Post & Schell P.C.
ATTORNEYS AT LAW

17 North Second Street
12th Floor
Harrisburg, PA 17101-1601
215-587-1000 Main
717-731-1985 Main Fax
www.postschell.com

Devin Ryan

dryan@postschell.com
717-612-6052 Direct
717-731-1985 Direct Fax
File #: 179373

November 30, 2020

VIA ELECTRONIC FILING

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor North
P.O. Box 3265
Harrisburg, PA 17105-3265

Re: Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase IV Energy Efficiency and Conservation Plan - Docket No. M-2020-3020824

Dear Secretary Chiavetta:

Enclosed for filing is PPL Electric Utilities Corporation's ("PPL Electric" or the "Company") Petition for Approval of its Act 129 Phase IV Energy Efficiency and Conservation Plan.

Appended to the Petition are Attachment A, which is a copy of the proposed Phase IV Energy Efficiency and Conservation Plan marked as PPL Electric Exhibit 1, and Attachment B, which contains copies of the Company's direct testimony and exhibits. In addition, pursuant to the Pennsylvania Public Utility Commission's Final Implementation Order entered on June 18, 2020, at Docket No. M-2020-3015228, PPL Electric is submitting a complete Avoided Costs Calculator.

Copies of this filing are being provided as indicated below and on the Certificate of Service.

Respectfully submitted,

Devin Ryan

DTR/jl
Enclosures

cc: Certificate of Service
Joseph Sherrick

Adam Young

CERTIFICATE OF SERVICE
(Docket No. M-2020-3020824)

I hereby certify that a true and correct copy of the foregoing has been served upon the following persons, in the manner indicated, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

VIA E-MAIL & FIRST CLASS MAIL

Richard A. Kanaskie, Esquire
PA Public Utility Commission
Bureau of Investigation & Enforcement
Commonwealth Keystone Building
400 North Street, 2nd Floor West
PO Box 3265
Harrisburg, PA 17105-3265

Elizabeth Rose Triscari, Esquire
Office of Small Business Advocate
555 Walnut Street
Forum Place, 1st Floor
Harrisburg, PA 17101

Darryl Lawrence, Esquire
Office of Consumer Advocate
555 Walnut Street
Forum Place, 5th Floor
Harrisburg, PA 17101-1923

Elizabeth R. Marx, Esquire
Pennsylvania Utility Law Project
118 Locust Street
Harrisburg, PA 17101

Judith D. Cassel, Esquire
Micah R. Bucy, Esquire
Hawke McKeon & Sniscak LLP
Harrisburg Energy Center
100 North Tenth Street
Harrisburg, PA 17101
Sustainable Energy Fund
of Central Eastern Pennsylvania

Derrick P. Williamson, Esquire
Barry A. Naum, Esquire
Spilman Thomas & Battle
1100 Bent Creek Boulevard, Suite 101
Mechanicsburg, PA 17050
Wal-Mart Stores East, LP
and Sam's East, Inc.

Joseph L. Vullo, Esquire
Burke Vullo Reilly Roberts
1460 Wyoming Avenue
Forty Fort, PA 18704
Commission on Economic Opportunity

Pamela C. Polacek, Esquire
Adeolu A. Bakare, Esquire
McNees Wallace & Nurick LLC
100 Pine Street
PO Box 1166
Harrisburg, PA 17108-1166
PP&L Industrial Customer Alliance

Scott H. DeBroff, Esquire
Clark Hill
One Oxford Centre
301 Grant Street, 14th Floor
Pittsburgh, PA 15219
Nest Labs, Inc.
EnerNOC, Inc.

Daniel Clearfield, Esquire
Deanne M. O'Dell, Esquire
Sarah C. Stoner, Esquire
Eckert Seamans Cherin & Mellott, LLC
213 Market Street, 8th Floor
Harrisburg, PA 17101
Retail Energy Supply Association

Eric Miller, Esquire
Keystone Energy Efficiency Alliance
1501 Cherry Street
Philadelphia, PA 19102

Todd Nedwick
National Housing Trust
1101 30th Street, NW Suite 100A
Washington, DC 20007

Sarah Ralich
Action Housing, Inc.
611 William Penn Place, Suite 800
Pittsburgh, PA 15219

Rachel Blake, Esquire
Regional Housing Legal Services
2 South Easton Road
Glenside, PA 19038

Deron Lovaas, Esquire
Natural Resources Defense Council
1152 15th Street NW, Suite 300
Washington, DC 20005

Date: November 30, 2020

Devin T. Ryan

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase IV Energy Efficiency and Conservation Plan	: : : :	Docket No. M-2020-3020824

PETITION OF PPL ELECTRIC UTILITIES CORPORATION FOR APPROVAL OF ITS ACT 129 PHASE IV ENERGY EFFICIENCY AND CONSERVATION PLAN

Pursuant to Act 129 of 2008 ("Act 129"), P.L. 1592, 66 Pa. C.S. §§ 2806.1 and 2806.2, PPL Electric Utilities Corporation ("PPL Electric" or the "Company") hereby files this Petition seeking approval of its Phase IV Energy Efficiency and Conservation Plan ("Phase IV EE&C Plan"). This filing is being made pursuant to Act 129, the Implementation Order entered by the Pennsylvania Public Utility Commission ("Commission") on June 18, 2020.[1] The Phase IV EE&C Plan includes a broad portfolio of energy efficiency programs, conservation practices and energy education initiatives. These integrated programs are designed to meet the goals established by Sections 2806.1 and 2806.2 of Act 129 and the Commission's *Implementation Order*.

For the reasons set forth below, PPL Electric respectfully requests that the Commission approve the Phase IV EE&C Plan as described herein and the appended **Attachment A**, which contains a copy of the proposed Phase IV EE&C Plan that is marked as PPL Electric Exhibit 1, and **Attachment B**, which contains copies of the Company's direct testimony and exhibits.

[1] *Energy Efficiency and Conservation Program*, Docket No. M-2020-3015228 (Implementation Order Entered June 18, 2020) ("*Implementation Order*").

I. INTRODUCTION

1. PPL Electric is a "public utility" and an "electric distribution company" ("EDC") as defined in Sections 102 and 2803 of the Pennsylvania Public Utility Code, 66 Pa. C.S. §§ 102, 2803. PPL Electric furnishes electric service to approximately 1.4 million customers throughout its certificated service territory, which includes all or portions of 29 counties and encompasses approximately 10,000 square miles in eastern and central Pennsylvania.

2. PPL Electric's attorneys are:

Michael J. Shafer (ID # 205681)
Kimberly A. Klock (ID # 89716)
PPL Services Corporation
Two North Ninth Street
Allentown, PA 18101
Phone: 610-774-4254
Fax: 610-774-6726
E-mail: mjshafer@pplweb.com
E-mail: kklock@pplweb.com

David B. MacGregor (ID # 28804)
Post & Schell, P.C.
Four Penn Center
1600 John F. Kennedy Boulevard
Philadelphia, PA 19103-2808
Phone: 215-587-1197
Fax: 215-320-4879
E-mail: dmacgregor@postschell.com

Devin T. Ryan (ID # 316602)
Post & Schell, P.C.
17 North Second Street
12th Floor
Harrisburg, PA 17101-1601
Phone: 717-612-6052
Fax: 717-731-1985
E-mail: dryan@postschell.com

PPL Electric's attorneys are authorized to receive all notices and communications regarding this Petition. If only one PPL Electric attorney is deemed the recipient for service on any formal or

informal service lists in this proceeding, the Company respectfully requests that Devin T. Ryan, Esquire, be the PPL Electric attorney included on any such lists.

3. Act 129, which became effective on October 15, 2008, created, *inter alia*, an energy efficiency and conservation ("EE&C") program, codified in the Pennsylvania Public Utility Code, 66 Pa. C.S. §§ 2806.1, 2806.2. This program required each EDC with at least 100,000 customers to adopt and implement a Commission-approved EE&C Plan. *See* 66 Pa. C.S. § 2806.1(b), (l). EE&C Plans are designed to achieve the Act 129 energy conservation and peak load reduction requirements, by specified dates, within the specified cost cap.

4. On July 1, 2009, in compliance with Section 2806.1(b)(1)(i) of Act 129, PPL Electric filed its Phase I EE&C Plan for the period of June 1, 2009, through May 31, 2013. On October 26, 2009, the Commission entered an Order approving PPL Electric's Phase I EE&C Plan with certain modifications and requiring PPL Electric to file a revised Phase I EE&C Plan consistent with its Order.[2] On February 17, 2010, the Commission approved PPL Electric's revised Phase I EE&C Plan.[3] The Commission thereafter approved modifications to PPL Electric's Phase I EE&C Plan.[4]

5. On November 15, 2012, PPL Electric filed its Phase II EE&C Plan for the period of June 1, 2013, through May 31, 2016. On March 14, 2013, the Commission entered an Order approving PPL Electric's Phase II EE&C Plan with certain modifications and directing the

[2] *See Petition of PPL Electric Utilities Corporation for Approval of its Energy Efficiency and Conservation Plan*, Docket No. M-2009-2093216 (Order entered Oct. 26, 2009).

[3] *Petition of PPL Electric Utilities Corporation for Approval of its Energy Efficiency and Conservation Plan*, Docket No. M-2009-2093216 (Order entered Feb. 17, 2010).

[4] *See, e.g.*, *Petition of PPL Electric Utilities Corporation for Approval of its Energy Efficiency and Conservation Plan*, Docket No. M-2009-2093216 (Order entered May 6, 2011).

Company to file a revised Phase II EE&C Plan consistent with that Order.[5] On July 11, 2013, the Commission entered an Order approving PPL Electric's revised Phase II EE&C Plan.[6] Further modifications to the Phase II EE&C Plan have since been approved.[7]

6. On November 30, 2015 PPL Electric filed its Phase III EE&C Plan for the period of June 1, 2016, through May 31, 2021. The Commission approved PPL Electric's initial Phase III EE&C Plan, with modifications, on March 17, 2016.[8] Pursuant to the *March 2016 Order*, PPL Electric submitted a compliance filing on April 22, 2016. The Company subsequently filed an Errata to its compliance filing on May 24, 2016. The Commission issued a Secretarial Letter approving PPL Electric's compliance filing, as amended, on June 27, 2016. Further modifications to the Phase III EE&C Plan have since been approved.[9]

7. By November 30, 2013, and every five years thereafter, the Commission must assess the cost-effectiveness of the EDCs' EE&C Plans and set additional reductions in energy

[5] *Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase II Energy Efficiency and Conservation Plan*, Docket No. M-2012-2334388 (Order entered Mar. 14, 2013).

[6] *Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase II Energy Efficiency and Conservation Plan*, Docket No. M-2012-2334388 (Order entered July 11, 2013).

[7] *See Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase II Energy Efficiency and Conservation Plan*, Docket No. M-2012-2334388 (Order entered Mar. 6, 2014); *Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase II Energy Efficiency and Conservation Plan*, Docket No. M-2012-2334388 (Order entered May 19, 2015).

[8] *Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase III Energy Efficiency and Conservation Plan*, Docket No. M-2015-2515642 (Order entered Mar. 17, 2016).

[9] *See Petition of PPL Electric Utilities Corporation for Approval of a Minor Plan Change to its Act 129 Phase III Energy and Conservation Plan*, Docket No. M-2015-2515642 (Order entered Jan. 26, 2017); *Petition of PPL Electric Utilities Corporation for Approval of Major and Minor Plan Changes to its Act 129 Phase III Energy and Conservation Plan*, Docket No. M-2015-2515642 (Order entered Nov. 21, 2017); *Petition of PPL Electric Utilities Corporation for Approval of Major and Minor Plan Changes to its Act 129 Phase III Energy and Conservation Plan*, Docket No. M-2015-2515642 (Order entered July 20, 2018).

consumption and peak demand if the benefits of the EDCs' EE&C Plans exceed their costs. 66 Pa. C.S. §§ 2806.1(c)(3), (d)(2).[10]

8. On June 18, 2020, the Commission issued the *Implementation Order*, which determined the required energy consumption and peak demand reduction targets for each EDC subject to Act 129 and established guidelines for implementing Phase IV (i.e., June 1, 2021 – May 31, 2026) of the EE&C program. To establish the EDCs' required energy consumption and peak demand reduction targets, the Commission relied on the findings of the Statewide Evaluator's ("SWE") Energy Efficiency and Demand Response Market Potential Studies. *See Implementation Order* at 8-12, 25, 50-55, 97. The Commission specified the following overall targets for PPL Electric to reduce energy consumption and peak demand:

- Energy reduction compliance target = 1,250,157 MWh.
- Peak demand reduction compliance target = 229 MW.

Implementation Order at 8.

9. On September 9, 2020, the Commission issued a Secretarial Letter at Docket No. M-2020-3015228 establishing the template for the EDCs' Phase IV EE&C Plans.

10. PPL Electric prepared its Phase IV EE&C Plan in accordance with the Commission's *Implementation Order* and the Phase IV EE&C Plan Template.

11. For the reasons that follow, PPL Electric respectfully requests that the Commission approve its proposed Phase IV EE&C Plan.

[10] Although subsection (d)(2) does not contain the "every five years thereafter" language that appears in subsection (c)(3), the Commission found that it must evaluate the cost-effectiveness of peak demand reduction every five years and may mandate additional peak demand reduction targets beyond November 30, 2013, if they are found to be cost-effective. *Energy Efficiency and Conservation Program*, Docket Nos. M-2012-2289411, M-2008-2069887, at 17 (Order Entered Feb. 20, 2014).

II. LEGAL REQUIREMENTS

12. Consistent with the requirements set forth in the Act 129 and the Commission's *Implementation Order*, PPL Electric's Phase IV EE&C Plan:

a. Specifies a budget showing total planned expenditures by program and customer class;

b. Describes PPL Electric's method for monitoring and verifying plan results;

c. Includes measures designed to achieve or exceed the required reductions and states the manner in which the consumption reductions will be achieved or exceeded;

d. Complies with the designated expenditure cap of 2% of 2006 Annual Revenues for each year of the five-year plan, which equates to an average of approximately $61.5 million per year for five years and approximately $307.5 million[11] for the Phase IV. The five-year Plan will start on June 1, 2021, and conclude on May 31, 2026;

e. Achieves a total overall gross verified energy reduction of at least 1,250,157 MWh by May 31, 2026;

f. Achieves a minimum of 5.8% (i.e., 72,509 MWh) of the consumption reduction requirements from programs solely directed at low-income customers (i.e., customers at or below 150% of Federal Poverty Income Guidelines)[12];

g. Achieves a total overall gross verified demand reduction of at least 229 MW by May 31, 2026;

h. Demonstrates that the proportion of measures available to the low-income sector is at least 9.95% of the total measures available to all customer sectors;

i. Offers at least one program for each rate class and offers a reasonable mix of programs for all customers;

j. Offers at least one comprehensive measure for residential customers and at least one comprehensive measure for non-residential customers;

[11] This funding cap excludes $5 million estimated cost for SWE.

[12]For compliance purposes, "savings from multifamily housing, up to the percentage of verified low-income households living in the multifamily housing, are eligible for the low-income carve-out." *Implementation Order* at 37.

k. Includes contracts with one or more conservation service providers ("CSPs") necessary to implement the Phase IV EE&C Plan[13];

l. Includes a proposed reconcilable cost-recovery mechanism, in accordance with 66 Pa. C.S. § 1307;

m. Demonstrates that the Phase IV EE&C Plan is cost-effective based on the Commission's Total Resource Cost ("TRC") Test; and

n. Includes an analysis of the Company's administrative costs.

III. PPL ELECTRIC'S PROPOSED PHASE IV EE&C PLAN

A. OVERVIEW OF THE PHASE IV EE&C PLAN

13. PPL Electric's Phase IV EE&C Plan is attached hereto as Attachment A and marked as PPL Electric Exhibit 1. PPL Electric's Phase IV EE&C Plan, as more fully described below, includes a broad portfolio of energy efficiency and energy education initiatives. PPL Electric's portfolio of programs is designed to meet the Company's Phase IV energy consumption and peak demand reduction targets and to comply with the other requirements set forth in the Commission's *Implementation Order*. The Phase IV EE&C Plan includes a range of energy efficiency programs geared toward all customer classes in PPL Electric's service territory. These programs are the key components of an electric energy efficiency initiative designed to achieve both the required 1,250,157 MWh of reduced energy consumption and 229 MW of peak demand reduction.

14. The proposed Phase IV EE&C Plan follows the template provided in the September 9, 2020 Secretarial Letter at Docket No. M-2020-3015228. The Phase IV EE&C Plan is divided into the following nine sections: (1) Overview of the Plan; (2) Energy Efficiency Portfolio/Program Summary Tables and Charts; (3) Program and Component Descriptions; (4) Management and Implementation Strategies; (5) Reporting and Tracking Systems; (6) Quality

[13] The CSP contract for the evaluation, measurement, and verification ("EM&V") services to be provided under the EE&C Plan was filed on November 30, 2020.

Assurance and Evaluation, Measurement, and Verification; (7) Cost Recovery Mechanism; (8) Cost-Effectiveness; and (9) Plan Compliance and Other Key Issues.

15. Attached to Mr. Koch's direct testimony (PPL Electric Statement No. 3) as PPL Electric Exhibit SRK-1 is the proposed *pro forma* tariff supplement for the Phase IV Act 129 Compliance Rider ("ACR-4"), which is designed to fully recover all applicable EE&C-related costs. The ACR-4 is fully reconcilable and will be applied on a non-bypassable basis to charges for electricity supplied to customers who receive electric distribution service from the Company.

B. PLAN DEVELOPMENT PROCESS

16. The requirements of Act 129 and the Commission's *Implementation Order* formed the basis for development of the Phase IV EE&C Plan. The Company carefully evaluated Act 129 and the *Implementation Order* to determine the broad requirements and allowable annual expenditures for PPL Electric. Actual amounts paid to PPL Electric for generation, transmission, distribution and surcharges by retail customers, including revenues collected by PPL Electric for an electric generation supplier for the 12 months ended December 31, 2006, were used to determine the 2% expenditure cap established by Act 129. The maximum allowable budget identified in the *Implementation Order* for PPL Electric is $307,506,880.[14] *Implementation Order* at 120 (specifying an annual budget of $61,501,376 for Phase IV).

17. The process for developing the Phase IV EE&C Plan consisted of establishing a set of guiding principles, including: (1) customer focus; (2) compliance with Act 129; (3) flexibility to address changing market conditions; (4) effective program design; (5) equitable programs; (6) market acceptance; and (7) commitment to low-income customers. *See* Phase IV EE&C Plan, Section 1.2.1.

[14] Funding cap excludes $5 million estimated cost for SWE. *See Implementation Order* at 123.

18. The programs included in PPL Electric's Phase IV EE&C Plan were designed as a portfolio and include options for all customer sectors. The Phase IV EE&C Plan is designed to provide customers with a cost-effective, equitable, flexible, and wide-ranging set of programmatic choices, incentive options, information, and educational opportunities.

19. PPL Electric's development of the Phase IV EE&C Plan began by thoroughly evaluating actual performance in Phases I, II, and III, and reviewing the SWE's and PPL Electric's Phase IV Market Potential Studies. In addition, PPL Electric's program staff identified possible programs and measures for consideration in Phase IV based on input from stakeholders, trade allies, other utilities, and requests for proposals from potential program implementation contractors for residential, low-income, and non-residential programs. Based on this input and review, PPL Electric developed a portfolio of programs that provides program options for all customer classes and that is designed to cost-effectively achieve the energy consumption and peak demand reduction targets set by the Commission, within the cost budget.

20. During the preparation of the Phase IV EE&C Plan, PPL Electric pursued opportunities to solicit input from and inform stakeholders of the Company's progress.[15] The Company maintained communications with a range of interested parties, including other investor-

[15] PPL Electric's stakeholder group includes, but it not limited to, representatives from: registered and other potential CSPs; environmental advocacy groups; Chambers of Commerce; public and private economic development organizations; trade allies, including contractors, trade associations, energy services companies, and vendors; market partners that deliver or promote energy-efficiency programs, including Keystone HELP, Pennsylvania Housing Finance Agency, SEDA-Council of Governments, Community Committee of the Lehigh Valley, Schuylkill Community Action, Community Action Program of Lancaster, other Community Action Groups, and property/facilities management companies; Pennsylvania Public Utility Law Project; the Sustainable Energy Fund; statutory advocates; the Pennsylvania Department of Environmental Protection; municipal and local government groups; county commissioners; township commissioners; the EFMR Monitoring Group; the Pennsylvania Department of Community & Economic Development's Energy-efficiency engineers and consultants; Citizens for Pennsylvania's Future; and the PP&L Industrial Customer Alliance.

owned utilities, consumer advocates, environmental advocates, non-utility parties, governmental and non-governmental organizations, potential trade allies, and CSPs.

21. PPL Electric anticipates that this collaborative process will increase the likelihood of success in implementing the portfolio. Information about stakeholder participation is summarized in Section 4.1.6 of the Phase IV EE&C Plan. Although it was not possible to include every recommendation received through the stakeholder process, the Company considered the input it received from its stakeholders. PPL Electric intends to meet with stakeholders as needed (but not less than twice annually) until May 31, 2026, and use their input to help identify modifications that would improve the efficiency or cost-effectiveness of the Phase IV EE&C Plan (subject to regulatory approval where required). This process should assist the review of the Phase IV EE&C Plan by the stakeholders and the Commission and should hopefully serve to expedite the Plan's approval, thereby allowing more time to prepare for implementation and expanding the opportunities for consumer savings.

C. DESCRIPTION OF THE PHASE IV EE&C PLAN

22. PPL Electric's primary objective is to deliver a portfolio of cost-effective programs that will meet customers' needs, fulfill the Company's Phase IV EE&C Plan objectives, as defined in Section 1.1.1 of the Phase IV EE&C Plan, and achieve the results required by Act 129 and the Commission's *Implementation Order*.

23. PPL Electric's portfolio reflects a strategic approach that is targeted, yet flexible enough to adjust and expand, as warranted, to meet changing market conditions and progress toward the Phase IV EE&C Plan goals.

24. The proposed Phase IV EE&C Plan, as noted above, includes a portfolio of energy efficiency and energy education initiatives. Specifically, the proposed portfolio consists of three

programs: (1) Residential Program; (2) Low-Income Program; and (3) Non-Residential Program. Each of these programs contains components, which are summarized below:

a. Residential Program
    i. Appliance Recycling Component
    ii. Efficient Lighting – Specialty Bulbs Component
    iii. Energy Efficient Homes Component
    iv. Student Energy Efficient Education Component
b. Low-Income Program
    i. Low-Income Assessment Component
c. Non-Residential Program
    i. Efficient Equipment Component (Small C&I)
    ii. Efficient Equipment Component (Large C&I)
    iii. Custom Component (Small C&I)
    iv. Custom Component (Large C&I)

All of the Company's programs are voluntary and, subject to the budget limitations for each program, customers can elect to participate in any program for which they are eligible.

25. Full descriptions of the programs are set forth in Sections 3.2 to 3.4 of the Phase IV EE&C Plan. These programs include a range of energy-efficiency programs targeted to every customer sector in PPL Electric's service territory.

26. PPL Electric has differentiated its programs according to four customer sectors: (1) Residential; (2) Low-Income; (3) Small C&I; and (4) Large C&I. *See* Phase IV EE&C Plan, Section 3. PPL Electric defines Residential customers as those customers served under Rate Schedules RS and RTS (R). PPL Electric defines Large C&I customers as those customers served at primary and transmission voltage levels (Rate Schedules LP-4, LP-5, and LPEP). Small C&I

customers include all non-residential accounts served at secondary voltage levels (Rate Schedules GS-1, GS-3, BL, SA, SM (R), SHS, SLE, SE, TS (R), and GH-2 (R)). The Low-Income sector includes all residential customers whose household income is at or below 150% of the Federal Poverty Income Guidelines ("FPIG"). 66 Pa. C.S. § 2806.1(b)(1)(i)(G).

27. PPL Electric's portfolio of programs is designed to provide customer benefits and to meet the Company's Phase IV energy consumption and peak demand reduction targets as well as other program requirements set forth in Act 129 and the *Implementation Order*, all within the designated expenditure cap of 2% of 2006 annual revenues for each year of the five-year EE&C Plan, which equates to approximately $307.5 million (plus PPL Electric's share of the SWE costs, estimated at $5 million).

28. In addition, the Commission directed that each EDC obtain a minimum of 5.8% of its total required consumption reduction from low-income customers. *Implementation Order* at 35-36. These savings may only be obtained from "programs solely directed at low-income customers or low-income-verified participants in multifamily housing programs." *Implementation Order* at 28.

29. As required in the Commission's *Implementation Order*, PPL Electric has designed its EE&C Plan to achieve at least 5.8% of its required energy consumption from the Low-Income sector (i.e., 72,509 MWh) and to provide the required proportion of measures for the Low-Income sector. *See* Phase IV EE&C Plan, Sections 1.1.1, 9.1.3; *see Implementation Order* at 35. These programs will be available to customers that are at or below 150% of the FPIG. Phase IV EE&C Plan, Sections 1.2.2, 3.3.

30. Furthermore, the Commission's *Implementation Order* requires that PPL Electric's EE&C Plan include at least one comprehensive program for residential customers and one

comprehensive program for non-residential customers. *Implementation Order* at 23-24. To satisfy this requirement for residential customers, PPL Electric will offer two programs: (1) the Residential Program targeting its non-low-income customers; and (2) the Low-Income Program targeting its low-income customers. Both programs will provide a comprehensive mix of cost-effective energy efficiency measures for all building types (single-family, multifamily, and manufactured homes and existing and new construction). Both programs will offer in-home energy audits that assess end uses, including weatherization, water heating, lighting, HVAC, and appliances. All residential customers will receive energy efficiency and peak demand education and be encouraged to implement multiple measures and to take a comprehensive approach to energy efficiency.

31. To meet the requirement for non-residential customers, PPL Electric will offer the Non-Residential Program that will target business customers of all sizes and in every segment, as well as government and educational institutions and master metered low-income multifamily buildings, with a comprehensive range of prescriptive measures (including HVAC, lighting, and water heating) as well as opportunities to implement a custom efficiency project for measures not included in PPL Electric's Energy Efficient Equipment (prescriptive) component and not included in the TRM. Custom component measures cover a comprehensive set of non-residential needs, including new or replacement energy efficient and peak demand-saving equipment, retro-commissioning, repairs, equipment optimization, building management or industrial process controls, new construction projects, combined heat and power ("CHP"), and operational and process improvements that result in cost-effective energy efficiency savings.

32. Moreover, although there is not a specific target for multifamily housing, the Commission directed EDCs to report savings achieved in multifamily housing under their Phase

IV EE&C Plans. *Implementation Order* at 36-37. PPL Electric has designed many of its program components to address energy efficiency within multifamily housing units for owners and renters, including those units that are master-metered and individually metered and that have low-income and non-low-income residents. *See* Phase IV EE&C Plan, Section 3.

33. The EE&C Plan further includes procedures to measure, evaluate, and verify performance of the programs and the Plan as a whole. *See* Phase IV EE&C Plan, Section 6. PPL Electric also will conduct an annual cost-effectiveness evaluation of the EE&C Plan and report the results of that evaluation in its final annual report in accordance with the Commission's *2021 TRC Test Order*. *See 2021 TRC Test Order* at 15-17; Phase IV EE&C Plan, Section 5.1.

34. For each program in the EE&C Plan, cost-effectiveness was estimated in accordance with the Commission's *2021 TRC Test Order*.

35. PPL Electric's proposed EE&C Plan is cost-effective based on a TRC criterion. *See* Phase IV EE&C Plan, Section 8. Cost-effectiveness of the EE&C Plan is demonstrated in the data tables presented in Section 8.2 of the Phase IV EE&C Plan. PPL Electric determined the life-cycle costs, savings, and avoided cost benefits for each measure to compute the measure's cost-effectiveness from a TRC perspective. Application of the TRC identified some programs (or specific customer sectors within a program) that did not meet the cost-effectiveness threshold. However, to meet the Low-Income compliance target and to ensure a well-balanced mix of measures that encourages non-low-income customers to take a more comprehensive approach for energy efficiency, some programs with a benefit-cost ratio below 1.0 were retained in the Phase IV EE&C Plan.

36. PPL Electric's programs are designed to support Residential, Low-Income, Small C&I, and Large C&I customers through a logical continuum of energy efficiency actions, starting

with facility review and analysis and ending with implementation, verification, and evaluation. Marketing and education functions, customer care and quality assurance, program tracking, and EM&V will be common features of all programs. The EE&C Plan is supported by financial incentives and a delivery approach focused on providing customers with the support they need to achieve their energy efficiency objectives. Implementation activities range from simple, common energy efficiency measures that can be installed with minimal oversight or administrative burdens to more complex measures that are vetted through a technical analysis and may (but are not required to) be part of a facility-wide energy management strategy.

D. CONSIDERING THE ROLE OF RISK AND UNCERTAINTY IN THE EE&C PLAN

37. There are several risks and uncertainties associated with PPL Electric's ability to achieve these targets within the constraints outlined in Act 129 and the Commission's *Implementation Order*. The EE&C Plan's program descriptions outline these risks and uncertainties and explain PPL Electric's strategies to manage these risks. *See* Phase IV EE&C Plan, Section 3.

38. Further, PPL Electric has developed its EE&C Plan to exceed its Phase IV energy consumption targets and peak demand reduction target by approximately 39% and 8%, respectively, to provide a reasonable margin for risks and uncertainties. Phase IV EE&C Plan, Sections 1.1.1, 1.2.1, 9.1.2.

39. The Phase IV EE&C Plan also was designed to provide the Company with flexibility to address risks and uncertainties. *See* Phase IV EE&C Plan, Section 1.2.1. For instance, the Phase IV EE&C Plan contains several program options and controls that will help the Company manage the pace of programs (i.e., the savings and costs in the EE&C Plan) while reducing the frequency of formal EE&C Plan changes. Phase IV EE&C Plan, Section 1.2.1. These

include modifying marketing tactics, adjusting incentive levels within the ranges detailed in the Phase IV EE&C Plan, offering different measures at certain times, and offering multiple delivery channels. *See* Phase IV EE&C Plan, Sections 1.2.1, 3.

40. In addition, the ability to meet the projected targets ultimately is a function of consumers' ability and willingness to participate in specific programs. To address the state of the economy and customers' ability to make investments in energy efficiency, PPL Electric has included various incentive levels for customers and will educate them about the benefits of implementing EE&C measures offered under the Phase IV EE&C Plan.

41. PPL Electric also has designed its Phase IV EE&C Plan to use the savings assumptions from the Commission's 2021 TRM, which the Commission has adopted for the entirety of Phase IV.[16] *Implementation Order* at 98.

42. Finally, PPL Electric will continue to use the protocols established in Phases I, II, and III to effectively monitor progress toward meeting the Phase IV EE&C Plan goals, to detect problems quickly and take corrective action, and to adjust the Phase IV EE&C Plan prospectively over time if necessary.

