findings and Recommendations for Large C&I DR Program	36
Table 4-1. EE&C Plan Expenditures by Cost Recovery Category.....	37
Table I-1. Hourly Results by Event Summary Table	I-1

EQUATIONS

Equation 3-1. Residential Within-Subjects Regression.....	18
Equation 3-2. Small C&I Within-Subjects Regression	25
Equation 3-3. Large C&I Within-Subjects Regression Equation	31
Equation 3-4. Weather-Sensitive Check	33

ACRONYMS

AMI	Advanced Metering Infrastructure
BDR	Behavioral Demand Response
C&I	Commercial and Industrial
CFL	Compact Fluorescent Lamp
CHP	Combined Heat and Power
CSP	Conservation Service Provider or 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
EM&V	Evaluation, Measurement, and Verification
EUL	Effective Useful Life
G/E/NP	Government, Educational, and Non-Profit
GNI	Government, Non-Profit, Institutional
HER	Home Energy Report
HIM	High Impact Measure
HVAC	Heating, Ventilating, and Air Conditioning
ICSP	Implementation Conservation Service Provider
kW	Kilowatt
kWh	Kilowatt-hour
LED	Light-Emitting Diode
LIURP	Low-Income Usage Reduction Program
M&V	Measurement and Verification
MW	Megawatt
MWh	Megawatt-hour
NPV	Net Present Value
NTG	Net-to-Gross
P3TD	Phase III to Date
PA PUC	Pennsylvania Public Utility Commission
PSA	Phase III to Date Preliminary Savings Achieved; equal to VTD + PYRTD
PSA+CO	PSA savings plus Carryover from Phase II
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

RCT	Randomized Control Trial
RR	Realization Rate
RTD	Phase III to Date Reported Gross Savings
RTO	Regional Transmission Organization
SWE	Statewide Evaluator
T&D	Transmission and Distribution
TRC	Total Resource Cost
TRM	Technical Reference Manual
VTD	Phase III to Date Verified Gross Savings

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 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 changes 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 EDC or its program Implementation Conservation Service Providers (ICSP), and stored in the program tracking system.

Unverified Reported Gross: The Phase III Evaluation Framework allows EDCs and the evaluation contractors the flexibility to not evaluate each program every year. If an EE&C program is being evaluated over a multiyear cycle, the reported savings for a program year where evaluated results are not available are characterized as unverified reported gross until the impact evaluation is completed and verified savings can be calculated and reported.

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 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 application of 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/year or MW/year. The Pennsylvania 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 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.

- **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.
- **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.
- **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). For PY8, the PSA savings will always equal the PYTD savings because PY8 is the first program year of the phase (no savings will be verified until the PY8 final annual report).
- **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.
- **Phase III to Date Verified + Carryover (VTD + CO):** The sum of the verified gross savings recorded to date in Phase III plus any verified gross carryover savings from Phase II of Act 129.

1. INTRODUCTION

Note: This report includes only demand response (DR) information with placeholders for the other sections to be completed in the annual report filed in November 2018.

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 Utilities 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 and effectiveness of the Phase III EE&C accomplishments for PECO in Program Year 9 (PY9), as well as the cumulative accomplishments of the Phase III programs since inception. This report additionally 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, reported gross, verified gross, and verified net impacts of the energy efficiency (EE) programs in PY9. Compliance with Act 129 savings goals are ultimately based on verified gross savings. This report also includes estimates of cost-effectiveness accorded to the Total Resource Cost (TRC) test.¹ PECO has retained Navigant Consulting, Inc. (Navigant) as an independent evaluation contractor for Phase III of Act 129. Navigant is responsible for the measurement and verification (M&V) of the savings and calculation of gross verified and net verified savings.

Navigant also performed a process evaluation to examine the design, administration, implementation, and market response to the EE&C program. This report presents the key findings and recommendations identified by the process evaluation and documents any changes to EE&C program delivery considered based on the recommendations.

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.

¹ The Pennsylvania TRC Test for Phase I was adopted by PUC order at Docket No. M-2009-2108601 on June 23, 2009 (2009 PA TRC Test Order). The TRC Test Order for Phase I later was refined in the same docket on August 2, 2011 (2011 PA TRC Test Order). The 2013 TRC Order for Phase II of Act 129 was issued on August 30, 2012. The 2016 TRC Test Order for Phase III of Act 129 was adopted by PUC order at Docket No. M-2015-2468992 on June 11, 2015.

2. SUMMARY OF ACHIEVEMENTS

2.1 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 Order² allowed EDCs to carry over savings achieved within Phase II that were in excess of the Phase II portfolio savings target. Phase I carryover savings cannot be counted in 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.³

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 Order⁴ 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

² Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Implementation Order*, at Docket No. M-2014-2424864, (*Phase III Implementation Order*), entered June 11, 2015.

³ Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Compliance Order*, at Docket No. M-2012-2289411, (*Phase II Compliance Determination Order*), entered August 3, 2017.

⁴ Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Implementation Order*, at Docket No. M-2014-2424864, (*Phase III Implementation Order*), entered June 11, 2015.

low-income customer segment.⁵ PECO carried over 0 MWh of G/E/NP and 0 MWh of low-income customer segment savings.⁶ 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



Sources: PECO's eTrack database, CSP tracking data

2.2 Phase III EE Achievements to Date

This section will be completed for the annual report filing in November 2018.

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 were 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 PY9, there were three DR events called. Table 2-1 lists the days that DR events were called along with the verified gross demand reductions achieved by each event. Table 2-1 also lists the average DR

⁵ Proportionate to those savings achieved by dedicated low-income programs in Phase III.

⁶ Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program Compliance Order*, at Docket No. M-2012-2289411, (*Phase II Compliance Determination Order*), entered August 3, 2017.

performance for PY9 and for Phase III to date. PECO's average DR performance to date is below the Phase III compliance reduction target by 33% (67% of target achieved).

Table 2-1. PY9 DR PYVTD Performance by Event

Event Date	Event Start Time	Event End Time	Program Name			
			Residential DR	Small C&I DR	Large C&I DR	Portfolio
June 13, 2017	2:00 p.m.	6:00 p.m.	10.0	2.9	82.7	95.5
July 20, 2017	2:00 p.m.	6:00 p.m.	19.1	0.0	100.3	119.4
July 21, 2017	1:00 p.m.	5:00 p.m.	12.2	-0.5	94.8	106.5
PYVTD - Average PY9 DR Event Performance			13.8	0.8	92.6	107.2
VTD - Average Phase III DR Event Performance			13.8	0.8	92.6	107.2

Source: Navigant 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 137 MW minimum for each DR event. Figure 2-3 compares the performance of each of the DR events in PY9 to the event-specific minimum and average targets.

Figure 2-3. Event Performance Compared to 85% Per-Event Target



Source: Navigant analysis

2.4 Phase III Performance by Customer Segment

The summary tables for EE programs will be included in the annual compliance report filed in November 2018. They present the DR program participation, savings, and spending results by customer sector for PY9.

Table 2-2 summarizes the participation and spending for the DR program for the three sectors.

Table 2-2. Summary Statistics for DR Programs by Customer Segment

Parameter	Customer Segment	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Participation	Residential	61,440	60,847				61,440 ^a
	Small C&I	1,586	1,564				1,586 ^a
	Large C&I	-	261				261 ^a
	Total	63,026	62,672				63,287
Incentive Spending (\$1,000)	Residential	3,005	2,838				5,843
	Small C&I	122	115				237
	Large C&I		0 ^b				0 ^b
	Total	3,127	2,953				6,080

^a DR participation is not additive like other programs since the same participants tend to remain in the program with only small attrition. Therefore, total participation in the DR programs for Phase III is equal to the highest program year participation count for each of the three programs.

^b PECO contracts with the program CSPs to obtain the DR resources for the program and does not provide direct participant incentives. Each CSP controls its participant incentives independently, thus the PECO customer incentive amount is zero.

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

Table 2-3 provides a summary of reported and verified demand (MW) savings for the DR program across the three sectors.

Table 2-3. Summary of Demand Savings for DR Programs by Customer Segment

Parameter	Customer Segment	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Reported Gross Demand Savings (MW)	Residential	N/A	N/A				N/A
	Small C&I	N/A	N/A				N/A
	Large C&I	N/A	104.8				104.8
	Total	N/A	104.8				104.8
Verified Gross Demand Savings (MW)	Residential	N/A	13.8				13.8
	Small C&I	N/A	0.8				0.8
	Large C&I	N/A	92.6				92.6
	Total	N/A	107.2				107.2

Demand Savings Realization Rate	Residential	N/A	N/A	N/A
	Small C&I	N/A	N/A	N/A
	Large C&I	N/A	88%	88%
	Total	N/A	N/A	N/A

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant Analysis

2.5 Summary of Participation by Program

EE program participation information for this section will be included in the annual report filed in November 2018.

Participation is defined differently for certain programs depending on the program delivery channel and data tracking practices. Table 2-4 provides the current participation totals for PY9 and Phase III.

