Michael J. Shafer
Senior Counsel

PPL
Two North Ninth Street
Allentown, PA 18101-1179
Tel. 610.774.2599 Fax 610.774.4102
MJShafer@pplweb.com

E-FILE

July 15, 2021

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

Re: Preliminary Annual Report for the Period June 2020 through May 2021
Program Year Twelve (12)
PPL Electric Utilities Corporation's Act 129 Plan
Docket No. M-2015-2515642

Dear Ms. Chiavetta:

Enclosed on behalf of PPL Electric Utilities Corporation ("PPL Electric") is the Preliminary Annual Report for Program Year Twelve (12), of PPL Electric's Act 129 Plan, for the period June 1, 2020 through May 31, 2021.

Pursuant to 52 Pa. Code § 1.11, the enclosed document is to be deemed filed on July 15, 2021, which is the date it was filed electronically using the Commission's E-Filing System.

If you have any questions regarding the enclosed filing, please call me or Dirk Chiles, PPL Electric's Manager - Energy Efficiency, at (484) 634-3005.

Respectfully submitted,

Michael J. Shafer

Enclosure
cc: Greg Clendenning – NMR Group, Inc. – Act 129 Statewide Evaluator – Email
Salil Gogte – Ecometric Consulting – Email
Jesse Smith – Demand Side Analytics – Email

Preliminary Annual Report to the Pennsylvania Public Utility Commission

Phase III of Act 129

Program Year 12

(June 1, 2020 – May 31, 2021)

For Pennsylvania Act 129 of 2008

Energy Efficiency and Conservation Plan

Prepared by Cadmus

For

PPL Electric Utilities

July 15, 2021

Table of Contents

Figures

Tables

Acronyms

BDR	Behavioral Demand Response
C&I	Commercial and Industrial
CFL	Compact Fluorescent Lamp
CSP	Conservation Service Provider or Curtailment Service Provider
DLC	Direct Load Control
DR	Demand Response
EDC	Electric Distribution Company
EDT	Eastern Daylight Time
EE&C	Energy Efficiency and Conservation
EM&V	Evaluation, Measurement, and Verification
EUL	Effective Useful Life
GNE	Government, Nonprofit, Education
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
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 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
RTD	Phase III to Date Reported Gross Savings
SWE	Statewide Evaluator
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.

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.

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 semi-annual 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).

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.

Table 1 lists savings values for a hypothetical EDC as of the PY10 semi-annual report, when the first six months of PY10 reported savings are available. The calculations below are then used to illustrate the differences between various savings values.

Table 1: P3TD Savings Calculation Example

Program Period	Reported Gross (MWh/year)	Verified Gross (MWh/year)
Phase II (Carryover)	N/A	400
PY8	800	700
PY9	900	850
PY10 (Q1+Q2)	500	N/A

PYRTD (PY10) = 500 MWh/year

RTD = 800 + 900 + 500 = 2,200 MWh/year

VTD = 700 + 850 = 1,550 MWh / year

PSA = 1,550 + 500 = 2,050 MWh/year

PSA + CO = 2,050 + 400 = 2,450 MWh/year

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 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 PPL Electric Utilities in Program Year 12 (PY12), as well as the cumulative accomplishments of the Phase III programs since inception.

This report details the participation, spending, and reported gross impacts of the energy efficiency programs in PY12. Compliance with Act 129 savings goals are ultimately based on verified gross savings. PPL Electric Utilities has retained Cadmus as an independent evaluation contractor for Phase III of Act 129. Cadmus is responsible for the measurement and verification of the savings and calculation of verified gross savings. The verified gross savings for PY12 energy efficiency programs will be reported in the final annual report, to be filed on November 15, 2021.

Phase III of Act 129 includes a demand response goal for PPL Electric Utilities. Demand response events are limited to the months of June through September, which are the first four months of the Act 129 program year. Because the demand response season is completed early in the program year, it is possible to complete the independent evaluation of verified gross savings for demand response sooner than is possible for energy efficiency programs. *Section 6.2* of this report includes the verified gross demand response impacts for PY12 as well as the cumulative demand response performance of this 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

PPL Electric Utilities does not have carryover savings from Phase II. The Commission's Phase III Implementation Order[1] also allowed EDCs to carry over savings in excess of the overall (portfolio) Phase II savings compliance target, in excess of the Phase II GNE savings compliance target and in excess of the Phase II low-income savings compliance target.[2] PPL Electric Utilities did not have carry over savings for the portfolio but did exceed its Phase II compliance targets for GNE and low-income. However, in the August 3, 2017, Compliance Order,[3] the PA PUC determined that because PPL Electric Utilities did not obtain Phase II savings in excess of its Phase II consumption reduction requirement, PPL Electric Utilities was not entitled to any GNE or low-income sector carryover savings into Phase III.

2.2 Phase III Energy Efficiency Achievements to Date

Since the beginning of Program Year 12 on June 1, 2020, PPL Electric Utilities has claimed:

- 187,161 MWh/yr of reported gross electric energy savings (PYRTD)
- 28.31 MW/yr of reported gross peak demand savings (PYRTD) from energy efficiency programs
- 98.72 MW/yr of reported gross peak demand savings (PYRTD) from demand response programs

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

- 1,768,786 MWh/yr of reported gross electric energy savings (RTD)
- 297.15 MW/yr of reported gross peak demand savings (RTD) from energy efficiency programs
- 1,690,215 MWh/yr of gross electric energy savings (PSA), which includes verified and unverified gross savings from previous Phase III program years[4] and the PYTD reported gross savings from PY12
- 4,084 MWh/yr from PY11 remain unverified
- 239.08 MW/yr of gross peak demand savings (PSA) from energy efficiency programs[5]