[16] The Commission also noted that "the 2021 TRM does not include peak demand savings for ENERGY STAR®-certified connected thermostats. [We] direct the SWE to investigate and modify the 2021 TRM via errata if the exclusion of peak demand savings is determined to be erroneous as it would be unfair to EDCs in pursuit of their Phase IV peak demand reduction target." *Implementation Order* at 99-100. An Errata was issued on September 24, 2020, updating the 2021 TRM. *See Implementation of the Alternative Energy Portfolio Standards Act of 2004: Standards for the Participation of Demand Side Management Resources – Technical Reference Manual 2021 Update*, Docket No. M 2019 3006867 (Secretarial Letter dated Sept. 24, 2020). The Commission also issued a Tentative Order on October 29, 2020, setting forth a potential amendment to the 2021 TRM. *See Implementation of the Alternative Energy Portfolio Standards Act of 2004: Standards for the Participation of Demand Side Management Resources – Technical Reference Manual 2021 Update*, Docket No. M 2019 3006867 (Order entered Oct. 29, 2020). As of the filing of the instant Petition, that amendment remains pending before the Commission. Additionally, the Company notes that the Commission "reserve[d] the right to implement a mid-phase TRM update if [it] deem[ed] it necessary." *Implementation Order* at 98.

E. COSTS AND COST ALLOCATION

43. Section 2806.1(g) of Act 129 requires that the total cost of any EE&C Plan not exceed 2% of the EDC's total annual revenues as of December 31, 2006. 66 Pa. C.S. § 2806.1(g). PPL Electric's total annual revenues for calendar year 2006 were $3,075,068,824. Accordingly, the designated expenditure cap of 2% of 2006 Annual Revenues for each year of the five-year plan, equates to an average of approximately $61.5 million per year for five years and approximately $307.5 million for the Phase IV EE&C Plan. Phase IV EE&C Plan, Section 7.1. Counting the estimated $5 million in costs for the SWE, PPL Electric's total budget for Phase IV is $312.5 million. Phase IV EE&C Plan, Section 7.2 n.20.

44. PPL Electric will spend most of the $312.5 million to implement its Phase IV EE&C Plan. Phase IV EE&C Plan, Section 7.2. This total cost also will include the costs that PPL Electric incurred to develop its EE&C Plan. Phase IV EE&C Plan, Section 7.2. In the *Implementation Order*, the Commission again found that EDCs should be permitted to recover the incremental costs incurred to design, create, and obtain Commission approval of a plan. *Implementation Order* at 121, 126-127.

45. In addition, Section 2806.1(a)(11) of Act 129 mandates that EE&C measures be paid for by the same customer class that receives the energy and conservation benefits of those measures. 66 Pa. C.S. § 2806.1(a)(11). The Phase IV EE&C Plan estimates the costs and savings for each of the four customer sectors (i.e., Residential, Low-Income, Small C&I, and Large C&I). Phase IV EE&C Plan, Section 2. However, for cost-recovery purposes, the Company must assign and allocate costs to each customer class. To that end, PPL Electric will: (1) directly assign costs to customer classes; and (2) allocate costs that are applicable to more than one customer class or that provide system-wide benefits using an allocation factor. Phase IV EE&C Plan, Section 7.5. The allocation factor is a percentage equal to the actual EE&C costs directly assigned to each

customer class divided by the actual EE&C costs assigned to all customer classes. Phase IV EE&C Plan, Section 7.5.

F. COST RECOVERY TARIFF MECHANISM

46. Act 129 directs each EDC to establish a reconcilable cost recovery tariff mechanism in accordance with 66 Pa. C.S. § 1307 and include this mechanism in its Phase IV EE&C Plan. 66 Pa. C.S. § 2806.1(b)(1)(i)(H), (k)(1); *see Implementation Order* at 119-20, 126-27. Attached to Mr. Koch's direct testimony (PPL Electric Statement No. 3) as PPL Electric Exhibit SRK-1 is the *pro forma* tariff supplement for the Company's proposed ACR-4, which is a reconcilable adjustment clause under Section 1307 of the Public Utility Code that will be set to recover the estimated program costs PPL Electric expects to incur each program year to achieve its energy consumption and peak demand reduction targets for that program year. Phase IV EE&C Plan, Section 7.4. The ACR-4 will be filed by May 1 of each year and will set forth the rates that will be charged to each customer depending on the customer's rate schedule. For each program year, PPL Electric will annually reconcile the actual expenses incurred for each customer class as a whole with the actual revenues it recovers through ACR-4 for that customer class as a whole. Phase IV EE&C Plan, Section 7.4. In addition to the annual reconciliation, upon determination by the Company that the ACR-4 rate (if left unchanged) would result in a material over- or under-collection of Phase IV costs incurred or expected to be incurred during the current 12-month period, the Company may file with the Commission for an interim revision of the ACR IV rate. Phase IV EE&C Plan, Section 7.4.

47. Section 2806.1(h) of Act 129 also provides that the Commission can recover program implementation costs from EDCs. *See Implementation Order* at 110-11. Consequently, it follows PPL Electric can recover those costs from customers, and the Company will recover such costs through the ACR IV. However, PPL Electric observes that the costs for the SWE are

not included under the Company's 2% cost cap, in accordance with the *Implementation Order*.[17] *See Implementation Order* at 110-11.

48. Further, the Commission's *Implementation Order* requires EDCs to combine their Phase III and Phase IV surcharges[18] into a single surcharge and tariff for Phase IV using the Commission's specified transition plan. *Implementation Order* at 142-43. In accordance with the *Implementation Order*, PPL Electric will reconcile the actual costs incurred through March 31, 2021, with the actual revenues received through March 31, 2021. *Implementation Order* at 142-43. The revenues and expenses of the remaining two months of Phase III (i.e., April 2021 and May 2021); expenses to finalize any measures installed and commercially operable on or before May 31, 2021; expenses to finalize any contracts; and other Phase III administrative obligations should be included, as clearly identified separate line items, in the reconciliation for the period April 1, 2021 through March 31, 2022. *Implementation Order* at 143. Additional details of how PPL Electric's ACR-4 for Phase IV will accomplish this transition are provided in PPL Electric Exhibit SRK-1 attached to Mr. Koch's direct testimony (PPL Electric Statement No. 3).

G. IMPLEMENTATION SCHEDULE AND STRATEGY

49. The proposed Phase IV EE&C Plan includes a five-year implementation schedule to achieve its Phase IV energy consumption and peak demand reduction targets. *See* Phase IV EE&C Plan, Section 1.4. The Phase IV EE&C Plan also includes detailed budgets, milestones, and anticipated delivery dates for each program. *See* Phase IV EE&C Plan, Section 3.

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[17] In establishing the 2% cost cap, Section 2806.1(g) of the Public Utility Code specifically characterizes the cap as a limitation on the "total costs of any plan required under this section." 66 Pa. C.S. § 2806.1(g). Because the costs of the SWE are not the costs of PPL Electric's Phase IV EE&C Plan, they are not subject to the limitation set forth in Section 2806.1(g).

[18] PPL Electric notes that its current cost recovery tariff mechanism for Phase III is the Phase III Act 129 Compliance Rider ("ACR III"), which will remain effective through May 31, 2021. *See* Electric Pa. P.U.C. No. 201, Supp. No. 208, Original Page No. 19Z.10D; *Implementation Order* at 143.

50. PPL Electric's implementation strategy is based on several key features that the Company has identified as critical to achieving the objectives of the proposed Phase IV EE&C Plan. *See* Phase IV EE&C Plan, Section 1.7. First, PPL Electric will rely on a broad range of CSPs, employees, trade allies, community agencies, stakeholders, and other entities engaged in energy efficiency to promote, deliver, and support the effective deployment of programs. Phase IV EE&C Plan, Section 1.7. Second, the Company will use program-level CSPs to implement the Residential, Low-Income, and Non-Residential Programs. Phase IV EE&C Plan, Section 1.7. Third, PPL Electric and its CSPs will engage in active marketing and outreach to customers about the programs. Phase IV EE&C Plan, Section 1.7. Fourth, the Company will rely on trade allies and other market partners to engage customers, promote programs, evaluate projects, and stock and install energy-efficient equipment. Phase IV EE&C Plan, Section 1.7.

IV. CUSTOMER NOTICE

51. The Company proposes to provide notice of this filing consistent with the notice provided by the Company for its Phase I, Phase II, and Phase III EE&C Plans. First, PPL Electric will serve copies of the filing on the Office of Consumer Advocate, the Office of Small Business Advocate, the Commission's Bureau of Investigation and Enforcement, and all parties of record in PPL Electric's Phase III EE&C Plan proceeding. Second, the Company will send notice of the filing to participants in the stakeholder process described in Section III.B, *supra*. Third, the filing will be posted on PPL Electric's Act 129 web site at https://www.pplelectric.com/ways-to-save/for-act-129-stakeholders.aspx. Fourth, the Company understands that the Commission will publish notice of this filing in the *Pennsylvania Bulletin*. PPL Electric believes that these various communications initiatives will provide all interested parties with full notice of the Company's proposals and an opportunity to participate in the Commission proceeding addressing those proposals.

V. THE PROPOSED EE&C PLAN IS IN THE PUBLIC INTEREST

52. PPL Electric believes that the proposed Phase IV EE&C Plan is in the public interest and in compliance with the requirements of Act 129 and all of the Commission's applicable Orders.

53. First, the Phase IV EE&C Plan includes a range of cost-effective energy efficiency programs that are available to all customer sectors in PPL Electric's electric service territory. As seen in the Phase IV EE&C Plan, these programs include a variety of measures and education and behavior components. Phase IV EE&C Plan, Section 3. Therefore, a variety of measures will be applied equitably and non-discriminatorily to all customer classes.

54. Second, these programs are designed to achieve the energy consumption and peak demand reductions required by the Commission's *Implementation Order* within the 2% cost cap established by Act 129.

55. Third, PPL Electric's energy efficiency programs provide a cohesive structure intended to support the Residential, Low-Income, Small C&I, and Large C&I customer sectors through a logical continuum of energy efficiency actions, starting with facility review and analysis and ending with implementation, verification, and evaluation. Marketing and education functions, customer care and quality assurance, program tracking, and EM&V will be common features of all programs in the Phase IV EE&C Plan. Furthermore, the programs are supported by financial incentives and a delivery approach focused on providing customers with the support they need to achieve their efficiency objectives.

56. Fourth, the Phase IV EE&C Plan contains a proposed tariff mechanism for full cost recovery. As part of this filing, PPL Electric's proposes the ACR-4 that is designed to recover all of the costs for energy efficiency and conservation measures incurred by the customer class that received the benefit of those measures. To the extent that PPL Electric over- or under-recovers

costs from customers, those funds will be refunded or recovered through the ACR-4 as part of the Company's annual reconciliation process.

VI. CONCLUSION

WHEREFORE, PPL Electric Utilities Corporation respectfully requests that the Pennsylvania Public Utility Commission approve the Phase IV EE&C Plan, as set forth in this Petition and the attachments hereto.

Respectfully submitted,

Michael J. Shafer (ID #205681)
Kimberly A. Klock (ID # 89716)
PPL Services Corporation
Office of General Counsel
Two North Ninth Street
Allentown, PA 18101
Phone: 610-774-4254
Fax: 610-774-6726
E-mail: mjshafer@pplweb.com
E-mail: kklock@pplweb.com

David B. MacGregor (ID # 28804)
Post & Schell, P.C.
Four Penn Center
1600 John F. Kennedy Boulevard
Philadelphia, PA 19103-2808
Phone: 215-587-1197
Fax: 215-320-4879
E-mail:dmacgregor@postschell.com

Devin T. Ryan (ID # 316602)
Post & Schell, P.C.
17 North Second Street
12th Floor
Harrisburg, PA 17101-1601
Phone: 717-731-1970
Fax: 717-731-1985
E-mail: dryan@postschell.com

Of Counsel:

Post & Schell, P.C.

Date: November 30, 2020

Attorneys for PPL Electric Utilities Corporation

Attachment A

(PPL Electric Exhibit 1- Phase IV EE&C Plan)

Before the

PENNSYLVANIA PUBLIC UTILITY COMMISSION

PPL Electric Utilities Corporation

Energy Efficiency and Conservation Plan

Act 129 Phase IV

Docket No. M-2020-3020824

Filed November 30, 2020

Table of Contents

Tables

Figures

Acronyms and Abbreviations

Acronym	Definition
ACR	Act 129 Compliance Rider
Act 129	Act 129 of 2008, P.L. 1592, 66 Pa. C.S. §§ 2806.1, 2806.2
BPM	Brushless permanent magnet
C&I	Commercial and industrial
CCFL	Cold-cathode fluorescent lamp
cfm	Cubic feet per minute
CHP	Combined heat and power
CIP	Continuous improvement process
Commission	Pennsylvania Public Utility Commission
CRAC	Computer room air conditioning
CRAH	Computer room air handling
CSP	Conservation service provider
DEER	California Database for Energy -Efficiency Resources
DLC	DesignLights Consortium
DOE	U.S. Department of Energy
EC	Electronically commutated
ECM	Electronically commutated motor
EDC	Electric distribution company
EE&C Plan	Act 129 Phase IV Energy Efficiency and Conservation Plan
EE&C Plan Template	EE&C Plan Template issued by the Commission on September 9, 2020, at Docket No. M-2020-3015228
EISA	Energy Independence and Security Act of 2007
EM&V	Evaluation, measurement, and verification
FCM	Forward capacity market
FHPC	Floating Head Pressure Control
FPIG	Federal Poverty Income Guidelines
GNE	Government/Nonprofit/Educational
GNI	Government, nonprofit, and institutional
HER	Home energy report
HID	High intensity discharge
HP	Horsepower
HVLS	High Volume Low Speed
IECC	International Energy Conservation Code
Implementation Order	Pennsylvania Public Utility Commission's Final Implementation Order entered on June 18, 2020, at Docket No. M-2020-3015228
IRR	Internal rate of return
kW	Kilowatt
kWh	Kilowatt-hour
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LIURP	Low-Income Usage Reduction Program
M&V	Measurement and verification
MW	Megawatt
MWh	Megawatt-hour

Acronym	Definition
MWh/year	MWh credited towards compliance target in the year a measure is installed
NTG	Net-to-gross
NYMEX	New York Mercantile Exchange
Pa PUC	Pennsylvania Public Utility Commission
Phase IV Plan	Act 129 Phase IV Energy Efficiency and Conservation Plan
PJM	PJM Interconnection LLC
PMS	Permanent magnet synchronous
PSC	Permanent split capacitor
psi	Pounds per square inch
psig	Pounds per square in gauge
QA/QC	Quality assurance and quality control
RFP	Request for proposals
SCOP	Seasonal coefficient of performance
SCR	Silicon controlled rectifier
SCT	Saturated condensing temperature
SEM	Strategic energy management
SP	Shaded-pole
SWE	Statewide Evaluator
T&D	Transmission and distribution
TRC	Total resource cost
TRM	Pennsylvania Technical Reference Manual
VFD	Variable-frequency drive
VSD	Variable speed drive
WRAP	Winter Relief Assistance Program

1 Overview of PPL Electric Utilities' Act 129 Phase IV Plan

1.1 Summary Description of the Plan

PPL Electric Utilities Corporation ("PPL Electric Utilities" or the "Company") hereby submits its Act 129 Phase IV Energy Efficiency and Conservation Plan ("EE&C Plan," "Plan," or "Phase IV Plan") in compliance with Act 129 of 2008, P.L. 1592, 66 Pa. C.S. §§ 2806.1, 2806.2 ("Act 129"). This Plan is being filed pursuant to the Pennsylvania Public Utility Commission's ("Pa PUC" or the "Commission") Final Implementation Order entered on June 18, 2020, at Docket No. M-2020-3015228,[1] the Commission's 2021 TRC Test Order at Docket No. M-2019-3006868,[2] and the Phase IV EE&C Plan Template served by Secretarial Letter on September 9, 2020, at Docket No. M-2020-3015228. The proposed portfolio comprises the three continuing comprehensive programs and nine associated components listed in Table 1.

Table 1. PPL Electric Utilities' Phase IV Programs and Components

#	Programs and Components
1. Residential Program	
1.1	Appliance Recycling
1.2	Efficient Lighting – Specialty Bulbs
1.3	Energy Efficient Homes
1.4	Student Energy Efficient Education
2. Low-Income Program	
2.1	Low-Income Assessment
3. Non-Residential Program	
3.1	Small Commercial and Industrial Efficient Equipment Prescriptive Rebate
3.2	Large Commercial and Industrial Efficient Equipment Prescriptive Rebate
3.3	Small Commercial and Industrial Custom
3.4	Large Commercial and Industrial Custom

The portfolio offers PPL Electric Utilities' customers a cost-effective, equitable, flexible, and comprehensive set of programmatic choices, incentives, information, and educational opportunities. Together, these programs meet the goals set forth in the Implementation Order, including cost-effectively achieving all savings objectives within the required budget caps (Table 2). The three programs, along with their associated program components, are described in Section 3.

[1] *Energy Efficiency and Conservation Program*, Docket No. M-2020-3015228 (Order entered June 18, 2020) ("Implementation Order").

[2] *2021 Total Resource Cost (TRC) Test*, Docket No. M-2019-3006868 (Order entered Dec. 19, 2019) ("2021 TRC Test Order").

Table 2. Summary of Compliance Targets

	Compliance Target[1]	EE&C Plan[2]
Overall Energy Reductions (MWh/year)	1,250,157	1,540,687
Overall Peak Demand Reductions (MW)[3]	229	248
Low-Income Energy Reductions (MWh/year)	72,509	74,793
Budget Cap (excluding SWE costs)	$307,506,880	$307,491,356
Cost-Effectiveness (per TRC)	1.0	1.17

[1] Per the Implementation Order, there are no government, nonprofit, and institutional ("GNI") compliance targets for Phase IV, page 5. PPL Electric Utilities will continue to serve the GNI sector through the Non-Residential Program.
[2] The overall energy reductions (MWh/year) exclude 200,000 MWh/year of carryover program savings from Phase III.
[3] Peak Demand is at generation.

1.1.1 Portfolio Objectives

PPL Electric Utilities designed the Phase IV Plan to meet the requirements set forth by the Commission's Implementation Order:

- Offer programs for a five-year term, beginning on June 1, 2021, and concluding on May 31, 2026.
- Comply with the designated expenditure cap of 2% of 2006 annual revenues for each year of the five-year Plan, which equates to a total energy efficiency budget of approximately $307.5 million,[3] over the five-year Phase IV period, and an average program acquisition cost of approximately $0.246 per kWh saved.
- Achieve 3.3% reduction in overall energy consumption, which is equivalent to 1,250,157 MWh/year of gross verified savings. The EE&C Plan must be designed to achieve at least 15% of the total cumulative energy reduction target in each of the five program years, which equates to 187,524 MWh/year each year.
- Achieve required energy reduction set-aside target from the low-income customer sector (those who are at or below 150% of the Federal Poverty Income Guidelines ["FPIG"]), which is equal to a minimum of 5.8% (72,509 MWh per year of gross verified savings) of the total portfolio energy reductions. Compliance savings must come entirely from income-qualified programs and may not accrue from low-income customer participation in non-low-income-specific residential programs.
- Achieve compliance target of cumulative peak demand reduction of 229 MW gross verified savings exclusively through deployment of energy efficiency measures offering coincident peak reduction benefits. The EE&C Plan must be designed to achieve at least 15% of the total cumulative demand reduction target in each of the five program years, which equates to 34.35 MW per year.
- Offer at least one comprehensive program for residential customers and one comprehensive program for non-residential customers.

[3] This dollar amount excludes approximately $5 million for PPL Electric Utilities' portion of the statewide evaluator ("SWE") costs that are not subject to the funding cap.

- Provide a portfolio cost recovery tariff mechanism.
- Dedicate at least 50% of funds to incentives at the portfolio level.
- Ensure the portfolio is cost-effective based on the total resource cost ("TRC") test and compliance with TRC guidance.[4]
- Include high-level plans to measure, evaluate, and verify the performance of individual programs and the Plan as a whole.
- Allocate the cost of measures to the customer class that receives the benefit of those measures.

In addition, PPL Electric Utilities designed the EE&C Plan to accomplish several corporate objectives:

- Exceed compliance targets, by approximately 39% MWh[5] and 8% MW, to allow for evaluation and other uncertainties.
- Enhance program comprehensiveness by offering overarching programs to serve residential, low-income, small commercial and industrial ("C&I"), and large C&I customers. These programs comprise customizable measure offerings bundled into components that span end uses, consolidate administrative functions, and eliminate arbitrary program designations that may serve as a barrier to participation.
- Achieve broad stakeholder consensus to the extent practical.
- Provide significant energy efficiency education to encourage customers to take a more comprehensive, holistic approach to energy efficiency (such as upgrading multiple measures, like weatherization and HVAC and water heating systems, or conducting whole-house and whole-building upgrades).
- Provide programs that achieve high customer satisfaction.
- Provide a transition for customers from Phase III to Phase IV program:
  - Offer residential customers a comparable mix of measures and incentive levels as those provided during Phase III for at least the first three months of Phase IV.
  - Offer comparable incentives to customers with non-residential projects on the Phase III waitlist that are completed in early Phase IV.
- Allow Phase III non-residential projects on the waitlist that are completed in Phase IV within the first three months to be eligible for a rebate based on Phase III eligibility requirements.
- Provide low-income programs at no cost to participants, although Act 129 Compliance Rider ("ACR") charges will appear on their bills.
- Provide a number of energy efficiency measures to low-income households that are proportionate to those households' share of total energy usage in the service territory (12.50%).
- Deliver programs using a customer-sector approach that is flexible enough to control the pace of programs if customer preferences or market conditions change.

[4] This TRC guidance is outline in the Commission's 2021 TRC Test Order.

[5] This includes 200,000 MWh/year of carryover savings from Phase III (23% without carryover savings).

- Achieve a reasonable net-to-gross ("NTG") ratio for each program.
- Continue to support an effective trade ally network that stocks and promotes efficient equipment.
- Achieve an equitable distribution of programs, savings, and costs for all customer sectors.
- Nominate a portion of the portfolio's peak demand reduction into the PJM Interconnection LLC ("PJM") Forward Capacity Market ("FCM").

PPL Electric Utilities is well-positioned to deliver a portfolio of programs that will meet customers' needs, fulfill the Company's Plan objectives, and achieve the results required for Phase IV. The Company designed its programs to provide residential, low-income, and non-residential (small and large C&I) customers with a comprehensive range of options intended to drive participation. PPL Electric Utilities uses targeted marketing techniques that capitalize on ongoing market research and on customer and trade ally feedback to match outreach and messaging strategies with likely participants' primary participation drivers. The common features of all programs are education, customer care, technical support, quality assurance and quality control ("QA/QC"), and evaluation, measurement, and verification ("EM&V").

The entire portfolio is supported by financial incentives, an active trade ally network, tracking, and a delivery approach focused on providing customers the support they need to achieve their energy efficiency objectives and encourage their continued engagement with PPL Electric Utilities' programs. Implementation activities range from simple, common energy efficiency measures that can be installed with minimal oversight or administration to more complex measures that may be (but are not required to be) part of a facility-wide energy management strategy. The Plan identifies opportunities for customers in all sectors to participate in one or more program components.

1.1.2 Overall Strategy to Achieve Energy Efficiency and Conservation Goals

In Phase IV, PPL Electric Utilities' savings acquisition cost will increase from $0.20 to $0.246. In Phase III, to achieve compliance with a lower budget allocation, the Company implemented several operational and delivery strategies aimed at increasing cost efficiencies and ratepayer value. In Phase IV, PPL Electric Utilities will continue these efforts but also recognizes the need to increase the amount of savings per customer interaction to meet its Phase IV goals. Therefore, in the Phase IV portfolio, the Company will offer customers a more holistic path to achieving deep energy savings. To facilitate this approach, PPL Electric Utilities developed budgets, savings targets, and performance objectives based on comprehensive program offerings for its primary customer sectors: residential, low-income, and non-residential. To accomplish this, the Company relied on Phase IV market potential studies, its Phase III program delivery experience and evaluation results, and an analysis of the Phase IV compliance requirements including the overall residential, low-income, and non-residential savings targets.

PPL Electric Utilities then issued requests for proposals ("RFPs") for the design and delivery of residential, low-income, and non-residential (targeting both small C&I and large C&I customers) programs. The Company used the responses to the RFPs to confirm that its savings targets and budgets

were achievable and to determine an appropriate mix of measures and delivery strategies to include in the EE&C Plan. In addition, PPL Electric Utilities engaged The Cadmus Group LLC ("Cadmus") to conduct a cost-effectiveness analysis of the EE&C Plan.[6]

This process enabled PPL Electric Utilities to identify overarching programs that target each key customer segment and encompass more granular paths for participation in the form of program components. These program components are based on measure bundles or delivery strategies so customers can participate at the level that best meets their needs without having to face administrative hurdles or participation barriers.

PPL Electric Utilities' sector-level programs include four Residential Program components, one Low-Income Program component, and four Non-Residential Program components (*i.e.*, two small C&I and two large C&I), together comprising the Phase IV EE&C portfolio. PPL Electric Utilities will continue to administer its programs, support its trade allies and strategic partners, and track and report its portfolio performance at the more granular component level. To customers, component-level administrative and delivery designations will be invisible, and the benefits of a holistic approach to efficiency will be clearly articulated. The portfolio is projected to be cost-effective and to comply with Act 129 targets, at or below the Company's budget cap.

To further support achievement of its Phase IV energy efficiency and conservation goals, PPL Electric Utilities has several additional portfolio strategies:

- ***Continue to deliver programs that optimize cost efficiency and deliver the greatest value to ratepayers.*** The Phase IV programs have a slightly higher acquisition cost than the Phase III programs,[7] primarily due to the loss of residential lighting opportunities, which were some of the least expensive savings. To address this, PPL Electric Utilities will continue to seek opportunities to reduce and control program administrative costs:
  - Offer comprehensive programs that focus on cost-effective measures with high savings and reasonable NTG ratios to all customer segments throughout the service territory.
  - Emphasize energy efficiency measures with coincident peak demand benefits to achieve demand reduction goals.
  - Create simple incentive applications in multiple submission formats (such as hard copy mail-in, online, and tablet entry by trade allies).

[6] Cadmus is a 100% employee-owned consulting firm. For more than 30 years, Cadmus has been helping organizations forecast energy demand and trends, design programs and portfolios to capture the energy savings, and assess achievement of energy savings and demand reduction.

[7] The program acquisition cost is defined as PPL Electric Utilities' total cost to implement the program (including administration and incentives) divided by the annual kilowatt-hours saved.

  - Continue to focus on providing personalized and flexible customer service to help ensure customers receive timely feedback to questions, information and educational resources that are directly relatable and immediately applicable, and rapid rebate processing.

- ***Work directly with conservation service providers ("CSPs") that have institutional knowledge of PPL Electric Utilities' market and implementation environment***. These CSPs will implement comprehensive residential, low-income, and non-residential (small C&I and large C&I) programs and enable PPL Electric Utilities to accomplish several goals:
  - Provide a smooth a transition from Phase III to Phase IV programs to maximize customer satisfaction and allow seamless distribution of incentives (and savings) for projects that straddle both phases.[8]
  - Create economies of scale associated with cross-program functions (such as the customer call center, rebate processing, market analytics, marketing, website development, and program management).
  - Facilitate integrated customer engagement across all programs to improve the effectiveness of marketing, customer communications, and cross-promotion of efficiency opportunities, thereby increasing the extent of participation and project comprehensiveness and reducing outreach and recruitment costs.
  - Provide journey mapping to help identify pain points for PPL Electric Utilities' customers , so it can create an enhanced and effortless customer experience.
  - Journey mapping will enable PPL Electric Utilities to segment its customers based on distinct characteristics and create customized approaches to their needs.
  - Implement contracts that tie payments to CSP performance (in terms of costs and savings), ensuring that these providers are accountable for successful program delivery.
  - Continue to provide automated rebate applications and processing, QA/QC, performance tracking, reporting, and other functions where practical.

- ***Emphasize comprehensive solutions for all customers.*** PPL Electric Utilities' redesigned portfolio will accomplish three tasks:
  - Offer multiple savings opportunities (in terms of measures, end uses, delivery channels, and incentive mechanisms) in each program.
  - Provide customers with high-quality energy efficiency education through both digital and traditional print outreach and engagement channels as well as through direct communications with trade allies, CSPs, strategic partners, and PPL Electric Utilities' staff.
  - Promote the benefits of multiple-measure, comprehensive projects (whole-home and whole-building approaches).

[8] The Company uses the in-service date of the project to determine whether to provide the funding under Phase III or Phase IV.

- ***Ensure that program staff are effective, knowledgeable, and accountable to defined performance metrics.*** Engaged and knowledgeable staff are essential to successful programs. To this end, PPL Electric Utilities is committed to ensuring several qualities about its staff:
  - Have a full understanding of all aspects of their programs and the markets in which they operate.
  - Adhere to program-specific performance metrics to track, monitor, and analyze program success.
  - Benchmark program performance metrics against similar Pennsylvania and national programs.
  - Maintain effective relationships with trade allies through frequent communications and by striving to understand trade ally practices and business needs.
  - Possess a strong knowledge of customer preferences, behavioral triggers, motivations, and barriers.

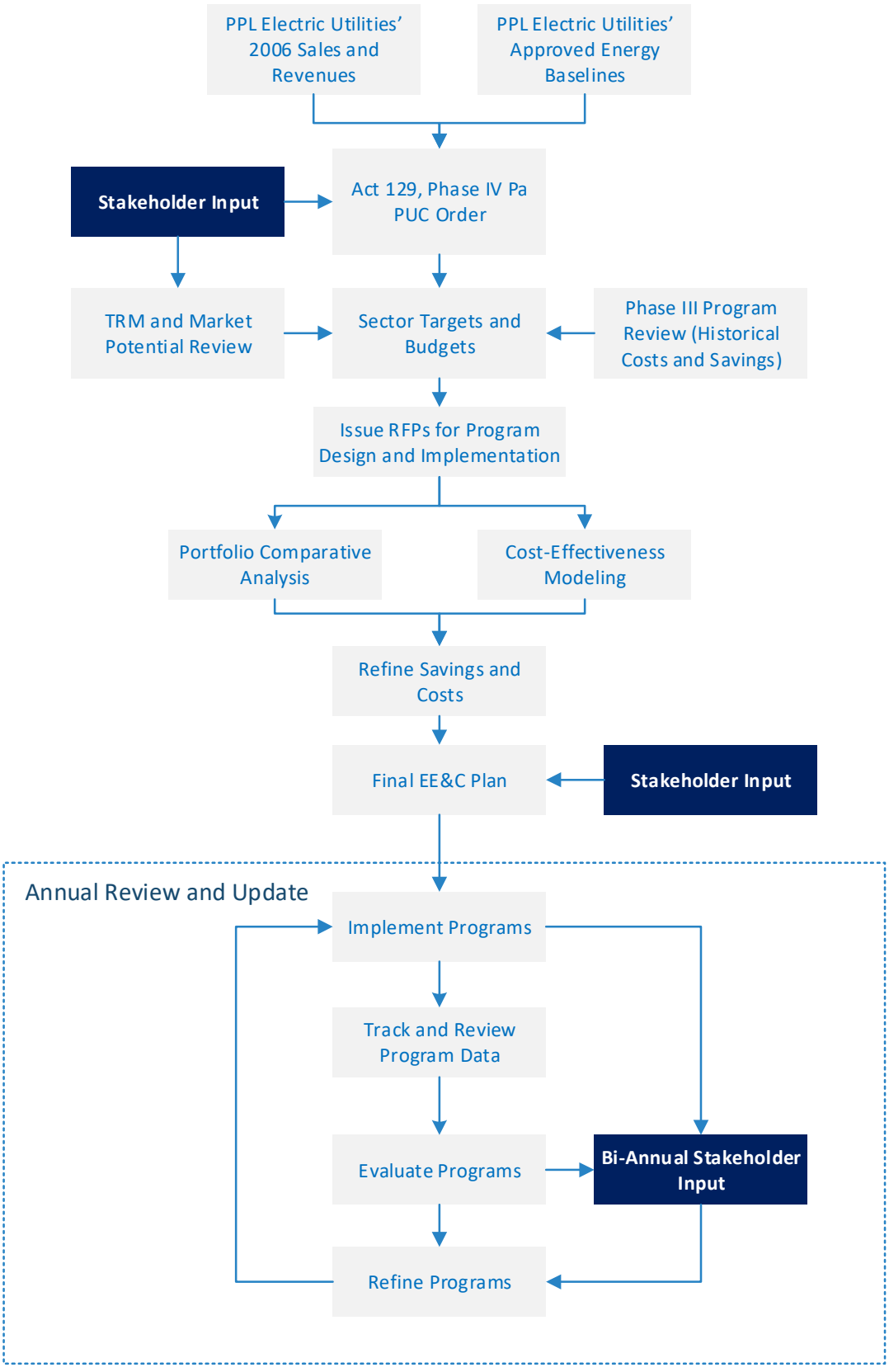
1.2 Plan Development Process and Key Assumptions

PPL Electric Utilities began developing the EE&C Plan shortly after the Pa PUC entered the Tentative Implementation Order on March 12, 2020, at Docket No. M-2020-3015228. After more than a decade of offering Act 129 programs, PPL Electric Utilities has cultivated an experienced professional staff of program managers who work closely with CSPs, trade allies, customers, and stakeholders to seek their input on programs and measures.