Table 2-4. EE&C Portfolio Participation by Program

Parameter	Program Name	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Participation	Residential EE						
	Low-Income EE						
	Small C&I EE						
	Large C&I EE						
	Combined Heat and Power (CHP)						
	Residential DR	61,440	60,847				61,440 ^a
	Small C&I DR	1,586	1,564				1,586 ^a
	Large C&I DR	-	261				261 ^a
	Portfolio Total	63,026	62,672				63,287

^a DR participation is not additive like other programs since the same participants tend to remain in the program with only small attrition. Therefore, total participation in the DR programs for Phase III is equal to the highest program year participation count for each of the three programs.

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

The nuances of the participant definition vary by program or solution and are summarized by program and solution as described here.

Residential DR Program

Three solutions make up the Residential DR Program; however, only the Direct Load Control (DLC) Solution is currently active. PECO defined participation counts in the solution as follows:

- For Residential DLC, a participant is defined as a unique account number where device status is install or swap, and the measure code is CACS (central air conditioner switch). One participant

may have more than one DLC device installed at the home. The categories not included in the participant count include disconnect, opt-out, and removal.

Small C&I DR Program

The Small C&I DR Program consists of the Small C&I DLC Solution. PECO defined participation counts in the solution as follows:

- For Small C&I DLC, a participant is defined as a unique account number where device status is install or swap, and the measure code is PCT (program controlled thermostat). One participant may have more than one DLC device installed on the premise. The categories not included in the participant count include disconnect, opt-out, and removal.

Large C&I DR Program

The Large C&I DR Program consists of the Demand Response Aggregator (DRA) Solution. PECO defined participation counts in the solution as follows:

- For DRA, a participant is defined as a Large C&I customer (defined by PECO account number) enrolled with a DR program CSP for at least 1 hour of at least one event occurring in any given program year.

2.6 Summary of Impact Evaluation Results

During PY9, Navigant completed impact evaluations for many of the EE programs in the portfolio. Table 2-5 summarizes the realization rates (RRs) and net-to-gross (NTG) ratios by program or evaluation initiative.

EE program information for this section will be included in the annual report filed in November 2018.

Table 2-5. Impact Evaluation Results Summary

Program Name	Parameter	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Residential EE	Energy RR						
	Demand RR						
	NTG Ratio						
Low-Income EE	Energy RR						
	Demand RR						
	NTG Ratio						
Small C&I EE	Energy RR						
	Demand RR						
	NTG Ratio						
Large C&I EE	Energy RR						
	Demand RR						
	NTG Ratio						
CHP	Energy RR						

Program Name	Parameter	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
	Demand RR						
	NTG Ratio						
Residential DR	Energy RR	N/A	N/A				N/A
	Demand RR	N/A	N/A				N/A
	NTG Ratio	1	1				1
Small C&I DR	Energy RR	N/A	N/A				N/A
	Demand RR	N/A	N/A				N/A
	NTG Ratio	1	1				1
Large C&I DR	Energy RR	N/A	N/A				N/A
	Demand RR	N/A	0.88				0.88
	NTG Ratio	1	1				1

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

2.7 Summary of Energy Impacts by Program

EE program information for this section will be included in the annual report filed in November 2018.

2.8 Summary of Demand Impacts by Program

PECO's Phase III EE&C programs achieve peak demand reductions in two primary 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 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 P3TD. Because of these differences, demand impacts from EE and DR are reported separately in the following sub-sections.

2.8.1 Energy Efficiency

EE program information for this section will be included in the annual report filed in November 2018.

2.8.2 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. Phase III DR events are initiated according to the following guidelines:

- Curtailment events shall be limited to the months of June through September.
- 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.
- Each curtailment event shall last 4 hours.
- Each curtailment event shall be called such that it will occur during the day’s forecast peak hour(s) above 96% of the PJM RTO summer peak demand forecast.
- 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. PECO uses the following line loss percentages/multipliers by sector.⁷

- Residential = 107.99% or 1.0799
- Small C&I = 107.99% or 1.0799
- Large C&I = 107.99% or 1.0799

Table 2-6 summarizes the PYVTD and VTD demand reductions for each of the DR programs in the EE&C plan and for the DR portfolio as a whole. VTD demand reductions are the average performance across all Phase III DR events independent of how many events occurred in a given program year. The relative precision columns in Table 2-6 indicate the margin of error (at the 90% confidence interval) around the PYVTD and VTD demand reductions.

Table 2-6. Summary of Demand Savings by DR Program

Parameter	DR Program Name	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Reported Gross Demand Savings (MW)	Residential DR	N/A	N/A				N/A
	Small C&I DR	N/A	N/A				N/A
	Large C&I DR	N/A	104.8				104.8
	Portfolio Total	N/A	104.8				104.8
Verified Gross	Residential DR	N/A	13.8				13.8

⁷ Pennsylvania Public Utility Commission, *Technical Reference Manual; State of Pennsylvania Act 129 Energy Efficiency and Conservation Program & Act 213 Alternative Energy Portfolio Standards*, dated June 2016, errata update February 2017. Section 1.14 Transmission and Distribution System Losses.

Parameter	DR Program Name	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Demand Savings (MW)	Small C&I DR	N/A	0.8				0.8
	Large C&I DR	N/A	92.6				92.6
	Portfolio Total	N/A	107.2				107.2
Relative Precision of Verified Gross Demand Savings at 90% Confidence Interval	Residential DR	N/A	4%				4%
	Small C&I DR	N/A	328%				328%
	Large C&I DR	N/A	38%				38%
	Portfolio Total	N/A	7%				7%

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

2.9 Summary of Fuel Switching Impacts

This section will be completed in the annual report filed in November 2018.

2.10 Summary of Cost-Effectiveness Results

All program information for this section will be included in the annual report filed in November 2018.

2.11 Comparison of Performance to Approved EE&C Plan

All program expenditure information for this section will be included in the annual report filed in November 2018.

Table 2-7 presents P3TD expenditures, by program, compared to the budget estimates set forth in the EE&C plan through PY9. All dollars in Table 2-7 are presented in 2016 dollars.

Table 2-7. Comparison of Expenditures to Phase III EE&C Plan by Program

Parameter	Program Name	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
EE&C Plan Budget (\$1,000)	Residential EE						
	Low-Income EE						
	Small C&I EE						
	Large C&I EE						
	CHP						
	Residential DR	2,310	2,734	2,799	2,884	2,990	13,717
	Small C&I DR	186	187	188	190	192	943

Parameter	Program Name	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
	Large C&I DR	165	6,771	6,752	6,733	6,715	27,137
	Portfolio Total	2,661	9,692	9,740	9,807	9,896	41,796
Actual Expenditures (\$1,000)	Residential EE						
	Low-Income EE						
	Small C&I EE						
	Large C&I EE						
	CHP						
	Residential DR	3,953	3,440				7,393
	Small C&I DR	106	133				239
	Large C&I DR	1,742	574				2,316
	Portfolio Total	5,801	4,147				9,948
	Ratio (Actual/Planned Spending)	Residential EE					
Low-Income EE							
Small C&I EE							
Large C&I EE							
CHP							
Residential DR		172%	127%				54%
Small C&I DR		53%	66%				26%
Large C&I DR		871%	8%				8%
Portfolio Total		215%	43%				24%

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

Table 2-8 compares the verified gross program savings to the demand savings projections filed in the EE&C plan.

Table 2-8. Comparison of DR Savings to Phase III EE&C Plan by Program

Parameter	Program Name	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
EE&C Plan Verified Gross Demand Savings (MW)	Residential DR		44				44
	Small C&I DR		1				1
	Large C&I DR		125				125
	Portfolio Total		170				170
Actual Verified Gross Demand Savings (MW)	Residential DR		13.8				13.8
	Small C&I DR		0.8				0.8
	Large C&I DR		92.6				92.6
	Portfolio Total		107.2				107.2

Parameter	Program Name	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Ratio (Actual/Planned Savings)	Residential DR		32%				32%
	Small C&I DR		100%				100%
	Large C&I DR		74%				74%
	Portfolio Total		63%				63%

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

The list below briefly discusses several key reasons why programs exceeded or fell short of projected gross energy savings in PY9.

- The Residential and Small C&I DR Programs fell short of projected savings due to data quality issues. PECO is not comfortable with these results because the data is not the quality that the analysis requires to use the preferred methods. PECO and Navigant will work to address the data issues. The team reserves the right to adjust this number in the future if better data becomes available. If data issue resolution is found that impacts these current findings, then the team will file a revised verified result for Residential and Small C&I DR later in 2018, after the team works on addressing and resolving data issues.
- The Large C&I DR Program fell short of projected savings due to under performance by several participants and other non-Act 129 and non-PJM Emergency DR load management activities. PECO has identified that some large C&I customers do active demand management including peak load shaving for 5CP hours and the PJM Economic Program, which could be causing an underrepresentation of the load reductions achieved by impacting usage data for days near the events.

As mentioned, Navigant and PECO are currently working through continuous process evaluation discussions to identify potential changes to the Phase III programs. There are no official, significant changes to report at this time; however, Navigant has made program-specific recommendations as will be discussed in subsequent sections of this report. See Table 2-9 for a summary of these recommendations.