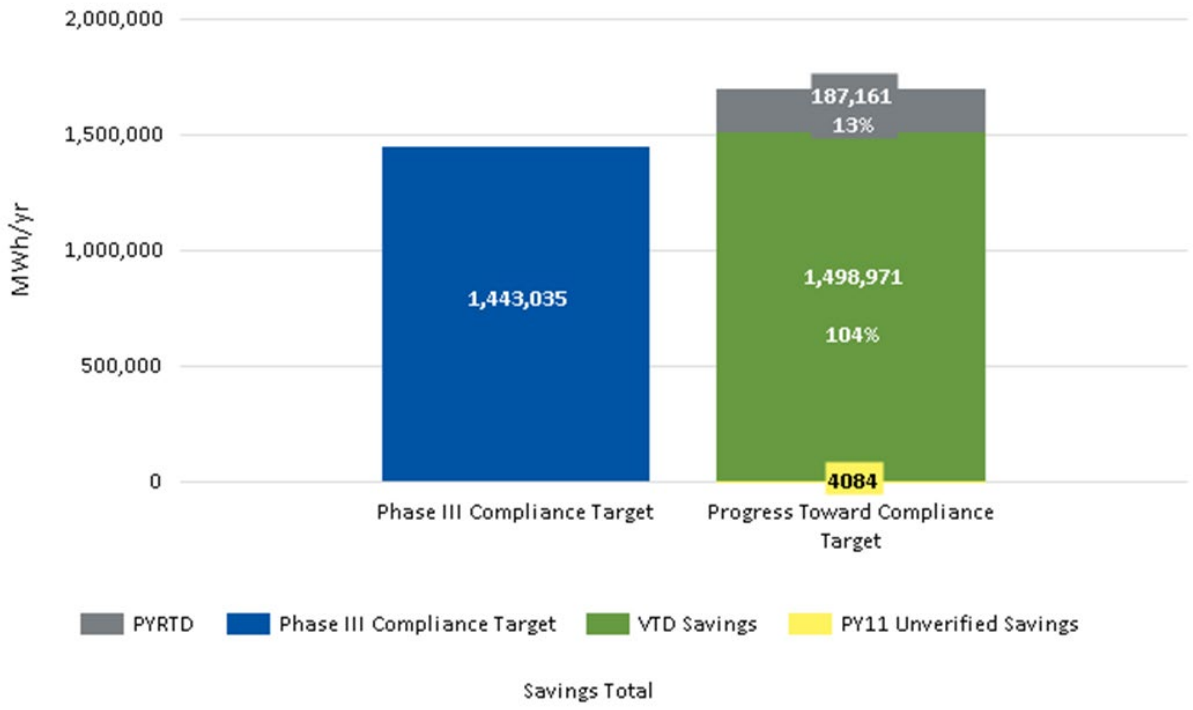
[1] Pennsylvania Public Utility Commission, *Energy Efficiency and Conservation Program* Implementation Order, at Docket No. M-2014-2424864, (*Phase III Implementation Order*), entered June 11, 2015.
[2] Proportionate to those savings achieved by dedicated low-income programs in Phase III.
[3] The Order addresses the EDCs' compliance with the Phase II energy reduction targets and the Petitions for reconsideration of the April 6, 2017, Compliance Order filed by Duquesne, PECO, and PPL Electric Utilities. Pennsylvania Public Utility Commission. Act 129 Phase II Final Compliance Order. Docket No. M-2012-2289411. Adopted August 3, 2017. Available online: http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/energy_efficiency_and_conservation_ee_c_program.aspx
[4] Verified savings from previous program years have been adjusted to account for Home Energy Education Program energy savings uplift (see Appendix C in the PY11 Annual Report). Uplift results in savings counted in more than one program; therefore, an adjustment is made to prevent double counting. Includes unverified savings from PY11 for the New Homes component of the Energy Efficient Home Program.
[5] Verified savings from previous program years have been adjusted to account for Home Energy Education Program energy savings uplift (see Appendix C in the PY11 Annual Report). Uplift results in savings counted in more than one program; therefore, an adjustment is made to prevent double counting. Includes unverified savings from PY11 for the New Homes component of the Energy Efficient Home Program.

- 1.38 MW/yr of peak demand savings from energy efficiency programs in PY11 remain unverified
- 106.70 MW/yr of reported gross peak demand savings (RTD) from demand response, reported as the average demand savings across all PY9, PY10, PY11, and PY12 Act 129 demand response events
- 108.37 MW/yr of verified gross peak demand savings (PSA) from demand response programs, calculated as the average demand savings across all PY9, PY10, PY11, and PY12 Act 129 demand response events

PPL Electric Utilities has achieved:

- 1,690,215 MWh/yr of PSA+CO energy savings recorded to date in Phase III[6]
    - This represents 117% of the May 31, 2021, energy savings compliance target of 1,443,035 MWh/yr.

Figure 1: EE&C Plan Performance Toward Phase III Portfolio Compliance Target*



*The total may not sum to 100% due to rounding.

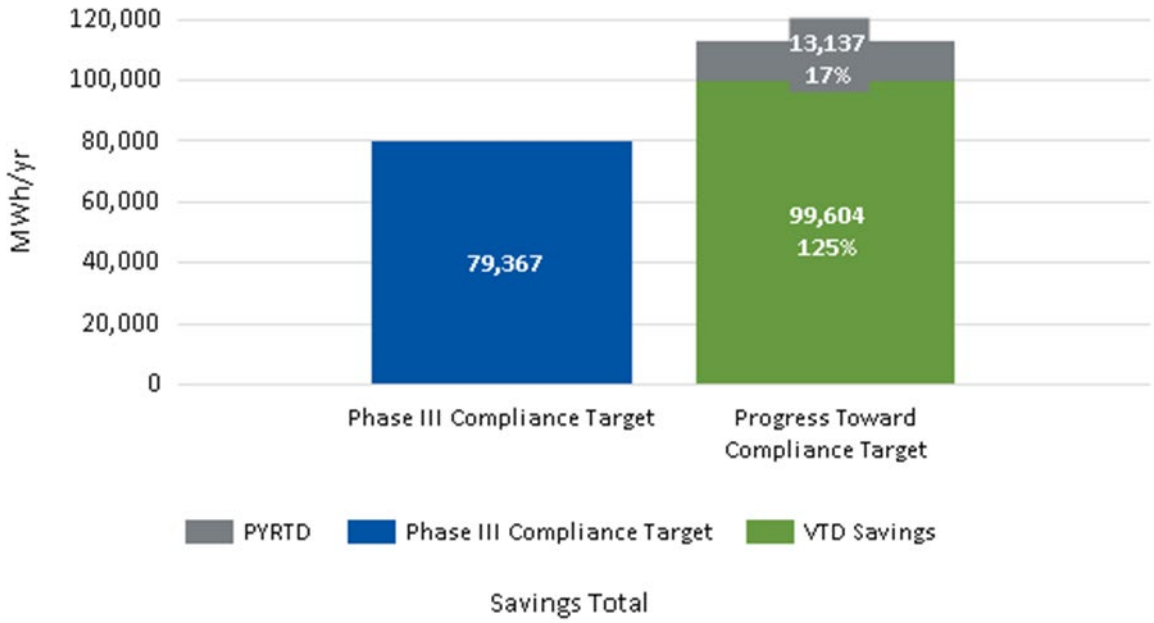
The Phase III Implementation Order directed EDCs to offer conservation measures to the low-income customer segment based on the proportion of electric sales attributable to low-income households. The proportionate number of measures target for PPL Electric Utilities is 9.95%. PPL Electric Utilities offers a total of 100 EE&C measures to its residential and nonresidential customer classes. In PY12, there are 22 measures available to the

[6] Verified savings from previous program years have been adjusted to account for Home Energy Education Program energy savings uplift (see Appendix C in the PY11 Annual Report). Uplift results in savings counted in more than one program; therefore, an adjustment is made to prevent double counting.

low-income customer segment at no cost to the customer. This represents 22% 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 low-income savings target for PPL Electric Utilities is 79,367 MWh/yr verified gross energy savings. Figure 2 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, PPL Electric Utilities has achieved 142% of the Phase III low-income energy savings target.