The Company designed the Plan to comply with Act 129's requirements and the Commission's Implementation Order and to draw on the Phase IV market potential studies (for energy efficiency and demand response), experience from Phase I through Phase III, stakeholder input, and the RFP responses from program implementers who informed the overarching strategy.

To achieve the Commission's energy savings targets within the required budget caps, PPL Electric Utilities looked to the implementation market for solutions. By issuing competitive RFPs requesting innovative strategies from potential implementation contractors, the Company was able to identify an optimal mix of measures and programs that can achieve significant energy savings at a comparatively low acquisition cost. Figure 1 summarizes PPL Electric Utilities' process for developing the Plan and ensuring continuous improvement.

Figure 1. Process for Developing the Plan



1.2.1 Principles Guiding Development of the Plan

PPL Electric Utilities has a longstanding commitment to energy efficiency and helping customers use electricity wisely and save on their electricity bills. The Company relies on several principles to guide development of the measures, programs, and implementation strategies in its portfolio:

- ***Customer focus.*** During Phase I through Phase III, PPL Electric Utilities has consistently focused on the customer and improved its programs to meet changing customer and market preferences. The Company designed its portfolio to educate and empower customers to take actions that save energy and money by providing personalized customer service, accelerated rebate processing, and clear and easy-to-understand program information on its website and program applications. Phase IV will continue to build on the virtual strategies the Company began in Phase III for the sake of customer safety and convenience. Through the Plan, PPL Electric Utilities offers a diverse range of information, education, and incentives to help its customers engage in energy efficiency and make informed, sustainable choices that will have a lasting impact on their energy costs.
- ***Compliance with Act 129.*** Consistent with the requirements of Act 129 and the Implementation Order, PPL Electric Utilities developed a portfolio of cost-effective energy efficiency programs that consider stakeholders' input and will generate the energy savings and peak demand reductions needed to meet the goals required by Act 129 and the Commission. The Plan is designed to exceed PPL Electric Utilities' compliance targets by approximately 39% MWh and 8% MW and within the budget cap.
- ***Flexibility to address changing market conditions.*** PPL Electric Utilities designed its Plan to achieve its EE&C targets within its designated budget cap even as market conditions and customer preferences change over time. The Company achieves this objective through specific actions:
  - Rely on a diverse set of proven, market-ready, and cost-effective energy efficiency (electric) technologies and conservation strategies.
  - Use an overarching program structure and CSPs that will help achieve economies of scale by consolidating program component-level administrative and delivery functions and by encouraging customer participation in multiple program components through effective cross-promotion and having a single view of the customer across all measures and components.
  - Provide multiple program options and controls that help PPL Electric Utilities manage the pace of programs (to achieve the savings and costs in the EE&C Plan) and reduce the frequency of formal EE&C Plan changes. These include modifying marketing tactics, adjusting incentive levels within specified ranges, offering different measures at different times, and offering multiple delivery channels.
- ***Effective program design.*** To design these programs, the Company relied on proven, cost-effective technologies and delivery strategies and based its participation, savings, and cost

projections on well-researched market potential data, historical performance, and analysis of regional and national trends in similar markets.

- ***Equitable programs.*** PPL Electric Utilities examined Phase III evaluation findings to identify the priorities, opportunities, and challenges faced by the variety of customer sectors, trade allies, and market partners that its programs serve. The Company designed the EE&C Plan to prioritize equity by capitalizing on identified opportunities and by mitigating challenges for disadvantaged customers. The Plan includes a range of measures and programs designed to meet the needs of all of PPL Electric Utilities' customers, with savings and costs distributed equitably across all customer sectors.
- ***Market acceptance.*** PPL Electric Utilities designed its Plan to stimulate market acceptance and installation of energy efficient technologies. The Company works closely with retailers, distributors, contractors, and other trade allies to encourage them to stock, specify, and promote energy efficient technologies. The EE&C Plan includes provisions for training and education; outreach to trade allies, distributors, and stakeholders; and an active awareness campaign to increase customer knowledge about and acceptance of the benefits of energy efficient equipment and to keep them informed about new advances in energy efficient products. PPL Electric Utilities will continue to encourage the wide availability of program-eligible energy efficiency measures and to support increasing demand for energy efficient products and equipment. The Company will monitor and adjust its programs' performance as required if programs are not successful or if NTG ratios are low.
- ***Commitment to low-income customers.*** The EE&C Plan continues PPL Electric Utilities' commitment to helping low-income customers reduce their electricity consumption. PPL Electric Utilities will continue its successful Low-Income Assessment component.

1.2.2 Developing the Portfolio

In its RFPs, the Company challenged bidders to propose a portfolio of program components that could achieve the required savings targets within the allocated budget. Specifically, each program must be designed to achieve verified gross energy savings and peak demand reduction that is approximately proportional to its customer mix and based on historical program performance over the five-year Plan period and to capture at least 15% of the total cumulative savings each year. Additionally, the Company required each program to meet its savings objective at a proportional total direct program cost (including incentives and non-incentives incurred by the CSP and excluding the allocation of common, portfolio-level costs) and overall cost (including common costs) within its overall budget cap. See Section 2 for program costs and savings detail in Table 10.

PPL Electric Utilities further directed its CSPs to adhere to its overall guiding principles and to comply with additional design features tailored to each customer sector, as described below.

- Residential Program
  - Achieve acceptable NTG ratios as determined by PPL Electric Utilities, its evaluator, or the SWE.

  - Wherever possible, be cost-effective as determined by the Pennsylvania 2021 TRC test method.
  - Offer diverse and comprehensive measure choices to all residential customers across PPL Electric Utilities' entire service territory.
  - Achieve high customer satisfaction (where at least 85% of customers rate themselves as *very satisfied* or *satisfied*).
- Low-Income Program
  - Offer a low-income component at no cost to households that are at or below 150% of the FPIG according to the U.S. Department of Health and Human Services in January of each program year.[9]
  - Provide a variety of energy efficiency measures and strive to maximize savings, within budget constraints, from direct install measures.
  - Achieve high customer satisfaction where at least 85% of customers rate themselves as *very satisfied* or *satisfied*).
  - Provide a broad selection of energy efficiency measures to qualifying low-income households.
  - Address renters and owners of single-family homes, multifamily buildings that are in the residential customer class and are occupied by low-income customers, and manufactured homes.
  - Offer information to Low-Income Assessment participants regarding PPL Electric Utilities' other universal service and energy conservation programs, such as the Company's Customer Assistance Program (*i.e.*, OnTrack).[10]
- Non-Residential Program
  - Achieve high customer satisfaction (where at least 85% of customers rate themselves as *very satisfied* or *satisfied*).
  - Offer a broad selection of energy efficiency measures across multiple end uses as well as to both the small C&I and large C&I customer segments across PPL Electric Utilities' service territory.
  - Achieve acceptable NTG ratios as determined by PPL Electric Utilities, its evaluator, or the SWE.
  - Be cost-effective as determined by the TRC test method.

PPL Electric Utilities worked with Cadmus to model program- and portfolio-level cost-effectiveness based on projected peak load reductions, energy savings, and costs (such as delivery, incentives,

[9] The Low-Income Program is not required to be cost-effective (per the 2021 TRC Test Order) as long as the EE&C portfolio overall is cost-effective.

[10] Through its OnTrack Program, PPL Electric Utilities offers reduced monthly payments to assist low-income customers with account balances in arrears.

incremental measure, and participant costs). PPL Electric Utilities provided the lifecycle costs, savings, and avoided cost benefits, enabling Cadmus to compute the cost-effectiveness from a TRC perspective.[11] The key assumptions used to estimate energy savings and peak demand reduction, calculate costs, and determine cost-effectiveness are listed in Section 8.

Finally, PPL Electric Utilities iteratively adjusted the expected number of participants and customer incentive levels for each program component and for each measure to balance the portfolio, meet all savings targets, increase cost-effectiveness, and stay within the budget for each customer sector.

1.3 Summary Tables of Portfolio Savings Goals, Budgets, and Cost-Effectiveness

The tables in this section summarize the estimated savings, budget, and cost-effectiveness for PPL Electric Utilities' entire portfolio. The tables are numbered sequentially, with the formats matching those provided in the EE&C Plan Template issued by the Commission on September 9, 2020, at Docket No. M-2020-3015228. Each table caption includes a reference to the corresponding table number provided in the EE&C Plan Template:

- Table 3. Pa PUC Table 1 - Portfolio Summary of Lifetime Costs and Benefits of Energy Efficiency Measures
- Table 4. Pa PUC Table 2 - Summary of Portfolio Energy and Demand Savings (Meter-Level)
- Table 5. Pa PUC Table 3 - Summary of Portfolio Energy and Demand Savings (System-Level)
- Table 6. Pa PUC Table 4 - Summary of Portfolio Costs

Table 3. Pa PUC Table 1 - Portfolio Summary of Lifetime Costs and Benefits of Energy

Portfolio	Total Discounted Lifetime Costs ($000)[1]	Total Discounted Lifetime Benefits ($000)	Total Discounted Net[2] Lifetime Benefits ($000)	Cost-Benefit Ratio (TRC)
Residential (exclusive of Low-Income)[3]	$135,548	$153,247	$17,699	1.13
Low-Income	$43,977	$19,144	$(24,833)	0.44
Commercial/Industrial Small	$226,867	$354,590	$127,722	1.56
Commercial/Industrial Large	$369,257	$383,384	$14,127	1.04
Total	**$775,649**	**$910,364**	**$134,716**	**1.17**

[1] Discounted common costs are included in the appropriate sector totals. See Table 55 (Pa PUC Table 11) for the allocation of common costs.

[2] "Net" refers to the arithmetic difference between the previous two columns. It does not refer to net verified savings.

[3] The Implementation Order disallowed the inclusion of low-income participation in standard, non-low-income-specific residential programs in the calculation of savings towards the low-income carve-out.

[11] The calculation methods and assumptions used for estimating all program costs are provided in Appendix C.

Table 4. Pa PUC Table 2 - Summary of Portfolio Energy and Demand Savings

MWh Saved for Consumption Reductions (Meter-Level)	PY13		PY14		PY15		PY16		PY17		Total	
	1st-Year MWh	Lifetime MWh	1st-Year MWh	Lifetime MWh	1st-Year MWh	Lifetime MWh	1st-Year MWh	Lifetime MWh	1st-Year MWh	Lifetime MWh	1st-Year MWh	Lifetime MWh
Baseline[1]	38,214,368		38,214,368		38,214,368		38,214,368		38,214,368		38,214,368	
Residential Sector (*exclusive of Low-Income*) **– Cumulative Projected Portfolio Savings**	39,768	482,159	81,282	988,466	121,218	1,468,993	160,369	1,935,614	199,312	2,396,940	199,312	2,396,940
Low-Income Sector – Cumulative Projected Portfolio Savings	12,712	69,297	28,420	154,920	45,625	248,706	62,830	342,492	74,793	407,706	74,793	407,706
Commercial/Industrial Small Sector – Cumulative Projected Portfolio Savings	102,924	1,402,529	214,171	2,927,008	326,250	4,469,658	434,846	5,965,812	545,004	7,487,697	545,004	7,487,697
Commercial/Industrial Large Sector – Cumulative Net Weather Adjusted Savings	138,124	1,976,773	284,686	4,080,107	432,229	6,202,784	577,160	8,290,924	721,578	10,372,285	721,578	10,372,285
EE&C Plan Total – Cumulative Projected Savings	293,528	3,930,758	608,559	8,150,501	925,321	12,390,141	1,235,204	16,534,842	1,540,687	20,664,628	1,540,687	20,664,628
Estimated Phase III Carryover Savings											200,000	
Total Cumulative Projected Savings Phase IV + Estimated Phase III Carryover Savings	293,528		608,559		925,321		1,235,204		1,540,687		1,740,687	
EE&C Plan Total – Percentage of Target to be Met[2]	23%		49%		74%		99%		123%		139%	
Percent Reduction from Baseline	1%		2%		2%		3%		4%		5%	
Commission-Identified Goal[2]											1,250,157	
Percent Savings due to Portfolio Above or Below Commission-Identified Goal											39%	

[1] As defined in the Implementation Order.

[2] The Implementation Order directed that electric distribution companies ("EDCs") achieve at least 15% of the target amount in each program year.

Table 5. Pa PUC Table 3 - Summary of Portfolio Energy and Demand Savings

MW Saved for Consumption Reductions (System-Level)	PY13		PY14		PY15		PY16		PY17		Total[3]	
	1st-Year MW	Lifetime MW	1st-Year MW	Lifetime MW	1st-Year MW	Lifetime MW	1st-Year MW	Lifetime MW	1st-Year MW	Lifetime MW	1st-Year MW	Lifetime MW
Baseline[1]												
Residential Sector (*exclusive of Low-Income*) **– Cumulative Projected Portfolio Savings**	11.38	11.38	22.94	22.94	32.23	32.23	40.31	40.31	47.79	47.79	47.79	47.79
Low-Income Sector – Cumulative Projected Portfolio Savings	1.68	1.68	3.75	3.75	6.02	6.02	8.29	8.29	9.86	9.86	9.86	9.86
Commercial/Industrial Small Sector – Cumulative Projected Portfolio Savings	17.06	17.06	35.23	35.23	53.41	53.41	71.02	71.02	88.86	88.86	88.86	88.86
Commercial/Industrial Large Sector – Cumulative Net Weather Adjusted Savings	19.59	19.59	40.26	40.26	60.97	60.97	81.28	81.28	101.51	101.51	101.51	101.51
EE&C Plan Total – Cumulative Projected Savings	49.71	49.71	102.18	102.18	152.64	152.64	200.90	200.90	248.03	248.03	248.03	248.03
EE&C Plan Total – Percentage of Target to be Met[2]	22%	22%	45%	45%	67%	67%	88%	88%	108%	108%	108%	108%
Percent Reduction from Baseline												
Commission-Identified Goal[1]											229	229
Percent Savings due to Portfolio Above or Below Commission-Identified Goal											8%	8%

[1] As defined in the Implementation Order.

[2] The Implementation Order directed that EDCs achieve at least 15% of the target amount in each program year.

[3] Demand savings in this table are at generation.

Table 6. Pa PUC Table 4 - Summary of Portfolio Costs[1]

Sector	PY13		PY14		PY15		PY16		PY17	
	$000	%	$000	%	$000	%	$000	%	$000	%
Residential Portfolio Annual Budget	$13,424	22%	$13,717	21%	$12,845	20%	$12,443	20%	$12,318	20%
Low-Income Portfolio Annual Budget	$7,417	12%	$8,673	14%	$9,310	15%	$9,326	15%	$7,174	12%
Commercial/Industrial Small Portfolio Annual Budget	$14,980	25%	$15,662	24%	$15,624	24%	$15,211	24%	$15,362	25%
Commercial/Industrial Large Portfolio Annual Budget	$16,696	27%	$17,413	27%	$17,456	27%	$17,180	27%	$17,162	28%
Common Costs[2]	$8,620	14%	$8,620	13%	$8,620	13%	$8,620	14%	$8,620	14%
Total Portfolio Annual Budget	**$61,137**	**100%**	**$64,085**	**100%**	**$63,855**	**100%**	**$62,780**	**100%**	**$60,635**	**100%**

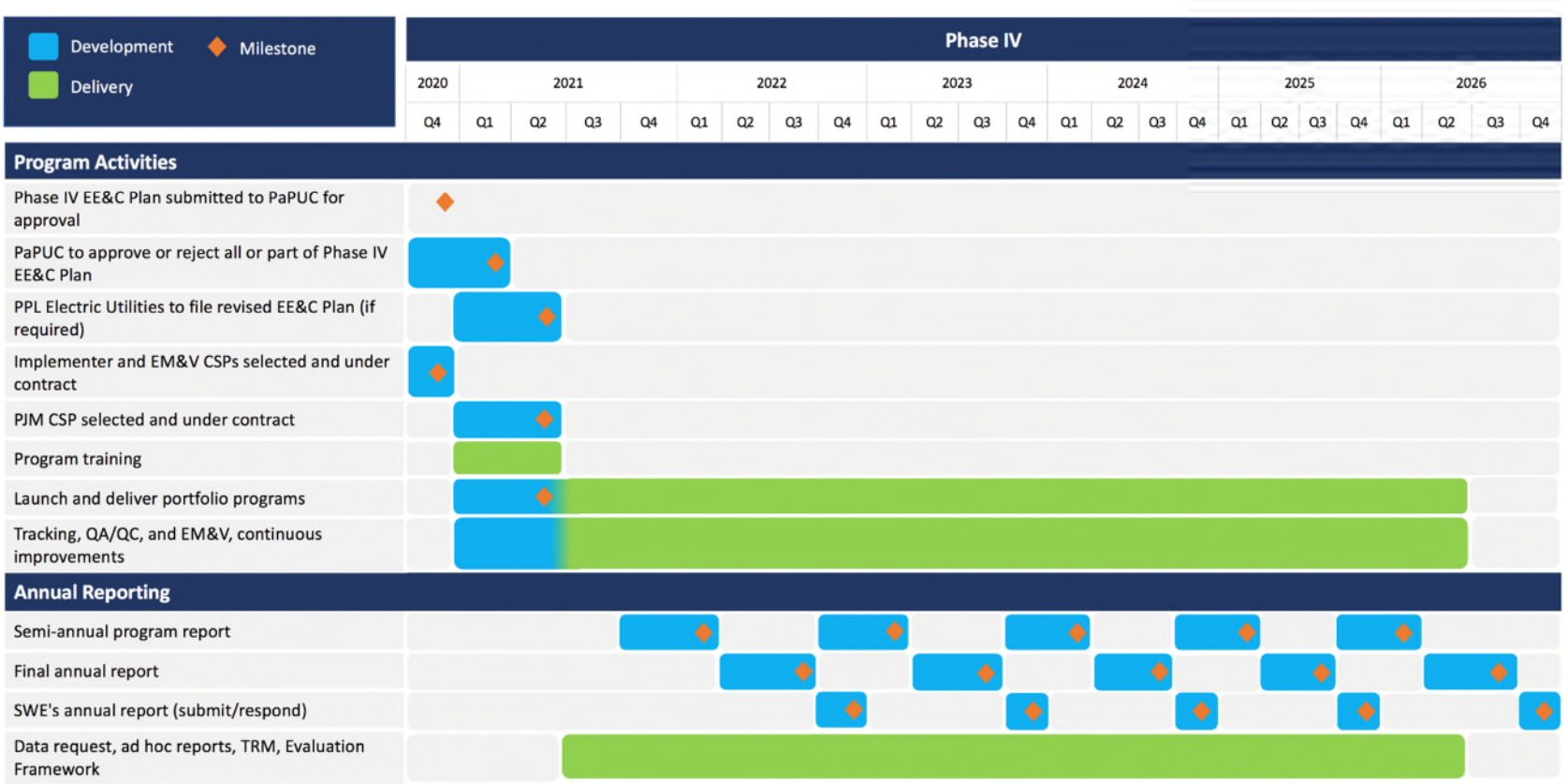
[1] Values in this table are nominal.

[2] Includes $5 million of SWE costs.

1.4 Summary of Program Implementation Schedule

Table 7 provides a visual summary of PPL Electric Utilities' implementation schedule in accordance with the Commission's EE&C Plan Template.

Table 7. PPL Electric Utilities Implementation Schedule



1.5 Strategy to Acquire 15% of Consumption Reduction and Peak Demand Reduction Target Each Program Year

Consistent with the Implementation Order, PPL Electric Utilities designed its programs to achieve at least 15% of the total consumption reduction target in each program year. The Company directed its CSPs to develop implementation strategies that also reflect this objective. The EE&C Plan includes many components and measures that will continue from Phase III. PPL Electric Utilities has significant experience with these measures and programs and believes it can control the programs' pace, as it has in previous phases. In addition, PPL Electric Utilities designed the EE&C Plan to focus on energy efficiency measures that provide coincident peak demand reduction opportunities.

PPL Electric Utilities will monitor actual performance, adjusting marketing, advertising, incentive levels, and eligible measures to manage participation as necessary to achieve at least 15% of its portfolio target annually.

1.6 Summary Description of the Programs or Measure Categories from which the Electric Distribution Company (EDC) Intends to Nominate Peak Demand Reduction into PJM's Forward Capacity Market (FCM), along with the Projected Megawatt Totals to be Bid by Year

Per the Implementation Order, PPL Electric Utilities will rely on energy efficiency measures with coincident peak demand reduction potential, such as lighting and cooling, in all its sector-level programs to achieve its annual and total peak demand reduction targets. Relying on this strategy will help the Company deliver consistent long-term peak demand reduction benefits at a lower cost than through targeted demand response programs.

PPL Electric Utilities will solicit bids from qualified third-party vendors to provide technical support to nominate a portion of its peak demand reduction as a capacity resource into PJM's FCM. At that time, PPL Electric Utilities will identify eligible peak demand reduction measures for nomination for each program. PPL Electric Utilities will own the forward capacity rights and the ability to bid this capacity into the PJM FCM for any energy efficiency project, measure installed, or product purchased, that includes an upstream/downstream/midstream discount, direct discount, rebate or incentive paid, or free measures installed or provided by PPL Electric Utilities, their representative CSP, partners, trade allies or distributors.

1.7 Strategy to Manage EE&C Portfolio and Engage Customers and Trade Allies

For its implementation strategy, PPL Electric Utilities will rely on a broad range of CSPs, employees, trade allies, community agencies, stakeholders, and other entities engaged in energy efficiency to promote, deliver, and support the effective deployment of programs.

PPL Electric Utilities will use two program-level CSPs—one CSP will implement the residential and non-residential (small C&I and large C&I) programs and one CSP will deliver the low-income program—to

deliver its portfolio. These CSPs will have the primary responsibility to design and deliver the EE&C programs, including marketing, customer care, application and rebate processing, and development and maintenance of effective trade ally networks, while jointly developing marketing plans with PPL Electric Utilities. In addition, PPL Electric Utilities will provide some overarching marketing and customer care for EE&C programs. PPL Electric Utilities will also enhance its marketing efforts and customer experience by developing an energy analyzer.

PPL Electric Utilities based its implementation strategy on an assessment of features needed to engage customers in EE&C programs and encourage them to take energy efficient actions. The engagement approach involves active, ongoing outreach to customers and trade allies. The Company follows several key strategies:

- Conduct annual EM&V to obtain several objectives:
  - Identify marketing channels and tactics most likely to elicit responses from customers and trade allies.
  - Understand drivers, motivations, and challenges to implementing energy efficiency upgrades among specific customer segments and related to common customer characteristics.
  - Develop messaging strategies matched to key customer and trade ally drivers.
  - Assess customer response to programs and evaluate whether programs are meeting customer needs.
- Offer a range of voluntary customer programs that provide tangible benefits.
- Emphasize customer service among PPL Electric Utilities staff, CSPs, and trade allies.
- Evaluate customer satisfaction and response.
- Modify programs as necessary to improve programs and customer satisfaction.
- Coordinate with trade allies, community-based organizations, and other local market participants through outreach, training, and co-marketing so that these partners are aware of PPL Electric Utilities' programs, can effectively articulate program features and benefits to potential customers, and can support customers in their decision to take energy efficiency actions.

In addition to CSPs' and PPL Electric Utilities' marketing, the success of Phase IV programs will depend on trade allies and other market partners to engage customers, promote programs, evaluate projects, and stock and install energy efficient equipment. The Company's objective is to strike a reasonable balance of costs, ratepayer value, customer choice, quality service, and energy and capacity savings. If necessary to achieve savings objectives, the Company will offer incentives to trade allies that promote, stock, and install efficient measures included in the EE&C Plan.

1.8 Data Management, Quality Assurance, and Evaluation Processes

The following sections describe the Company's approach to implementing data management, QA/QC, and evaluation processes.

1.8.1 Data Management

Each CSP's tracking system and PPL Electric Utilities' tracking database allow for program activities to be tracked daily. These systems generate reports and queries to allow for ongoing monitoring, management, analysis, and reporting of activities.

1.8.2 Quality Assurance and Quality Control

During planning and design, PPL Electric Utilities will continue to follow QA procedures to promote consistency and avoid errors. QC activities and inspection points during the implementation and evaluation phases help guide the correction of errors and identification of areas for improvement. Together, QA and QC will improve program performance.

PPL Electric Utilities will employ QA/QC procedures for Act 129 at various levels of program implementation, including CSP recruitment and training, data tracking, program operations, and inspections:

- Anticipate, detect, and prevent problems or errors rather than reacting to them.
- Strive to perform work correctly the first time.
- Establish screening and qualification protocols to confirm that qualified individuals perform all work functions.
- Train staff, CSPs, and trade allies to maintain current knowledge and skills needed for their positions.
- Document data collection and QA/QC protocols and conduct a full review to confirm that the proper data are collected consistently, resources are allocated appropriately, and program performance can be measured accurately.
- Conduct adequate planning, coordination, supervision, and technical direction.
- Define and develop a clear understanding of job requirements and procedures.
- Conduct post-installation inspections of an appropriately sized random sample of participants to confirm that the program-reported measures were installed, followed best practices and procedures, and function as expected.

A detailed description of PPL Electric Utilities' QA/QC protocols and standards is provided in Section 6**.**

1.8.3 Evaluation Processes

PPL Electric Utilities' EM&V CSP will conduct ongoing and annual evaluations of each program in compliance with all Pa PUC requirements and the Evaluation Framework. As part of this process, the EM&V CSP will develop an Evaluation Plan that describes the EM&V scope of work, objectives, methods, and activities for evaluating program impacts, processes, cost-effectiveness, net savings analysis, and QA/QC protocols.

The EM&V CSP will develop this Evaluation Plan in accordance with Evaluation Framework requirements and submit it to the SWE for review and approval. PPL Electric Utilities and the EM&V CSP will review (at least annually) and may update the Evaluation Plan if changes are made to programs, participation levels, savings levels, or Act 129 evaluation requirements.

The EM&V CSP will conduct evaluations annually, focusing the impact evaluation on developing accurate estimates of the programs' actual savings based on protocols developed by the SWE and the Commission, as summarized in the Evaluation Framework and the Pennsylvania Technical Reference Manual ("TRM"), as well as in the Pa PUC's Implementation Order. The impact evaluation also will include an assessment to confirm that all data required for the impact evaluation are collected (evaluability assessment). For the process evaluation, the CSP will focus on qualitative assessments of the programs' design, operation, and implementation.

The CSP will also conduct annual evaluations to determine the cost-effectiveness of the programs and portfolio using the TRC test method specified by the Commission in its 2021 TRC Test Order.

Finally, the CSP will conduct net savings evaluations as indicated by the Evaluation Framework and outlined in the Evaluation Plan to determine the net verified savings of each program. Net savings include the effects of free ridership and spillover. The EM&V CSP may also propose to conduct market effects studies to understand changes in the market and to further inform net savings. Guidance for net savings analyses are provided in the Evaluation Framework, with periodic updates from the SWE and the NTG Working Group.

Over the life of the Phase IV EE&C Plan, PPL Electric Utilities expects to revisit and revise a number of assumptions to reflect updated market conditions. The Company will submit required revisions to the Commission for review and approval in accordance with the Commission's requirements for revising EE&C Plans.

1.9 Cost Recovery Mechanism

Act 129 directs each EDC to establish a reconcilable cost recovery tariff mechanism in accordance with 66 Pa. C.S. § 1307 and to include this mechanism in its EE&C Plan (66 Pa. C.S. § 2806.1(b)(1)(i)(H), (k)(1)).

2 Energy Efficiency Portfolio/Program Summary Tables and Charts

The following tables provide a quantitative overview of the Phase IV Plan. Note that tables in this section are numbered sequentially, but the applicable table formats are based on those provided in the Commission's EE&C Plan Template (as noted below). The table captions include references to the corresponding table numbers provided in the EE&C Plan Template.