2.12 Findings and Recommendations

EE program information for this section will be included in the annual report filed in November 2018.

The PY9 impact and process evaluation activities completed by Navigant led to a variety of recommendations for program improvement. Table 2-9 lists the overarching recommendations that affect more than one program, the evaluation activity(s) that uncovered the finding, and Navigant's recommendation(s) to PECO to address the finding. Detailed findings and recommendations for each program and solution are discussed in subsequent sections of this report.

Table 2-9. Summary of Evaluation Recommendations

Program(s)	Finding	Recommendation
Residential and Small Commercial DR	Event performance was lower than projected	Investigate program DR event signal reception along with DLC switch and PCT operability
Large C&I	Event performance was lower than projected	Consider reviewing available resources vs PY9 achieved and review shortfalls with CSPs towards developing a plan for ensuring better target achievement for PY10
Residential and Small Commercial DR	Advanced metering infrastructure (AMI) meter data contained a large percentage of integers	Investigate data quality and data query procedures
Residential DR	Some customers reported that they would like more information about the program	Consider increasing communication with customers so that they feel more engaged with the program: a. Invite customers to opt in to event notification emails b. Send an end-of-season report to customers that explains the event dates that were called and the system impacts of the program
Residential and Small Commercial DR	Customers are interested in saving energy but have low awareness of other program offerings	Market additional EE opportunities to encourage program channeling

Source: Navigant analysis

3. EVALUATION RESULTS BY PROGRAM

This section documents the gross impact, net impact, and process evaluation activities conducted in PY9 along with the outcomes of those activities. Not every program receives an evaluation every program year. Table 3-1 shows a breakdown of the evaluation activity plan, with a check mark indicating the type of evaluation Navigant will conduct for each program over each year.

Table 3-1. Evaluation Activity Matrix

Program	Solution	PY8			PY9			PY10			PY11			PY12		
		Gross	Net	Process												
Residential EE	Lighting, Appliances & HVAC	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Appliance Recycling	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Whole Home	√			√	√	√	√			√	√	√			
	New Construction				√	√	√	√			√	√	√	√		
	Multifamily Targeted	√	√	√	√			√	√	√	√			√	√	√
	Behavioral	√		√	√			√		√	√			√		√
Residential Low-Income EE	Whole Home	√		√				√		√				√		
	Lighting	√		√	√		√	√		√		√		√		√
Small C&I EE	Equipment and Systems	√			√	√	√	√			√	√	√	√		
	New Construction	√			√	√	√	√			√	√	√			
Small C&I EE	Whole Building				√	√	√				√	√	√			
	Behavioral	√		√	√			√		√				√		√
	Data Center Targeted	√			√	√	√	√			√	√	√	√		
	Multifamily Targeted	√	√	√	√			√	√	√	√				√	√
Large C&I EE	Equipment and Systems	√			√	√	√	√			√	√	√	√		
	New Construction	√			√	√	√	√			√	√	√			

Program	Solution	PY8			PY9			PY10			PY11			PY12			
		Gross	Net	Process													
	Data Center Targeted	√			√	√	√	√				√	√	√			
	Multifamily Targeted	√	√	√	√			√	√	√	√						
CHP	Combined Heat and Power	√			√	√	√	√				√	√	√	√		
	Residential DR	√			√		√	√				√		√	√		
DR	Small C&I DR	√			√		√	√				√			√		
	Large C&I DR				√		√	√				√		√	√		

Source: Navigant analysis

3.1 Residential EE Program

This section will be completed in the annual report filed in November 2018.

3.2 Residential Low-Income EE Program

This section will be completed in the annual report filed in November 2018.

3.3 Small C&I EE Program

This section will be completed in the annual report filed in November 2018.

3.4 Large C&I EE Program

This section will be completed in the annual report filed in November 2018.

3.5 CHP Program

This section will be completed in the annual report filed in November 2018.

3.6 Residential DR Program

The PECO Residential DR Program encompasses opportunities designed to engage customers in demand reduction. The eligible population and target markets for the PECO Residential DR Program are all PECO residential electric customers. The program encompasses three solutions: Residential DLC Solution, Smart Thermostat for DR Savings Solution, and Behavioral DR Savings Solution. Only the Residential DLC Solution is currently active.

The Residential DLC Solution is implemented by Itron (previously Comverge). The program shifts participant load off of peak hours by cycling their air conditioner during DR event days. For Residential DLC, a participant is defined as a unique account number where device status is install or swap, and the measure code is CACS (central air conditioner switch). One participant may have more than one DLC device installed at the home. The categories not included in the participant count include disconnect, opt-out, and removal. The summer DR events had over 61,000 residential participants. This year and for the remainder of Phase III, the incentive is \$40 per DLC unit per year.

For Phase III, event days are called when the PJM day-ahead peak load forecast reaches 96%. Based on the day-ahead forecasts, PECO called three events during the summer of 2017: June 13 (2:00 p.m.-6:00 p.m.), July 20 (2:00 p.m.-6:00 p.m.), and July 21 (1:00 p.m.-5:00 p.m.).

Compliance targets for DR programs were established at the system level, which means the load reductions measured at the customer meter must be escalated to reflect T&D losses. The peak demand impacts presented in this section have been adjusted for line losses.

3.6.1 Participation and Reported Savings by Customer Segment

This section provides the total Residential DR Program results for PY9, including participation, demand savings, and incentive costs. Table 3-2 presents the participation counts and incentive payments for the Residential DR Program in PY9 by customer segment.

Table 3-2. Summary Statistics for Residential DR Program by Customer Segment

Parameter	Customer Segment	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Participation	Residential	61,440	60,847	-	-	-	61,440 ^a
	Small C&I	-	-	-	-	-	-
	Large C&I	-	-	-	-	-	-
	Total	61,440	60,847	-	-	-	61,440
Incentive Spending (\$1,000)	Residential	3,005	2,838	-	-	-	5,843
	Small C&I	-	-	-	-	-	-
	Large C&I	-	-	-	-	-	-
	Total	3,005	2,838	-	-	-	5,843

^a DR participation is not additive like other programs since the same participants tend to remain in the program with only small attrition. Therefore, total participation in the DR programs for Phase III is equal to the highest program year participation count.

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

Table 3-3 provides the reported and verified demand savings results for the Residential DR Program for PY9.

Table 3-3. Summary of Demand Savings for Residential DR Program by Customer Segment

Parameter	Customer Segment	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Reported Gross Demand Savings (MW)	Residential	-	N/A	-	-	-	N/A
	Small C&I	-	-	-	-	-	-
	Large C&I	-	-	-	-	-	-
	Total	-	N/A	-	-	-	N/A
Verified Gross Demand Savings (MW)	Residential	-	13.8	-	-	-	13.8
	Small C&I	-	-	-	-	-	-
	Large C&I	-	-	-	-	-	-
	Total	-	13.8	-	-	-	13.8
Demand Savings RR	Residential	-	N/A	-	-	-	N/A
	Small C&I	-	-	-	-	-	-
	Large C&I	-	-	-	-	-	-
	Total	-	N/A	-	-	-	N/A

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

3.6.2 Gross Impact Evaluation

For the Residential DR Program, the evaluation plan identified two methods to estimate demand savings. Selection of the method described below was based on the metering and data management systems in place at PECO.

Billing analysis employs econometric regression methods to estimate the net demand savings from the program by utilizing AMI data at hourly or sub-hourly intervals. The 2016 Technical Reference Manual (TRM) suggests that billing analysis be based on experimental design (e.g., randomized control trials, or RCTs) as the first and preferred method for evaluating impacts from such programs. However, this method is not feasible for the Residential AC Cycling Program during Phase III because it was created in Phase I, and all participants in that program were enrolled without randomization or the creation of a control group. Thus, Navigant chose one of the secondary approaches described below to verify achievement of the Phase III demand reduction targets as outlined in the 2016 PA TRM:

1. **Comparison group analysis:** Uses loads from a group of non-participating customers and matches them to similar participating customers with respect to observable characteristics—e.g., non-event weekday consumption.
2. **Within-subject regression:** Uses loads of participating customers on non-event days to estimate the reference load. Demand is specified as a function of temperature and other variables that influence usage in the regression equation.

While the preferred approach above is a comparison group analysis, this approach was not possible for PY9. This was due to the low precision data available from PECO to conduct the analyses. A significant number of integer values were present in the data, leading to low resolution of data. This reduced precision would not result in a robust matching process. To find a customer's best match, it is imperative to have data that is beyond one decimal place. A read of zero may in fact be a positive usage value, but that value could have been rounded or truncated. It no longer represents the customer's true usage value. Therefore, when conducting a comparison group exercise, the group selected may not be the most accurate group for comparison.

Within-Subjects Regression

When the counterfactual cannot be developed from a separate population in a program, a within-subjects approach in which an individual's usage on non-event weekdays is used to determine the counterfactual.

The within-subjects regression equation is illustrated in Equation 3-1. This model predicts customer load as a function of the event hours, day of the week, hour of the day, cooling degree hours, and customer load earlier in the day (i.e., day-of adjustment), snapback effect post-event hours.