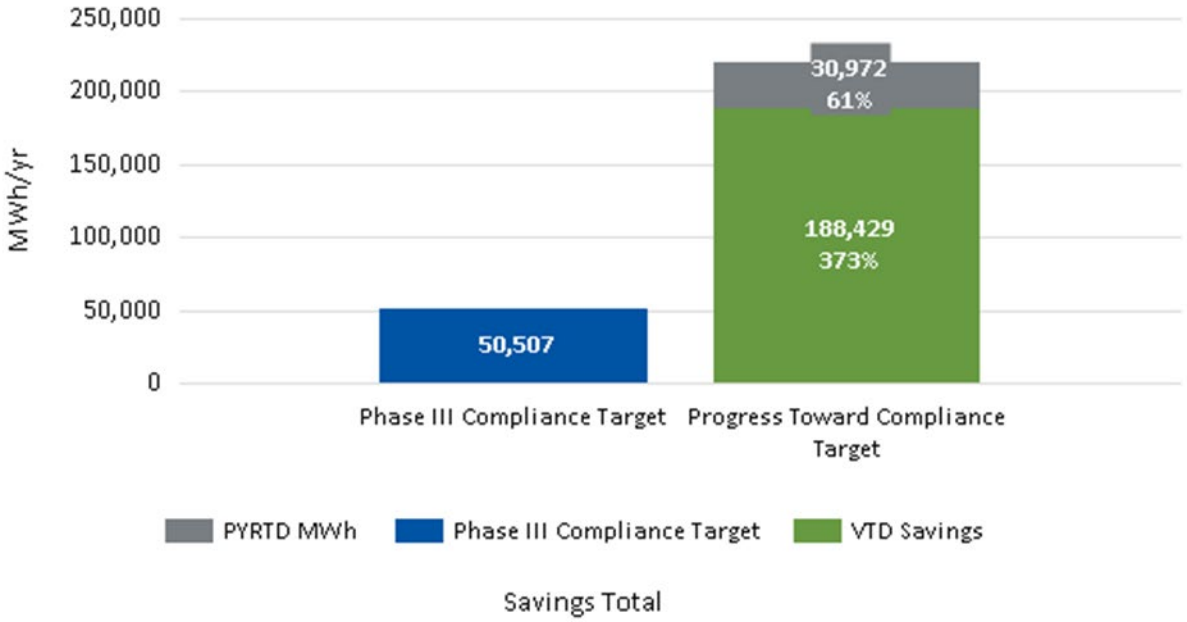
Figure 2: EE&C Plan Performance Toward Phase III Low-Income Compliance Target [(1)]



[(1)]WRAP includes savings for master-metered multifamily projects that are allocated to the GNE and Small C&I sectors based on the rate class of the buildings' meters (included in this figure). All savings from the WRAP program are counted toward the low-income compliance target, as set forth in PPL Electric Utilities EE&C Plan Act 129 Phase III, Docket No. M-2015-2515642, November 2018. Therefore, the total savings shown here do not match the totals in Table 4: Phase III Summary Statistics by Customer Segment. The additional savings counted toward the low-income compliance target total 2,909 MWh/yr of verified savings: 2,426 MWh/yr from GNE and 483 MWh/yr from Small C&I, and 0 MWh/yr of reported savings from PY12.

The Phase III Implementation Order established a government, nonprofit, and educational energy savings target of 3.5% of the portfolio savings goal. The GNE savings target for PPL Electric Utilities is 50,507 MWh/yr verified gross energy savings. Figure 3 compares the PSA+CO performance to date for the GNE customer segment to the Phase III savings target. Based on the latest available information, PPL Electric Utilities has achieved 434% of the Phase III GNE energy savings target.

Figure 3: EE&C Plan Performance Toward Phase III GNE Compliance Target [(1)]



[(1)]WRAP includes savings for master-metered multifamily projects that are allocated to the GNE and Small C&I sectors based on the rate class of the buildings' meters (included in this figure). All savings from the WRAP program are counted toward the low-income compliance target, as set forth in PPL Electric Utilities EE&C Plan Act 129 Phase III, Docket No. M-2015-2515642, November 2018. Therefore, the savings in this figure do not include the 2,426 verified MWh/yr and 0 reported PY12 MWh/yr GNE savings allocated to Low Income WRAP and do not match the GNE savings in Table 4: Phase III Summary Statistics by Customer Segment.

2.3 PHASE III DEMAND RESPONSE ACHIEVEMENTS TO DATE

The Phase III demand response performance target for PPL Electric Utilities is 92 MW. Compliance targets for demand response programs are based on average performance across event hours 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 losses. Compliance with Act 129 will not be based on performance in PY12 per the Pennsylvania Public Utility Commission's Phase III Modification Order that the Pennsylvania electric distribution companies may operate the demand response programs in PY12 on a voluntary basis.[7] The Commission modified the compliance requirements in response to disruptions to electric utility customer operations related to the COVID-19 pandemic. However, the Commission encouraged the utilities to operate their programs in PY12, and PPL Electric Utilities elected to continue operating the program for commercial and industrial (C&I) customers and for government, nonprofit, and education (GNE) customers.

[7] Pennsylvania Public Utility Commission. June 3, 2020. *Phase III Modification Oder.* Docket No. M-2014-2424864. http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/energy_efficiency_and_conservation_ee_c_program.aspx

Act 129 demand response 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 demand response event is initiated for the following day. In PY12, there were five voluntary demand response events called. Table 2 lists the days that DR events were called along with the verified gross demand reductions achieved by each program. Table 2 also lists the average DR performance for PY12, the PY9-PY11 compliance period, and for Phase III to date.

Table 2: PY12 Demand Response PYVTD Performance by Event

Event Date	Start Hour	End Hour	Small CI Load Curtailment (MW)	Large CI Load Curtailment (MW)	GNE Load Curtailment (MW)	Portfolio MW/event Impact [1]
July 20, 2020	2 p.m.	6 p.m.	2.1	103.1	4.5	109.6
July 27, 2020	2 p.m.	6 p.m.	1.6	97.5	3.2	102.4
July 29, 2020	3 p.m.	7 p.m.	2.0	71.2	3.3	76.5
August 25, 2020	2 p.m.	6 p.m.	2.9	87.6	0.9	91.3
August 27, 2020	3 p.m.	7 p.m.	1.9	101.5	1.3	104.7
PYVTD - Average PY12 DR Event Performance						**96.9**
PY9-PY11 Compliance Period Average DR Event Performance						**112.8**
VTD - Average Phase III DR Event Performance						**108.4**

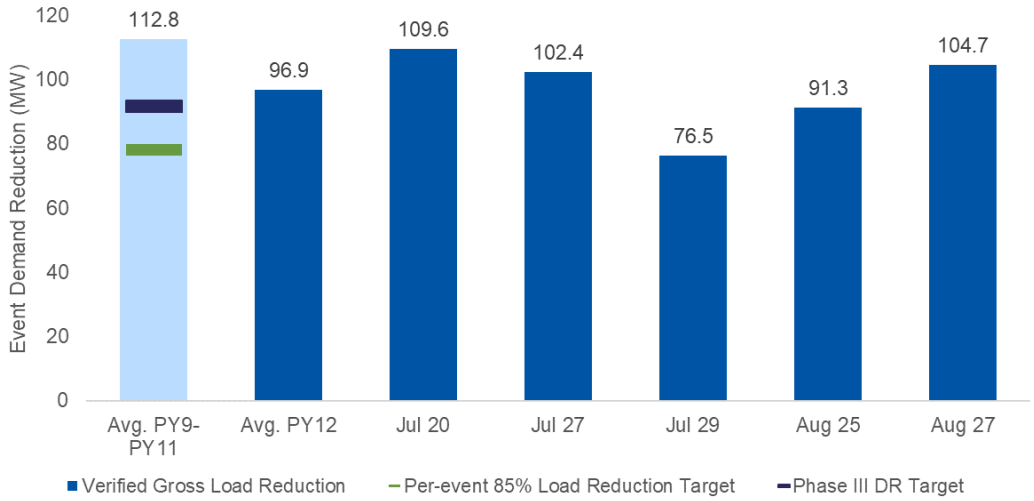
[1] Portfolio MW/event may not equal the sum of customer segment MW/event because of rounding.