Tables in this section are the following:

- Table 8. Pa PUC Table 5 – Residential, C&I Small, and C&I Large Portfolio Summaries
- Table 9. Pa PUC Table 6 – Budget and Parity Analysis
- Table 10. Summary of Costs and Savings by Program and Customer Sector

Table 8. Pa PUC Table 5 - Residential, C&I Small, and C&I Large Portfolio Summaries

Program Name	Component Name	Program Market	Program Two-Sentence Summary	Program Years Operated	Lifetime MWh Savings	Lifetime MW Savings	Percentage of Portfolio Resource Savings (MWh% and MW%)	
Residential Portfolio Program (*exclusive of Low-Income)*	Appliance Recycling	All customers (primarily residential)	Free pick up and recycling of inefficient refrigerators, freezers, room air conditioners and possibly dehumidifiers. Incentive paid for each eligible appliance.	PY13 - PY17	142,556	6,130	1%	3%
	Efficient Lighting – Specialty Bulbs	All customers (primarily residential)	Upstream retail promotion and incentives applied to eligible light emitting diode ("LED") specialty bulbs. Other distribution channels include online, mail, directly to customers, welcome kits, etc.	PY13 - PY17	191,446	13,081	1%	6%
	Energy Efficient Homes	Existing and new residential single family and multifamily homes	Offers rebates on a wide range of energy efficient measures for retrofit and new construction applications.	PY13 - PY17	1,736,782	21,867	8%	9%
	Student Energy Efficient Education	Residential customers: students and teachers	Energy efficiency education targeting primary and secondary grades, including classroom presentations, curriculum, and energy efficiency kits.	PY13 - PY17	326,155	2,868	2%	1%
	Home Energy Efficiency Report[1]	Residential single and multifamily	Education, online home energy surveys and Home Energy Reports comparing energy use to other customers in PPL Electric Utilities' service territory, and offering energy efficiency and demand response tips.	PY15 - PY17	-	-	0%	0%
	Totals for Residential Sector				2,396,940	43,946	12%	19%
Low-Income Sector Program	Low-Income Assessment	Income-qualified single family, multifamily and manufactured homes	Offers a range of free direct install energy efficiency measures to customers whose incomes are at or below 150% of FPIG.	PY13 - PY17	407,706	9,071	2%	4%
	Totals for Low-Income Sector				407,706	9,071	2%	4%

Program Name	Component Name	Program Market	Program Two-Sentence Summary	Program Years Operated	Lifetime MWh Savings	Lifetime MW Savings	Percentage of Portfolio Resource Savings (MWh% and MW%)	
Commercial/Industrial Small Portfolio Program	SCI- Custom and Efficient Equipment	Small C&I	Provides rebates/incentives for a list of qualified energy efficiency measures and custom measures not included in PPL Electric Utilities' other programs. Includes combined heat and power ("CHP"), process upgrades, retro-commissioning, and other measures.	Custom PY13 - PY17	2,002,359	19,201	10%	8%
				Efficient Equipment PY13 - PY17	5,485,338	62,510	27%	27%
	Totals for C&I Small Sector				7,487,697	81,711	36%	35%
Commercial/Industrial Large Portfolio Program	LCI-Custom and Efficient Equipment	Large C&I	Provides rebates/incentives for a list of qualified energy efficiency measures and custom measures not included in PPL Electric Utilities' other programs. Includes CHP, , process upgrades, retro-commissioning, and other measures.	Custom PY13 - PY17	6,972,229	59,099	34%	25%
				Efficient Equipment PY13 - PY17	3,400,056	38,322	16%	17%
	Totals for C&I Large Sector				10,372,285	97,421	50%	42%
Totals for Plan					20,664,628	232,148	100%	100%

[1] Although PPL Electric Utilities does not currently project participation for HERs in the Phase IV Plan, the Company may decide to offer HERs within the Phase IV period, within the approved budget, and therefore includes the HERS component in this table.

Table 9. Pa PUC Table 6 - Budget and Parity Analysis

Customer Sector	Phase IV EE&C Budget (inclusive of allocated common cost)	% of Total EDC EE&C Budget	% of EDC Total Annual Revenue	% of EDC Total MWh Sales
Residential Sector (*exclusive of Low-Income*)	$74,769,337	24%	52%	39%
Low Income Sector[1]	$48,386,207	15%		
Residential Subtotal	$123,155,544	39%	52%	39%
Commercial/Industrial Small Sector	$89,392,278	29%	26%	39%
Commercial/Industrial Large Sector	$99,943,535	32%	22%	22%
Non-Residential Subtotal	$189,335,813	61%	48%	61%
EDC TOTAL	**$312,491,356**	**100%**	**100%**	**100%**

[1] Customers in the Low-Income sector are all customers in the residential customer class. Therefore, the Low-Income sector's figures are included in the Residential part of this table.

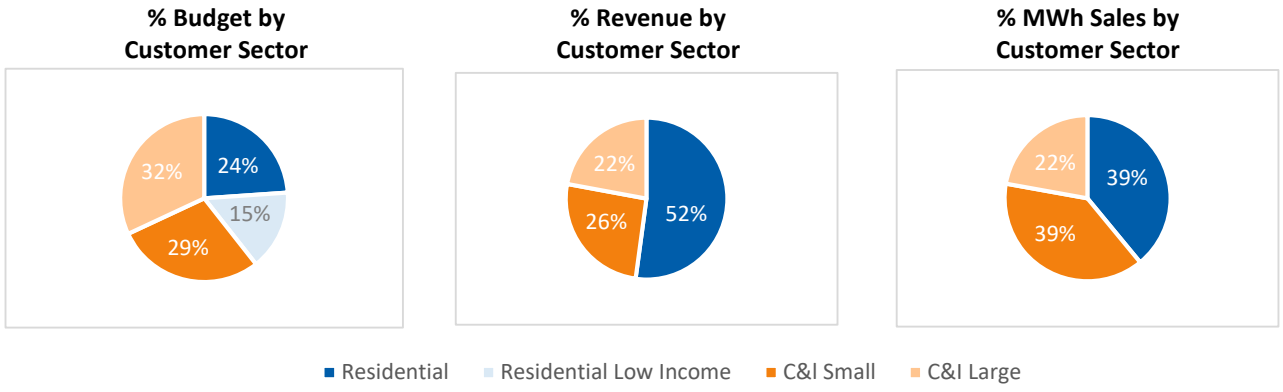


Table 10. Summary of Costs and Savings by Program and Customer Sector[1]

Component	Residential			Low-Income			Small C&I			Large C&I			Total Cost ($1000)	Total MWh/yr. Reduc-tion[2,3]	$/kWh[4]	Total MW Reduc-tion[2,5]	$/kW[4,8]
	Costs ($1000)	Savings MWh/yr[2]	Savings MW/yr[2]	Costs ($1000)	Savings MWh/yr[2]	Savings MW/yr[2]	Costs ($1000)	Savings MWh/yr[2]	Savings MW/yr[2]	Costs ($1000)	Savings MWh/yr[2]	Savings MW/yr[2]					
Total Residential Program	$64,747	199,312	48										$64,747	199,312	$0.32	48	$1,355
Total Low-Income Program				$41,900	74,793	10							$41,900	74,793	$0.56	10	$4,248
Total Non-Residential Program							$76,838	545,004	89	$85,906	721,578	102	$162,745	1,266,582	$0.13	190	$855
Total - Direct Program Costs	**$64,747**			**$41,900**			**$76,838**			**$85,906**			**$269,391**				
Percent of Total Direct Costs [6]	24.03%			15.55%			28.52%			31.89%			100%				
Common Costs Allocation [7]	$10,023			$6,486			$12,554			$14,037			$43,100				
TOTAL ESTIMATED EE&C PLAN COST[7]	**$74,769**			**$48,386**			**$89,392**			**$99,944**			**$312,491**				
Estimated SWE Cost													**$5,000**				
Total Cost excluding SWE Costs													**$307,491**				
Total Estimated Phase IV MWh/Yr Reduction [3]		199,312			74,793			545,004			721,578			1,540,687			
Total Estimated Phase IV MW Reduction [5]			48			10			89			102				248	
Phase IV Cost Cap													$307,506				
Energy Reduction Compliance Target (MWh/year) [3]					72,509									1,250,157			
Peak Demand Reduction Compliance Target (MW) [5]																229	
$/kWh (direct & common) for energy efficiency programs	$0.38			$0.65			$0.16			$0.14					$0.20		
Carryover from Phase III					20,000									200,000			
Total Plan and Carryover MWh/yr					94,793									1,740,687			

[1] Peak demand savings are gross verified MW at the generator level (grossed up to reflect transmission and distribution ("T&D") line losses).
[2] Savings are for measures installed and operable from June 1, 2021, through May 31, 2026.
[3] MWh/year are on a verified gross basis.
[4] Program acquisition cost for energy efficiency programs equals program costs divided by first year's savings.
[5] MW are on a verified gross basis.
[6] Direct percentages are slightly different for common costs as none of the Key Account Management costs are allocated to residential or low income sectors.
[7] Includes $5 million SWE costs that are not subject to the cost cap.
[8] $/kW are rounded values.

3 Program and Component Descriptions

3.1 Process Used for Selection of Programs and Components

To enhance customer engagement in energy efficiency, PPL Electric Utilities revised the structure of its program offerings for Phase IV. Rather than offering a portfolio of individual programs consisting of bundled measure offerings, PPL Electric Utilities' Phase IV Plan will focus on providing each target customer sector with comprehensive solutions. PPL Electric Utilities will contract with implementation CSPs that will be tasked with providing balanced, integrated offerings to customers in the sector(s) over which they are responsible.

Customers are typically unaware of the existence of program designations; they simply want to find information easily, have a smooth participation process, and receive their incentive quickly. Under the new design, customers in the key sector will have the opportunity to implement as many, or as few, of individual energy efficiency and peak demand improvements as they like. PPL Electric Utilities designed its Phase IV programs to facilitate a seamless customer experience and provide the flexibility to enable customers who want deeper, more comprehensive efficiency upgrades to implement the project that best fits their needs and budget.

Because implementation CSPs will be tasked with (and will receive incentives for) delivering comprehensive solutions across an entire customer sector, they will be empowered to educate customers on the benefits of holistic energy efficiency strategies and to cross-promote appropriate solutions that result in more complete retrofits and higher energy and peak demand savings per participant. This comprehensive, solutions-based portfolio approach is consistent with best practices and industry trends.

The revised portfolio structure offers PPL Electric Utilities an opportunity to capture operational efficiencies, facilitate more extensive promotion and participation, encourage deeper energy efficiency and peak demand enhancements per customer, and have greater flexibility and control to manage program delivery and achieve objectives. Each program comprises components through which PPL Electric Utilities can deliver targeted offerings to its customers based on the predominant operational and delivery characteristics of that component.

These program components are very similar to the successful offerings in Phases I through III. Under its revised program design strategy, PPL Electric Utilities will continue to administer, evaluate, and report on program performance at a component level. PPL Electric Utilities developed separate budgets, savings targets, and performance objectives for each program—residential, low-Income, and non-residential—and for the associated program components. Delineation of components will be largely invisible from a customer perspective, especially in the residential sector. Access to individual measures or whole home solutions will be broadly customizable and solely at the customer's discretion. This strategy allows PPL Electric Utilities and its CSPs and trade allies to capitalize on the existing portfolio's momentum and enhance the customer experience by broadening customers' choices.

The remainder of this section provides details on individual programs, program components, and the analysis PPL Electric Utilities conducted to construct its Phase IV portfolio.

3.1.1 Portfolio Objectives and Metrics that Define Success

Portfolio Objectives

PPL Electric Utilities designed the Phase IV EE&C Plan to meet the requirements set forth by the Implementation Order and to achieve additional objectives associated with customer satisfaction and operational efficiency. These objectives are described in detail in Section 1 of this Plan.

Metrics that Define Success

The primary objectives of this Plan are to meet the requirements of Act 129 and encourage more efficient use of electric power by PPL Electric Utilities' customers. PPL Electric Utilities will monitor its progress in meeting these objectives by tracking specific performance indicators and, when deficiencies are found, identifying corrective action. The Company will employ a range of EM&V, QA/QC, and data tracking activities to assess and monitor program and component performance and customer and trade ally satisfaction throughout Phase IV. Table 11 identifies the performance indicators and metrics PPL Electric Utilities will use to measure program and component success.

Table 11. Key Indicators and Metrics for Monitoring Portfolio Success

Key Indicator	Metrics
Market Response	• Number of participants • Number of measures installed per participant • Participation benchmarked against industry norms • Feedback from trade allies
Impacts	• kWh/year savings • kW/year saving • Average project size
Customer and Trade Ally Satisfaction	• Responses to participant surveys administered as part of QA and/or EM&V • Feedback from trade allies
Operating Efficiency	• Application processing time • Incentive processing time • Expenditures in each category • Acquisition cost ($/kWh saved)[1] • Levelized cost ($/kWh saved)[1]
Cost-Effectiveness	• TRC benefit/cost ratio

[1] Acquisition cost is ratio of total EDC expenditures to annual kWh. Levelized cost is the full TRC cost (including participant cost) over lifetime kWh.

3.1.2 How Program Components Were Constructed

PPL Electric Utilities relied on its Phase III program designs as a template for assigning eligible energy efficiency and peak demand measures to specific program components for analyzing cost-effectiveness and impacts. The Company then examined new measures identified through the Phase IV market

potential studies, its Phase III experience, and other market research to assess the ability of these measures to supplement or enhance existing customer offerings. PPL Electric Utilities assigned each promising measure to one or more components and then estimated participation and costs based on previous experience and an analysis of Phase IV requirements, including compliance targets and associated budgets.

After defining sector-level budgets and targets, PPL Electric Utilities issued RFPs for the design and implementation (i.e., delivery) of the residential, non-residential, and low-income programs. These RFPs were intended to confirm that PPL Electric Utilities' savings targets and budgets were achievable and realistic for each sector and to confirm the types of programs, components, and measures to include in the EE&C Plan.

Each measure underwent an extensive technical and economic screening analysis (see Section 8) to determine component, program, and portfolio-level cost-effectiveness. This analysis was the basis for iteratively adjusting individual elements to balance the portfolio and provide a reasonable mix of programs to meet all the Act 129 requirements. These requirements include the low-income set-aside targets, the overall cost cap, equity and comprehensiveness across customer segments, and cost-effectiveness at the portfolio level. The result is a mix of proven energy efficiency and peak demand strategies that will enable PPL Electric Utilities to reach its program goals within the parameters set forth in Act 129 and the Implementation Order.

For the launch and delivery of programs in Phase IV, PPL Electric Utilities will capitalize on existing activities and relationships with market partners, rely on the implementation CSPs' delivery experience, and account for the seasonality of some program components to achieve its Act 129 goals.

PPL Electric Utilities' Phase IV programs are intended to provide comprehensive energy and peak demand savings across end uses, as shown in Figure 2.

Figure 2. End Uses Addressed, by Program

End-Use	Residential	Low Income	Non-Residential
Agricultural			●
Appliances	●	●	
Appliance Recycling	●	●	●
Audits	●	●	
CHP			●
Compressed Air			●
Cooling	●		
Cooling Chillers			●
Food Service			●
Heat Pump	●	●	●
Heating	●		
HVAC			●
Industrial			●
Kits	●	●	
Lighting	●	●	●
Lighting Controls			●
Miscellaneous	●	●	●
Motors, Pumps & Fans			●
New Homes	●		
Office Equipment			●
Plug Loads	●	●	
Pool Pumps	●		
Refrigeration (Commercial)			●
Thermostats	●	●	
Ventilation			●
Water Heat	●	●	●
Weatherization	●		

3.1.3 Measures Included in the Portfolio of Program Components

Measures to be offered in the Phase IV program components are described in Sections 3.2 through 3.4 (see the Eligible Measures and Incentive Strategy section in each program component description).

3.1.4 Comprehensive Measures to Be Offered

The Implementation Order directs EDCs to "include at least one comprehensive program for residential customers and at least one comprehensive program for non-residential customers."[12] To satisfy this requirement for residential customers, PPL Electric Utilities will offer two programs: (1) the Residential

[12] Implementation Order at 23.

Program targeting its non-low-income customers; and (2) the Low-Income Program targeting its low-income customers. Both programs will provide a comprehensive mix of cost-effective energy efficiency measures for all building types (single-family, multifamily, and manufactured homes and existing and new construction). Both programs will offer in-home energy audits that assess end uses, including weatherization, water heating, lighting (available through the Efficient Lighting component), HVAC, and appliances. Residential customers will receive energy efficiency and peak demand education and be encouraged to implement multiple measures and to take a comprehensive approach to energy efficiency.

To meet the requirement for non-residential customers, PPL Electric Utilities will offer the Non-Residential Program that will target business customers of all sizes and in every segment, as well as government and educational institutions and master metered low-income multifamily buildings, with a comprehensive range of prescriptive measures (including HVAC, lighting, and water heating) as well as opportunities to implement a custom efficiency project for measures not included in PPL Electric Utilities' Energy Efficient Equipment (prescriptive) component and not included in the TRM. Custom component measures cover a comprehensive set of non-residential needs, including new or replacement energy efficient and peak demand-saving equipment, retro-commissioning, repairs, equipment optimization, building management or industrial process controls, new construction projects, CHP, and operational and process improvements that result in cost-effective energy efficiency savings.

3.2 Residential Program (2021-2026)

The following sections describe the components in PPL Electric Utilities' proposed Residential Program:

- Appliance Recycling
- Efficient Lighting – Specialty Bulbs
- Energy Efficient Homes
- Student Energy Efficient Education

The next sections describe each component and their objectives; target market; implementation strategy; issues, risks, and risk management strategy; anticipated costs to participating customers; ramp-up strategy; marketing strategy; eligible measures and incentive strategy; deadline for rebate applications; start date with key schedule milestones; EM&V; administrative requirements; and estimated savings and participation. Please note that participation levels, savings, costs, and incentive ranges are estimates as directed by the Pa PUC EE&C Plan Template.

Table 12 lists estimated savings and costs by program year. The Residential Program budget is 20.7% of the total portfolio budget.[13]

Table 12. Pa PUC Table 9 - Residential Costs and Benefits by Program Year and Total ($1000)

Cost Element		PY13	PY14	PY15	PY16	PY17	Phase IV Total [1]
Total Budget ($000)		$13,424	$13,717	$12,845	$12,443	$12,318	$64,747
Incentives ($000)	Rebates	$3,132	$3,160	$3,188	$3,216	$3,246	$15,943
	Upstream/Midstream Buydown	$4,407	$4,506	$3,574	$3,075	$2,823	$18,385
	Kits	$938	$955	$973	$992	$1,011	$4,869
	Direct Install Materials & Labor	$343	$349	$356	$363	$370	$1,781
	Incentive Total	**$8,820**	**$8,971**	**$8,092**	**$7,646**	**$7,449**	**$40,977**
Non-Incentives ($000)	CSP Program Design	$46	-	-	-	-	$46
	CSP Administrative	$567	$595	$626	$651	$675	$3,115
	CSP Delivery Fees	$3,281	$3,437	$3,412	$3,422	$3,459	$17,012
	CSP Marketing	$490	$493	$495	$503	$515	$2,496
	EDC Administrative	$220	$220	$220	$220	$220	$1,100
	EDC Other	-	-	-	-	-	-
	Non-Incentive Total	**$4,604**	**$4,746**	**$4,753**	**$4,797**	**$4,869**	**$23,769**
Percent Incentives		66%	65%	63%	61%	60%	63%

[1] Total values may not equal the sum of all program year values due to rounding.

[13] This percentage represents the program budget without common costs over the total portfolio budget, which includes common costs.

The Residential Program is projected to be cost-effective, with a TRC test ratio of 1.13. Table 13 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio.

Table 13. Residential Program Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$153,247
NPV Costs	$135,548
Net Benefits	$17,699
Benefit/Cost Ratio	1.13

As noted in Section 1.6, PPL Electric Utilities will rely on energy efficiency measures with coincident peak demand reduction potential to achieve its annual and total demand reduction goals. PPL Electric Utilities will target end uses to nominate roughly 1 to 20% of eligible PJM peak demand savings from the Residential Program over the five-year Plan. PPL Electric Utilities is not aware at this time which measures will be nominated; however, they will likely include cooling and lighting. PPL Electric Utilities will competitively select a qualified third-party vendor to provide technical support in nominating a portion of its peak demand reductions as a capacity resource in PJM's FCM.

Appliance Recycling

Description

PPL Electric Utilities offers free pick-up and recycling of refrigerators, freezers, dehumidifiers, room air conditioners, and possibly consumer electronics (without savings or incentive). The Company offers customers a rebate for each recycled appliance, which must be plugged in and functioning when picked up. Room air conditioners, consumer electronics (if offered), and dehumidifiers are eligible for pick up with a refrigerator or freezer. PPL Electric Utilities may decide to allow dehumidifiers and room air conditioners as stand-alone measures. If feasible, the Company will offer small appliance pick-up events to which customers may bring room air conditioners and/or dehumidifiers for disposal and receive PPL Electric Utilities' incentives. The component will have the flexibility to offer in-person home pick-up or contactless curbside pick-up.

PPL Electric Utilities offers scheduling, pick-up, and decommissioning of refrigerators and freezers units and transports the units to a Pennsylvania-based processing center for disposal in an environmentally responsible manner. The disposal process involves removing hazardous materials, such as chlorinated fluorocarbons, from the refrigerant and foam insulation, preparing refrigerant for reclamation, and recycling other materials including metal and plastic.

Objectives

The objectives of Appliance Recycling are:

- Encourage customers to dispose of their existing, inefficient refrigerators, freezers, air-conditioning units, and dehumidifiers in an environmentally responsible manner.
- Reduce the use of secondary, inefficient refrigerators, freezers, and air-conditioning units.

- Enhance relationships with box stores and independent retailers to encourage participation in the "buy new and recycle" component.
- Decommission appliances on the site to prevent resale in a secondary market.
- Promote other PPL Electric Utilities energy efficiency programs.
- Achieve a total energy reduction of approximately 26,316 MWh/year and 6.7 MW[14] gross verified savings.
- Achieve high customer and trade ally satisfaction.

Target Market

Appliance Recycling targets residential customers but is available to customers in all sectors with working, residential-grade refrigerators, freezers, dehumidifiers, and room air-conditioning units. PPL Electric Utilities also encourages landlords and multifamily property managers/owners in its service territory to recycle refrigerators and freezers in their tenant units.

Implementation Strategy

The Residential CSP will manage and deliver Appliance Recycling to customers, which involves scheduling, picking up appliances, decommissioning, recycling, training retailer staff to promote the component, and tracking data. The Residential CSP will also support program-level functions by operating a customer call center, marketing and advertising, processing incentives, and tracking component activities. PPL Electric Utilities' energy efficiency staff will provide overall strategic direction and management. The EM&V CSP will provide evaluation services.

Issues, Risks, and Risk Management Strategy

Table 14 presents market risks associated with Appliance Recycling and strategies PPL Electric Utilities will use to manage each risk.

Table 14. Appliance Recycling Issues, Risks, and Risk Management Strategies

Component Issue	Risk	Risk Management Strategies
Convenient time required for customer to be available for pick-up.	Customer may have the interest to recycle but not have time available.	Residential CSP works with customers to provide as convenient a pick-up as possible. On a case-by-case basis, special pick-up times may be arranged to meet customer needs.
Lack of component awareness among customers.	Customer participation might be low.	Residential CSP manages a robust marketing strategy, including distributing materials at community events and to retailers, running a media campaign, and designing PPL Electric Utilities bill inserts.
Customer may not see benefit of recycling qualified appliance(s).	Customer disposes of units through channels other than this component.	Residential CSP works with retailers where new units are sold to display information about the benefits of recycling. PPL Electric Utilities offers free pick-up

[14] Peak Demand is at generation.

Component Issue	Risk	Risk Management Strategies
		services plus an incentive to encourage customers to recycle appliances.

Anticipated Costs to Participating Customers

There are no direct costs incurred by customers in this component.

Ramp-up Strategy

Appliance Recycling is an existing, mature offering being carried forward from Phase III. The Residential CSP will develop marketing materials to facilitate the transition to Phase IV.

Marketing Strategy

PPL Electric Utilities' staff will work with the Residential CSP to develop and execute a marketing plan that captures sector-level economies of scale and employs targeted outreach where practical. The marketing strategy may include the following:

- Promote component through "Connect," bill inserts, the Customer Engagement Hub, and email blasts.
- Provide online access to the component via the Company's EE&C website.
- Distribute materials at community events.
- Advertise through multiple channels.
- Educate retailer staff and customers through in-store events.
- Distribute point-of-purchase materials to local retailers.
- Train local retailer staff to cross-promote component when customers purchase a new refrigerator.
- Conduct targeted outreach to PPL Electric Utilities' customers who submit a new refrigerator rebate application.

Eligible Measures and Incentive Strategy

Qualified customers receive free pick-up and disposal and an incentive for recycling working refrigerators, freezers, dehumidifiers, room air conditioners, and possibly consumer electronics (without savings or incentives). Room air conditioners, consumer electronics, and dehumidifiers may be picked up along with a qualified refrigerator or freezer. PPL Electric Utilities may decide to allow dehumidifiers and room air conditioners as stand-alone measures.

Table 15 lists PPL Electric Utilities' proposed measures, minimum eligibility qualifications, and ranges of incentive levels.

Table 15. Pa PUC Table 7-Appliance Recycling Eligible Measures and Incentives

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit)
Dehumidifier Recycling	Per Product	No	Retirement and recycling without direct EDC replacement of an operable but older and inefficient room dehumidifier unit that would not have otherwise been recycled.	$15	4	$15	$10 to $25
Recycle Fridge	Per Product	No	Working unit, > 10 cubic feet and ≤ 30 cubic feet	$35	6	$35	$35 to $75
Recycle Freezer	Per Product	No	Working unit, > 10 cubic feet and ≤ 30 cubic feet	$35	5	$35	$35 to $75
RAC Recycling	Per Product	No	Retirement and recycling without direct EDC replacement of an operable but older and inefficient room AC (RAC) unit that would not have otherwise been recycled.	$10	3	$10	$10 to $25

[1] All eligible measures are listed in this table regardless of participation projections.

Not all measures may be available at all times. PPL Electric Utilities may suspend a measure depending on popularity, pace of the component (savings and costs), free ridership, evaluation requirements, complexity of information required from customers, administrative requirements for the measure, or other reasons. PPL Electric Utilities will review the component continually and may adjust available measures or eligibility qualifications to achieve savings and cost budgets. The Company may offer tiered incentives that encourage the recycling of older equipment, installation of multiple measures, or a more comprehensive whole-home or facility approach.

Deadline for Rebate Applications

There is no rebate application for this component.

Start Date with Key Schedule Milestones

Appliance Recycling is currently offered in Phase III, and PPL Electric Utilities will manage the transition to Phase IV. Table 16 lists estimated key schedule milestones for Appliance Recycling. PPL Electric Utilities will lead implementation or provide management oversight of all tasks.

Table 16. Appliance Recycling Schedule and Milestones

Schedule	Milestones
11/30/2020	Phase IV EE&C Plan submitted to Pa PUC
06/01/2021	Launch Phase IV component
Annually starting 01/15/2022	EDCs submit semiannual program report
Annually starting 09/30/2022	EDCs submit final annual program report
05/31/2026	Program ends

Evaluation, Measurement, and Verification

EM&V requirements will be detailed in PPL Electric Utilities' Evaluation Plan, which will be submitted to the SWE for review. PPL Electric Utilities and its EM&V CSP will conduct annual evaluations of each program component in compliance with all Pa PUC requirements and the Evaluation Framework. As part of this process, the EM&V CSP will review a sample of CSP records to verify quantity, efficiency level, and qualifying equipment. The EM&V CSP will follow all applicable methods in the TRM and the Evaluation Framework to calculate energy savings and peak demand reduction. For the Appliance Recycling component, PPL Electric Utilities anticipates conducting annual impact evaluations and conducting one process evaluation during Phase IV (activities vary by year).

Administrative Requirements

The Residential CSP will provide overall administrative and operational management of Appliance Recycling. PPL Electric Utilities will provide oversight and operational support to establish effective deployment.

Estimated Savings and Participation

Table 17 shows the order of magnitude participation estimates for Appliance Recycling. Actual quantities will vary, and PPL Electric Utilities will manage the component to stay within budget.

Table 17. Pa PUC Table 8-Appliance Recycling Participation [1]

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Dehumidifier Recycling	Energy Savings (MWh/year)	866	866	866	866	866	4,330
	Demand Reduction (MW)	0.201	0.201	0.201	0.201	0.201	1.004
	Projected Participation	1,200	1,200	1,200	1,200	1,200	6,000
Recycle Fridge	Energy Savings (MWh/year)	3,208	3,273	3,338	3,405	3,473	16,697
	Demand Reduction (MW)	0.518	0.528	0.539	0.550	0.561	2.695
	Projected Participation	7,055	7,196	7,340	7,487	7,637	36,715
Recycle Freezer	Energy Savings (MWh/year)	883	900	918	937	955	4,594
	Demand Reduction (MW)	0.142	0.145	0.148	0.151	0.154	0.741
	Projected Participation	1,761	1,796	1,832	1,869	1,906	9,164
RAC Recycling	Energy Savings (MWh/year)	134	136	139	142	145	696
	Demand Reduction (MW)	0.324	0.331	0.338	0.344	0.351	1.689
	Projected Participation	1,633	1,666	1,699	1,733	1,768	8,499

[1] To show numerical values in the Pa PUC Table 8 tables, deviation from the standard use of decimals throughout Section 3 may have been applied.

[2] Total values may not equal the sum of all program year values due to rounding

Efficient Lighting - Specialty Bulbs

Description

PPL Electric Utilities encourages residential customers to purchase and install specialty LED bulbs.[15] Participating customers can purchase a variety of discounted LED bulbs at local retail stores and the Company's Online Marketplace. The Residential CSP will manage operations and provide support to participating retailers and manufacturers that promote and sell eligible bulbs.

Objectives

The objectives of Efficient Lighting are:

- Provide a mechanism for customers to easily obtain discounted specialty LED bulbs in local retail stores and/or the Online Marketplace.
- Achieve widespread visibility through independent and regional retailers that carry eligible specialty LED bulbs.
- Develop and execute strategies aimed at continuing the transformation of the market for specialty LED bulbs.
- Educate customers on new lighting technologies.
- Engage retailers by educating and training retail sales associates about specialty LED bulbs.
- Achieve a total energy reduction of approximately 12,763 MWh/year and 14.2 MW[16] gross verified savings.
- Achieve high customer and trade ally satisfaction.

Target Market

Efficient Lighting targets residential customers but is available to all PPL Electric Utilities customers.

Implementation Strategy

The Residential CSP will administer the component by managing retailer/manufacturer recruitment, delivering incentives to participating energy efficient light bulb manufacturers, providing marketing and educational support, and overseeing marketing and product placement in retail stores. The Residential CSP will also support program-level functions by operating a customer call center, following PPL Electric Utilities' marketing and branding guidelines, and tracking activities. PPL Electric Utilities' energy efficiency staff will provide overall strategic direction and management. The EM&V CSP will provide evaluation services.

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[15] Based on actual results from Phase III, PPL Electric Utilities estimated a portion of costs and savings associated with the Efficient Lighting Component for the small C&I sector from cross-sector sales. The actual costs and savings for the small C&I sector will be determined by the EM&V CSP during the annual evaluation.

[16] Peak Demand is at generation.

Issues, Risks, and Risk Management Strategy

Table 18 presents market risks associated with Efficient Lighting and the strategies PPL Electric Utilities will use to manage each risk.

Table 18. Efficient Lighting Issues, Risks, and Risk Management Strategies

Component Issue	Risk	Risk Management Strategies
Cost of energy efficient bulbs may be higher than the customer is willing to pay.	• Low sales translating to low savings. • Customers may not be willing to purchase new, more efficient light bulbs if their current light bulbs are functioning. • Economic conditions may limit customers' ability to purchase energy efficient bulbs.	• PPL Electric Utilities offers incentives to offset the cost of efficient bulbs at retail locations. PPL Electric Utilities will likely use other distribution channels such as offering free bulbs at customer giveaway events, and through the Online Marketplace. • PPL Electric Utilities educates customers on the long-term energy cost-saving benefits of higher efficiency lighting.
Lack of customer awareness about energy usage associated with different types of bulbs.	Customers do not see a need to use more efficient bulbs.	Residential CSP manages a robust marketing and education strategy, including point-of-sale promotions and discounts.
Reduction in savings due to Energy Independence and Securities Act of 2007 standards.	Specialty bulb market saturation.	PPL Electric Utilities determines the proper product mix of bulbs to reduce reliance on savings for specific bulbs
Energy efficient bulb performance.	Customer may not purchase energy efficient bulbs if they perceive bulbs do not perform well.	Residential CSP conducts ongoing communication with retailers, including training, outreach, and education.
Changing technology may affect lifecycle cost.	Customer decision-making process may change as new technology becomes available in the market.	PPL Electric Utilities adds new measures as efficiency improves.