Equation 3-1. Residential Within-Subjects Regression

$$\begin{aligned}
 Q_{kijt} = & \beta_k + \beta_1 prekW_{kijt} + \sum_{\varphi}^N \beta_{2\varphi} Treat_{kijt} + \sum_{i=1}^{24} \beta_{3i} \cdot h_{ijt} + \sum_{i=1}^{24} \beta_{4i} \cdot h_{ijt} \cdot CDH_{ijt} \\
 & + \sum_{m=M}^{M,Tu,W,Th,F} (\beta_{5m} \cdot DTYPE_{jt}) + \sum_g^{Jun,Jul} (\beta_{6g} \cdot MONTH_t) + \sum_f^6 \beta_{7f} SB_{kijt} + \varepsilon_{kijt}
 \end{aligned}$$

Where

k =customer, i = hour ending, j = day, t =month

Q_{kijt} = Hourly demand for customer k during hour ending i on day j on month t .

$prekW_{kijt}$ = is the average load in the day before the event. The purpose of this variable is to perform a day-of adjustment that accounts for idiosyncratic day-of consumption during an interval that is as close as possible to the time interval of interest, while avoiding the possibility of the adjustment variable to itself be part of the event.

$Treat_{kijt}$ = A set of indicator variables taking value of 1 if customer k at hour ending i on day j and month t is an event and takes value 0 if otherwise.

CDH_{ijt} = is the number of cooling degree hours in during hour ending i , day j and month t . The base for this calculation is 65 °F.

$DTYPE_{jt}$ = is a dummy variable taking a value of 1 on the j^{th} day of the week, where j indexes Monday to Friday on a given month t and 0 otherwise. (Navigant excludes weekend days from the data).

$MONTH_t$ = is a dummy variable taking a value of 1 on month t , where t indexes June through September, and 0 otherwise.

SB_{kijt} = is a dummy variable taking the value 1 where hour of sample t is the f^{th} hour following the end of an event. Note that for Event 1 and Event 2 the number of snapback hours is 6, and for Event 3 it is 7.

$\beta_0 - \beta_7$ =Parameter estimates. These values are the estimated relationship between demand and the variable for which the beta represents. β_0 is the intercept.

Table 3-4 provides the sampling frame for the gross impact evaluation of the Residential DR Program in PY9.

Table 3-4. Residential DR Program Gross Impact Sample Design for PY9

Stratum Solution	Stratum Name	Percentage of Program Reported Savings	Population Size	Achieved Sample Size	Verification Method
Total Program	Residential	100%	60,847	60,402	Within-Subjects Regression

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

Table 3-5 provides a summary of reported and verified demand (MW) savings results, along with the relative precision for each stratum sampled for the Residential DR Program in PY9.

Table 3-5. Residential DR Program Gross Demand Savings Impact Evaluation Results for PY9

Stratum Solution	Stratum Name	Reported Gross Demand Savings (MW)	Verified Gross Demand Savings (MW)	Demand RR	Relative Precision at 90% Confidence Interval
Total Program	Residential	N/A	13.8	N/A	4%

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

The following are possible factors that led to lower than expected verified savings:

- From a data perspective, low precision data could alter comparisons and savings. The significant number of integer values present in the hourly usage data provided by PECO could be affecting the ability of the regression model to pick up meaningful impacts.
- It is possible that some switches are malfunctioning, which is leading to no DR impact at all since AC is not being curtailed due to a malfunctioning switch.
- It is possible that some percentage of customers have turned off or uninstalled their switch to avoid being curtailed altogether.

3.6.3 Process Evaluation

Navigant conducted in-depth interviews with the program managers at PECO and the CSP, Itron. The interviews serve to provide a detailed picture of the program implementation, the goals of the program managers, and the customer experience with the program. These interviews also informed the content of the customer surveys.

Navigant fielded a post-event survey for residential customers. The survey was designed to:

- Assess customer understanding, satisfaction, and attitudes about the program
- Assess customer awareness and comfort during DR events
- Measure success and identifying potential areas for program design improvement

The survey was fielded by telephone directly following the first and third DR events of the 2017 season, as well as one placebo day—a day when the weather was hot but no DR event was called. When possible, fielding was completed within 48 hours of the end of the event. The residential survey targeted 90 completes per fielding based on a sample designed to achieve 90/10 confidence and precision. Table 3-6 displays the total number of completes achieved.

Table 3-6. Residential DR Post-Event Survey Completes

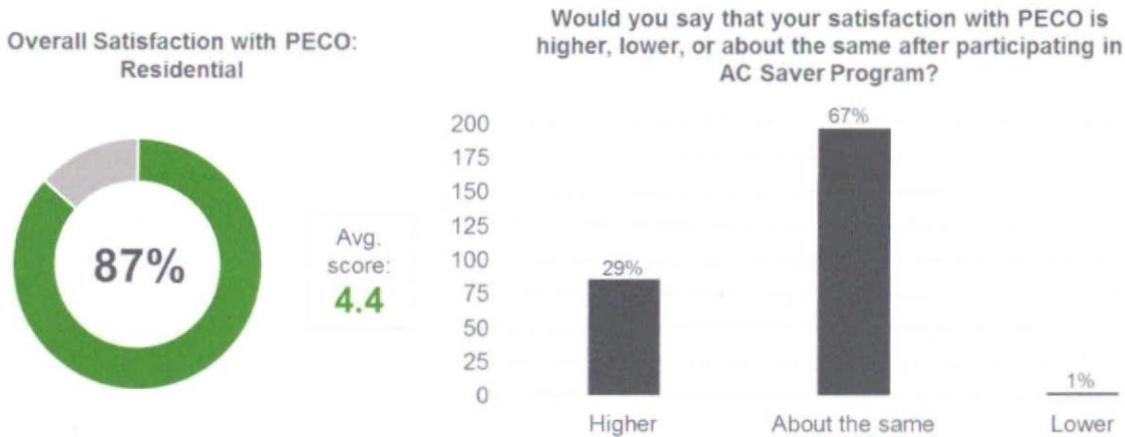
Stratum Name	Event 1: June 13	Event 3: July 21	Placebo: August 2
Residential	109	92	91

Source: Navigant analysis

The survey assessed whether participants were aware of the DR event and found that only 18% of customers reported awareness. Of those customers, 57% reported receiving a pre-event notification from PECO. Customers are able to opt in to event notification emails, but only approximately 3,000 customers are currently enrolled.

The survey also investigated satisfaction. Satisfaction is assessed using a scale of 1 to 5, with 1 being very unsatisfied and 5 being very satisfied. Navigant qualifies customer satisfaction as a rating of 4 or 5. The team found that most participants are satisfied with PECO as a company, and their AC Saver Program participation has a positive or neutral effect, as shown in Figure 3-1.

Figure 3-1. Residential DR Satisfaction with PECO (n=286)



Source: Navigant analysis

Most Residential DR participants are also satisfied with the AC Saver Program, their home comfort during events, and the bill credits they receive, as shown in Figure 3-2.

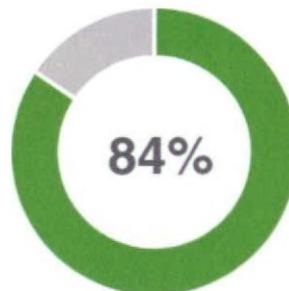
Figure 3-2. Residential DR Satisfaction with Program Components



Source: Navigant analysis

Survey respondents were also asked to rate their likelihood of recommending the DR program to friends or family. Of residential respondents, 84% were likely to recommend the program, as shown in Figure 3-3.

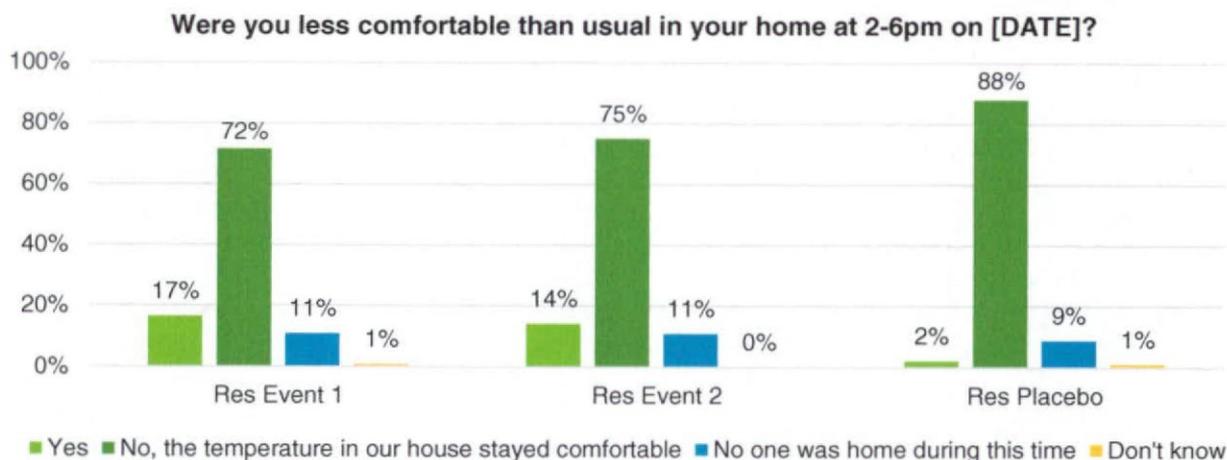
Figure 3-3. Likelihood to Recommend AC Saver Program: Residential (n=288)



Source: Navigant analysis

As shown in Figure 3-4, the majority of residential customers do not report any discomfort during event hours.