Figure 4 shows the PY9-PY11 gross verified savings, which were the basis for determining Phase III compliance. For Phase III, the verified Act 129 event load reductions were 112.8 MW (the average load reduction over PY9, PY10, and PY11 event hours), which exceeds the Phase III compliance target of 92 MW. In addition, in PY9, PY10, and PY11, PPL Electric Utilities met its per-event compliance target of at least 78.2 MW (85% of the total compliance target) in each demand response event.

Figure 4 also shows the gross verified savings for PY12 by event. In PY12, verified Act 129 event load reductions were 96.9 MW (equal to the average demand reduction over the five 4-hour demand response events), a realization rate of 98.2% relative to the reported (*ex ante*) load reduction.

These verified load impacts are based on Cadmus analysis of participant AMI consumption data and have been grossed up to reflect transmission and distribution losses.

Figure 4: Event Performance Compared to 85% Per-Event Target



2.4 PHASE III PERFORMANCE BY CUSTOMER SEGMENT

Table 3 presents the participation, savings, and spending by customer sector for PY12. The residential, small C&I, large C&I sectors are defined by EDC tariff and the residential low-income and governmental/educational/ nonprofit sector were defined by statute (66 Pa. C.S. § 2806.1). The residential low-income (LI) segment is a subset of the residential customer class. The GNE segment includes customers who are part of the small C&I or large C&I rate classes. The savings, spending, and participation values for the LI and GNE segments have been removed from the parent sectors in Table 3.

Table 3: PY12 Summary Statistics by Customer Segment

Parameter	Residential	Low-Income	Small C&I	Large C&I	GNE	Total [1]
Number of Participants [2]	28,139	34,846	4,007	1,205	1,839	70,036
PYRTD MWh/yr	23,503	13,137	79,209	40,340	30,972	187,161
PYRTD MW/yr (Energy Efficiency)	4.69	1.32	10.95	5.38	5.96	28.31
PYVTD MW/yr (Demand Response) [3]	-	-	2.10	92.18	2.63	96.91
Incentives ($1000)	$3,358	-	$6,890	$3,344	$1,569	$15,161

[1] Total may not sum due to rounding.
[2] Please see Table 5 for participant definitions. Some participant definitions, e.g., WRAP, have been retroactively changed.
[3] Savings are presented as the average of the total demand response savings per event across the July 20, July 27, July 29, August 25, and August 27 Act 129 events.

Table 4 summarizes plan performance by sector since the beginning of Phase III.

Table 4: Phase III Summary Statistics by Customer Segment

Parameter	Residential [1]	Low Income	Small C&I [1]	Large C&I	GNE	Total [2]
Number of Participants [3]	1,391,932	149,824	66,607	4,296	9,290	1,621,949
PSA MWh/yr [4]	647,747	109,832	443,549	289,224	221,827	1,712,179
PSA MW/yr [4] (Energy Efficiency)	91.87	11.38	67.79	36.84	33.65	241.53
Phase III MW/yr (Demand Response) [5]	-	-	1.70	102.41	4.26	108.37
Incentives ($1000)	$36,262	-	$32,080	$20,982	$10,612	$99,936

[1] 80,945 of PSA MWh/yr and 16.97 PSA MW from Efficient Lighting are attributed to Small C&I.

[2] Total may not sum due to rounding.

[3] Please see Table 5 for participant definitions. Some participant definitions, e.g., WRAP, have been retroactively changed.

[4] These totals also include unverified savings from PY11 for the New Homes component of the Energy Efficient Home Program. The residential verified savings included in PSA MWh/yr and MW/yr have not been adjusted to account for energy savings uplift (double counting) in the Home Energy Education Program. As shown in Table 6 and Table 7, the double-counting adjustments applied to cumulative verified savings are -21,964 MWh/yr and -2.45 MW.

[5] Savings are presented as the average of the total demand response savings per event across the June 13, 2017, July 20, 2017, July 21, 2017, July 2, 2018, July 3, 2018, August 6, 2018, August 28, 2018, September 4, 2018, September 5, 2018 and July 17, 2019, July 18, 2019, July 19, 2019 and August 19, 2019, and July 20, 2020, July 27, 2020, July 29, 2020, August 25, 2020, and August 27, 2020 Act 129 events.

3 Updates and Findings

3.1 Implementation Updates and Findings

This section contains implementation updates.

- **Appliance Recycling (residential sector).** The program was suspended in mid-March 2020, but customers could add their name to a waitlist until the program resumed. The waitlist remained in effect until mid-July at which time contactless pick-ups began for those customers. In November, the program re-opened to all customers with contactless pick-ups and with no in-home pick-up option, and participation levels were much lower than in previous years. There were 5,042 participants in PY12 and 56,589 phase-to-date who recycled refrigerators, freezers, room air conditioners, and dehumidifiers.
- **Demand Response.** PPL Electric Utilities' ICSP, CPower, enrolled 126 customers' facilities in the program either itself or through sub-contractors during PY12 (June 1, 2020, to May 31, 2021) and 118 participated in at least one event. PPL Electric Utilities initiated five events during the summer of PY12 because the PJM threshold trigger was met. The average reported performance of the events was 96.9 MWs, exceeding the program performance requirement of 92 MW per event average. The Pennsylvania Public Utility Commission made PY12 participation voluntary due to possible customer hardship related to COVID-19.
- **Efficient Lighting (residential sector).** This program was not implemented in PY12. Given the uncertainty of the current lighting legislation, the Efficient Lighting Program was designed to emphasize the lighting incentives in the early part of Phase III, with a phase out target toward the end of 2019. By the end of November 2019, the lighting incentives were discontinued by major retailers. Although the lighting incentive was phased out, PPL Electric Utilities continues to maintain the lighting page on its website and continues to encourage customers to purchase LEDs. Specialty LEDs are available on the online marketplace.
- **Energy Efficiency Kits and Education (residential low-income sector).** This program was not implemented in PY12. The Energy Efficiency Kits and Education program launched June 1, 2016, and targeted income eligible customers. The program delivered more than 50,000 energy efficiency kits through direct mail or one of the 20 participating agencies. The ICSP stopped distributing energy efficiency kits to agencies and through direct mail in 2019. The program enjoyed very high customer satisfaction levels.
- **Energy Efficient Home (residential sector).** Phase-to-date, over 55,000 customers have completed the online assessment and over 40,000 received an energy efficiency kit for their home. Ductless heat pumps remain the most popular HVAC measure with over 2,000 projects in PY12. Smart thermostat rebates were steady through PY12 with 591 downstream rebates and 669 through the online marketplace. Pool pump rebates have remained constant throughout the phase with 385 in PY12 and over 1,600 for the phase. PPL Electric Utilities continued to experience strong performance in efficient new home construction with 1,312 homes in PY12. Analytics have shown that in addition to new customers, many have revisited the marketplace to take advantage of savings on energy efficient products as well as special promotions with additional savings.
- **Home Energy Education (residential sector).** This program sends home energy reports to customers; it is not a rebate program. This program had shown decreasing customer satisfaction, which was due in part

to customer fatigue in receiving the reports over several years. The home energy reports were discontinued beginning January 1, 2020 although the low-income customers continued to receive two final home energy reports in PY12. Savings for the low-income component will be reported under WRAP.