Anticipated Costs to Participating Customers

Although the incentives will cover a portion of the efficient products' incremental costs, participating customers will be responsible for the remaining costs of purchased LED bulbs. Customer-incurred costs will vary by bulb type.

Ramp-up Strategy

This is a relaunch of the Efficient Lighting offering from Phase III, but focusing specifically on specialty bulbs. The Residential CSP will develop marketing material to facilitate the transition to Phase IV.

Marketing Strategy

PPL Electric Utilities will work with the Residential CSP to develop and execute a marketing plan that captures sector-level economies of scale and employs targeted outreach where practical. The marketing strategy may include the following:

- Promote the component through "Connect," bill inserts, the Customer Engagement Hub, and email blasts.

- Provide online access to the program via the Company's EE&C website.
- Advertise through multiple channels.
- Educate retailer staff and customers through in-store events.
- Distribute point-of-purchase materials to local retailers.
- Collaborate with ENERGY STAR® and lighting manufacturers.
- Cross-promote the lighting component with other energy efficiency educational materials.

Eligible Measures and Incentive Strategy

Table 19 identifies PPL Electric Utilities' proposed list of measures, minimum eligibility qualifications, and range of incentive levels. In general, the incentives provided at the retail level are designed to cover up to 50% of the retail cost of LEDs.

Table 19. Pa PUC Table 7- Efficient Lighting Eligible Measures and Incentives

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit)
TCP 11.68 Downlight Solid State Retrofit	Per Bulb	No	Downlight fixture, ≥ 400 lumens	$5	15	$3	$5 to $8
Decorative and Min-Base AVG	Per Bulb	No	Decorative, mini-base, or globe, 250- 2,600 lumens	$3	15	$3	$5 to $8
Globe AVG	Per Bulb	No	Decorative, mini-base, or globe, 250- 2,600 lumens	$5	15	$3	$5 to $8
Reflectors AVG	Per Bulb	No	Reflectors or outdoor, 250-2,600 lumens	$5	15	$3	$5 to $8
Outdoor AVG	Per Bulb	No	Reflectors or outdoor, 250-2,600 lumens	$5	15	$3	$5 to $8
MaxLite 11 Parabolic Aluminized Reflector	Per Bulb	No	Reflectors or outdoor, 250-2,600 lumens	N/A	N/A	N/A	$5 to $8
MaxLite 5 Globe	Per Bulb	No	Decorative, mini-base, or globe, 250- 2,600 lumens	N/A	N/A	N/A	$5 to $8
MaxLite 6.5 Multifaceted Reflector	Per Bulb	No	Reflectors or outdoor, 250-2,600 lumens	N/A	N/A	N/A	$5 to $8
Philips 4.5 Specialty	Per Bulb	No	Decorative, mini-base, or globe, 250- 2,600 lumens	N/A	N/A	N/A	$5 to $8
Philips 7.2 Bulged Reflector	Per Bulb	No	Reflectors or outdoor, 250-2,600 lumens	N/A	N/A	N/A	$5 to $8
Philips 9 Bulged Reflector	Per Bulb	No	Reflectors or outdoor, 250-2,600 lumens	N/A	N/A	N/A	$5 to $8
TCP 10.5 Parabolic Aluminized Reflector	Per Bulb	No	Reflectors or outdoor, 250-2,600 lumens	N/A	N/A	N/A	$5 to $8
TCP 4 Globe	Per Bulb	No	Decorative, mini-base, or globe, 250- 2,600 lumens	N/A	N/A	N/A	$5 to $8
TCP 5 Globe	Per Bulb	No	Decorative, mini-base, or globe, 250- 2,600 lumens	N/A	N/A	N/A	$5 to $8
TCP 5 Specialty	Per Bulb	No	Decorative, mini-base, or globe, 250- 2,600 lumens	N/A	N/A	N/A	$5 to $8
TCP 7.5 Reflector	Per Bulb	No	Reflectors or outdoor, 250-2,600 lumens	N/A	N/A	N/A	$5 to $8

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit)
TCP 9.5 Bulged Reflector	Per Bulb	No	Reflectors or outdoor, 250-2,600 lumens	N/A	N/A	N/A	$5 to $8

[1] All eligible measures are listed in this table regardless of participation projections. N/A indicates measure may be offered in future program years but not at the launch of Phase IV.

All measures may not be available at all times. PPL Electric Utilities may suspend a measure depending on popularity, pace of the component (savings and costs), free ridership, evaluation requirements, administrative requirements for the measure, or other reasons. PPL Electric Utilities will review the component continually and may adjust available measures or eligibility qualifications to achieve savings and cost budgets.

Deadline for Rebate Applications

PPL Electric Utilities offers Efficient Lighting incentives at the point of sale; therefore, there is no rebate application.

Start Date with Key Schedule Milestones

Efficient Lighting was offered in Phase III, and PPL Electric Utilities will facilitate its relaunch as a component in Phase IV, but focus on specialty lighting. Table 20 lists the estimated key schedule milestones

Table 20. Efficient Lighting Schedule and Milestones

Schedule	Milestones
11/30/2020	Phase IV EE&C Plan submitted to Pa PUC
06/01/2021	Launch Phase IV component
Annually starting 01/15/2022	EDCs submit semiannual program report
Annually starting 09/30/2022	EDCs submit final annual program report
05/31/2026	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electric Utilities' Evaluation Plan, which will be submitted to the SWE for review. PPL Electric Utilities and its EM&V CSP will conduct annual evaluations of each component in compliance with all Pa PUC requirements and the Evaluation Framework. As part of this process, the EM&V CSP will verify savings attributable to this component. The EM&V CSP will verify bulb quantities and savings for lighting distributed through other channels (such as giveaways) where the specific participant is known. The EM&V CSP will follow all applicable methods in the TRM and the Evaluation Framework to calculate energy savings and peak demand reduction. For Efficient Lighting, PPL Electric Utilities anticipates conducting annual impact and process evaluations (activities vary by year).

Administrative Requirements

The Residential CSP will provide overall administrative and operational management of Efficient Lighting. PPL Electric Utilities will provide oversight and operational support to establish effective deployment.

Estimated Participation

Table 21 shows the order of magnitude participation estimates for Efficient Lighting. Actual quantities will vary, and PPL Electric Utilities will manage the component to stay within budget.

Table 21. Pa PUC Table 8-Efficient Lighting Projected Participation [1]

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
TCP 11.68 Downlight Solid State Retrofit	Energy Savings (MWh/year)	588	576	288	115	58	1,624
	Demand Reduction (MW)	0.613	0.600	0.300	0.120	0.060	1.693
	Projected Participation	102,000	99,960	49,980	20,000	10,000	281,940
Decorative and Min-Base AVG	Energy Savings (MWh/year)	732	717	359	179	75	2,062
	Demand Reduction (MW)	0.803	0.787	0.393	0.197	0.082	2.261
	Projected Participation	210,000	205,800	102,900	51,450	21,438	591,588
Globe AVG	Energy Savings (MWh/year)	413	405	202	101	51	1,172
	Demand Reduction (MW)	0.454	0.445	0.223	0.111	0.056	1.289
	Projected Participation	96,000	94,080	47,040	23,520	11,760	272,400
Reflectors AVG	Energy Savings (MWh/year)	2,021	1,981	990	495	206	5,694
	Demand Reduction (MW)	2.252	2.207	1.104	0.552	0.230	6.345
	Projected Participation	330,000	323,400	161,700	80,850	33,687	929,637
Outdoor AVG	Energy Savings (MWh/year)	699	699	466	233	116	2,212
	Demand Reduction (MW)	0.471	0.471	0.314	0.157	0.079	1.493
	Projected Participation	72,000	72,000	48,000	24,000	12,000	228,000

[1] To show numerical values in the Pa PUC Table 8 tables, deviation from the standard use of decimals throughout Section 3 may have been applied.
[2] Total values may not equal the sum of all program year values due to rounding.

Energy Efficient Homes

Description

PPL Electric Utilities provides comprehensive energy efficiency options for new and existing homes. The Company offers a range of energy efficient measures, rebates, education, and services that help its customers increase their homes' efficiency. The component contains these delivery channels:

- The **new homes channel** encourages construction of energy efficient new homes through a rebate to builders or homeowners who exceed the energy efficiency performance required by current building codes in newly constructed homes. This offer is for both single-family and multifamily buildings.
- In the **comprehensive in-home audit and weatherization channel**, customers learn about the benefits of energy efficiency measures, such as appliance recycling, lighting, HVAC, and water heating. Depending on audit recommendations, customers may receive direct-install or giveaway measures and may qualify for insulation and air sealing rebates. Energy efficiency kits

may also be offered to PPL Electric Utilities' customers interested in learning more about energy efficiency and the programs offered by the Company.

- In the **midstream and/or downstream energy efficiency equipment** channel PPL Electric Utilities provides rebates for high-performance heat pumps, heat pump water heaters, pool pumps, and central air conditioners, as well as other energy efficient appliances.

PPL Electric Utilities is also considering offering an enhanced bonus incentive to customers who install a comprehensive package of measures.

Objectives

The objectives of Energy Efficient Homes are:

- Encourage customers to view energy efficiency in a holistic manner.
- Provide customers with education, audits, and energy-saving solutions.
- Promote construction of energy efficient new homes.
- Educate construction industry professionals and other trade allies about the benefits of energy efficient homes.
- Achieve a total energy reduction of approximately 122,803 MWh/year and 23.8 MW[17] gross verified savings.
- Achieve high customer and trade ally satisfaction.

Target Market

Energy Efficient Homes is targeted to residential homebuilders and customers residing in single-family and individually metered multifamily homes.

Implementation Strategy

The Residential CSP will deliver Energy Efficient Homes to customers and homebuilders through marketing, participant recruitment, and trade ally recruitment and support. Because the component consists of three separate channels, trade ally support will vary. These are the responsibilities of the Residential CSP and PPL Electric Utilities:

- ***New homes.*** The Residential CSP will identify, recruit, and train potential builders; assist new home builders with paperwork; answer specific questions; test new home performance; and issue incentives to builders and homeowners.
- ***Audit and weatherization.*** The Residential CSP will conduct in-home audits; identify, recruit, and train HVAC contractors; form and maintain a trade ally network; and answer questions.
- ***Energy efficient equipment.*** The Residential CSP will work with retailers, distributors, trade allies, and manufacturers to promote energy efficient equipment such as HVAC equipment and pool pumps through a midstream approach that builds on its current and new relationships with distributors in PPL Electric Utilities' service territory and may decide to offer an HVAC Tune-Up

[17] Peak Demand is at generation.

Optimization measure within this component. PPL Electric Utilities will continue to broaden its market reach by offering rebates for qualified products at the point of sale.

- ***Online Marketplace***. PPL Electric Utilities will offer customers the opportunity to purchase energy efficient lighting and equipment through a virtual storefront.

The Residential CSP will also support program-level functions by operating a customer call center, managing marketing and advertising, processing incentives to customers, and tracking activities. PPL Electric Utilities will provide overall strategic direction and management. The EM&V CSP will provide evaluation services.

Issues, Risks, and Risk Management Strategy

Table 22 presents market risks associated with Energy Efficient Homes and the strategies PPL Electric Utilities will use to manage each risk.

Table 22. Energy Efficient Homes Issues, Risks, and Risk Management Strategies

Component Issue	Risk	Risk Management Strategies
Efficiency is not a common priority for builders and customers.	Builders do not take advantage of rebates, resulting in lower savings.	Residential CSP educates builders on the value and benefits associated with energy efficiency.
Builders may not abide by the efficient building practices required to qualify for the rebate	Builders may choose cheaper, less efficient equipment and building practices.	Residential CSP educates builders on the performance standards and building practices required to qualify for program rebates.
The economic environment may limit the ability of builders and customers to purchase energy efficient equipment and appliances for these reasons: • High-efficiency equipment is viewed as too expensive. • There is little incentive to upgrade equipment that is still operational or to weatherize a home.	Builders or customers may choose to install cheaper, less efficient equipment.	• Residential CSP conducts robust program marketing and provides general energy efficiency information to customers. • PPL Electric Utilities offers rebates that help reduce incremental costs. • Residential CSP educates customers on the long-term energy cost-saving benefits of higher-efficiency equipment and home weatherization.

Anticipated Costs to Participating Customers

Costs incurred by Energy Efficient Homes participants will vary by delivery channel and type of qualifying equipment installed through the component.

Ramp-up Strategy

Energy Efficient Homes is an existing, mature offering carried forward from Phase III. The Residential CSP will develop marketing material to facilitate the transition to Phase IV. The CSP also plans to make rebates for HVAC equipment and pool pumps available through a midstream channel. PPL Electric Utilities may continue to offer downstream rebates on these measures.

Marketing Strategy

PPL Electric Utilities will work with the Residential CSP to develop and execute a marketing plan that captures sector-level economies of scale and employs targeted outreach where practical. The marketing strategy may include the following:

- Promote component through "Connect," bill inserts, the Customer Engagement Hub, and email blasts.
- Provide online access to the component via the Company's EE&C website.
- Advertise through multiple marketing channels.
- Identify builders through collaboration with state and regional builders' associations and provide them with component details.
- Educate retailer staff and customers through in-store events.
- Distribute point-of-purchase materials to local retailers.
- Recruit and train retailers and distributors on qualifying technology, rebates, and cross-promotion.

The Residential CSP will also conduct outreach to previously participating and new trade allies (retailers, manufacturers, distributors, homebuilders, and contractors) and provide them with rebate information, educate them on Phase IV changes, and offer ongoing support.

Eligible Measures and Incentive Strategy

Table 23 lists PPL Electric Utilities' expected measures, minimum eligibility qualifications, and incentive level ranges.

Table 23. Pa PUC Table 7-Energy Efficient Homes Eligible Measures and Incentives

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit)
Connected Thermostat-Electric Heat AVG (downstream)	Per Product	No	ENERGY STAR Certified Product List	$140	11	$75	Up to $200
Connected Thermostat-CAC AVG (downstream)	Per Product	No	ENERGY STAR Certified Product List	$140	11	$75	Up to $200
New Homes-Connected Thermostat-Electric Heat (downstream)	Per Product	No	ENERGY STAR Certified Product List	$140	11	$75	Up to $200
New Homes-Connected Thermostat-CAC (downstream)	Per Product	No	ENERGY STAR Certified Product List	$140	11	$75	Up to $200
Fuel Switching – Central Heating (downstream) Maximum of 200 units across all customer sectors/programs	Per Project	No	Must replace electric equipment with ENERGY STAR certified natural gas, propane, or fuel oil equipment	$8,600	15	$200	Up to $300
Fuel Switching – DHW (downstream)	Per Project	No	Must replace electric water heater with ENERGY STAR	$1,416	11	$200	Up to $300

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit)
Maximum of 200 units across all customer sectors/programs			certified natural gas or propane equipment				
HPWH-AVG	Per Project	No	ENERGY STAR	$671	10	$400	Up to $500
Air Sealing -AVG (weatherization – downstream)	Per Project	No	Must be performed in accordance with BPI standards with pre- and post-blower door testing. Must have a 10% minimum improvement. Home must have a main source electric heating or central air conditioning.	$1,596	15	$200	Up to $200
ENERGY STAR Dehumidifiers (downstream)	Per Product	No	ENERGY STAR	$11	12	$50	Up to $25
Ductless Mini-Split Heat Pump (16 SEER/9.0 HSPF) – replacing baseboard/room AC	Per Project	No	ENERGY STAR	$3,847	15	$400	Up to $500
ENERGY STAR Air Source Heat Pump 16 SEER/9.0 HSPF/12.5 EER or Higher	Per Project	No	ENERGY STAR	$987	15	$450	Up to $400
ENERGY STAR Air Source Heat Pump 17.5 SEER/9.7 HSPF/EER 13.5 or Higher	Per Project	No	ENERGY STAR	$1,222	15	$450	Up to $500
ENERGY STAR Refrigerator (downstream)	Per Product	No	ENERGY STAR, at least 15% more efficient than baseline	$68	14	$50	Up to $75
Ceiling Insulation AVG-Electric Heat (weatherization – downstream)	Per Project	No	The existing R-value cannot exceed R-30. Final R-value must be ≥ R-49, home has electric main source heat. Rebate cannot exceed the cost of the measure.	$2,401	15	$500	75% of cost, up to $500
Ceiling Insulation AVG-Non-Electric Heat (weatherization – downstream)	Per Project	No	The existing R-value cannot exceed R-30. Final R-value must be ≥ R-49, home has central air conditioning. Rebate cannot exceed the cost of the measure.	$2,401	15	$200	75% of cost, up to $300
Basement Wall Insulation AVG (weatherization – downstream)	Per Project	No	Home has electric main source heat or central air conditioning. Basement or crawl space insulation should have either a minimum R-10 continuous insulated sheathing on the interior or exterior of the home, or R-13 cavity insulation at the interior of the crawl space wall in International Energy Conservation Code (“IECC”) Climate Zone 4, and R-15	$1,870	15	$500	75% of cost, up to $500

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit)
			continuous or R-19 cavity insulation in zones 5 or 6.				
ENERGY STAR Central Air Conditioner (13 SEER/12EER to 16 SEER/12.5EER)	Per Project	No	ENERGY STAR	$1,037	15	$300	Up to $400
ENERGY STAR Central Air Conditioner (14 SEER/12EER to 17.5 SEER/13.5EER)	Per Project	No	ENERGY STAR	$719	15	$300	Up to $500
Variable speed pool pump	Per Project	No	Replace constant speed	$396	10	$350	Up to $350
New Homes-15% or higher better than code-Electric Heat	Per Project	No	Individually metered, must have own heating, < 6 stories, dwellings must occupy 80% or more of occupiable space, 15% or higher better than code	$1,930	15	$838	Up to $4,500
New Homes-15% or higher better than code-Gas Heat	Per Project	No	Individually metered, must have own heating, < 6 stories, dwellings must occupy 80% or more of occupiable space, 15% or higher better than code	$1,930	15	$370	Up to $4,500
In-Home Audit Incentive (Elec Heat + AC)	Per Project	No	Home has electric main source heat and central air conditioning	$0	0	$350	Up to $350
In-Home Audit Incentive (Elec Heat or Central AC)	Per Project	No	Home has electric main source heat or central air conditioning	$0	0	$200	Up to $200
Comprehensive Retrofit Bonus- Tier 1	Per Project	No	Tier 1	$0	0	$250	Up to $250
Comprehensive Retrofit Bonus- Tier 2	Per Project	No	Tier 2	$0	0	$350	Up to $350
Electric Hot Water Kit (Single Family – In-Home Audits)	Per Kit	No	Electric hot water only	$38	7	$38	$38
Gas Hot Water Kit (Single Family – In-Home Audits)	Per Kit	No	Gas hot water only	$29	6	$29	$29
Electric Hot Water Kit (Single Family)	Per Kit	No	Electric hot water only	$38	7	$38	$38
Gas Hot Water Kit (Single Family)	Per Kit	No	Gas hot water only	$29	6	$29	$29
Smart Thermostat (Online Marketplace)	Per Product	No	ENERGY STAR	$140	11	$65	Up to $75
Weatherstrip (Online Marketplace)	Per Project	No	Must be installed on doors, windows, or attic hatches/doors	$2	15	$4	Up $5
Advanced Power Strip (Online Marketplace)	Per Product	No	Tier 1	$32	5	$9	Up to $15
Occupancy Sensor Switch (Online Marketplace)	Per Product	No	Installation of occupancy sensors and/or connected (“smart”) lighting	$26	10	$5	Up to $15
ENERGY STAR Dehumidifier (Online Marketplace)	Per Product	No	ENERGY STAR	$11	12	$50	Up to $25

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit)
Electric Hot Water Kit (Single Family – Virtual Assessments)	Per Kit	No	Electric hot water only	$38	7	$38	$38
Gas Hot Water Kit (Single Family – Virtual Assessments)	Per Kit	No	Gas hot water only	$29	6	$29	$29
ENERGY STAR Air Purifier (downstream rebates and online marketplace)	Per Product	No	ENERGY STAR	$74	9	$25	N/A
Water Heater Pipe Insulation (online marketplace)	Per Foot	No	≥ R-3	$4	15	$5	N/A
Holiday Lights (online marketplace)	Per Product	No	Replace incandescent holiday lights	$6	10	$5	N/A
ENERGY STAR Clothes Washers (downstream rebates)	Per Product	No	ENERGY STAR	$187	11	$50	N/A
ENERGY STAR Ceiling Fans (downstream rebates)	Per Product	No	ENERGY STAR	$15	15	$25	N/A
GSHP DeSuperheaters (midstream)	Per Project	No	Installation on new or existing Ground Source Heat Pump to replace any type of electric water heater	$1,811	15	$1,000	N/A
Solar Water Heaters (midstream)	Per Project	No	Existing electric water heater	$6,655	15	$1,000	N/A
Water Heater Tank Wrap (online marketplace)	Per Project	No	Installation of R-8 wrap insulation to existing electric water heater with R-24 or less	$72	7	$10	N/A
Compact Refrigerators (downstream rebates)	Per Product	No	ENERGY STAR	$36	14	$10	N/A
Duct Sealing 50% unvented crawlspace, 30% attic (average)	Per Project	No	Home with electric ducted heating system. Requires duct leakage test by BPI certified trade allies.	$479	15	$175	N/A
Duct Sealing & Insulation 50% unvented crawlspace, 30% attic (average)	Per Project	No	Home with electric ducted heating system. Requires duct leakage test by BPI certified trade allies.	$1,702	15	$500	N/A
Custom Measures	Per kW	No	Minimum TRC requirement may be implemented as a requirement for projects if necessary to help ensure the program or portfolio TRC is greater than 1.0. Incentive $500/kW, incentive capped at $1,000.	N/A	N/A	N/A	N/A
Home Energy Report	Per Project	No	Must be PPL Electric Utilities residential customer	N/A	Varies based on TRM	N/A	N/A

[1] All eligible measures are listed in this table regardless of participation projections. N/A indicates measure may be offered in future program years but not at the launch of Phase IV.

All measures may not be available at all times. PPL Electric Utilities may suspend a measure depending on popularity, pace of the component (savings and costs), free ridership, evaluation requirements, complexity of information required by customer, administrative requirements for the measure, or other reasons. PPL Electric Utilities will review the component continually and may add or adjust available measures, eligibility qualifications, or incentives to achieve savings and cost budgets. It may offer tiered incentives that encourage installation of multiple measures or a more comprehensive whole home or facility approach. PPL Electric Utilities plans to work with other EDCs and stakeholders to offer a consistent mechanism for new home construction delivery.

PPL Electric Utilities will offer comprehensive in-home diagnostic audits throughout Phase IV. The cost of a comprehensive audit may vary depending on the auditor chosen by the customer. Customers will receive a rebate, the amount of which may vary depending on the type of heating and cooling equipment installed in the home.

To the extent that a project is eligible under the new construction offering, the Company will work with interested stakeholders to help ensure that the Act 129 funds allocated for multifamily affordable housing projects are not substituted for funds otherwise provided through state or federal assistance programs.

Deadline for Rebate Applications

The rebate application will list the deadline for its submission. The deadline will not exceed 180 days from the date the measure was installed or purchased. For some measures, PPL Electric Utilities may allow customers to request project preapproval to lock in the stipulated incentive level and guarantee project funding.

Start Date with Key Schedule Milestones

Table 24 lists the estimated key schedule milestones for Energy Efficient Homes. PPL Electric Utilities will lead implementation or provide management oversight of all tasks.

Table 24. Energy Efficient Homes Schedule and Milestones

Schedule	Milestones
11/30/2020	Phase IV EE&C Plan submitted to Pa PUC
06/01/2021	Launch Phase IV component
Annually starting 01/15/2022	EDCs submit semiannual program report
Annually starting 09/30/2022	EDCs submit final annual program report
05/31/2026	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electric Utilities' Evaluation Plan, which will be submitted to the SWE for review. PPL Electric Utilities and its EM&V CSP will conduct annual evaluations of each component in compliance with all Pa PUC requirements and the Evaluation Framework. The EM&V CSP will follow all applicable methods in the TRM and the Evaluation Framework to calculate

energy savings and peak demand reduction. For Energy Efficient Homes, PPL Electric Utilities anticipates conducting annual impact and process evaluations (activities vary by year).

Through Energy Efficient Homes, PPL Electric Utilities offers incentives for new home construction, in-home energy audits, and a variety of weatherization and equipment. Each of these requires an evaluation approach specifically tailored to the product.

As part of the savings verification and evaluation, the EM&V CSP will review a sample of participant rebates and Residential CSP records to verify the quantity, efficiency level, and rebate qualifications by measure type. Because the Company offers a variety of equipment and services, the EM&V CSP will stratify the verification sample accordingly, designating a sample size appropriate for each stratum and technology. Overall, the sample size will meet the level of rigor specified in the Evaluation Framework, which will probably be 85% confidence with 15% precision (85/15) at the component level, the same as in Phase III.

Administrative Requirements

The Residential CSP will provide overall administrative and operational management of Energy Efficient Homes. PPL Electric Utilities will provide oversight and operational support to establish effective deployment.

Estimated Participation

Table 25 shows the order of magnitude participation estimates for Energy Efficient Homes. Actual quantities will vary, and PPL Electric Utilities will manage the component to stay within budget.

Table 25. Pa PUC Table 8-Energy Efficient Homes Projected Participation [1]

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Connected Thermostat-Electric Heat AVG (downstream)	Energy Savings (MWh/year)	672	685	700	713	727	3,497
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	554	565	577	588	600	2,884
Connected Thermostat- CAC AVG (downstream)	Energy Savings (MWh/year)	46	47	48	49	50	239
	Demand Reduction (MW)	0.007	0.008	0.008	0.008	0.008	0.039
	Projected Participation	264	269	275	280	286	1,374
New Homes-Connected Thermostat-Electric Heat (downstream)	Energy Savings (MWh/year)	152	155	158	161	165	792
	Demand Reduction (MW)	0.005	0.006	0.006	0.006	0.006	0.028
	Projected Participation	350	357	364	371	379	1,821
New Homes-Connected Thermostat-CAC (downstream)	Energy Savings (MWh/year)	36	37	37	38	39	187
	Demand Reduction (MW)	0.006	0.006	0.006	0.006	0.006	0.030
	Projected Participation	350	357	364	371	379	1,821
Fuel Switching – Central Heating (downstream) Maximum of 200 units across all customer sectors/programs	Energy Savings (MWh/year)	218	224	224	231	237	1,135
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	34	35	35	36	37	177
Fuel Switching – DHW (downstream) Maximum of 200 units across all customer sectors/programs	Energy Savings (MWh/year)	58	58	61	61	64	301
	Demand Reduction (MW)	0.005	0.005	0.005	0.005	0.005	0.024
	Projected Participation	21	21	22	22	23	109

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
HPWH-AVG	Energy Savings (MWh/year)	722	736	751	766	782	3,757
	Demand Reduction (MW)	0.060	0.061	0.063	0.064	0.065	0.313
	Projected Participation	516	526	537	548	559	2,686
Air Sealing -AVG (weatherization – downstream)	Energy Savings (MWh/year)	15	15	16	16	16	79
	Demand Reduction (MW)	0.0003	0.0003	0.0003	0.0003	0.0003	0.0015
	Projected Participation	16	16	17	17	17	83
ENERGY STAR Dehumidifiers (downstream)	Energy Savings (MWh/year)	320	327	333	340	347	1,667
	Demand Reduction (MW)	0.080	0.082	0.084	0.085	0.087	0.418
	Projected Participation	1,660	1,693	1,727	1,762	1,797	8,639
Ductless Mini-Split Heat Pump (16 SEER/9.0 HSPF) – replacing baseboard/room AC	Energy Savings (MWh/year)	14,867	16,303	16,405	16,405	16,405	80,386
	Demand Reduction (MW)	1.873	2.053	2.066	2.066	2.066	10.125
	Projected Participation	2,900	3,180	3,200	3,200	3,200	15,680
ENERGY STAR Air Source Heat Pump 16 SEER/9.0 HSPF/12.5 EER or Higher	Energy Savings (MWh/year)	677	691	705	-	-	2,073
	Demand Reduction (MW)	0.141	0.144	0.147	-	-	0.432
	Projected Participation	1,144	1,167	1,190	-	-	3,501
ENERGY STAR Air Source Heat Pump 17.5 SEER/9.7 HSPF/EER 13.5 or Higher	Energy Savings (MWh/year)	-	-	-	719	733	1,452
	Demand Reduction (MW)	-	-	-	0.149	0.151	0.300
	Projected Participation	-	-	-	1,214	1,238	2,452
ENERGY STAR Refrigerator (downstream)	Energy Savings (MWh/year)	80	82	84	85	87	418
	Demand Reduction (MW)	0.017	0.017	0.017	0.018	0.018	0.086
	Projected Participation	1,711	1,745	1,780	1,816	1,852	8,904
Ceiling Insulation AVG-Electric Heat (weatherization – downstream)	Energy Savings (MWh/year)	217	222	226	230	235	1,129
	Demand Reduction (MW)	0.042	0.043	0.044	0.045	0.045	0.218
	Projected Participation	232	237	241	246	251	1,207
Ceiling Insulation AVG-Non-Electric Heat (weatherization – downstream)	Energy Savings (MWh/year)	17	17	17	18	18	86
	Demand Reduction (MW)	0.012	0.013	0.013	0.013	0.013	0.065
	Projected Participation	131	134	136	139	142	682
Basement Wall Insulation AVG (weatherization – downstream)	Energy Savings (MWh/year)	2	2	2	2	2	11
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0006
	Projected Participation	4	4	4	4	4	20
ENERGY STAR Central Air Conditioner (13 SEER/12EER to 16 SEER/12.5EER)	Energy Savings (MWh/year)	271	276	282	-	-	829
	Demand Reduction (MW)	0.161	0.164	0.168	-	-	0.493
	Projected Participation	932	951	970	-	-	2,853
ENERGY STAR Central Air Conditioner (14 SEER/12EER to 17.5 SEER/13.5EER)	Energy Savings (MWh/year)	-	-	-	285	290	575
	Demand Reduction (MW)	-	-	-	0.173	0.177	0.350
	Projected Participation	-	-	-	989	1,009	1,998
Variable speed pool pump	Energy Savings (MWh/year)	514	524	534	546	556	2,675
	Demand Reduction (MW)	0.169	0.172	0.176	0.180	0.183	0.880
	Projected Participation	353	360	367	375	382	1,837
New Homes-15% or higher better than code-Electric Heat	Energy Savings (MWh/year)	2,221	2,266	2,311	2,356	2,404	11,558
	Demand Reduction (MW)	0.866	0.884	0.902	0.919	0.938	4.509
	Projected Participation	837	854	871	888	906	4,356
New Homes-15% or higher better than code-Gas Heat	Energy Savings (MWh/year)	600	612	625	637	650	3,124
	Demand Reduction (MW)	0.531	0.541	0.553	0.563	0.574	2.763
	Projected Participation	513	523	534	544	555	2,669
	Energy Savings (MWh/year)	-	-	-	-	-	-