Figure 3-4. Residential DR Reported Home Comfort During Events (n=292)



Source: Navigant analysis

3.6.4 Cost-Effectiveness Reporting

A detailed breakdown of program finances and cost-effectiveness will be presented in the Annual PY9 Report filed in November 2018, once full program year expenditures are complete.

3.6.5 Status of Recommendations

The impact and process evaluation activities in PY9 led to the following findings and recommendations from Navigant to PECO, along with a summary of how PECO plans to address the recommendation in program delivery.

Table 3-7. Summary of Findings and Recommendations for Residential DR Program

Solution	Finding	Recommendation	EDC Status
DLC	Event performance was lower than projected	Investigate DCU switch operability	Under consideration
DLC	AMI meter data contained a large percentage of integers	Investigate data quality and data query procedures	Under consideration
DLC	Some customers reported that they would like more information about the program	Consider increasing communication with customers so that they feel more engaged with the program: a. Invite customers to opt in to event notification emails b. Send an end-of-season report to customers that explains the event dates that were called and the system impacts of the program	Under consideration

Solution	Finding	Recommendation	EDC Status
DLC	Customers are interested in saving energy but have low awareness of other program offerings	Market additional EE opportunities to encourage program channeling	Under consideration

Source: Navigant analysis

3.7 Small C&I DR Program

PECO designed the PECO Small C&I DR Program to engage customers in demand reduction through DLC of major electrical end-use equipment during designated peak load hours. The eligible population and target markets for the Small C&I DR Program are all PECO small C&I customers; this includes customers in the G/E/NP sector. The program encompasses a single solution: the DLC Solution.

The Small C&I DLC Solution is implemented by Itron (previously Comverge). The program shifts participant load off peak hours by cycling their air conditioner during DR event days. A participant is defined as a unique account number where device status is install or swap, and the measure code is PCT (program controlled thermostat). One participant may have more than one DLC device installed on the premise. The categories not included in the participant count include disconnect, opt-out, and removal. The summer DR events had over 1,500 small C&I participants. This year and for the remainder of Phase III, the incentive is \$40 per DLC unit per year.

For Phase III, these event days are called when the PJM day-ahead peak load forecast reaches 96%. Based on the day-ahead forecasts, PECO called three events during the summer of 2017: June 13 (2:00 p.m.-6:00 p.m.), July 20 (2:00 p.m.-6:00 p.m.), and July 21 (1:00 p.m.-5:00 p.m.).

Compliance targets for DR programs were established at the system level, which means the load reductions measured at the customer meter must be escalated to reflect T&D losses. The peak demand impacts presented in this section have been adjusted for line losses.

3.7.1 Participation and Reported Savings by Customer Segment

This section provides the total Small C&I DR Program results for PY9, including participation, demand savings, and incentive costs. Table 3-8 presents the participation counts and incentive payments for the Small C&I DR Program in PY9 by customer segment.

Table 3-8. Summary Statistics for Small C&I DR Program by Customer Segment

Parameter	Customer Segment	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Participation	Residential	-	-	-	-	-	-
	Small C&I	1,586	1,564	-	-	-	1,586 ^a
	Large C&I	-	-	-	-	-	-
	Total	1,586	1,564	-	-	-	1,586
Incentive Spending (\$1,000)	Residential	-	-	-	-	-	-
	Small C&I	122	115	-	-	-	237
	Large C&I	-	-	-	-	-	-
	Total	122	115	-	-	-	237

^a DR participation is not additive like other programs since the same participants tend to remain in the program with only small attrition. Therefore, total participation in the DR programs for Phase III is equal to the highest program year participation count. Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

Table 3-9 provides the reported and verified demand savings results for the Small C&I DR Program for PY9.

Table 3-9. Summary of Demand Savings for Small C&I DR Program by Customer Segment

Parameter	Customer Segment	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Reported Gross Demand Savings (MW)	Residential	-	-	-	-	-	-
	Small C&I	-	N/A	-	-	-	N/A
	Large C&I	-	-	-	-	-	-
	Total	-	N/A	-	-	-	N/A
Verified Gross Demand Savings (MW)	Residential	-	-	-	-	-	-
	Small C&I	-	0.8	-	-	-	0.8
	Large C&I	-	-	-	-	-	-
	Total	-	0.8	-	-	-	0.8
Demand Savings RR	Residential	-	-	-	-	-	-
	Small C&I	-	N/A	-	-	-	N/A
	Large C&I	-	-	-	-	-	-
	Total	-	N/A	-	-	-	N/A

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

3.7.2 Gross Impact Evaluation

For the Small C&I DR Program, the evaluation plan identified two methods to estimate demand savings. Selection of the method described below was based on the metering and data management systems in place at PECO.

Billing analysis employs econometric regression methods to estimate the net demand savings from the program by utilizing AMI data at hourly or sub-hourly intervals. The 2016 TRM suggests that billing analysis be based on experimental design (e.g., RCTs) as the first and preferred method for evaluating impacts from such programs. However, this method is not feasible for the Residential AC Cycling Program during Phase III because it was created in Phase I and all participants in that program were enrolled without randomization or the creation of a control group. Thus, Navigant chose one of the secondary approaches described below to verify achievement of the Phase III demand reduction targets as outlined in the 2016 PA TRM:

1. **Comparison group analysis:** Uses loads from a group of non-participating customers and matches them to similar participating customers with respect to observable characteristics—e.g., non-event weekday consumption.
2. **Within-subject regression:** Uses loads of participating customers on non-event days to estimate the reference load. Demand is specified as a function of temperature and other variables that influence usage in the regression equation.

While the preferred approach above is a comparison group analysis, this approach was not possible for PY9. This was due to the low precision data available from PECO to conduct the analyses. A significant number of integer values were present in the data, leading to low resolution of data. This reduced precision would not result in a robust matching process. To find a customer's best match, it is imperative to have data that is beyond one decimal place. A read of zero may in fact be a positive usage value, but that value could have been rounded or truncated. It no longer represents the customer's true usage value. Therefore, when conducting a comparison group exercise, the group selected may not be the most accurate group for comparison.

Within-Subjects Regression

When the counterfactual cannot be developed from a separate population in a program, a within-subjects approach in which an individual's usage on non-event weekdays is used to determine the counterfactual.

The within-subjects regression equation is illustrated in Equation 3-2. This model predicts customer load as a function of the event hours, day of the week, hour of the day, cooling degree hours, and customer load earlier in the day (i.e., day-of adjustment), snapback effect post-event hours.

Equation 3-2. Small C&I Within-Subjects Regression

$$\begin{aligned}
 Q_{kijt} = & \beta_k + \beta_1 prekW_{kijt} + \sum_{\varphi}^N \beta_{2\varphi} Treat_{kijt} + \sum_{i=1}^{24} \beta_{3i} \cdot h_{ijt} + \sum_{i=1}^{24} \beta_{4i} \cdot h_{ijt} \cdot CDH_{ijt} \\
 & + \sum_{m=M}^{M,Tu,W,Th,F} (\beta_{5m} \cdot DTYPE_{jt}) + \sum_g^{Jun,Jul} (\beta_{6g} \cdot MONTH_t) + \sum_f^6 \beta_7 SB_{kijt} + \varepsilon_{kijt}
 \end{aligned}$$

Where

k =customer, i = hour ending, j = day, t =month

Q_{kijt} = Hourly demand for customer k during hour ending i on day j on month t .

$prekW_{kijt}$ = is the average load in the day before the event. The purpose of this variable is to perform a day-of adjustment that accounts for idiosyncratic day-of consumption during an interval that is as close as possible to the time interval of interest, while avoiding the possibility of the adjustment variable to itself be part of the event.

$Treat_{kijt}$ = A set of indicator variables taking value of 1 if customer k at hour ending i on day j and month t is an event and takes value 0 if otherwise.

CDH_{ijt} = is the number of cooling degree hours in during hour ending i , day j and month t . The base for this calculation is 65 °F.

$DTYPE_{jt}$ = is a dummy variable taking a value of 1 on the j^{th} day of the week, where j indexes Monday to Friday on a given month t and 0 otherwise. (Navigant excludes weekend days from the data).

$MONTH_t$ = is a dummy variable taking a value of 1 on month t , where t indexes June through September, and 0 otherwise.

SB_{kijt} = is a dummy variable taking the value 1 where hour of sample t is the f^{th} hour following the end of an event. Note that for Event 1 and Event 2 the number of snapback hours is 6, and for Event 3 it is 7.