- **Non-Residential: Custom (nonresidential sector).** Due to COVID-19, all site visits were conducted virtually. For projects that required logging, data loggers were sent to the premise for installation. In PY12, the Custom program reported 37% of the nonresidential savings. This is the highest percentage of savings from custom projects in previous program years. These savings came from CHP, HVAC, advanced lighting controls, process improvement, motor, and agricultural projects.
- **Non-Residential: Efficient Equipment (nonresidential sector).** PPL Electric Utilities continues to receive applications for prescriptive equipment projects. In PY12, 2% of the overall savings for the Non-Residential Program were attributed to prescriptive equipment projects.
- **Non-Residential: Efficient Equipment Lighting (nonresidential sector).** Due to COVID-19, all site visits were conducted virtually. For projects that required logging, data loggers were sent to the premise for installation. In PY12, 43% of nonresidential savings were attributed to Efficient Equipment lighting measures. Direct Discount (DD) channel contributed about 13% of the nonresidential portfolio PY12 savings.
- **Non-Residential: Midstream Lighting (nonresidential sector).** Distributors were impacted by COVID-19 with closures and shutdowns in early 2020. However, distributors were able to adapt and continue to offer this program to customers in PY12. Approximately 19% of total nonresidential PY12 savings were attributed to the Midstream Lighting Program.
- **Student Energy Efficient Education (residential sector)**. Due to COVID-19, the Student Energy Efficient Education Program for PY12 was delivered to students virtually. The Bright Kids and Innovation cohorts were fully subscribed for PY12. The Take Action program continued to recruit students for the spring but was not fully subscribed. The program reached over 24,000 children at approximately 200 schools, including over 22,900 kits distributed to participating children. In PY12, this program again focused on schools in low-income areas of PPL Electric Utilities' service territory with a minimum of 45% reduced and free lunches, as documented by the Pennsylvania Department of Education. Savings for the low-income component will be reported under WRAP. Children in kindergarten through 8th grade once again answered the call to communicate their ideas on energy efficiency in the Bright Ideas Poster Contest with close to 300 entries.
- **WRAP (residential low-income sector).** This program for income-eligible customers launched June 1, 2016. Customer interest and satisfaction (97%) remains high. The program has completed more than 47,000 jobs, including participants in the Manufactured Home Initiative. Of the approximately 47,000 jobs completed, almost 5,400 were completed virtually in PY12.

3.2 Evaluation Updates and Findings

This section summarizes evaluation activities occurring within each program during PY12. For each program offered in PY12, Cadmus updated the evaluation plans, and submitted them to PPL Electric Utilities and the SWE. Cadmus received Q1-Q4 participation data and confirmed that it contained the necessary data for evaluation activities. Cadmus will launch surveys with Q3 and Q4 participants in July 2020 for the Energy Efficient Home, Custom, Efficient Equipment, and WRAP programs.

- **Appliance Recycling (residential sector).** Cadmus conducted a stakeholder interview with the program implementer in February 2021 and will analyze PY12 participant survey data and present results to PPL Electric Utilities in the fall of 2021. Cadmus will complete savings analysis in July.
- **Demand Response (nonresidential sector).** Cadmus estimated the load impacts for each of the PY12 participant facilities during the hours of the five events. Cadmus administered an online and telephone survey with enrolled customers and drafted the findings of the load impact analysis, staff interviews, and customer surveys for the PY12 annual report which was submitted March 15, 2021.
- **Energy Efficient Home (residential sector).** Cadmus will analyze PY12 participant survey data and will present results to PPL Electric Utilities in the fall of 2021. Cadmus presented results of records reviews for four key measures (DHPs, ASHPs, HPWHs and smart thermostats) and database reviews for all remaining measures except New Homes through Q2 in May 2021. For the New Homes component, Cadmus gathered lighting and appliance data from HERS Raters and conducted site-visits. Cadmus will perform impact analysis for all Energy Efficient Homes measures and report the results to PPL Electric Utilities in the fall of 2021.
- **Home Energy Education (residential sector).** Cadmus gathered the PY12 program design and delivery information from the ICSP's subcontractor, including copies of the home energy reports. The information and materials will be reviewed and used to draft the PY12 evaluation report. In PY11 PPL Electric Utilities decided to cease sending the home energy reports to residential customers for the remainder of Phase III. However, low-income customers in the program continued to receive the home energy reports in PY12.
- **Non-Residential: Custom (nonresidential sector).** Cadmus will analyze PY12 participant survey data and will present results to PPL Electric Utilities in the fall of 2021. Cadmus verified savings for 15 PY12 projects in the large stratum. Ongoing evaluation activities, including review of project documentation, creation of site-specific measurement and verification plans, analysis of customer-deployed data loggers and trend data (with assistance from the customers), determination of project savings using a high-rigor approach, and presenting finalized savings in a verification report, are currently underway for four large stratum projects. Additionally, evaluation activities for ten projects in the small stratum sample are ongoing for which on-site visits have been indefinitely delayed due to COVID-19 restrictions. On a case-by-case basis, Cadmus is determining for which facilities virtual site visits are applicable.
- **Non-Residential: Efficient Equipment (nonresidential sector).** Cadmus will analyze PY12 participant survey data and will present results to PPL Electric Utilities in the fall of 2021. Cadmus will analyze Q3/Q4 project documentation and complete desk reviews and site visits in June, July, and August.
- **Non-Residential Efficient Equipment Lighting (nonresidential sector).** Cadmus will analyze PY12 participant survey data and will present results to PPL Electric Utilities in the fall of 2021. Cadmus will analyze Q3/Q4 project documentation and complete desk reviews and site visits in June, July, and August.

- **Non-Residential: Midstream Lighting (nonresidential sector).** Cadmus conducted a stakeholder interview with the program implementer in February 2021 and will conduct interviews with participating distributors and contractor purchasers in June and July 2021. Cadmus completed verification of the Q1-Q2 evaluation sample and selected an evaluation sample from Q3 data. Cadmus will conduct desk reviews and site visits for Q3 in June and analyze findings.
- **Student Energy Efficient Education (residential sector)**. Cadmus will review and analyze the HEW data and perform impact analysis in July and August and report the results to PPL Electric Utilities in the fall of 2021.
- **WRAP (residential low-income sector).** Cadmus will analyze PY12 Q3-Q4 participant survey data and will present results to PPL Electric Utilities in the fall of 2021. For the impact evaluation, Cadmus reviewed PY12 Q1 through Q3 program tracking data, and the ICSP's audit records, database extracts, product specifications, and PY12 Q1-Q2 survey data. Cadmus is reviewing PY12 Q4 data and will review the PY12 Q3-Q4 participant survey to complete the PY12 impact evaluation.

4 Summary of Participation by Program

Participation is defined differently for each program depending on the program delivery channel and data tracking practices. The nuances of the participant definition vary by program and are summarized by program in Table 5. The table provides the current participation totals for PY12 and Phase III.