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
In-Home Audit Incentive (Elec Heat + AC)	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	50	51	52	53	54	260
In-Home Audit Incentive (Elec Heat or Central AC)	Energy Savings (MWh/year)	-	-	-	-	-	-
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	26	26	27	27	28	134
Comprehensive Retrofit Bonus- Tier 1	Energy Savings (MWh/year)	-	-	-	-	-	-
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	75	77	78	80	81	391
Comprehensive Retrofit Bonus- Tier 2	Energy Savings (MWh/year)	-	-	-	-	-	-
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	25	26	26	27	27	131
Electric Hot Water Kit (Single Family – In-Home Audits)	Energy Savings (MWh/year)	8	8	8	8	8	40
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.004
	Projected Participation	50	51	52	53	54	260
Gas Hot Water Kit (Single Family – In-Home Audits)	Energy Savings (MWh/year)	2	2	2	3	3	13
	Demand Reduction (MW)	0.0002	0.0002	0.0002	0.0002	0.0002	0.0012
	Projected Participation	26	27	27	28	28	136
Electric Hot Water Kit (Single Family)	Energy Savings (MWh/year)	576	584	593	602	611	2,966
	Demand Reduction (MW)	0.061	0.062	0.063	0.064	0.065	0.316
	Projected Participation	3,753	3,808	3,864	3,922	3,980	19,327
Gas Hot Water Kit (Single Family)	Energy Savings (MWh/year)	247	251	255	260	264	1,278
	Demand Reduction (MW)	0.021	0.021	0.021	0.022	0.022	0.107
	Projected Participation	2,489	2,529	2,569	2,611	2,653	12,851
Smart Thermostat (Online Marketplace)	Energy Savings (MWh/year)	172	176	179	183	187	897
	Demand Reduction (MW)	0.028	0.028	0.029	0.030	0.030	0.145
	Projected Participation	992	1,012	1,032	1,053	1,074	5,163
Weatherstrip (Online Marketplace)	Energy Savings (MWh/year)	20	22	23	24	24	112
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0004
	Projected Participation	580	620	660	680	680	3,220
Advanced Power Strip (Online Marketplace)	Energy Savings (MWh/year)	15	15	15	16	16	77
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.002	0.008
	Projected Participation	182	186	189	193	197	947
Occupancy Sensor Switch (Online Marketplace)	Energy Savings (MWh/year)	0	0	1	1	1	2
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	17	17	18	18	18	88
ENERGY STAR Dehumidifier (Online Marketplace)	Energy Savings (MWh/year)	77	77	77	77	77	386
	Demand Reduction (MW)	0.019	0.019	0.019	0.019	0.019	0.097
	Projected Participation	400	400	400	400	400	2,000
Electric Hot Water Kit (Single Family – Virtual Assessments)	Energy Savings (MWh/year)	84	85	87	89	90	435
	Demand Reduction (MW)	0.008	0.008	0.008	0.008	0.009	0.042
	Projected Participation	551	562	573	584	596	2,866
Gas Hot Water Kit (Single Family – Virtual Assessments)	Energy Savings (MWh/year)	10	10	11	11	11	53
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.005
	Projected Participation	110	112	115	117	119	573
	Energy Savings (MWh/year)	56	56	56	56	56	278
	Demand Reduction (MW)	0.006	0.006	0.006	0.006	0.006	0.032

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
ENERGY STAR Air Purifier (downstream rebates and online marketplace)	Projected Participation	100	100	100	100	100	500
Water Heater Pipe Insulation (online marketplace)	Energy Savings (MWh/year)	0.1	0.1	0.1	0.1	0.1	0.6
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0006
	Projected Participation	100	100	100	100	100	500
Holiday Lights (online marketplace)	Energy Savings (MWh/year)	2	2	2	2	2	10
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	100	100	100	100	100	500
ENERGY STAR Clothes Washers (downstream rebates)	Energy Savings (MWh/year)	10	10	10	10	10	52
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.006
	Projected Participation	100	100	100	100	100	500
ENERGY STAR Ceiling Fans (downstream rebates)	Energy Savings (MWh/year)	3	3	3	3	3	15
	Demand Reduction (MW)	0.0002	0.0002	0.0002	0.0002	0.0002	0.0011
	Projected Participation	100	100	100	100	100	500
GSHP DeSuperheaters (midstream)	Energy Savings (MWh/year)	1	1	1	1	1	4
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003
	Projected Participation	2	2	2	2	2	10
Solar Water Heaters (midstream)	Energy Savings (MWh/year)	9	9	9	9	9	47
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.006
	Projected Participation	5	5	5	5	5	25
Water Heater Tank Wrap (online marketplace)	Energy Savings (MWh/year)	14	14	14	14	14	68
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.002	0.008
	Projected Participation	100	100	100	100	100	500
Compact Refrigerators (downstream rebates)	Energy Savings (MWh/year)	0.3	0.3	0.3	0.3	0.3	1.7
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003
	Projected Participation	10	10	10	10	10	50
Duct Sealing 50% unvented crawlspace, 30% attic (average)	Energy Savings (MWh/year)	8	8	8	8	8	38
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.003
	Projected Participation	15	15	15	15	15	75
Duct Sealing & Insulation 50% unvented crawlspace, 30% attic (average)	Energy Savings (MWh/year)	12	12	12	12	12	59
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.002	0.010
	Projected Participation	15	15	15	15	15	75

[1] To show numerical values in the Pa PUC Table 8 tables, deviation from the standard use of decimals throughout Section 3 may have been applied.
[2] Total values may not equal the sum of all program year values due to rounding.

Student Energy Efficient Education

Description

PPL Electric Utilities offers energy efficiency kits and education to students and teachers. The component consists of these three channels:

- **Primary Grade Energy Efficiency Education**, in which the Company offers an interactive classroom presentation to students in grades 2-3.

- **Intermediate Grade Energy Efficiency Education**, in which the Company offers an interactive classroom presentation to students in grades 5-7.
- **Secondary Grade Energy Efficiency Education**, in which the Company offers an interactive classroom presentation to students in grades 9-12.

The presentation educates students about energy and conservation topics using hands-on activities. Content is correlated to Pennsylvania Education Academic Standards for the appropriate grade levels and endorsed by the Pennsylvania Department of Education. Students who participate in the presentation receive a take-home energy efficiency kit.

The CSP will offer a poster contest and innovation challenge, which will support the component by giving students an additional opportunity to reflect on what they learned and how they acted on tips provide during the presentations.

PPL Electric Utilities will provide participating teachers with energy efficiency measures, such as smart power strips, to use as instructional aides to educate students about energy efficiency.

Objectives

The objectives of Student Energy Efficient Education are:

- Expand and promote energy efficiency literacy through education outreach components.
- Provide energy efficiency education to students offered through school assemblies and classroom curriculum.
- Confirm energy efficiency education correlates to Pennsylvania Education Academic Standards.
- Provide students and teachers with a take-home kit of energy efficiency measures that can be installed at home.
- Provide teachers with energy efficiency information, lesson plans, activities, training, materials, and support for classroom use.
- Achieve a total energy reduction of approximately 37,429 MWh/year and 3.1 MW[18] gross verified savings.
- Achieve high customer and teacher satisfaction.

Target Market

PPL Electric Utilities targets Student Energy Efficient Education to residential customers throughout its service territory by using schools as an outreach mechanism.

Implementation Strategy

The Residential CSP will deliver the component to schools and have sole responsibility for marketing to and recruiting potential schools and teachers, creating curriculum correlated to Pennsylvania Education

[18] Peak Demand is at generation.

Academic Standards, securing endorsement by the Pennsylvania Department of Education, conducting the energy efficiency presentations, and assembling and shipping the take-home energy efficiency kits. The Residential CSP will also provide support by operating a customer call center, following PPL Electric Utilities' marketing and branding guidelines, and tracking activities.

PPL Electric Utilities' energy efficiency staff will provide overall strategic direction and management. The EM&V CSP will provide evaluation services.

Issues, Risks, and Risk Management Strategy

Table 26 presents market risks associated with Student Energy Efficient Education and the strategies PPL Electric Utilities will use to manage each risk.

Table 26. Student EE Education Issues, Risks, and Risk Management Strategies

Component Issue	Risk	Risk Management Strategies
Teachers may not have time in their schedules to incorporate the presentations.	Lesson plans are often created far in advance and teachers may not see value in the presentation and, therefore, may not participate.	Residential CSP ensures that the curriculum is correlated to the Pennsylvania Education Academic Standards and fits into teachers' existing lesson plans.
Customers do not install the energy efficiency measures or complete the survey included in their take-home kits	Although the education component would be completed, measurable energy savings would not be achieved.	• Residential CSP provides instructions on how to install the devices in the kits. • Residential CSP manages a customer call center for participants who have questions about the kits or how to install the measures.
Virtual presentations.	Not as much direct interactions with students, so it may be more difficult to capture their attention.	• Residential CSP may provide follow-up calls with teachers and email follow-ups with students after the presentation.

Anticipated Costs to Participating Customers

There are no direct costs incurred by customers in this component.

Ramp-up Strategy

Student Energy Efficient Education is an existing, mature offering being carried forward from Phase III. The Residential CSP will develop marketing material to facilitate the transition to Phase IV.

Marketing Strategy

To recruit teachers and schools to participate in Student Energy Efficient Education, the Residential CSP will work with PPL Electric Utilities to secure a list of qualified schools in the PPL Electric Utilities' service territory. The Residential CSP will issue promotional materials directly to potential participants via email and direct mail.

Eligible Measures and Incentive Strategy

Participants in each component receive a take-home energy efficiency kit that contains a variety of low-cost measures, such as LEDs and water-saving measures. PPL Electric Utilities will review the component continually and may adjust available measures or eligibility qualifications to achieve savings and cost budgets.

Table 27. Pa PUC Table 7-Student EE Education Eligible Measures and Incentives

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit)
Bright Kids (Primary School) Kit	Per Kit	No	Meets current TRM requirements	$20	5	$20	$20
Take Action (Middle School) Kit	Per Kit	No	Meets current TRM requirements	$31	9	$31	$31
Innovation (High School) TI Strip Kit	Per Kit	No	Meets current TRM requirements	$30	9	$30	$30

[1] All eligible measures are listed in this table regardless of participation projections.

Deadline for Rebate Applications

PPL Electric Utilities offers Student Energy Efficient Education services at no cost to customers; therefore, there is no rebate application.

Start Date with Key Schedule Milestones

Student Energy Efficient Education is currently offered in Phase III, and PPL Electric Utilities will facilitate the transition to Phase IV. Table 28 lists the estimated key schedule milestones for Student Energy Efficient Education. PPL Electric Utilities will lead implementation or provide management oversight of all tasks.

Table 28. Student Energy Efficient Education Schedule and Milestones

Schedule	Milestones
11/30/2020	Phase IV EE&C Plan submitted to Pa PUC
06/01/2021	Launch Phase IV component
Annually starting 01/15/2022	EDCs submit semiannual program report
Annually starting 09/30/2022	EDCs submit final annual program report
05/31/2026	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electric Utilities' Evaluation Plan, which will be submitted to the SWE for review. PPL Electric Utilities and its EM&V CSP will conduct annual evaluations of each component in compliance with all Pa PUC requirements and the Evaluation Framework. As part of this process, the EM&V CSP will review a sample of CSP records and student surveys and will follow all

applicable methods in the TRM and the Evaluation Framework to calculate energy savings and peak demand reduction. For the Student Energy Efficient Education component, PPL Electric Utilities anticipates conducting annual impact and process evaluations (activities vary by year).

Through Student Energy Efficient Education, PPL Electric Utilities offers classroom training for students and delivers energy conservation kits free of charge to participants. Typically, the energy efficiency kits include a paper/online survey for students to complete. As part of the evaluation, the EM&V CSP will analyze data collected from all returned student surveys.

Administrative Requirements

The Residential CSP will provide overall administrative and operational management of Student Energy Efficient Education. PPL Electric Utilities will provide oversight and operational support to establish effective deployment.

Estimated Participation

Table 29 shows order of magnitude participation estimates for Student Energy Efficient Education. Actual quantities will vary, and PPL Electric Utilities will manage the component to stay within budget.

Table 29. Pa PUC Table 8-Student Energy Efficient Education Projected Participation[1]

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Bright Kids (Primary School) Kit	Energy Savings (MWh/year)	514	525	535	546	557	2,677
	Demand Reduction (MW)	0.042	0.043	0.043	0.044	0.045	0.217
	Projected Participation	5,168	5,271	5,377	5,484	5,594	26,894
Take Action (Middle School) Kit	Energy Savings (MWh/year)	4,839	4,935	5,034	5,135	5,238	25,181
	Demand Reduction (MW)	0.367	0.374	0.382	0.389	0.397	1.909
	Projected Participation	13,899	14,177	14,461	14,750	15,045	72,332
Innovation (High School) TI Strip Kit	Energy Savings (MWh/year)	1,839	1,876	1,914	1,952	1,991	9,571
	Demand Reduction (MW)	0.143	0.145	0.148	0.151	0.154	0.742
	Projected Participation	5,290	5,396	5,504	5,614	5,726	27,530

[1] To show numerical values in the Pa PUC Table 8 tables, deviation from the standard use of decimals throughout Section 3 may have been applied.
[2]Total values may not equal the sum of all program year values due to rounding.

3.3 Low-Income Program (2021-2026)

This section summarizes PPL Electric Utilities' proposed Low-Income Program component (*i.e.*, Low-Income Assessment) and the component's objectives, target market, implementation strategy, issues, risks and risk management strategy, anticipated costs to participating customers, ramp-up strategy, marketing strategy, eligible measures and incentive strategy, deadline for rebate applications, start date with key schedule milestones, EM&V, administrative requirements, estimated savings and participation, and plans for achieving compliance with the Implementation Order.

Table 30 lists estimated savings and costs by program year. The Low-Income Program budget is 13.4% of the total portfolio budget.[19]

Table 30. Pa PUC Table 9 - Low-Income Costs and Benefits by Program Year ($1000)

Cost Element		PY13	PY14	PY15	PY16	PY17	Phase IV Total [1]
Total Budget ($000)		$7,417	$8,673	$9,310	$9,326	$7,174	$41,900
Incentives ($000)	Rebates	-	-	-	-	-	-
	Upstream/Midstream Buydown	-	-	-	-	-	-
	Kits	$155	$191	$209	$209	$146	$910
	Direct Install Materials & Labor	$4,067	$4,751	$5,094	$5,094	$3,895	$22,901
	Incentive Total	**$4,221**	**$4,943**	**$5,303**	**$5,303**	**$4,041**	**$23,811**
Non-Incentives ($000)	CSP Program Design	-	-	-	-	-	-
	CSP Administrative	$523	$539	$556	$573	$589	$2,781
	CSP Delivery Fees	$2,203	$2,721	$2,980	$2,980	$2,073	$12,958
	CSP Marketing	$250	$250	$250	$250	$250	$1,250
	EDC Administrative	$220	$220	$220	$220	$220	$1,100
	EDC Other	-	-	-	-	-	-
	Non-Incentive Total	**$3,196**	**$3,731**	**$4,006**	**$4,023**	**$3,133**	**$18,089**
Percent Incentives		57%	57%	57%	57%	56%	57%

[1] Total values may not equal the sum of all program year values due to rounding.

The Low-Income Program is projected not to be cost-effective, with a TRC test ratio of 0.44. Table 31 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio.

Table 31. Low-Income Program Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$19,144
NPV Costs	$43,977
Net Benefits	($24,833)
Benefit/Cost Ratio	0.44

[19] This percentage represents the program budget without common costs over the total portfolio budget, which includes common costs.

As noted in Section 1.6, PPL Electric Utilities will rely on energy efficiency measures with coincident peak demand reduction potential to achieve its annual and total peak demand reduction goals. PPL Electric Utilities will target end uses to nominate roughly 1 to 20% of eligible PJM peak demand savings from the low-income program over the five-year Plan. PPL Electric Utilities is not aware at this time which measures will be nominated; however, they will likely include cooling and lighting. PPL Electric Utilities will competitively select a qualified third-party vendor to provide technical support in nominating a portion of its peak demand reductions as a capacity resource in PJM's FCM.

Low-Income Assessment

Description

Through Low-Income Assessment, PPL Electric Utilities will offer a broad selection of no-cost energy-saving improvements and education to qualifying low-income customers residing in single-family homes, individually metered multifamily units, and manufactured homes.[20] Direct installation of energy efficiency measures for lighting, water aeration, and weatherization will be offered through PPL Electric Utilities' in-home and remote assessment delivery channels. Additionally, PPL Electric Utilities may offer comprehensive measures, such as ductless mini-split heat pumps, heat pump maintenance, heat pump water heaters, and smart thermostats through the in-home assessment delivery channel.

Low-income residents in individually metered multifamily units will be eligible for all measures provided in the Low-Income Assessment, but specific measures may require landlord approval. Common space in multifamily building will be treated separately through PPL Electric Utilities' Non-Residential Program. Multifamily buildings' eligibility requirements are not affected by the number of living units in the buildings. All delivery channels are subject to available funding and must fall within the overall acquisition cost of the program.

Objectives

The objectives of the Low-Income Assessment component are:

- Provide low-income customers with no-cost energy-saving improvements and education to help them reduce their energy and peak demand usage.
- Achieve high customer, preferred partner, and trade ally satisfaction.
- Promote other PPL Electric Utilities energy efficiency program components.
- Provide low-income customers several options for receiving services safely and in consideration of their preferences.

[20] Under Low-Income Assessment, individually metered low-income multifamily residences are eligible for the same measures as individually metered single family low-income residences. Individually metered manufactured homes are also eligible for the same measures as any other type of individually metered home receiving services from Low-Income Assessment as long as they meet income guidelines.

- Achieve a total energy reduction of approximately 74,793 MWh/year and 10 MW/year[21] of gross verified savings.
- Increase the safety of low-income customers' homes by installing no-cost measures such as smoke and carbon monoxide detectors, which will be coordinated with the Low-Income Usage Reduction Program ("LIURP") Assessment.

Target Market

Through Low-Income Assessment, PPL Electric Utilities targets low-income customers (renters and owners) living in single-family homes, individually metered multifamily buildings (residential customer class), and manufactured homes. To qualify as low-income, household income must be at or below 150% of the Federal Poverty Income Guidelines (FPIG). Enrollees in PPL Electric Utilities' OnTrack Program are eligible.[22] Tenants must obtain landlord approval for certain measures to participate in the component. The number of units in a multifamily building does not affect the eligibility of its residents to receive energy-saving improvements and education.

Implementation Strategy

The Low-Income CSP will deliver the Low-Income Assessment component and will be responsible for outreach, customer recruitment, assessments, education, and equipment installation. The Low-Income CSP will also support sector-level functions, including operating a customer call center, marketing, and tracking activities. PPL Electric Utilities' energy efficiency staff will provide overall strategic direction and management. The EM&V CSP will provide evaluation services.

Issues, Risks, and Risk Management Strategy

Table 32 presents market risks associated with Low-Income Assessment and the strategies PPL Electric Utilities will use to manage each risk.

Table 32. Low-Income Assessment Issues, Risks, and Risk Management Strategies

Component Issue	Risk	Risk Management Strategies
Homeowner and landlord lack of component awareness.	Low participation	• Low-Income CSP markets directly to income-eligible customers and through other partners and trade allies. • Low-Income CSP conducts neighborhood sweeps where few customers have participated in assessments. • Low-Income CSP markets at town hall gatherings and other venues
Difficulty getting landlord approval for participation by low-income tenants.	Low participation among renters	• Low-Income CSP markets directly to landlords. • Low-Income CSP seeks joint ventures with equipment suppliers, trade allies, and other organizations to provide additional incentives/discounts (such as financial incentives to eliminate code violations) to remove landlord barriers.

[21] Peak Demand is at generation.

[22] Through its OnTrack Program, PPL Electric Utilities offers reduced monthly payments to assist low-income customers with account balances in arrears.

Component Issue	Risk	Risk Management Strategies
Possible saturation of eligible assessment participants.	Low participation and savings	• PPL Electric Utilities strongly encourages that all OnTrack Program enrollees also participate in Low-Income Assessment. • Low-Income CSP installs additional measures for customers who previously participated. • Low-Income CSP reaches out to landlords who previously declined participation.

Anticipated Costs to Participating Customers

There are no direct costs incurred by customers in this component.

Ramp-up Strategy

The Low-Income Assessment is an existing, mature component being carried forward from Phase III. The Low-Income CSP will develop marketing materials and an implementation strategy to facilitate the transition to Phase IV.

Marketing Strategy

PPL Electric Utilities will work with the Low-Income CSP to develop and execute a marketing plan that captures sector-level economies of scale and employs targeted outreach where practical. In addition to the current outreach encouraging OnTrack customers to participate in Low-Income Assessment, the Company will work with the Low-Income CSP to create and target marketing and outreach to eligible low-income customers who are not enrolled in OnTrack. The Company will describe its Low-Income Assessment marketing efforts at its Act 129 EE&C stakeholder meetings and ask stakeholders for feedback and recommendations.

The marketing strategy may include the following:

- Promote the component in PPL Electric Utilities' publications.
- Provide online access to the component through the Company's EE&C website.
- Introduce a welcome kit to recruit customers for the Low-Income Assessment component.
- Implement direct outreach, such as neighborhood sweeps, community and town hall events, and door-to-door canvassing, to create awareness about the Low-Income Assessment component; such outreach will involve identifying low-income neighborhoods, multifamily buildings, and manufactured home parks that may benefit from services and canvassing with door hangers.
- Conduct targeted telemarketing and direct mailing to customers participating in the OnTrack Program and Low-Income Home Energy Assistance Program ("LIHEAP") and to other income-eligible customers.
- Develop partnerships with housing and redevelopment authorities, community action groups, and other social service agencies.
- Recruit multifamily building owners and tenants to implement energy efficiency measures.

Eligible Measures and Incentive Strategy

Table 33 identifies PPL Electric Utilities' proposed list of measures, minimum eligibility qualifications, and range of incentive levels.

Table 33. Pa PUC Table 7-Low-Income Assessment Eligible Measures and Incentives

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Full Cost ($/unit)	Estimated Useful Life	Incentive Amount or Incentive Range ($/unit)
Welcome Kit REA	Per Kit	Yes	Must be current OnTrack customer	$9	15	$9
Welcome Kit On-site	Per Kit	Yes	Must be current OnTrack customer	$9	15	$9
Water Kit SF REA	Per Kit	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$10	9	$10
Water Kit MF REA	Per Kit	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$10	9	$10
Water Kit SF On-site	Per Kit	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$10	9	$10
Water Kit MF On-site	Per Kit	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$10	9	$10
Kitchen Aerator SF REA	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$3	10	$3
Kitchen Aerator MF REA	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$3	10	$3
Bath Aerator SF REA	Per Product	Yes	Electric hot water only, maximum flow rate is 0.5 gallons per minute	$2	10	$2
Bath Aerator MF REA	Per Product	Yes	Electric hot water only, maximum flow rate is 0.5 gallons per minute	$2	10	$2
Low Flow Showerhead SF REA	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$7	9	$7
Low Flow Showerhead MF REA	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$7	9	$7
Low Flow Showerhead Hand Held SF REA	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$11	9	$11
Low Flow Showerhead Hand Held MF REA	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$11	9	$11
LED Night Light REA	Per Product	Yes	Meets current TRM requirements, Replaces incandescent night light	$2	8	$2
LED Specialty (Globe/Candelabra) REA	Per Bulb	Yes	Meets current TRM requirements, ENERGY STAR	$6	15	$6
LED GSL A-Line (9 Watt or other) REA	Per Bulb	Yes	Meets current TRM requirements, ENERGY STAR	$6	15	$6
LED Reflector (Par/BR/R/downlight) REA	Per Bulb	Yes	Meets current TRM requirements, ENERGY STAR	$6	15	$6
Smart Strips - Tier 1 REA	Per Product	Yes	Meets current TRM requirement	$19	5	$19
Remote assessment & Energy Education REA	Per Project	Yes	Must be PPL Electric Utilities customer regardless of heating fuel	$70	1	$70
Carbon Monoxide Detector REA	Per Product	Yes	Must be recommended by auditor	$20	1	$20
Smoke Alarm REA	Per Product	Yes	Must be recommended by auditor	$5	1	$5
Kitchen Aerator SF On-site	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$4	10	$4

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Full Cost ($/unit)	Estimated Useful Life	Incentive Amount or Incentive Range ($/unit)
Kitchen Aerator MF On-site	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$4	10	$4
Bath Aerator SF On-site	Per Product	Yes	Electric hot water only, maximum flow rate is 0.5 gallons per minute	$3	10	$3
Bath Aerator MF On-site	Per Product	Yes	Electric hot water only, maximum flow rate is 0.5 gallons per minute	$3	10	$3
Water Heater Pipe Insulation On-site	Per Foot	Yes	Electric hot water only	$2	13	$2
Low Flow Showerhead SF On-site	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$9	9	$9
Low Flow Showerhead MF On-site	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$9	9	$9
Low Flow Showerhead Hand Held SF On-site	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$15	9	$15
Low Flow Showerhead Hand Held MF On-site	Per Product	Yes	Electric hot water only, maximum flow rate is 1.5 gallons per minute	$15	9	$15
Thermostatic Shower Restriction Valve SF On-site	Per Product	Yes	Electric hot water only, Meets current TRM requirements	$26	15	$26
Thermostatic Shower Restriction Valve MF On-site	Per Product	Yes	Electric hot water only, Meets current TRM requirements	$26	15	$26
Water Heater Temperature Setback On-site	Per Product	Yes	Electric hot water only, Meets current TRM requirements	$10	2	$10
Heat Pump Water Heater Replacement On-site	Per Project	Yes	Electric hot water only, ENERGY STAR	$2,768	10	$2,768
Furnace Whistle On-site	Per Product	Yes	Meets current TRM requirements	$4	5	$4
LED Night Light On-site	Per Product	Yes	Meets current TRM requirements, Replaces incandescent night light	$3	8	$3
LED Specialty (Globe/Candelabra) On-site	Per Bulb	Yes	Meets current TRM requirements, ENERGY STAR	$8	15	$8
LED A-Line (9 Watt or other) On-site	Per Bulb	Yes	Meets current TRM requirements, ENERGY STAR	$8	15	$8
LED Reflector (Par/BR/R/downlight) On-site	Per Bulb	Yes	Meets current TRM requirements, ENERGY STAR	$8	15	$8
Removal/Disposal of Extra Refrigeration Unit On-site	Per Product	Yes	Existing, working refrigerator or freezer 10-30 cubic feet in size, unit is primary or secondary unit	$50	5	$50
Recycle and Replace Freezer On-site	Per Product	Yes	Existing, working refrigerator or freezer 10-30 cubic feet in size, unit is primary or secondary unit	$696	5	$696
Smart Strips - Tier 1 On-site	Per Product	Yes	Meets current TRM requirement	$25	5	$25
Carbon Monoxide Detector On-site	Per Product	Yes	Must be recommended by auditor	$20	1	$20
Smoke Alarm On-site	Per Product	Yes	Must be recommended by auditor	$5	1	$5

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Full Cost ($/unit)	Estimated Useful Life	Incentive Amount or Incentive Range ($/unit)
Smart Thermostat Heat Pump On-site	Per Product	Yes	ENERGY STAR	$320	11	$320
Smart Thermostat Electric Furnace On-site	Per Product	Yes	ENERGY STAR	$320	11	$320
Heat Pump Maintenance On-site	Per Product	Yes	Repair or replacement, Meets current TRM requirements	$250	3	$250
On-site Assessment & Energy Education On-site	Per Product	Yes	Must be PPL Electric Utilities customer regardless of heating fuel	$100	1	$100
Ductless Mini-split Heat Pumps On-site	Per Product	Yes	Repair or replacement, Meets current TRM requirements. ENERGY STAR	Up to $8,000	15	Up to $8,000
Water Heater Pipe Insulation REA	Per Foot	Yes	Electric hot water only	N/A	N/A	N/A
Thermostatic Shower Restriction Valve SF REA	Per Product	Yes	Electric hot water only, Meets current TRM requirements	N/A	N/A	N/A
Thermostatic Shower Restriction Valve MF REA	Per Product	Yes	Electric hot water only, Meets current TRM requirements	N/A	N/A	N/A
Furnace Whistle REA	Per Product	Yes	Meets current TRM requirements	N/A	N/A	N/A
Recycle and Replace Refrigerator REA	Per Product	Yes	Existing, working refrigerator or freezer 10-30 cubic feet in size, unit is primary or secondary unit	N/A	N/A	N/A
Removal/Disposal of Extra Refrigeration Unit REA	Per Product	Yes	Existing, working refrigerator or freezer 10-30 cubic feet in size, unit is primary or secondary unit	N/A	N/A	N/A
Recycle and Replace Freezer REA	Per Product	Yes	Existing, working refrigerator or freezer 10-30 cubic feet in size, unit is primary or secondary unit	N/A	N/A	N/A
Smart Strips - Tier 2 REA	Per Product	Yes	Meets current TRM requirement	N/A	N/A	N/A
ES Dehumidifier REA	Per Product	Yes	ENERGY STAR	N/A	N/A	N/A
Battery Replaced in Existing Smoke Alarm REA	Per Product	Yes	As recommended by auditor	N/A	N/A	N/A
Recycle and Replace Refrigerator On-site	Per Product	Yes	Existing, working refrigerator or freezer 10-30 cubic feet in size, unit is primary or secondary unit	N/A	N/A	N/A
Smart Strips - Tier 2 On-site	Per Product	Yes	Meets current TRM requirement	N/A	N/A	N/A
Energy Star Dehumidifier On-site	Per Product	Yes	ENERGY STAR	N/A	N/A	N/A
Battery Replaced in Existing Smoke Alarm On-site	Per Product	Yes	As recommended by auditor	N/A	N/A	N/A

[1] All eligible measures are listed in this table regardless of participation projections. N/A indicates measure may be offered in future program years but not at the launch of Phase IV.

PPL Electric Utilities and the Low-Income CSP will work with stakeholders, preferred partners, and trade allies to create partnerships that can take advantage of additional incentives or cost savings for low-income customers.

All measures may not be available at all times. PPL Electric Utilities will review the component continually and may adjust available measures or eligibility qualifications to achieve savings and cost budgets. PPL Electric Utilities will coordinate Low-Income Assessment with its LIURP Assessment to maximize the effectiveness of measures and services provided to participants.

If a low-income home is eligible for full cost treatment,[23] the Company will install eligible measures through its LIURP Assessment or Low-Income Assessment budget, provided that the following conditions are all met:

- The customer receives landlord approval, as appropriate.
- The customer has installed electric heat in at least 50% of the home.
- The customer's home did not previously receive full cost services through the Low-Income Winter Relief Assistance Program (WRAP) in Phase III.
- The customer's home has no health or safety concerns that prevent the installation of full cost measures.
- The cost of the full cost measures can be accommodated in the LIURP Assessment or Low-Income Assessment budget.