$\beta_0 - \beta_7$ =Parameter estimates. These values are the estimated relationship between demand and the variable for which the beta represents. β_0 is the intercept.

Table 3-10 provides the sampling frame for the gross impact evaluation of the Small C&I DR Program in PY9.

Table 3-10. Small C&I DR Program Gross Impact Sample Design for PY9

Stratum Solution	Stratum Name	Percentage of Program Reported Savings	Population Size	Achieved Sample Size	Verification Method
Total Program	Small C&I	100%	1,564	1,549	Within-Subjects Regression

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

Table 3-11 provides a summary of reported and verified demand (MW) savings results, along with the relative precision for each stratum sampled for the Small C&I DR Program in PY9.

The following are possible factors that led to possibly lower than expected verified savings include:

- From a data perspective, low precision data could alter comparisons and savings. The significant number of integer values present in the data provided by PECO could be affecting the ability of the regression model to pick up meaningful impacts.
- It is possible that some program controlled thermostats are malfunctioning, which is leading to no DR impact at all since AC is not being curtailed due to a malfunctioning unit.
- It is possible customers have replaced their thermostat(s) to avoid being curtailed altogether.

Table 3-11. Small C&I Program Gross Demand Savings Impact Evaluation Results for PY9

Stratum Solution	Stratum Name	Reported Gross Demand Savings (MW)	Verified Gross Demand Savings (MW)	Demand RR	Relative Precision at 90% Confidence Interval
Total Program	Small C&I	N/A	0.8	N/A	328%

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

3.7.3 Process Evaluation

Navigant conducted in-depth interviews with the program managers at PECO and the CSP, Itron. The interviews serve to provide a detailed picture of the program implementation, the goals of the program managers, and the customer experience with the program. These interviews also informed the content of the customer surveys.

Navigant fielded a post-event survey for commercial customers. The survey was designed to:

- Assess customer understanding, satisfaction, and attitudes about the program
- Assess customer awareness and comfort during DR events
- Measure success and identifying potential areas for program design improvement

The survey was fielded by telephone directly following the third DR event of the 2017 season, as well as one placebo day—a day when the weather was hot but no DR event was called. When possible, fielding was completed within 5 days of the end of the event. The commercial survey targeted 50 completes per fielding based on a sample designed to achieve 90/10 confidence and precision. As shown in Table 3-12, the total number of completes achieved was below the target sample. The team, therefore, caveats the results presented below, and only shows results aggregated from the two survey fielding efforts (51 completes total). Navigant is considering alternative survey methods to reach the Small C&I group in future program years, including online surveys.

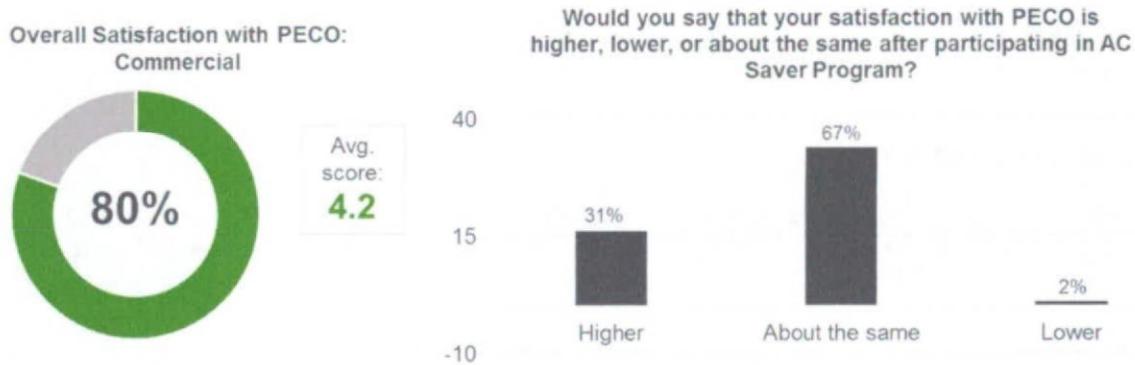
Table 3-12. Residential DR Post-Event Survey Completes

Stratum Name	Event 1: June 13	Event 3: July 21	Placebo: August 2
Commercial	0	8	43

Source: Navigant analysis

The survey primarily examined satisfaction. Satisfaction is assessed using a scale of 1 to 5, with 1 being very unsatisfied and 5 being very satisfied. Navigant qualifies customer satisfaction as a rating of 4 or 5. The team found that most commercial participants are satisfied with PECO as a company, and their AC Saver participation has a positive or neutral effect, as shown in Figure 3-5.

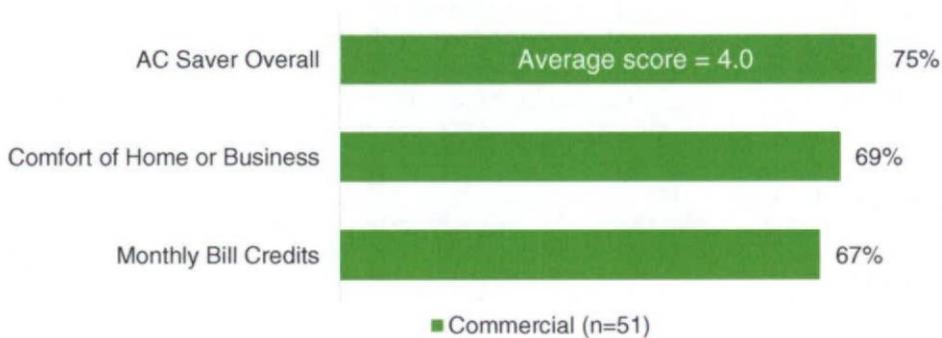
Figure 3-5. Commercial DR Satisfaction with PECO (n=51)



Source: Navigant Analysis

Most commercial DR participants are also satisfied with the AC Saver Program, the comfort of their place of business during events, and the bill credits they receive, as shown in Figure 3-6.

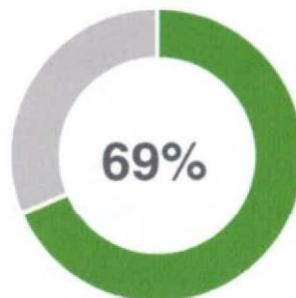
Figure 3-6. Small C&I DR Satisfaction with Program Components



Source: Navigant analysis

Survey respondents were also asked to rate their likelihood of recommending the DR program to friends or family. Of commercial respondents, 96% were likely to recommend the program, as shown in Figure 3-7.

Figure 3-7. Likelihood to Recommend AC Saver: Commercial (n=51)



Source: Navigant analysis

3.7.4 Cost-Effectiveness Reporting

A detailed breakdown of program finances and cost-effectiveness will be presented in the Annual PY9 Report filed in November 2018, once full program year expenditures are complete.

3.7.5 Status of Recommendations

The impact and process evaluation activities in PY9 led to the following findings and recommendations from Navigant to PECO, along with a summary of how PECO plans to address the recommendation in program delivery.

Table 3-13. Summary of Findings and Recommendations for Small C&I DR Program

Solution	Finding	Recommendation	EDC Status
DLC	Event performance was lower than projected	Investigate PCT signal reception and operability	Under consideration
DLC	AMI meter data contained a large percentage of integers	Investigate data quality and data query procedures	Under consideration
DLC	Some customers reported that they would like more information about the program	Consider increasing communication with customers so that they feel more engaged with the program: a. Invite customers to opt in to event notification emails b. Send an end-of-season report to customers that explains the event dates that were called and the system impacts of the program	Under consideration
DLC	Customers are interested in saving energy but have low awareness of other program offerings	Market additional EE opportunities to encourage program channeling	Under consideration

Source: Navigant analysis

3.8 Large C&I DR Program

PECO designed the Large C&I DR Program to engage customers in demand reduction through DRA across multiple customers. The eligible population and target markets for the PECO Large C&I DR Program are all PECO large C&I electric customers, including those in the G/E/NP sector. The program encompasses a single solution: the DRA Solution. The program is implemented by two CSPs: EnerNOC and CPower.

Compliance targets for DR programs were established at the system level, which means the load reductions measured at the customer meter must be escalated to reflect T&D losses. The peak demand impacts presented in this section have been adjusted for line losses.

3.8.1 Participation and Reported Savings by Customer Segment

This section provides the total Large C&I DR Program results for PY9, including participation, demand savings, and incentive costs. Table 3-14 presents the participation counts and incentive payments for the

Large C&I DR Program in PY9 by customer segment. In PY9, 261 Large C&I customers participated in the DR program.

Table 3-14. Summary Statistics for Large C&I DR Program by Customer Segment

Parameter	Customer Segment	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Participation	Residential	-	-	-	-	-	-
	Small C&I	-	-	-	-	-	-
	Large C&I	N/A	261	-	-	-	261 ^a
	Total	N/A	261	-	-	-	261
Incentive Spending (\$1,000)	Residential	-	-	-	-	-	-
	Small C&I	-	-	-	-	-	-
	Large C&I	0	0 ^b	-	-	-	0 ^b
	Total	0	0	-	-	-	0

^a DR participation is not additive like other programs since the same participants tend to remain in the program with only small attrition. Therefore, total participation in the DR programs for Phase III is equal to the highest program year participation count.