Table 5: EE&C Plan Participation by Program

Program	Participant Definition	PY12TD Participation	P3TD Participation
Appliance Recycling	Unique job number; corresponds with each unique appliance decommissioned through the program during the program year.	5,042	56,589
Demand Response	Unique account number; corresponds to a customer that enrolled in the Program; not the number who participated in at least one event.	126	353
Efficient Lighting	Person or business purchasing discounted bulbs. See the Efficient Lighting Chapter, in the PY11 Annual report [(1)] describing the approach to computing number of participants. This program was not implemented in PY12.	-	1,003,843
Energy-Efficiency Kits and Education	Unique job number; corresponds to an energy-savings kit delivered to an income-eligible customer through the agency or the direct-mail delivery channel Participation is determined by the unique job numbers. Returned kits are assigned two unique job numbers: one for the distributed kit, and one for the returned kit. This program was not implemented in PY12.	-	55,137
Energy Efficient Home	Unique job number; corresponds to a rebated project Households could have more than one rebated project.	14,742	98,977
Home Energy Education	Unique bill account number (household) that receives a home energy report in any program year (a household is counted once, even if it received reports in more than one year).	14,944	208,096
Non-Residential Energy Efficiency	*Custom:* Unique job number; commercially operable job that received an incentive payment during the reporting period. *Midstream Lighting Program:* Unique job number (RBT); corresponds to each purchase of discounted products. *Prescriptive Lighting and Equipment*: Unique job number; corresponds to each unique job that received a rebate.	6,892	32,436
Student Energy Efficient Education	Number of participants is counted as the number of energy conservation kits delivered.	22,911	119,292

Program	Participant Definition	PY12TD Participation	P3TD Participation
WRAP	Unique bill account number; corresponds to an income-eligible household that receives an audit and program services. In PY8, a participant was defined as a unique job, but the PY9 updated definition is applied retroactively here. Therefore, the P3TD total will not match the PY8 total plus PY9TD + PY10TD + PY11TD + PY12TD. In PY10 and PY11, an LED giveaway component was added to the program. The participant count for this component is equal to the number of packs given away, 2,450 in PY10 and 2,200 in PY11.	5,379	47,226
Portfolio Total		**70,036**	**1,621,949**

[1] PPL Electric Utilities. Annual Report Program Year 11: June 1, 2019–May 31, 2020. Presented to Pennsylvania Public Utility Commission. Prepared by Cadmus. February 15, 2021.

5 Summary of Energy Impacts by Program

Figure 5 presents a summary of the PYTD reported gross energy savings by program for Program Year 12. The energy impacts in this report are presented at the meter level and do not reflect adjustments for transmission and distribution losses.

Figure 5: PYTD Reported Gross Energy Savings by Program

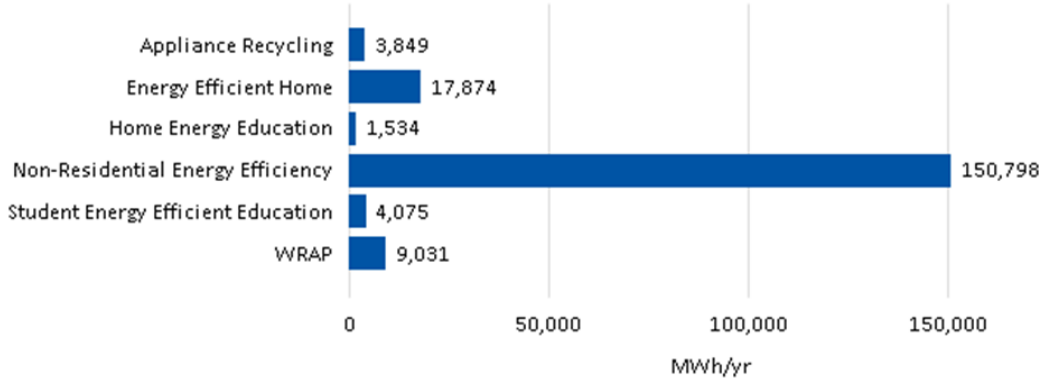
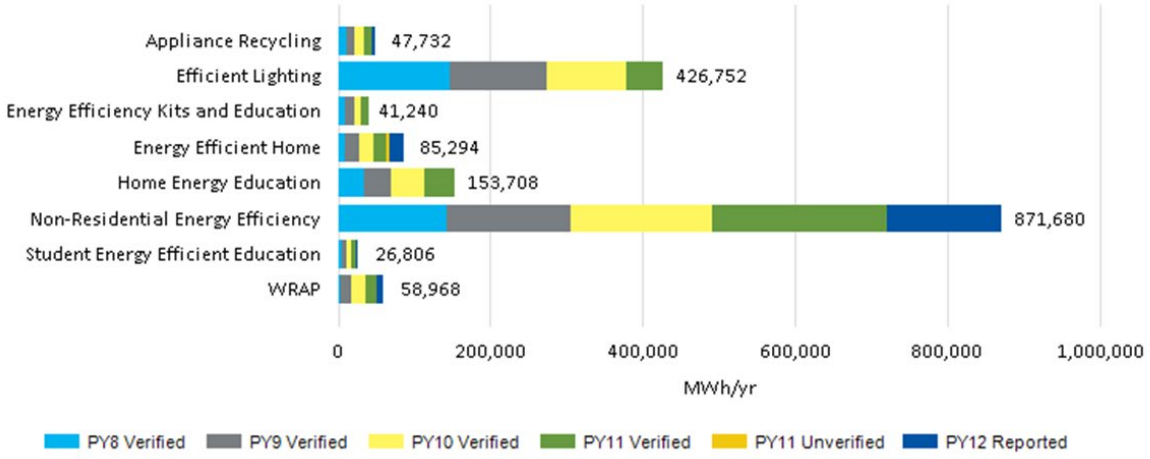


Figure 6 presents a summary of the PSA gross energy savings by program for Phase III of Act 129. PSA savings include verified gross savings from previous program years, unverified savings from PY11, and the PYTD savings from the current program year.

Figure 6: PSA Energy Savings by Program for Phase III



A summary of energy impacts by program through the current reporting period is presented in Table 6.

Table 6: Energy Savings by Program (MWh/Year)

Program	PYTD MWh/yr	RTD MWh/yr	VTD MWh/yr	Unverified Savings from PY11 MWh/yr	PSA MWh/yr [1]
Appliance Recycling	3,849	53,752	43,883	-	47,732
Efficient Lighting[2]	-	438,501	426,752	-	426,752
Energy Efficiency Kits and Education	-	48,719	41,240	-	41,240
Energy Efficient Home	17,874	90,894	63,336	4,084	85,294
Home Energy Education [3]	1,534	154,101	152,174	-	153,708
Non-Residential Energy Efficiency	150,798	889,294	720,882	-	871,680
Student Energy Efficient Education [3]	4,075	27,125	22,731	-	26,806
WRAP [4]	9,031	66,399	49,937	-	58,968
Total	**187,161**	**1,768,786**	**1,520,935**	**4,084**	**1,712,179**
Adjustment for Residential Home Energy Education Program Double-Counted Savings			(21,964)	-	(21,964)
Adjusted Portfolio Savings	**187,161**	**1,768,786**	**1,498,971**	**4,084**	**1,690,215**

[1] Total may not sum due to rounding. Includes unverified savings.
[2] 80,945 of PSA MWh/yr from Efficient Lighting are attributed to Small C&I (cross-sector sales).
[3] 9,436 of PSA MWh/yr from Student Energy Efficient Education and 3,098 of PSA MWh/yr from Home Energy Education are attributed to Low-Income.
[4] All 58,968 of PSA MWh/yr from WRAP are attributed to the Low-Income compliance target, including 2,426 MWh/yr from GNE and 483 MWh/yr from Small C&I.