Some measures provided in a home will be covered by Low-Income Assessment and others by LIURP Assessment. PPL Electric Utilities intends to increase the coordination and provide additional efficiencies between the Low-Income Assessment and LIURP Assessment, including:

- Single source for coordinated marketing campaigns.
- Reduced customer acquisition cost.
- Integrated intake and customer eligibility screening.
- Additional LIURP pre-screening opportunities for enhanced delivery of the program.
- Streamlined administrative and management processes.
- Consistent QA/QC procedures.

Potential LIURP Assessment measures will be identified during the Low-Income Assessment. If eligibility is determined, a Personal Energy Guide will refer the customer to a Preferred Partner for the installation of the LIURP measures.[24]

The Low-Income Assessment will provide baseload measures for LIURP Assessment customers whose income is less than 150% of the FPIG, allowing more of the LIURP budget to focus on comprehensive

[23] Full cost treatment may include weatherization and other measures outside scope of traditional assessments.

[24] See page 127 for Preferred Partner definition.

measures. Baseload measures for customers whose income is between 150% and 200% of the FPIG will be funded through the LIURP budget.

Deadline for Rebate Applications

PPL Electric Utilities offers Low-Income Assessment services at no cost to customers; therefore, there is no rebate application.

Start Date with Key Schedule Milestones

Table 34 lists the estimated key schedule milestones for Low-Income Assessment. PPL Electric Utilities staff will lead implementation or provide management oversight of all tasks.

Table 34. Low-Income Assessment Schedule and Milestones

Schedule	Milestones
11/30/2020	Phase IV EE&C Plan submitted to Pa PUC
06/01/2021	Launch Phase IV component
Annually starting 01/15/2022	EDCs submit semiannual program report
Annually starting 09/30/2022	EDCs submit final annual program report
05/31/2026	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electric Utilities' Evaluation Plan, which will be submitted to the SWE for review. The EM&V CSP will follow all applicable methods in the TRM to calculate energy savings and peak demand reduction. PPL Electric Utilities anticipates conducting annual impact evaluations and conducting process evaluations at least once during Phase IV.

The EM&V CSP will review a sample of participant records to verify the quantity, efficiency level, and qualification based on measure type and job type. If a home receives measures from Low-Income Assessment and LIURP Assessment, the Evaluation Plan will describe how their savings will be allocated.

Administrative Requirements

The Low-Income CSP will provide overall administrative and operational management of Low-Income Assessment. PPL Electric Utilities will provide oversight and operational support to establish effective deployment.

Estimated Participation

Table 35 shows the order of magnitude participation estimates for Low-Income Assessment. Actual quantities will vary, and PPL Electric Utilities will manage the component to stay within budget.

Table 35. Pa PUC Table 8-Low-Income Assessment Projected Participation [1]

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Welcome Kit REA	Energy Savings (MWh/year)	254	314	344	344	239	1,495

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
	Demand Reduction (MW)	0.112	0.138	0.151	0.151	0.105	0.658
	Projected Participation	11,900	14,700	16,100	16,100	11,200	70,000
Welcome Kit On-site	Energy Savings (MWh/year)	109	135	147	147	103	641
	Demand Reduction (MW)	0.048	0.059	0.065	0.065	0.045	0.282
	Projected Participation	5,100	6,300	6,900	6,900	4,800	30,000
Water Kit SF REA	Energy Savings (MWh/year)	18	22	25	25	17	107
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.002	0.011
	Projected Participation	114	141	154	154	107	670
Water Kit MF REA	Energy Savings (MWh/year)	1	1	1	1	1	5
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0005
	Projected Participation	6	7	8	8	6	35
Water Kit SF On-site	Energy Savings (MWh/year)	8	10	11	11	7	46
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.005
	Projected Participation	49	60	66	66	46	287
Water Kit MF On-site	Energy Savings (MWh/year)	0	0	1	1	0	2
	Demand Reduction (MW)	0.000	0.000	0.000	0.000	0.000	0.000
	Projected Participation	3	3	3	3	2	15
Kitchen Aerator SF REA	Energy Savings (MWh/year)	608	751	823	823	572	3,578
	Demand Reduction (MW)	0.082	0.102	0.111	0.111	0.077	0.484
	Projected Participation	3,426	4,232	4,635	4,635	3,224	20,151
Kitchen Aerator MF REA	Energy Savings (MWh/year)	24	30	32	32	23	141
	Demand Reduction (MW)	0.003	0.004	0.004	0.004	0.003	0.019
	Projected Participation	180	223	244	244	170	1,061
Bath Aerator SF REA	Energy Savings (MWh/year)	410	506	555	555	386	2,411
	Demand Reduction (MW)	0.056	0.069	0.075	0.075	0.052	0.327
	Projected Participation	5,375	6,639	7,272	7,272	5,059	31,616
Bath Aerator MF REA	Energy Savings (MWh/year)	27	33	36	36	25	158
	Demand Reduction (MW)	0.004	0.005	0.005	0.005	0.003	0.021
	Projected Participation	283	349	383	383	266	1,664
Low Flow Showerhead SF REA	Energy Savings (MWh/year)	228	281	308	308	214	1,338
	Demand Reduction (MW)	0.018	0.023	0.025	0.025	0.017	0.108
	Projected Participation	788	973	1,065	1,065	741	4,632
Low Flow Showerhead MF REA	Energy Savings (MWh/year)	12	15	16	16	11	70

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.006
	Projected Participation	41	51	56	56	39	244
Low Flow Showerhead Hand Held SF REA	Energy Savings (MWh/year)	796	984	1,077	1,077	749	4,684
	Demand Reduction (MW)	0.064	0.080	0.087	0.087	0.061	0.379
	Projected Participation	2,756	3,405	3,729	3,729	2,594	16,213
Low Flow Showerhead Hand Held MF REA	Energy Savings (MWh/year)	41	51	56	56	39	244
	Demand Reduction (MW)	0.003	0.004	0.005	0.005	0.003	0.020
	Projected Participation	145	179	196	196	137	853
LED Night Light REA	Energy Savings (MWh/year)	228	281	308	308	214	1,340
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	9,594	11,852	12,981	12,981	9,030	56,438
LED Specialty (Globe/Candelabra) REA	Energy Savings (MWh/year)	717	886	970	970	675	4,219
	Demand Reduction (MW)	0.099	0.122	0.134	0.134	0.093	0.583
	Projected Participation	26,864	33,185	36,346	36,346	25,284	158,025
LED GSL A-Line (9 Watt or other) REA	Energy Savings (MWh/year)	3,361	4,152	4,547	4,547	3,163	19,770
	Demand Reduction (MW)	0.481	0.594	0.650	0.650	0.453	2.828
	Projected Participation	92,106	113,778	124,614	124,614	86,688	541,800
LED Reflector (Par/BR/R/downlight) REA	Energy Savings (MWh/year)	157	194	213	213	148	924
	Demand Reduction (MW)	0.022	0.027	0.030	0.030	0.021	0.130
	Projected Participation	3,838	4,741	5,192	5,192	3,612	22,575
Smart Strips - Tier 1 REA	Energy Savings (MWh/year)	1,417	1,754	1,923	1,923	1,332	8,350
	Demand Reduction (MW)	0.143	0.177	0.194	0.194	0.135	0.844
	Projected Participation	15,919	19,711	21,607	21,607	14,970	93,815
Remote assessment & Energy Education REA	Energy Savings (MWh/year)	608	751	823	823	572	3,576
	Demand Reduction (MW)	0.003	0.004	0.005	0.005	0.003	0.020
	Projected Participation	7,676	9,482	10,385	10,385	7,224	45,150
Carbon Monoxide Detector REA	Energy Savings (MWh/year)	-	-	-	-	-	-
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	724	894	979	979	673	4,249
Smoke Alarm REA	Energy Savings (MWh/year)	-	-	-	-	-	-
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	5,757	7,111	7,788	7,788	5,418	33,863
Kitchen Aerator SF On-site	Energy Savings (MWh/year)	270	333	365	365	254	1,586

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
	Demand Reduction (MW)	0.036	0.045	0.049	0.049	0.034	0.215
	Projected Participation	1,519	1,876	2,055	2,055	1,429	8,934
Kitchen Aerator MF On-site	Energy Savings (MWh/year)	11	13	14	14	10	62
	Demand Reduction (MW)	0.001	0.002	0.002	0.002	0.001	0.008
	Projected Participation	80	99	108	108	75	470
Bath Aerator SF On-site	Energy Savings (MWh/year)	174	215	235	235	164	1,022
	Demand Reduction (MW)	0.024	0.029	0.032	0.032	0.022	0.138
	Projected Participation	2,278	2,814	3,082	3,082	2,144	13,401
Bath Aerator MF On-site	Energy Savings (MWh/year)	11	14	15	15	11	67
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.001	0.009
	Projected Participation	120	148	162	162	113	705
Water Heater Pipe Insulation On-site	Energy Savings (MWh/year)	12	14	16	16	11	68
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.005
	Projected Participation	1,480	1,829	2,003	2,003	1,393	8,708
Low Flow Showerhead SF On-site	Energy Savings (MWh/year)	98	120	132	132	92	574
	Demand Reduction (MW)	0.008	0.010	0.011	0.011	0.007	0.046
	Projected Participation	338	417	457	457	318	1,985
Low Flow Showerhead MF On-site	Energy Savings (MWh/year)	5	6	7	7	5	30
	Demand Reduction (MW)	0.000	0.001	0.001	0.001	0.000	0.002
	Projected Participation	18	22	24	24	17	104
Low Flow Showerhead Hand Held SF On-site	Energy Savings (MWh/year)	341	422	462	462	321	2,007
	Demand Reduction (MW)	0.028	0.034	0.037	0.037	0.026	0.163
	Projected Participation	1,181	1,459	1,598	1,598	1,112	6,949
Low Flow Showerhead Hand Held MF On-site	Energy Savings (MWh/year)	18	22	24	24	17	105
	Demand Reduction (MW)	0.001	0.002	0.002	0.002	0.001	0.008
	Projected Participation	62	77	84	84	59	366
Thermostatic Shower Restriction Valve SF On-site	Energy Savings (MWh/year)	14	17	19	19	13	83
	Demand Reduction (MW)	0.001	0.001	0.002	0.002	0.001	0.007
	Projected Participation	243	300	329	329	229	1,429
Thermostatic Shower Restriction Valve MF On-site	Energy Savings (MWh/year)	1	1	1	1	1	4
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0004
	Projected Participation	13	16	17	17	12	75
	Energy Savings (MWh/year)	62	77	84	84	58	365

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Water Heater Temperature Setback On-site	Demand Reduction (MW)	0.005	0.006	0.007	0.007	0.005	0.030
	Projected Participation	622	768	841	841	585	3,657
Heat Pump Water Heater Replacement On-site	Energy Savings (MWh/year)	136	169	185	185	128	803
	Demand Reduction (MW)	0.007	0.009	0.010	0.010	0.007	0.043
	Projected Participation	75	92	101	101	70	439
Furnace Whistle On-site	Energy Savings (MWh/year)	1	2	2	2	1	8
	Demand Reduction (MW)	0.0003	0.0004	0.0004	0.0004	0.0003	0.0017
	Projected Participation	107	132	145	145	101	629
LED Night Light On-site	Energy Savings (MWh/year)	98	121	132	132	92	574
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	4,112	5,079	5,563	5,563	3,870	24,188
LED Specialty (Globe/Candelabra) On-site	Energy Savings (MWh/year)	307	380	416	416	289	1,808
	Demand Reduction (MW)	0.042	0.052	0.057	0.057	0.040	0.250
	Projected Participation	11,513	14,222	15,577	15,577	10,836	67,725
LED A-Line (9 Watt or other) On-site	Energy Savings (MWh/year)	1,200	1,483	1,624	1,624	1,130	7,061
	Demand Reduction (MW)	0.172	0.212	0.232	0.232	0.162	1.010
	Projected Participation	32,895	40,635	44,505	44,505	30,960	193,500
LED Reflector (Par/BR/R/downlight) On-site	Energy Savings (MWh/year)	67	83	91	91	63	396
	Demand Reduction (MW)	0.009	0.012	0.013	0.013	0.009	0.056
	Projected Participation	1,645	2,032	2,225	2,225	1,548	9,675
Removal/Disposal of Extra Refrigeration Unit On-site	Energy Savings (MWh/year)	1	1	1	1	1	5
	Demand Reduction (MW)	0.0001	0.0002	0.0002	0.0002	0.0001	0.0008
	Projected Participation	1	1	1	1	1	6
Recycle and Replace Freezer On-site	Energy Savings (MWh/year)	8	10	10	10	7	45
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.004
	Projected Participation	16	20	22	22	15	97
Smart Strips - Tier 1 On-site	Energy Savings (MWh/year)	534	660	723	723	503	3,142
	Demand Reduction (MW)	0.054	0.067	0.073	0.073	0.051	0.318
	Projected Participation	6,002	7,415	8,121	8,121	5,648	35,307
Carbon Monoxide Detector On-site	Energy Savings (MWh/year)	-	-	-	-	-	-
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	313	386	422	422	295	1,838
Smoke Alarm On-site	Energy Savings (MWh/year)	-	-	-	-	-	-

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	2,467	3,048	3,338	3,338	2,322	14,513
Smart Thermostat Heat Pump On-site	Energy Savings (MWh/year)	13	16	17	17	12	75
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	22	27	30	30	21	129
Smart Thermostat Electric Furnace On-site	Energy Savings (MWh/year)	18	22	24	24	17	104
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	12	15	16	16	11	71
Heat Pump Maintenance On-site	Energy Savings (MWh/year)	9	12	13	13	9	55
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.001	0.009
	Projected Participation	43	54	59	59	41	255
On-site Assessment & Energy Education On-site	Energy Savings (MWh/year)	261	322	353	353	245	1,533
	Demand Reduction (MW)	0.001	0.002	0.002	0.002	0.001	0.009
	Projected Participation	3,290	4,064	4,451	4,451	3,096	19,350
Ductless Mini-split Heat Pumps On-site	Energy Savings (MWh/year)	19	23	25	25	18	110
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.002	0.010
	Projected Participation	9	11	12	12	8	50

[1] To show numerical values in the Pa PUC Table 8 tables, deviation from the standard use of decimals throughout Section 3 may have been applied.
[2] Total values may not equal the sum of all program year values due to rounding.

Plans for Achieving Compliance with the Implementation Order

PPL Electric Utilities designed its EE&C Plan to achieve its low-income targets with Phase IV transactions (projects that are implemented during Phase IV) through an income-qualified component only, the Low-Income Assessment.

3.4 Non-Residential Program (2021-2026)

PPL Electric Utilities' proposed Non-Residential Program will be offered to all large C&I and small C&I customers, including government and educational institutions and master metered low-income multifamily buildings. The following sections describe the two components in PPL Electric Utilities' proposed Non-Residential Program:

- Efficient Equipment (Prescriptive)
- Custom

The component sections below provide the component description; objectives; target market; implementation strategy; issues, risks, and risk management strategy; anticipated costs to participating customers; ramp-up strategy; marketing strategy; eligible measures and incentive strategy; deadline for

rebate applications; start date with key schedule milestones; EM&V; administrative requirements; and estimated savings and participation. Please note that participation levels, savings, costs, and incentive ranges are estimates as directed by the Pa PUC EE&C Plan Template.

Table 36 and Table 37 list estimated savings and costs by program year and in total for the Non-Residential Program (large C&I and small C&I, respectively). The Non-Residential Large C&I budget is 27.5% of the total portfolio budget, and the Non-Residential Small C&I budget is 24.6% of the total portfolio budget.[25]

Table 36. Pa PUC Table 9 - Large C&I Costs and Benefits by Program Year ($1000)

Cost Element		PY13	PY14	PY15	PY16	PY17	Phase IV Total [1]
Total Budget ($000)		$16,696	$17,413	$17,456	$17,180	$17,162	$85,906
Incentives ($000)	Rebates	$10,733	$11,191	$11,189	$10,993	$10,955	$55,060
	Upstream/Midstream Buydown	$537	$552	$533	$507	$501	$2,630
	Kits	-	-	-	-	-	-
	Direct Install Materials & Labor	-	-	-	-	-	-
	Incentive Total	**$11,270**	**$11,742**	**$11,722**	**$11,500**	**$11,456**	**$57,690**
Non-Incentives ($000)	CSP Program Design	$101	-	-	-	-	$101
	CSP Administrative	$769	$849	$885	$906	$934	$4,343
	CSP Delivery Fees	$4,032	$4,254	$4,262	$4,176	$4,159	$20,884
	CSP Marketing	$414	$457	$477	$488	$503	$2,339
	EDC Administrative	$110	$110	$110	$110	$110	$550
	EDC Other	-	-	-	-	-	-
	Non-Incentive Total	**$5,426**	**$5,671**	**$5,734**	**$5,680**	**$5,706**	**$28,216**
Percent Incentives		68%	67%	67%	67%	67%	67%

[1] Total values may not equal the sum of all program year values due to rounding.

Table 37. Pa PUC Table 9 - Small C&I Costs and Benefits by Program Year ($1000)

Cost Element		PY13	PY14	PY15	PY16	PY17	Phase IV Total [1]
Total Budget ($000)		$14,980	$15,662	$15,624	$15,211	$15,362	$76,838
Incentives ($000)	Rebates	$8,731	$9,181	$9,168	$8,923	$9,022	$45,025
	Upstream/Midstream Buydown	$1,461	$1,483	$1,445	$1,393	$1,370	$7,152
	Kits	-	-	-	-	-	-
	Direct Install Materials & Labor	$150	$178	$176	$174	$167	$845
	Incentive Total	**$10,342**	**$10,842**	**$10,789**	**$10,490**	**$10,560**	**$53,022**
	CSP Program Design	$129	-	-	-	-	$129

[25] This percentage represents the program budget without common costs over the total portfolio budget, which includes common costs.

Non-Incentives ($000)	CSP Administrative	$702	$755	$767	$768	$786	$3,778
	CSP Delivery Fees	$3,319	$3,548	$3,546	$3,430	$3,482	$17,325
	CSP Marketing	$378	$407	$413	$413	$423	$2,034
	EDC Administrative	$110	$110	$110	$110	$110	$550
	EDC Other	-	-	-	-	-	-
	Non-Incentive Total	**$4,638**	**$4,820**	**$4,835**	**$4,721**	**$4,802**	**$23,816**
Percent Incentives		69%	69%	69%	69%	69%	69%

[1] Total values may not equal the sum of all program year values due to rounding.

Table 38 and Table 39 show net present value benefits and costs, net benefits, and the overall benefit/cost ratio for the large C&I and small C&I sectors, respectively.

Table 38. Large C&I Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$383,384
NPV Costs	$369,257
Net Benefits	$14,127
Benefit/Cost Ratio	1.04

Table 39. Small C&I Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$354,590
NPV Costs	$226,867
Net Benefits	$127,722
Benefit/Cost Ratio	1.56

As noted in Section 1.6, PPL Electric Utilities will rely on energy efficiency measures with coincident peak demand reduction potential to achieve its annual and total peak demand reduction goals. PPL Electric Utilities will target end uses to nominate roughly 1% to 20% of eligible PJM peak demand savings from the Non-Residential Program over the five-year Plan. PPL Electric Utilities is not aware at this time which measures will be nominated; however, they will likely include cooling and lighting. PPL Electric Utilities will competitively select a qualified third-party vendor to provide technical support in nominating a portion of its peak demand reductions as a capacity resource in PJM's FCM.

Efficient Equipment Component

The Efficient Equipment component is the same for both large C&I and small C&I customers unless noted otherwise.

Description

Through the Efficient Equipment component, PPL Electric Utilities promotes the purchase and installation of a wide range of high-efficiency measures, including lighting, HVAC, refrigeration, motors/drives, commercial kitchen equipment, agricultural equipment, equipment controls, and new construction projects. The Company provides customers financial incentives based on the measure

installed and savings achieved, which offset the higher purchase costs of energy efficient and peak demand-saving equipment.

The component has four delivery channels:

- **Downstream rebates.** In Phase IV, PPL Electric Utilities will continue to offer rebate submissions, similar to the downstream channel successfully used in Phase III. Customers, contractors, or trade allies will submit applications for review and validation by the Non-Residential CSP. The CSP will review and validate all submitted applications and eligible projects will be processed and incentives paid upon project completion and final savings calculations.
- **Direct discount.** PPL Electric Utilities will implement the direct discount delivery channel to engage small C&I customers. This approach is supported by a network of qualified contractors and higher incentives that motivate them to complete projects that would otherwise not receive their attention. The Non-Residential CSP helps the contractor orchestrate the project from beginning to end on behalf of the customer. Small C&I customers benefit by having an expert identify the applicable measures, manage the project, and apply for and secure incentives to offset the upfront cost of the project. The amount of the incentive appears on the project invoice, and the customer is responsible for the remaining project cost. Once the project is complete and the application is updated, the Non-Residential CSP commences measurement and verification. The CSP then reimburses the contractor with a check for the incentive.
- **Direct install.** In Phase IV, PPL Electric Utilities will build on the successful direct install offering from Phase III. The Non-Residential CSP will target hard-to-reach small C&I customers and provide a no-cost assessment to identify retrofit measures and operational improvements to lower energy consumption and costs and to install energy efficiency measures. After the assessment, the Non-Residential CSP will send customers an assessment report with additional recommendations to support their overall energy efficiency and peak demand needs and goals and recommendations for qualified trade allies with whom they can work.
- **Midstream**. PPL Electric Utilities will continue using a midstream delivery channel to help customers choose and procure certain high-efficiency products more quickly and easily than through typical downstream methods. In the midstream approach, trade allies and customers may purchase high-efficiency products listed by ENERGY STAR or DesignLights Consortium (“DLC”) directly from participating and qualified midstream distributors and receive an immediate rebate at the point of purchase. This approach has proven to raise customer and trade ally satisfaction; reduce administrative expenses; increase the volume of installed, high-efficiency lighting and socket upgrades, particularly for customers implementing routine projects; and lower the number of contractors and customers who use high-efficiency lighting products but fail to submit program applications.

The Non-Residential CSP will manage and coordinate the Efficient Equipment component, maintain a call and rebate processing center, recruit and educate trade allies, and conduct marketing to achieve the desired participation and encourage customers to take a whole-building approach or implement multiple measures.

Objectives

The objectives of the Efficient Equipment component are:

- Provide energy and peak demand-savings opportunities and incentives to qualified customers.
- Increase the market penetration of high-efficiency technologies and building systems for customers by offering incentives for high-efficiency and ENERGY STAR-rated appliances, lighting equipment, and HVAC systems.
- Increase customer awareness of the features and benefits of energy efficient equipment.
- Support emerging technologies and nontypical efficiency solutions in cost-effective applications.
- Engage trade allies to stock, promote, and provide high-efficiency technology options to customers.
- Promote other PPL Electric Utilities energy efficiency program components.
- Collect energy, peak demand, and operating data from customers, as required to confirm customer and measure eligibility and to determine energy and peak demand savings and cost-effectiveness.
- Achieve a total energy reduction of approximately 665,361 MWh/year and 108 MW[26] gross verified savings for large C&I and small C&I customers, or business types.

Implementation Strategy

The Non-Residential CSP will deliver the Efficient Equipment component promoting the various energy efficiency options available to the non-residential customer segment with a range of marketing and outreach tactics. The Efficient Equipment component relies on projects being initiated by customers, trade allies, distributors, and the Non-Residential CSP. The Non-Residential CSP will build on trade ally and distributor relationships to co-market energy efficient equipment and the value of participation.

Key steps include the following:

- Educate customers on energy efficiency opportunities and direct them to the appropriate path through marketing activities, the website, or direct contact with equipment distributors or equipment installation contractors/trade allies.
- Have customers complete applications or work with customers, equipment/appliance retailers, midstream distributors, and installation contractors to complete program applications.
- Ensure customers/contractors submit the required documentation for processing.
- Review pending and completed project documentation to verify applicant is a PPL Electric Utilities customer and the completed project and installed equipment meet program eligibility criteria.

[26] Peak Demand is at generation.

- When possible, work with customers to confirm project preapproval before ordering energy efficiency equipment.
- Recruit and develop an effective trade ally network.
- Process applications and issue rebates for qualified projects/equipment.
- Verify completed equipment/appliance installation for a sample of participants to confirm program integrity as part of M&V.

Issues, Risks, and Risk Management Strategy

Table 40 presents market risks associated with the Efficient Equipment component and the strategies that PPL Electric Utilities will use to manage each risk.

Table 40. Efficient Equipment Issues, Risks, and Risk Management Strategies

Component Issue	Risk	Risk Management Strategies
Customer or building owner does not prioritize energy efficiency.	• Decision-makers choose to install cheaper, less efficient equipment with shorter payback/internal rate of return ("IRR"), resulting in lower savings. • Owners are not informed about how their facility uses energy. • Existing debt may limit funds to purchase new efficient equipment. • Customers place a priority on fluctuating commodity prices.	• PPL Electric Utilities offers incentives to reduce payback and IRR for business owners. • Non-Residential CSP offers planning assistance to enhance energy savings. • Non-Residential CSP educates customers about the long-term benefits of energy efficiency, available incentives, and other components.
Customers typically replace equipment only upon failure.	• Customers see no need to replace functioning equipment. • Customers are not informed about the most efficient equipment available when the need to replace it is immediate. Some efficient equipment may have a longer delivery time that would affect customer operations.	• Non-Residential CSP educates trade allies and customers about available energy efficient choices before equipment fails and encourages businesses to plan for equipment replacement. • PPL Electric Utilities provides incentives for trade allies to stock, promote, and install efficient measures.
Customers are unaware of the benefits of installing and properly maintaining energy efficient equipment.	• Customers do not properly maintain equipment, and savings benefits erode over time.	• Non-Residential CSP promotes the importance and value of equipment maintenance and training.

Anticipated Costs to Participating Customers

Costs incurred by customers participating in Efficient Equipment will vary by the specific type of efficient equipment installed.

Ramp-Up Strategy

Efficient Equipment component is an existing, mature offering being carried forward from Phase III. The Non-Residential CSP will develop marketing material to facilitate the transition to Phase IV. The Non-Residential CSP has developed a transitional strategy to bridge incentives for customers whose participation in the program spans Phase III and Phase IV.

PPL Electric Utilities expects to implement the following transition plan between Phase III and Phase IV:

- Projects on the Phase III waitlist will receive comparable incentives if completed and installed early in Phase IV. Comparable is defined as the Phase III rebate, up to $0.05/annual kWh saved and subject to Phase III per project or per customer incentive caps. Projects must be completed by August 31, 2021, for most measures. PPL Electric Utilities will consider exceptions to that deadline on a case-by-case basis, depending on the project details.
- Projects approved (funds reserved) in Phase III that are installed (placed in service) in Phase IV may be eligible for the approved Phase III rebate and will be accounted for as Phase IV projects.

Marketing Strategy

PPL Electric Utilities will work with the Non-Residential CSP to develop and execute a marketing plan that captures sector-level economies of scale and employs targeted outreach where practical. The marketing strategy may include the following:

- Take advantage of trade ally and manufacturer relationships to co-market energy efficient equipment and products.
- Host webinars.
- Participate in trade shows and other outreach events.
- Communicate and provide access to program component information on the Company's EE&C website.
- Promote the component in newsletters.
- Advertise using newspaper, radio, direct mail, bill inserts, cross-program component advertisements, commercial ads, and other mass media.
- Coordinate advertising opportunities with trade allies.
- Develop, publish, and distribute brochures and case studies.
- Conduct one-on-one marketing to small C&I customers through trade allies, business accounts specialists, and Non-Residential CSP outreach.
- Target marketing to facility managers, building or process engineers, building owners and managers associations, HVAC contractors, energy services firms, architects and engineers, real estate developers, economic development organizations, customer advocacy groups, trade associations, and other trade allies to encourage installation of new energy efficient technologies and adoption of best-operating practices.
- Provide specific outreach to individual tenants as well as building owners and property managers in leased commercial buildings to encourage participation in the program.
- Target specific sectors identified as having a high unrealized energy efficiency potential.

- Publish marketing materials including charts, brochures, and case studies.
- Provide newsletters and coordinate with key market partners, including trade associations and agencies.
- Use limited time offers, special promotions, and no-cost measures to promote energy efficiency.
- Offer trade ally incentives and rewards.
- Cross-promote through other PPL Electric Utilities energy efficiency program components.
- Provide information and training on specific technologies directed towards niche markets.
- Incorporate customers in area- or territory-focused promotions.
- Work with distributors to promote and encourage purchases of efficient equipment to capture savings opportunities missed by other outreach methods.

Eligible Measures and Incentive Strategy

PPL Electric Utilities will offer rebates and incentives to qualified customers (or trade allies, depending on the delivery channel) who submit completed applications and documentation of the efficiency measures installed. Customers will have the option to assign rebate payments to a third party.

PPL Electric Utilities offers performance incentives based on the avoided or reduced energy (kWh/year) or peak demand (kW) savings resulting from the project. Incentives may be capped at 50% to 100% of the total project costs (excluding internal labor) or $500,000 and are subject to an annual cap for each project and each participating customer. The per-customer-site cap is defined as one building with one or more meters. A parent company cap of $1 million per year will apply to a campus setting or multiple buildings (on the same property or in different locations) with a common owner. For all measures offered through the Efficient Equipment component, PPL Electric Utilities will provide incentives in the range of $0.02 to $0.22 per annual kWh saved and/or $30 to $1,200 per kW peak demand.

PPL Electric Utilities may distribute lighting measures to customers through the traditional rebate, direct discount (i.e., incentive paid to a trade ally), direct install, or midstream channel. Table 41 and Table 42 lists PPL Electric Utilities' proposed measures and minimum eligibility qualifications for large C&I and small C&I, respectively.