^b PECO contracts with the program CSPs to obtain the DR resources for the program and does not provide direct participant incentives. Each CSP controls its participant incentives independently, thus the PECO customer incentive amount is zero.

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

Table 3-15 provides the reported and verified demand savings results for the Large C&I DR Program for PY9. Reported savings for PY9 are equal to 105 MW, while verified gross savings are equal to 93 MW. This is equal to an 88% RR for the Large C&I segment of the PY9 DR program.

Table 3-15. Summary of Demand Savings for Large C&I DR Program by Customer Segment

Parameter	Customer Segment	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Reported Gross Demand Savings (MW)	Residential	-	-	-	-	-	-
	Small C&I	-	-	-	-	-	-
	Large C&I	N/A	104.8	-	-	-	104.8
	Total	N/A	104.8	-	-	-	104.8
Verified Gross Demand Savings (MW)	Residential	-	-	-	-	-	-
	Small C&I	-	-	-	-	-	-
	Large C&I	N/A	92.6	-	-	-	92.6
	Total	N/A	92.6	-	-	-	92.6
Demand Savings RR	Residential	-	-	-	-	-	-
	Small C&I	-	-	-	-	-	-
	Large C&I	N/A	88%	-	-	-	88%
	Total	N/A	88%	-	-	-	88%

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

3.8.2 Gross Impact Evaluation

Navigant implemented a combination approach for estimating gross demand impacts for the Large C&I Program: within-subjects regression (individual customer regressions) and day averaging (customer baselines, CBL). These approaches are consistent with the requirements of the Evaluation Framework and the approved evaluation plan. These methods are described briefly below and expanded on in the paragraphs that follow.

1. **Within-subjects regression:** Uses loads of participating customers on non-event days to estimate the reference load. Demand is specified as a function of temperature and other variables that influence usage in the regression equation.
2. **Day Averaging (CBL):** Reference load calculation, which is the simple arithmetic mean of loads from the same hour on non-event days.

1. Within-Subjects Regression

The within-subjects regression model predicts customer load as a function of the event hours, day of the week, hour of the day, cooling degree hours, and customer load from the day before the event. This method is usually more appropriate for weather-sensitive loads. Navigant’s method for determining weather-sensitive loads is described later in this section. A separate regression is estimated for each customer.

The within-subjects regression equation is illustrated in Equation 3-3.

Equation 3-3. Large C&I Within-Subjects Regression Equation

$$\begin{aligned}
 Q_{kijt} = & \beta_0 + \beta_1 preKW_{kijt} \\
 & + \sum_{\substack{\varphi \\ M,Tu,W,Th,F}}^N \beta_{2\varphi} Treat_{kijt} + \sum_{i=1}^{48} \beta_{3i} \cdot h_{ijt} + \sum_{i=1}^{48} \beta_{4i} \cdot h_{ijt} \cdot CDH_{ijt} \\
 & + \sum_{m=M} (\beta_{5m} \cdot DTYPE_{jt}) + \sum_{\substack{Jun,Jul \\ g}} (\beta_6 \cdot MONTH_t) + \varepsilon_{kijt}
 \end{aligned}$$

Where

k = customer, i = half hour ending, j = day, t = month.

Q_{kijt} = Half hour demand for customer k during hour ending i on day j in month t .

$preKW_{kijt}$ = is the average load in the day before the event. The purpose of this variable is to use recently observed information regarding demand patterns in the prior day to better estimate demand in the current day.

$Treat_{kijt}$ = A set of 24 indicator variables (one for each half hour period in which an event takes place) taking value of 1 if customer k at half hour ending i on day j and month t is an event and takes value 0 if otherwise.

h_{ijt} = 48 indicator variables, each taking a value of 1 if half hour ending i of the day j on month t and 0 otherwise

CDH_{ijt} = is the number of cooling degree hours during half hour ending i , day j and month t . The base for this calculation is 65 °F.

$DTYPE_{jt}$ = is a dummy variable taking a value of 1 on the j^{th} day of the week, where j indexes Monday to Friday on a given month t and 0 otherwise. (Navigant excludes weekend days from the data).

$MONTH_t$ = is a dummy variable taking a value of 1 on month t , where t indexes June and July, and 0 otherwise.

$\beta_0 - \beta_6$ = Parameter estimates. These values are the estimated relationship between demand and the variable for which the beta represents. β_0 is the intercept.

2. Day Averaging (CBL Baseline)

The CBL method was used for facilities with loads that are not weather sensitive. Navigant's method for determining weather-sensitive loads is described later in this section.

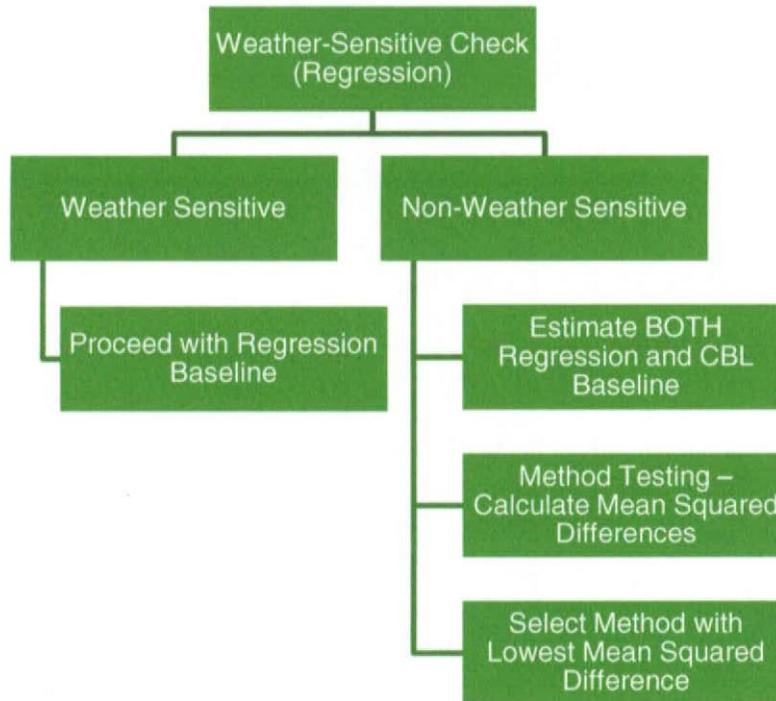
The CBL approach employed by Navigant is a standard 4-of-5 customer baseline. This baseline was estimated in the following manner:

1. **Remove Non-Qualifying Days:** In this step, weekends and public holidays are removed from the dataset.
2. **Identify Look-Back Window:** Next, a 5-day window of qualifying days preceding the event is identified.
3. **Drop Low Day:** The non-event day with the lowest average event window demand is dropped.
4. **Calculate CBL:** The event-specific CBL—the baseline—values are estimated by calculating the average demand, by half hour of day, in the four non-event days not dropped, from within the look-back window.

Baseline Selection: Regression or CBL

To determine if a load is weather sensitive and to determine which baseline to compare actual usage to during the event windows, Navigant used a method selection process illustrated in Figure 3-8.

Figure 3-8. Baseline Method Selection



Weather Sensitivity Check

To test for weather sensitivity, Navigant estimated a regression for each customer that included a weather variable (cooling degree hours) and hourly and daily dummies. The equation for this weather sensitivity check is illustrated in Equation 3-4. Only non-event, non-holiday weekdays are included in this regression.

Equation 3-4. Weather-Sensitive Check

$$Q_{kijt} = \beta_0 + \sum_{i=1}^{10} \beta_{1i} \cdot h_{ijt} + \beta_2 CDH_{ijt} + \sum_{m=M}^{M,Tu,W,Th,F} (\beta_{3m} \cdot DTYPE_{jt}) + \varepsilon$$

Where:

Q_{kijt} = Half hour demand for customer k during hour ending i on day j in month t.

h_{ijt} = 48 indicator variables, each taking a value of 1 if half hour ending i of the day j on month t and 0 otherwise.

CDH_{ijt} = is the number of cooling degree hours during half hour ending i, day j and month t.

$DTYPE_{jt}$ = is a dummy variable taking a value of 1 on the jth day of the week, where j indexes Monday to Friday on a given month t and 0 otherwise. (Navigant excludes weekend days from the data).

β_2 = The coefficient of interest indicating weather sensitivity if significant at the 95% level of confidence.

If the parameter associated with the CDH variable is statistically significant at the 95% confidence level, then the site is deemed to be weather sensitive. However, before a CBL baseline method is employed, a baseline selection process is implemented. This selection method is described below.

Baseline Selection

Both a regression and CBL baseline are estimated for those customers identified as being weather sensitive (see above). To determine the best method to estimate impacts, Navigant performed additional testing.

Using the top three demand days from June and July (2017), excluding event days/holidays/weekends, Navigant employed both a linear regression and CBL baseline approach to calculate the mean squared difference during the event time period of both approaches to the actual. The baseline method with the lowest mean squared difference is selected as the preferred approach for the given participant. Table 3-16 lists the days used in this approach.