6 Summary of Demand Impacts by Program

PPL Electric Utilities' Phase III EE&C programs achieve peak demand reductions in two ways. The first is through coincident reductions from energy efficiency measures and the second is through dedicated demand response programs that exclusively target temporary demand reductions on peak days. Energy efficiency 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 demand response programs.

The two types of peak demand reduction savings are also treated differently for reporting purposes. Peak demand reductions from energy efficiency are generally additive across program years, meaning that the P3TD savings reflect the sum of the first-year savings in each program year. Conversely, demand response 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 energy efficiency and demand response are reported separately in the following sub-sections.

6.1 Energy Efficiency

Act 129 defines peak demand savings from energy efficiency 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 energy efficiency in this report are presented at the meter level and do not reflect adjustments for transmission and distribution losses. Figure 7 presents a summary of the PYRTD reported gross peak demand savings by energy efficiency program for Program Year 12.

Figure 7: PYRTD Gross Demand Savings by Energy Efficiency Program

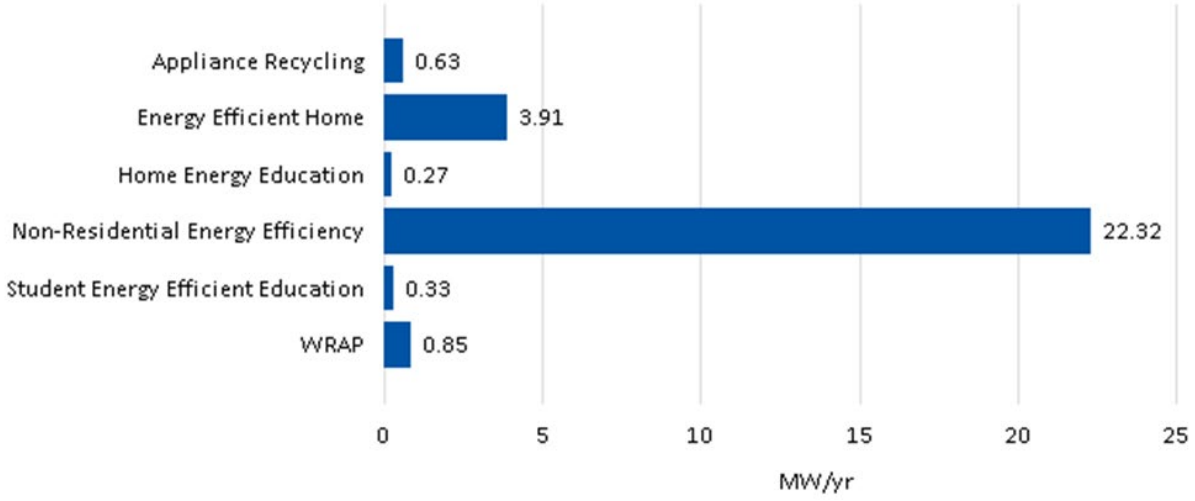
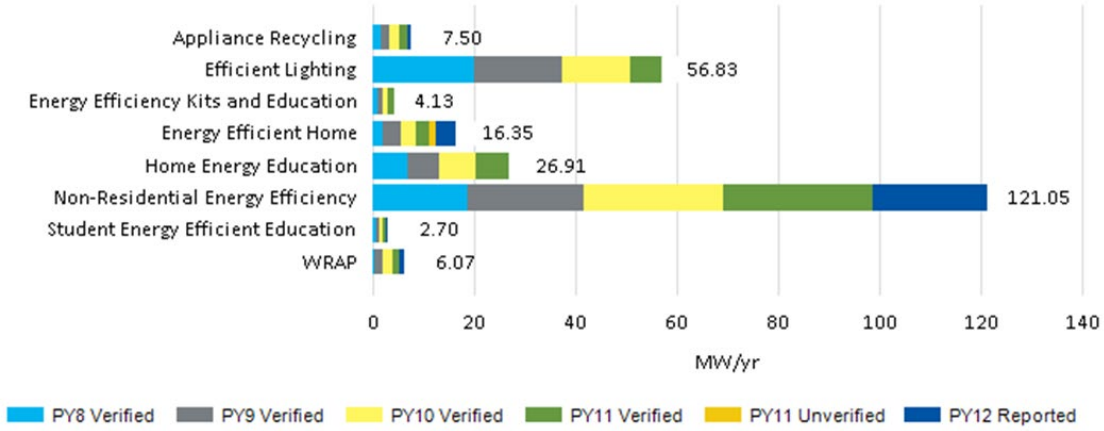


Figure 8 presents a summary of the PSA gross demand savings by energy efficiency program for Phase III of Act 129. This includes verified savings from previous years, unverified savings from PY11, and reported savings from PY12.

Figure 8: PSA Demand Savings by Energy Efficiency Program for Phase III



A summary of the peak demand impacts by energy efficiency program through the current reporting period are presented in Table 7.

Table 7: Peak Demand Savings by Energy Efficiency Program (MW/Year)

Program	PYTD MW/yr	RTD MW/yr	VTD MW/yr	Unverified Savings from PY11 MW/yr	PSA MW/yr [1]
Appliance Recycling	0.63	8.18	6.87	-	7.50
Efficient Lighting[2]	-	61.68	56.83	-	56.83
Energy Efficiency Kits and Education	-	3.43	4.13	-	4.13
Energy Efficient Home	3.91	17.08	11.05	1.38	16.35
Home Energy Education [3]	0.27	74.72	26.64	-	26.91
Non-Residential Energy Efficiency	22.32	123.03	98.73	-	121.05
Student Energy Efficient Education [3]	0.33	2.56	2.37	-	2.70
WRAP [4]	0.85	6.47	5.22	-	6.07
Total	**28.31**	**297.15**	**211.84**	**1.38**	**241.53**
Adjustment for Residential Home Energy Education Program Double-Counted Savings			**-2.446**	-	**-2.446**
Adjusted Portfolio Savings	**28.31**	**297.15**	**209.39**	**1.38**	**239.08**

[1]Total may not sum due to rounding. Includes PY11 unverified savings.
[2] 16.97 of PSA MW/yr from Efficient Lighting are attributed to Small C&I.
[3] 0.92 of PSA MW/yr from Student Energy Efficient Education and 0.53 of PSA MW/yr from Home Energy Education are attributed to Low-Income.
[4] All 6.07 of PSA MW/yr from WRAP are attributed to the Low-Income compliance target, including 0.22 MW/yr from GNE and 0.04 MW/yr from Small C&I

6.2 Demand Response

Act 129 defines peak demand savings from demand response as the average reduction in electric demand during the hours when a demand response event is initiated. Phase III DR events are initiated according to the following requirements included in the Phase III Implementation Order:

1) Curtailment events shall be limited to the months of June through September.
2) Curtailment events shall be called for the first six days of each program year (starting in PY9) in which the peak hour of PJM's day-ahead forecast for the PJM 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 four hours.
4) Each curtailment event shall be called such that it will occur during the day's forecasted 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 demand response in this report are presented at the system level and reflect adjustments to account for transmission and distribution losses. PPL Electric Utilities uses the following line loss percentages/multipliers by sector.