Table 3-16. Large C&I DR Program Event Days

Date	Average Temperature (°F)
July 12, 2017	86°
July 13, 2017	85°
July 19, 2017	89°

Sources: PJM and the National Oceanic and Atmospheric Administration

In total, 21 sites were selected to use the CBL approach for baseline, with the remaining 240 sites using a regression baseline.

Table 3-17 provides the sampling frame for the gross impact evaluation of the Large C&I DR Program in PY9.

Table 3-17. Large C&I DR Program Gross Impact Sample Design for PY9

Stratum Solution	Stratum Name	Percentage of Program Reported Savings	Population Size	Achieved Sample Size	Verification Method
Total Program	Large C&I DR	100%	261	261	Regression and CBL

Source: Navigant analysis

Table 3-18 provides a summary of reported and verified demand (MW) savings results, along with the relative precision for each stratum sampled for the Large C&I DR Program in PY9.

Table 3-18. Large C&I DR Program Gross Demand Savings Impact Evaluation Results for PY9

Stratum Solution	Stratum Name	Reported Gross Demand Savings (MW)	Verified Gross Demand Savings (MW)	Demand RR	Relative Precision at 90% Confidence Interval
Total Program	Large C&I DR	104.8	92.6	88%	38%

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: Navigant analysis

The following are possible factors that led to the variation between the reported and verified savings and the resulting observed RRs:

- To calculate reported savings, CSPs rely primarily on the CBL approach; however, CBL was used in the verification for only 8% of participants (21 out of 261 total). Differing underlying approaches can lead to different results, and CBL is known to usually provide slightly greater savings if used across an entire population versus a regression based approach.
- The program fell short of projected savings due to under performance by several participants and other non-Act 129 and non-PJM Emergency DR load management activities. PECO has identified that some large C&I customers do active demand management including peak load shaving for 5CP hours and the PJM Economic Program, which could be causing an underrepresentation of the load reductions achieved.

3.8.3 Process Evaluation

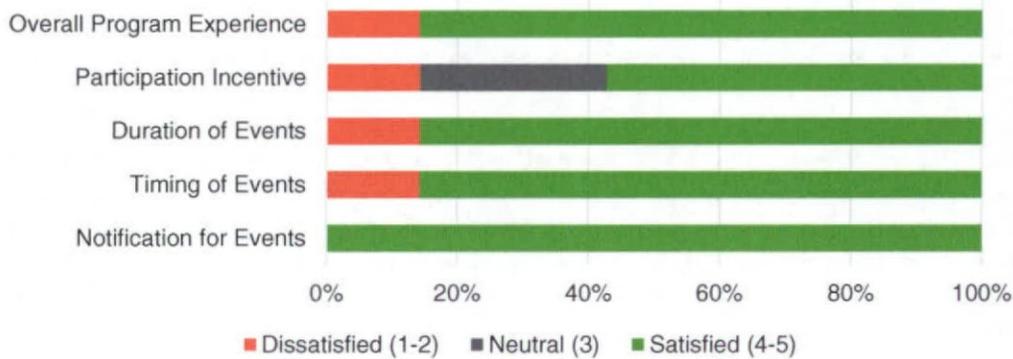
Navigant conducted in-depth interviews with the program managers at PECO and the CSPs, EnerNOC and CPower. The interviews serve to provide a detailed picture of the program implementation, the goals of the program managers, and the customers' experience with the program. These interviews also informed the content of the customer surveys.

Navigant fielded a post-season survey for commercial customers. The survey was designed to assess customer understanding, satisfaction, and attitudes about the program. The survey was fielded online via email in October 2017, after the summer DR season concluded. The Navigant team received contact information for 44 customers, seven of whom completed the survey. The respondents represented 63 participating sites.

Survey respondents reported their reasons for participating in the PECO DR program. The most common reasons cited were the ability to earn money, and that it was not difficult to participate in the program.

The survey also investigated satisfaction. Satisfaction is assessed using a scale of 1 to 5, with 1 being very unsatisfied and 5 being very satisfied. Navigant qualifies customer satisfaction as a rating of 4 or 5. The team found that most participants were satisfied with the DR program in general. Note that one respondent did report dissatisfaction (shown in red in Figure 3-9), but that respondent represented one site that signified a small proportion of savings.

Figure 3-9. Large C&I DR Satisfaction with Program (n=7)



Source: Navigant analysis

3.8.4 Cost-Effectiveness Reporting

A detailed breakdown of program finances and cost-effectiveness will be presented in the Annual PY9 Report filed in November 2018, once full program year expenditures are complete.

3.8.5 Status of Recommendations

The impact and process evaluation activities in PY9 led to the following findings and recommendations from Navigant to PECO, along with a summary of how PECO plans to address the recommendation in program delivery.

Table 3-19. Summary of Findings and Recommendations for Large C&I DR Program

Solution	Finding	Recommendation	EDC Status
DRA	The program under performed as compared to projected demand reductions	Consider reviewing available resources versus PY9 achieved and review shortfalls with CSPs towards developing a plan for ensuring better target achievement for PY10	Under consideration
DRA	Customers reported lower satisfaction with incentive payments	Encourage CSPs to provide fast feedback on event performance and to communicate flexibility on incentive payments to increase customer satisfaction	Under consideration

Source: Navigant analysis

4. COST RECOVERY

PY9 information for this section will be completed in the annual report filed in November 2018.

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 governed by tariffed rate class, so it is necessarily tied to the way customers are metered and charged for electric service. Readers should be mindful of the differences between Table 4-1 and Section 2.4. For example, the low-income customer segment is a subset of PECO's residential tariff(s) and, therefore, is not listed in Table 4-1.

Table 4-1. EE&C Plan Expenditures by Cost Recovery Category⁸

Cost Recovery Sector	Rate Classes Included	Program Year					Phase III to Date
		PY8	PY9	PY10	PY11	PY12	
Residential	R, RH, and CAP	\$35,450	-	-	-	-	\$35,450
Small C&I	GS	\$7,036	-	-	-	-	\$7,036
Large C&I	PD, HT, and EP	\$9,713	-	-	-	-	\$9,713
Municipal	SLE, AL, and TLCL	\$28	-	-	-	-	\$28
Portfolio Total	All	\$52,226	-	-	-	-	\$52,226

Note: Values in tables may not reconcile exactly with the sum of more detailed level results or previously reported results due to rounding.

Source: PECO

⁸ SWE costs not included.

APPENDIX A. UPSTREAM LIGHTING CROSS SECTOR SALES

This section will be completed in the annual report filed in November 2018.

APPENDIX B. SITE INSPECTION SUMMARY

This section will be completed in the annual report filed in November 2018.

APPENDIX C. HER IMPACT EVALUATION DETAIL

This section will be completed in the annual report filed in November 2018.

APPENDIX D. RESIDENTIAL EE PROGRAM

This section will be completed in the annual report filed in November 2018.

APPENDIX E. RESIDENTIAL LOW-INCOME EE PROGRAM

This section will be completed in the annual report filed in November 2018.

APPENDIX F. SMALL C&I EE PROGRAM

This section will be completed in the annual report filed in November 2018.

APPENDIX G. LARGE C&I EE PROGRAM

This section will be completed in the annual report filed in November 2018.

APPENDIX H. MULTIFAMILY TARGETED MARKET SEGMENT

This section will be completed in the annual report filed in November 2018.

APPENDIX I. DEMAND RESPONSE PROGRAMS

Table I-1 presents the event and hour impacts for the DR programs (Residential, Small C&I, and Large C&I).

Table I-1. Hourly Results by Event Summary Table

Program Year	Event	Hour Ending (HE)	Residential DR Program Demand Savings (MW)	Small C&I DR Program Demand Savings (MW)	Large C&I DR Program Demand Savings (MW)	Portfolio Demand Savings (MW)
PY9	Event 1 June 13, 2017	15	12.8	2.9	70.0	85.7
		16	10.7	2.8	95.4	108.9
		17	8.7	2.9	94.7	106.3
		18	7.6	2.8	70.7	81.2
		Average Event Impact by Program	10.0	2.9	82.7	95.5
	Event 2 July 20, 2017	15	19.9	-0.3	95.7	115.3
		16	20.0	0.0	106.3	126.3
		17	18.4	0.1	112.3	130.8
		18	18.2	0.2	86.8	105.1
		Average Event Impact by Program	19.1	0.0	100.3	119.4
	Event 3 July 21, 2017	14	11.9	-0.9	80.8	91.7
		15	9.0	-0.6	101.9	110.4
		16	11.9	-0.5	97.5	108.9
		17	16.0	0.0	99.1	115.1
		Average Event Impact by Program	12.2	-0.5	94.8	106.5
Average Program Year Impact			13.8	0.8	92.6	107.2
PY10	Events TBD					
PY11	Events TBD					
PY12	Events TBD					

Source: Navigant analysis

APPENDIX J. PROGRAM- AND SOLUTION-LEVEL TABLES

This section will be completed in the annual report filed in November 2018.