- Residential = [8.75% or 1.0875]
- Small C&I = [8.75% or 1.0875]
- Large C&I = [4.2% or 1.0420]

Table 8 summarizes PYVTD and VTD demand reductions for each of the demand response programs in the EE&C plan and for the demand response portfolio as a whole. VTD demand reductions are the average performance across all Phase III demand response events independent of how many events occurred in a given program year. Phase III demand response compliance was determined on PY9 through PY11 demand reductions per the Pennsylvania Public Utility Commission's Phase III Modification Order.[8] The relative precision columns indicate the margin of error (at the 90% confidence interval) around the PYVTD and VTD demand reductions.

Table 8: Verified Gross Demand Response Impacts by Program

Program	PYVTD		Verified PY9-PY11 Compliance Period		VTD	
	Gross MW	Relative Precision (90%)	Gross MW	Relative Precision (90%)	Gross MW	Relative Precision (90%)
Demand Response	96.9	3.1%	112.8	1.8%	108.4	1.5%
Portfolio Total	**96.9**	**3.1%**	**112.8**	**1.8%**	**108.4**	**1.5%**

[8] Pennsylvania Public Utility Commission. June 3, 2020. *Phase III Modification Oder.* Docket No. M-2014-2424864. http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/energy_efficiency_and_conservation_ee_c_program.aspx

7 Summary of Finances

Section 7 provides an overview of the expenditures associated with PPL Electric Utilities' portfolio and the recovery of those costs from ratepayers.

7.1 Program Financials

Program-specific and portfolio total finances through the end of Q4 for PY12 are shown in Table 9. The columns in Table 9 and Table 10 are adapted from the 'Direct Program Cost' categories in the Commission's EE&C Plan template[9] 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 an EDC employs to support program delivery. The dollar amounts are based on EDC tracking of expenditures with no adjustments to account for inflation.[10]

Table 9: Program Year (PY12) to Date Financials ($1,000)

Program	Incentives to Participants and Trade Allies	EDC Materials, Labor, and Administration	ICSP Materials, Labor, and Administration	EM&V	Total [(1)]
Appliance Recycling Program	$126	$75	$1,434	-	$1,634
Demand Response Program	$1,407	$36	$1,105	-	$2,549
Efficient Lighting Program	$5	$39	$138	-	$182
Energy Efficiency Kits & Education Program [(2)]	-	$16	$30	-	$46
Energy Efficient Home Program	$3,215	$75	$4,179	-	$7,469
Home Energy Education Program	-	$42	$1,938	-	$1,981
Non-Residential Energy Efficiency	$10,408	$154	$6,328	-	$16,889
Student Energy Efficiency Education Program	-	$54	$1,059	-	$1,113
WRAP [(2)]	-	$152	$4,925	-	$5,077
Common Portfolio Costs [(3)]	-	$3,252	$921	$1,963	$6,137
Portfolio Total [(4)]	**$15,162**	**$3,896**	**$22,057**	**$1,963**	**$43,079**
SWE Costs [(5)]	-	-	-	-	**$300**
Total [(4)]	**$15,162**	**$3,896**	**$22,057**	**$1,963**	**$43,379**

[(1)] Total may not equal sum of column due to rounding.
[(2)] Costs associated with low income program measures provided to customers at no cost are categorized as administrative costs (rather than incentives to participants).
[(3)] Common Portfolio Costs are costs applicable to more than one customer class, to more than one program, or those that provide portfolio-wide benefits. These include PPL Electric Utilities labor and materials, costs related to PPL Electric Utilities' tracking system, EE&C plan development, etc.
[(4)] Portfolio Total and Total may not equal total of column due to rounding.
[(5)] Statewide Evaluation costs are outside of the 2% spending cap.

[9] Pennsylvania Public Utility Commission Phase III Energy Efficiency and Conservation Plan Template (Docket No. M-2014-2424864) dated July 21, 2015. (http://www.puc.pa.gov/pcdocs/1372426.doc)
[10] The cost-recovery of program expenses through riders generally happens promptly so that costs are being recovered from ratepayers in the same dollars that they are incurred.

Program-specific and portfolio total finances since the inception of Phase III are shown in Table 10.

Table 10: Phase III to Date Financials ($1,000)

Program	Incentives to Participants and Trade Allies	EDC Materials, Labor, and Administration	ICSP Materials, Labor, and Administration	EM&V	Total [1]
Appliance Recycling Program	$1,641	$271	$7,975	-	$9,887
Demand Response Program	$5,448	$306	$3,900	-	$9,655
Efficient Lighting Program	$23,410	$283	$6,465	-	$30,158
Energy Efficiency Kits & Education Program [2]	-	$208	$6,415	-	$6,624
Energy Efficient Home Program	$13,754	$308	$17,368	-	$31,429
Home Energy Education Program	-	$202	$7,631	-	$7,834
Non-Residential Energy Efficiency	$55,683	$940	$31,549	-	$88,172
Student Energy Efficiency Education Program	-	$250	$5,677	-	$5,927
WRAP [2]	-	$1,055	$34,234	-	$35,289
Common Portfolio Costs [3]	-	$15,183	$5,925	$12,528	$33,635
Portfolio Total [4]	**$99,937**	**$19,007**	**$127,139**	**$12,528**	**$258,611**
SWE Costs [5]	-	-	-	-	**$2,200**
Total [4]	**$99,937**	**$19,007**	**$127,139**	**$12,528**	**$260,811**

[1] Total may not equal sum of column due to rounding.
[2] Costs associated with low income program measures provided to customers at no cost are categorized as administrative costs.
[3] Common Portfolio Costs are costs applicable to more than one customer class, to more than one program, or those that provide portfolio-wide benefits. These include PPL Electric Utilities labor and materials, costs related to PPL Electric Utilities' tracking system, EE&C plan development, etc.
[4] Portfolio Total and Total may not equal total of column due to rounding.
[5] Statewide Evaluation costs are outside of the 2% spending cap.

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 PY12 will be presented in the final annual report to the PA PUC on November 15, 2021 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. PPL Electric Utilities' cost-recovery charges are organized separately by 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 charges for electric service. Readers should

be mindful of the differences between Table 11 and *Section 7.1*. For example, the low-income customer segment is a subset of PPL Electric Utilities' residential tariff(s) and therefore not listed in Table 11.

Table 11: EE&C Plan Expenditures by Cost-Recovery Category [1] ($1,000)

Cost Recovery Customer Sector	Rate Schedules Included	PYTD Spending	P3TD Spending
Residential & Low-Income	Residential (primarily RS)	$18,180	$127,315
Small C&I	Small C&I (primarily GS1 & GS3)	$11,000	$50,215
Large C&I	Large C&I (primarily LP4 & LP5)	$6,524	$37,625
GNE	Residential, Small C&I, and Large C&I	$2,643	$19,195
Common [2]	N/A	$5,031	$26,461
Portfolio Total [3]	**-**	**$43,379**	**$260,811**

[1] Includes SWE costs.
[2] Includes costs not collected at the sector level. These costs are allocated to the sectors at the end of the phase.
[3] Totals may not sum due to rounding.