Table 41. Pa PUC Table 7-Large C&I Efficient Equipment Rebates Eligible Measures and Incentives

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Lighting Improvements	Per Project	No	Products must meet the minimum requirements of ENERGY STAR or the DLC and complete PA TRM Lighting Form.	$46,521	13	$8,860	Up to $0.22/kWh and/or up to $1,200/kW first year savings
LED Exit Signs	Per Product	No	Replacement of existing incandescent or fluorescent exit signs with a new LED exit sign.	$55	15	$21	Up to $0.22/kWh and/or up to $1,200/kW first year savings
HVAC Systems	Per Product	No	This measure excludes water source, ground source, and groundwater source heat pump measures that are covered in the Water Source and Geothermal Heat Pumps measure. All HVAC applications other than comfort cooling and heating, such as process cooling, are ineligible for this measure.	$194	15	$441	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Electric Chillers	Per Product	No	Installation of high efficiency electric chillers that exceed the minimum performance allowed by the current PA Energy Code.	$4,021	15	$1,890	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Water Source and Geothermal Heat Pumps	Per Product	No	High-efficiency groundwater source, water source, or ground source heat pump system that exceeds the energy efficiency requirements of the IECC 2015, Table 403.2.3(1).	$52,603	15	$111	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Ductless mini-split heat pumps < 5.4 tons	Per Product	No	<5.4 tons, ENERGY STAR with inverter technology.	$2,313	15	$379	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Room A/C	Per Product	No	ENERGY STAR	-$65	9	$3	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Guest Room Occupancy Sensor controls	Per Ton	No	Guest rooms that are equipped with energy management thermostats replacing manual heating/cooling temperature set-point and fan On/Off/Auto thermostat controls.	$180	15	$34	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Economizer controls	Per Control	No	Adding an economizer and dual enthalpy (differential) control on existing HVAC unit with no economizer or with a non-functional/disabled economizer.	$1,421	10	$973	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
VFD Improvements	Per Control	No	A motor with a variable-frequency drive ("VFD") control replacing a motor without an existing VFD control.	$2,607	15	$1,282	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ECM Circulating fan	Per Product	No	Circulating fan motors of 1 horsepower ("HP") or less with a baseline shaded-pole ("SP") or permanent-split capacitor ("PSC") evaporator fan motor in an air handling unit.	$417	15	$34	Up to $0.22/kWh and/or up to $1,200/kW first year savings
VSD on Kitchen Exhaust Fan	Per Fan	No	The energy efficient condition is a kitchen ventilation system equipped with a variable speed drive ("VSD") and demand ventilation controls and sensors. The baseline equipment is kitchen ventilation that has a constant speed ventilation motor.	$2,296	15	$216	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Refrigeration/Freezer Cases	Per Product	No	ENERGY STAR, Eligible refrigerators and freezers are self-contained with vertical-closed transparent or solid doors.	$853	12	$39	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High efficiency evaporator fan motors for walk in or reach in cases	Per Product	No	Replacement of existing SP evaporator fan motors or PSC motors in walk-in or reach-in refrigerated display cases with an electronically commutated motor ("ECM") or a permanent magnet synchronous ("PMS") motor.	$343	15	$40	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Evaporator Fan controllers	Per Control	No	Installation of evaporator fan controls in medium-temperature walk-in or reach-in coolers and low temperature walk-in or reach-in freezers.	$563	15	$71	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Anti-sweat heater controls	Per Control	No	Adding controls to glass door cooler or refrigerator with uncontrolled heaters utilizing either ON/OFF or micro pulse controls.	$1,051	12	$221	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Variable speed refrigeration compressor	Per Horsepower	No	VSD control system replacing a slide valve control system in existing commercial refrigeration systems.	$85	15	$16	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Strip curtains for walk-in freezers and coolers	Per Door	No	Install or retrofit strip curtains in commercial walk-in cooler and freezer doors. Strip curtains must be at least 0.06 inches thick.	$359	4	$676	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Night covers for display cases	Per Foot	No	Install on existing open-type refrigerated display cases, where covers are deployed during the facility's unoccupied hours.	$42	5	$3	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Auto door closers	Per Product	No	Retrofit doors not equipped with auto-closers and assume the doors have strip curtain for walk-in coolers and freezers. Auto-closer must be able to firmly close door when it is within one inch of full closure. Walk-in door perimeter must be ≥ 16 feet.	$498	8	$96	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Door gaskets for walk-in and reach-in coolers and freezers	Per Door	No	Replace worn-out gaskets with new better-fitting gaskets.	$98	4	$18	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Low or No anti-sweat heat for reach-in freezers and coolers	Per Door	No	Install a no-heat/low-heat clear glass door on an upright display case. Limited to door heights of 57 inches or more. Doors must have either heat reflective treated glass, be gas filled, or both.	$1,213	12	$37	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Refrigerated Display cases with doors replacing open cases	Per Foot	No	A new, vertical case with no sweat doors that meets federal standard requirements.	$449	12	$28	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Adding doors to existing refrigerated display cases	Per Foot	No	Retrofit existing vertical open display cases with zero heat doors.	$521	12	$31	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Ice machines	Per Product	No	ENERGY STAR	$378	8	$127	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Beverage machine controls	Per Product	No	Added to non-ENERGY STAR machines.	$180	5	$99	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Office equipment	Per Product	No	ENERGY STAR	$10	6	$7	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Cycling refrigerated thermal mass dryer	Per Horsepower	No	Baseline: non-cycling (e.g., continuous) air dryer with a capacity of 600 cubic feet per minute (“cfm”) or below. The replacement of desiccant, deliquescent, heat-of-compression, membrane, or other types of dryers does not qualify under this measure.	$24	10	$4	Up to $0.22/kWh and/or up to $1,200/kW first year savings
No-loss condensate drains	Per Product	No	Retrofit existing timed drained system with new no-loss condensate drains.	$194	5	$167	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Variable speed drive air compressor	Per Horsepower	No	Install or retrofit a single VSD unit less than 40 HP with variable speed control.	$191	13	$59	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High efficiency ventilation fans with and w/o thermostats	Per Product	No	Agricultural Application: Installation of high efficiency ventilation fans where standard efficiency ventilation fans are replaced and/or the installation of a thermostat controlling either new efficient fans or existing fans.	$175	15	$31	Up to $0.22/kWh and/or up to $1,200/kW first year savings
VSD Controller on dairy vacuum pumps	Per Product	No	Agricultural Application: Installation of a VSD and controls on dairy vacuum pumps, or the purchase of dairy vacuum pumps with variable speed capability.	$5,120	15	$663	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Lighting Improvements for Midstream	Per Fixture	No	Products must meet the minimum requirements of ENERGY STAR or the DLC and complete PA TRM Lighting Form.	$77	15	$76	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Lighting Improvements for Midstream	Per Lamp	No	Products must meet the minimum requirements of ENERGY STAR or the DLC and complete PA TRM Lighting Form.	$6	15	$4	Up to $0.22/kWh and/or up to $1,200/kW first year savings
HVAC Systems Midstream	Per Product	No	This measure excludes water source, ground source, and groundwater source heat pump measures that are covered in the Water Source and Geothermal Heat Pumps measure. All HVAC applications other than comfort cooling and heating, such as process cooling, are ineligible for this measure.	$194	15	$561	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Ductless mini-split heat pumps < 5.4 tons Midstream	Per Product	No	<5.4 tons, ENERGY STAR with inverter technology.	$2,313	15	$482	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Ice machines Midstream	Per Product	No	ENERGY STAR	$378	8	$162	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial fryer Midstream	Per Product	No	ENERGY STAR	$1,038	12	$220	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial hot food holding cabinet Midstream	Per Product	No	ENERGY STAR	$895	12	$155	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
High efficiency ventilation fans with and w/o thermostats Midstream	Per Product	No	Agricultural Application: Installation of high efficiency ventilation fans where standard efficiency ventilation fans are replaced and/or the installation of a thermostat controlling either new efficient fans or existing fans.	$175	15	$40	Up to $0.22/kWh and/or up to $1,200/kW first year savings
VSD Controller on dairy vacuum pumps Midstream	Per Product	No	Agricultural Application: Installation of a VSD and controls on dairy vacuum pumps, or the purchase of dairy vacuum pumps with variable speed capability.	$5,120	15	$844	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Lighting Controls	Per kW Controlled	No	Lighting controls turn lights on and off automatically, which are activated by time, light, motion, or sound.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
LED Channel Signage	Per Foot	No	Replacement of neon and/or incandescent channel letter signs with efficient LED channel letter signs. Replacement signs cannot use more than 20% of the actual input power of the sign that is replaced.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
LED Refrigeration Display Case Lighting	Per Door	No	Installation of LED case lighting with or without motion sensors on existing refrigerators, coolers, and freezers - specifically on vertical displays.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Fuel Switching	Per Product	No	Must replace electric equipment with ENERGY STAR certified natural gas, propane, or fuel oil equipment.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Computer room A/C	Per Product	No	Newly installed computer room air conditioner systems that exceed the baseline efficiencies (in seasonal coefficient of performance (“SCOP”)) outlined in Table 3-56 of the current PA TRM.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Computer room A/C EC fans	Per Product	No	Installation of electronically commutated (“EC”) plug fans in computer room air conditioning (“CRAC”) and computer room air handling (“CRAH”) units.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Computer room VFD on fans	Per Horsepower	No	Installation of a VSD to control AC fan motors in CRAC and CRAH units.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Circulation Fan: High Volume Low Speed	Per Product	No	Installation of High Volume Low Speed (“HVLS”) fans (diameters ranging from 8 to 24 feet) replacing conventional circulating fans. Commercial and industrial applications only.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Premium Efficiency Motors	Per Horsepower	No	Replacement of old motors with new energy efficient motors of the same rated HP.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ECM Circulator Pump	Per Pump	No	An ECM or brushless permanent magnet (BPM) circulator pump replacing single-speed induction motor circulator pumps in space heating and hot water applications.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High Efficiency Pumps	Per Horsepower	No	Compliant pumps will achieve a PEI of 1.0 or less. All pumps manufactured after January 27, 2020 must comply with the U.S. Department of Energy's ("DOE") energy conservation standard as described in 10 CFR 431 Subpart Y.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Heat Pump Water Heaters	Per Product	No	Installation of a heat pump water heater instead of a code minimum electric water heater.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Low Flow Pre-rinse Sprayers	Per Product	No	Efficient low flow pre-rinse sprayers that use less than 1.6 gallons of water per minute. Only applicable to premises with electric water heating.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Fuel Switching: electric water heaters to gas/propane	Per Product	No	Must replace electric water heater with ENERGY STAR certified natural gas or propane equipment.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Floating head pressure control ("FHPC")	Per Control	No	Adding FHPCs to a refrigeration system. FHPCs must have a minimum Saturated Condensing Temperature ("SCT") programmed for the floating head pressure control of ≤ 70 ºF. The use of FHPC would require balanced-port expansion valves, allowing satisfactory refrigerant flow over a range of head pressures. The compressor must be 1 HP or larger.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Evaporator coil defrost controls	Per Evaporator Unit	No	Adding defrost controls to existing walk-in coolers or freezers without defrost controls.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Suction pipe insulation for walk-in coolers and freezers	Per Foot	No	Insulate bare refrigeration suction pipes for walk-in coolers and freezers according to the current PA TRM requirements.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Air cooled refrigeration condenser	Per Ton	No	Installing an efficient, close-approach air-cooled refrigeration condenser that meets the current PA TRM requirements.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Refrigerated case light occupancy sensors	Per Watt Controlled	No	Installation of motion-based lighting controls that allow the LED case lighting to be dimmed or turned off completely during unoccupied conditions.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Refrigeration economizers	Per Compressor Horsepower	No	Economizers installed on a walk-in refrigeration system.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Clothes washer	Per Product	No	ENERGY STAR, installed in commercial laundromats or multifamily complex laundry rooms.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR bathroom ventilation fan	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Snack machine controls	Per Product	No	Added to non-ENERGY STAR, non-refrigerated machines.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Electric steam cooker	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Combination oven	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial convection oven	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial fryer	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial hot food holding cabinet	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial Dishwasher	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial Griddle	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Wall and Ceiling Insulation	Per SQFT	No	Applies to buildings that are heated and/or cooled using electricity. Existing construction buildings are required to meet or exceed the code requirement. New construction buildings must exceed the code requirement.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Office Equipment - Network power management enabling	Per Workstation	No	Applicable to any software that manages workstations in a networked environment that meets the current PA TRM requirements.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Advanced power strips	Per Workstation	No	Installation of an Advanced Power Strip Tier 1 or Tier 2.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Servers	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Server virtualization	Per Product	No	Servers must be consolidated to increase utilization of the remaining servers, and the virtualized servers must be either a) removed or b) physically disconnected from power.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Air-entraining air nozzle	Per Product	No	Replace non-air entraining air nozzle (open copper tube of 1/8-inch or 1/4-inch orifice diameter) with an energy efficient air-entraining air nozzle that uses less than 15 cfm at 100 pounds per square inch (“psi”) for industrial applications.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Air tanks for Load/No load compressors	Per Horsepower	No	Minimum storage ratio of 4 gallons per cfm.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Compressed air controller	Per Horsepower	No	The baseline condition is having no existing pressure/flow controller and an existing compressed air system with a total compressor motor capacity ≥ 40 hp. This measure requires a minimum storage of 3gal/cfm.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Compressed air low pressure drop filters	Per Horsepower	No	The baseline condition is a standard coalescing filter with a pressure drop of 3 psi when new and 5 psi or more at element change. The efficient condition is a low pressure drop filter with pressure drop not exceeding 1 psi when new and 3 psi at element change.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Compressed air mist eliminators	Per Horsepower	No	The compressed air system must be greater than 50 HP to qualify, and the mist eliminator must have less than a 1 pound per square inch gauge ("psig") pressure drop and replace a coalescing filter.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High efficiency transformer	Per Product	No	Transformers more efficient than the federal standard.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Engine block heat timer	Per Product	No	Agricultural Application: Installation of a timer on an engine block heater.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High frequency battery chargers	Per Product	No	Baseline equipment is a silicon controlled rectifier ("SCR") or ferroresonant battery charger system with minimum 8-hour shift operation five days per week. Energy-efficient equipment is a high frequency battery charger system with a minimum power conversion efficiency of 90% and 8-hour shift operation five days per week.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Automatic Milker takeoffs	Per Cow	No	Agricultural Application: Automatic milker take-offs that determine milking end time, and the vacuum pump system serving the impacted milking units must be equipped with a variable speed drive.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Dairy scroll compressors	Per Product	No	Agricultural Application: Installation of a scroll compressor to replace an existing reciprocating compressor or to be installed in a new construction application.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Heat reclaimers	Per Product	No	Agricultural Application: Installation of heat recovery equipment on dairy parlor milk refrigeration systems to heat hot water. This measure only applies to dairy parlors with electric water heating equipment.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High Volume Low Speed fans	Per Product	No	Agricultural Application: Installation of HVLS fans to replace conventional circulating fans. HVLS fans are a minimum of 16 feet long in diameter.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Livestock waterer	Per Product	No	Agricultural Application: Thermostatically controlled with 2 inches or more of factory-installed insulation.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Low pressure irrigation system	Per Acre	No	Agricultural Application: Replace systems operating on 50% or less than existing system pressure.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
New Construction Lighting	Per SQFT	No	Eligible lighting equipment and fixture/lamp types include fluorescent fixtures (lamps and ballasts), compact fluorescent lamps, high intensity discharge ("HID") lamps, interior and exterior LED lamps and fixtures, cold-cathode fluorescent lamps ("CCFLs"), induction lamps, and lighting controls.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Electric steam cooker Midstream	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Combination oven Midstream	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial convection oven Midstream	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial Dishwasher Midstream	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial Griddle Midstream	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Automatic Milker takeoffs Midstream	Per Cow	No	Agricultural Application: Automatic milker take-offs that determine milking end time, and the vacuum pump system serving the impacted milking units must be equipped with a variable speed drive.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Dairy scroll compressors Midstream	Per Product	No	Agricultural Application: Installation of a scroll compressor to replace an existing reciprocating compressor or to be installed in a new construction application.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Heat reclaimers Midstream	Per Product	No	Agricultural Application: Installation of heat recovery equipment on dairy parlor milk refrigeration systems to heat hot water. This measure only applies to dairy parlors with electric water heating equipment.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
High Volume Low Speed fans Midstream	Per Product	No	Agricultural Application: Installation of HVLS fans to replace conventional circulating fans. HVLS fans are a minimum of 16 feet long in diameter.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Livestock waterer Midstream	Per Product	No	Agricultural Application: Thermostatically controlled with 2-inches or more of factory-installed insulation.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

[1] All eligible measures are listed in this table regardless of participation projections. N/A indicates measure may be offered in future program years but not at the launch of Phase IV.
[2] PPL Electric Utilities does not pay incentives on a per unit basis, but rather on a cents per kWh/yr and/or dollars per kW basis.
[3] Note that incentive rates may vary due to availability of program funds and/or changes made to encourage participation in a certain measure.

Table 42. Pa PUC Table 7-Small C&I Efficient Equipment Rebates Eligible Measures and Incentives

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Lighting Improvements	Per Project	No	Products must meet the minimum requirements of ENERGY STAR or the DLC and complete PA TRM Lighting Form.	$46,521	13	$8,860	Up to $0.22/kWh and/or up to $1,200/kW first year savings
LED Exit Signs	Per Product	No	Replacement of existing incandescent or fluorescent exit signs with a new LED exit sign.	$55	15	$21	Up to $0.22/kWh and/or up to $1,200/kW first year savings
HVAC Systems	Per Product	No	This measure excludes water source, ground source, and groundwater source heat pump measures that are covered in the Water Source and Geothermal Heat Pumps measure. All HVAC applications other than comfort cooling and heating, such as process cooling, are ineligible for this measure.	$194	15	$441	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Electric Chillers	Per Product	No	Installation of high efficiency electric chillers that exceed the minimum performance allowed by the current PA Energy Code.	$4,021	15	$1,890	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Water Source and Geothermal Heat Pumps	Per Product	No	High-efficiency groundwater source, water source, or ground source heat pump system that exceeds the energy efficiency requirements of the IECC 2015, Table 403.2.3(1).	$52,603	15	$111	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Ductless mini-split heat pumps < 5.4 tons	Per Product	No	<5.4 tons, ENERGY STAR with inverter technology.	$2,313	15	$379	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
ENERGY STAR Room A/C	Per Product	No	ENERGY STAR	-$65	9	$3	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Guest Room Occupancy Sensor controls	Per Ton	No	Guest rooms that are equipped with energy management thermostats replacing manual heating/cooling temperature set-point and fan On/Off/Auto thermostat controls.	$180	15	$34	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Economizer controls	Per Control	No	Adding an economizer and dual enthalpy (differential) control to an HVAC unit with no economizer installers or with a non-functional/disabled economizer.	$1,421	10	$973	Up to $0.22/kWh and/or up to $1,200/kW first year savings
VFD Improvements	Per Control	No	A motor with a VFD control replacing a motor without a VFD control.	$2,607	15	$1,282	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ECM Circulating fan	Per Product	No	Circulating fan motors of 1 HP or less with a baseline SP or PSC evaporator fan motor in an air handling unit.	$417	15	$34	Up to $0.22/kWh and/or up to $1,200/kW first year savings
VSD on Kitchen Exhaust Fan	Per Fan	No	The energy efficient condition is a kitchen ventilation system equipped with a VSD and demand ventilation controls and sensors. The baseline equipment is kitchen ventilation that has a constant speed ventilation motor.	$2,296	15	$216	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Refrigeration/Freezer Cases	Per Product	No	ENERGY STAR. Eligible refrigerators and freezers are self-contained with vertical-closed transparent or solid doors.	$853	12	$39	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High efficiency evaporator fan motors for walk in or reach in cases	Per Product	No	Replacement of existing SP evaporator fan motors or PSC motors in walk-in or reach-in refrigerated display cases with ECM or PMS motor.	$343	15	$40	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Evaporator Fan controllers	Per Control	No	Installation of evaporator fan controls in medium-temperature walk-in or reach-in coolers and low temperature walk-in or reach-in freezers.	$563	15	$71	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Anti-sweat heater controls	Per Control	No	Adding controls to glass door cooler or refrigerator with uncontrolled heaters utilizing either ON/OFF or micro pulse controls.	$1,051	12	$221	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Variable speed refrigeration compressor	Per Horsepower	No	VSD control system replacing a slide valve control system in existing commercial refrigeration systems.	$85	15	$16	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Strip curtains for walk-in freezers and coolers	Per Door	No	Install or retrofit strip curtains in commercial walk-in cooler and freezer doors. Strip curtains must be at least 0.06 inches thick.	$359	4	$676	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Night covers for display cases	Per Foot	No	Install on existing open-type refrigerated display cases, where covers are deployed during the facility's unoccupied hours.	$42	5	$3	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Auto door closers	Per Product	No	Retrofit doors not equipped with auto-closers and assume the doors have strip curtain for walk-in coolers and freezers. The auto-closer must be able to firmly close the door when it is within one inch of full closure. Walk-in door perimeter must be ≥ 16 feet.	$498	8	$96	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Door gaskets for walk-in and reach-in coolers and freezers	Per Door	No	Replace worn-out gaskets with new better-fitting gaskets.	$98	4	$18	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Low or No anti-sweat heat for reach-in freezers and coolers	Per Door	No	Install a no-heat/low-heat clear glass door on an upright display case. Limited to door heights of 57 inches or more. Doors must have either heat reflective treated glass, be gas filled, or both.	$1,213	12	$37	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Refrigerated Display cases with doors replacing open cases	Per Foot	No	A new, vertical case with no sweat doors that meets federal standard requirements.	$449	12	$28	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Adding doors to existing refrigerated display cases	Per Foot	No	Retrofit existing vertical open display cases with zero heat doors.	$521	12	$31	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Ice machines	Per Product	No	ENERGY STAR	$378	8	$127	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Beverage machine controls	Per Product	No	Added to non-ENERGY STAR machines.	$180	5	$99	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Office equipment	Per Product	No	ENERGY STAR	$10	6	$7	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Cycling refrigerated thermal mass dryer	Per Horsepower	No	Baseline: non-cycling (e.g., continuous) air dryer with a capacity of 600 cfm or below. The replacement of desiccant, deliquescent, heat-of-compression, membrane, or other types of dryers does not qualify under this measure.	$24	10	$4	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
No-loss condensate drains	Per Product	No	Retrofit existing timed drained system with new no-loss condensate drains.	$194	5	$167	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Variable speed drive air compressor	Per Horsepower	No	Install or retrofit a single VSD unit less than 40 HP with variable speed control.	$191	13	$59	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High efficiency ventilation fans with and w/o thermostats	Per Product	No	Agricultural Application: Installation of high efficiency ventilation fans where standard efficiency ventilation fans are replaced and/or the installation of a thermostat controlling either new efficient fans or existing fans.	$175	15	$31	Up to $0.22/kWh and/or up to $1,200/kW first year savings
VSD Controller on dairy vacuum pumps	Per Product	No	Agricultural Application: Installation of a VSD and controls on dairy vacuum pumps, or the purchase of dairy vacuum pumps with variable speed capability.	$5,120	15	$663	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Lighting Improvements for Midstream	Per Fixture	No	Products must meet the minimum requirements of ENERGY STAR or the DLC and complete PA TRM Lighting Form.	$77	15	$76	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Lighting Improvements for Midstream	Per Bulb	No	Products must meet the minimum requirements of ENERGY STAR or the DLC and complete PA TRM Lighting Form.	$6	15	$4	Up to $0.22/kWh and/or up to $1,200/kW first year savings
HVAC Systems Midstream	Per Product	No	This measure excludes water source, ground source, and groundwater source heat pump measures that are covered in the Water Source and Geothermal Heat Pumps measure. All HVAC applications other than comfort cooling and heating, such as process cooling, are ineligible for this measure.	$194	15	$561	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Ductless mini-split heat pumps < 5.4 tons Midstream	Per Product	No	<5.4 tons, ENERGY STAR with inverter technology.	$2,313	15	$482	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Ice machines Midstream	Per Product	No	ENERGY STAR	$378	8	$162	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial fryer Midstream	Per Product	No	ENERGY STAR	$1,038	12	$220	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial hot food	Per Product	No	ENERGY STAR	$895	12	$155	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
holding cabinet Midstream							
High efficiency ventilation fans with and w/o thermostats Midstream	Per Product	No	Agricultural Application: Installation of high efficiency ventilation fans where standard efficiency ventilation fans are replaced and/or the installation of a thermostat controlling either new efficient fans or existing fans.	$175	15	$40	Up to $0.22/kWh and/or up to $1,200/kW first year savings
VSD Controller on dairy vacuum pumps Midstream	Per Product	No	Agricultural Application: Installation of a VSD and controls on dairy vacuum pumps, or the purchase of dairy vacuum pumps with variable speed capability.	$5,120	15	$844	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Adding doors to existing refrigerated display cases Direct Discount	Per Foot	No	Retrofit existing vertical open display cases with zero heat doors.	$521	12	$39	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Air tanks for Load/No load compressors Direct Discount	Per Horsepower	No	Minimum storage ratio of 4 gallons per cfm.	$80	15	$33	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Air-entraining air nozzle Direct Discount	Per Product	No	Replace non-air entraining air nozzle (open copper tube of 1/8-inch or 1/4-inch orifice diameter) with an energy efficient air-entraining air nozzle that uses less than 15 cfm at 100 psi for industrial applications.	$89	15	$183	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Anti-sweat heater controls Direct Discount	Per Control	No	Adding controls to glass door cooler or refrigerator with uncontrolled heaters utilizing either ON/OFF or micro pulse controls.	$1,051	12	$273	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Auto door closers Direct Discount	Per Product	No	Retrofit doors not equipped with auto-closers, and assume the doors have strip curtain for walk-in coolers and freezers. The auto-closer must be able to firmly close the door when it is within one inch of full closure. The walk-in door perimeter must be ≥ 16 feet.	$498	8	$119	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Beverage machine controls Direct Discount	Per Product	No	Added to non-ENERGY STAR machines.	$180	5	$122	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Compressed air controller Direct Discount	Per Horsepower	No	The baseline condition is having no existing pressure/flow controller and an existing compressed air system with a total compressor motor capacity ≥ 40 hp. This measure requires a minimum storage of 3gal/cfm.	$27	15	$16	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Compressed air low pressure drop filters Direct Discount	Per Horsepower	No	The baseline condition is a standard coalescing filter with a pressure drop of 3 psi when new and 5 psi or more at element change. The efficient condition is a low pressure drop filter with pressure drop not exceeding 1 psi when new and 3 psi at element change.	$10	10	$3	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Compressed air mist eliminators Direct Discount	Per Horsepower	No	The compressed air system must be greater than 50 HP to qualify, and the mist eliminator must have less than a 1 psig pressure drop and replace a coalescing filter.	$22	5	$7	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Cycling refrigerated thermal mass dryer Direct Discount	Per Horsepower	No	Baseline: non-cycling (e.g., continuous) air dryer with a capacity of 600 cfm or below. The replacement of desiccant, deliquescent, heat-of-compression, membrane, or other types of dryers does not qualify under this measure.	$24	10	$5	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Economizer controls Direct Discount	Per Control	No	Adding an economizer and dual enthalpy (differential) control to an HVAC unit with no economizer installers or with a non-functional/disabled economizer.	$1,421	10	$1,202	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Evaporator Fan controllers Direct Discount	Per Control	No	Installation of evaporator fan controls in medium-temperature walk-in or reach-in coolers and low temperature walk-in or reach-in freezers.	$563	15	$88	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High efficiency evaporator fan motors for walk in or reach in cases Direct Discount	Per Product	No	Replacement of existing SP evaporator fan motors or PSC motors in walk-in or reach-in refrigerated display cases with an ECM or a PMS motor.	$343	15	$49	Up to $0.22/kWh and/or up to $1,200/kW first year savings
LED Refrigeration Display Case Lighting Direct Discount	Per Door	No	Installation of LED case lighting with or without motion sensors on existing refrigerators, coolers, and freezers - specifically on vertical displays.	$51	8	$40	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Lighting Controls Direct Discount	Per kW Controlled	No	Lighting controls turn lights on and off automatically, which are activated by time, light, motion, or sound.	$387	8	$77	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Lighting Improvements Direct Discount	Per Project	No	Products must meet the minimum requirements of ENERGY STAR or the DLC and complete PA TRM Lighting Form.	$46,521	13	$9,590	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Low Flow Pre-rinse Sprayers Direct Discount	Per Product	No	Efficient low flow pre-rinse sprayers that use less than 1.6 gallons of water per minute. Only applicable to premises with electric water heating.	$124	8	$89	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
No-loss condensate drains Direct Discount	Per Product	No	Retrofit existing timed drained system with new no-loss condensate drains.	$194	5	$207	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Refrigerated case light occupancy sensors Direct Discount	Per Watt Controlled	No	Installation of motion-based lighting controls that allow the LED case lighting to be dimmed or turned off completely during unoccupied conditions.	$1	8	$0	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Strip curtains for walk-in freezers and coolers Direct Discount	Per Door	No	Install or retrofit strip curtains in commercial walk-in cooler and freezer doors. Strip curtains must be at least 0.06 inches thick.	$359	4	$835	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Variable speed drive air compressor Direct Discount	Per Horsepower	No	Install or retrofit a single VSD unit less than 40 HP with variable speed control.	$191	13	$73	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Variable speed refrigeration compressor Direct Discount	Per Horsepower	No	VSD control system replacing a slide valve control system in existing commercial refrigeration systems.	$85	15	$20	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Lighting Improvements Direct Install	Per Project	No	Products must meet the minimum requirements of ENERGY STAR or the DLC and complete PA TRM Lighting Form.	$186	13	$186	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Low Flow Pre-rinse Sprayers Direct Install	Per Product	No	Efficient low flow pre-rinse sprayers that use less than 1.6 gallons of water per minute. Only applicable to premises with electric water heating.	$72	8	$72	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Lighting Controls	Per kW Controlled	No	Lighting controls turn lights on and off automatically, which are activated by time, light, motion, or sound.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
LED Channel Signage	Per Foot	No	Replacement of neon and/or incandescent channel letter signs with efficient LED channel letter signs. Replacement signs cannot use more than 20% of the actual input power of the sign that is replaced.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
LED Refrigeration Display Case Lighting	Per Door	No	Installation of LED case lighting with or without motion sensors on existing refrigerators, coolers, and freezers - specifically on vertical displays.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Fuel Switching	Per Product	No	Must replace electric equipment with ENERGY STAR certified natural gas, propane, or fuel oil equipment.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Computer room A/C	Per Product	No	Newly installed computer room air conditioner systems that exceed the baseline efficiencies (in SCOP) outlined in Table 3-56 of the current PA TRM.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Computer room A/C EC fans	Per Product	No	Installation of EC plug fans in CRAC and CRAH units.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Computer room VFD on fans	Per Horsepower	No	Installation of a VSD to control AC fan motors in CRAC and CRAH units.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Circulation Fan: High Volume Low Speed	Per Product	No	Installation of HVLS fans (diameters ranging from 8 to 24 feet) replacing conventional circulating fans. Commercial and industrial applications only.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Premium Efficiency Motors	Per Horsepower	No	Replacement of old motors with new energy efficient motors of the same rated HP.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ECM Circulator Pump	Per Pump	No	An ECM or BPM circulator pump replacing single-speed induction motor circulator pumps in space heating and hot water applications.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High Efficiency Pumps	Per Horsepower	No	Compliant pumps will achieve a PEI of 1.0 or less. All pumps manufactured after January 27, 2020 must comply with the DOE's energy conservation standard as described in 10 CFR 431 Subpart Y.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Heat Pump Water Heaters	Per Product	No	Installation of a heat pump water heater instead of a code minimum electric water heater.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Low Flow Pre-rinse Sprayers	Per Product	No	Efficient low flow pre-rinse sprayers that use less than 1.6 gallons of water per minute. Only applicable to premises with electric water heating.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Fuel Switching: electric water heaters to gas/propane	Per Product	No	Must replace electric water heater with ENERGY STAR certified natural gas or propane equipment.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Floating head pressure controls	Per Control	No	Adding FHPCs to a refrigeration system. FHPCs must have a minimum SCT programmed for the floating head pressure control of ≤ 70 ºF. The use of FHPC would require balanced-port expansion valves, allowing satisfactory refrigerant flow over a range of head pressures. The compressor must be 1 HP or larger.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Evaporator coil defrost controls	Per Evaporator Unit	No	Adding defrost controls to existing walk-in coolers or freezers without defrost controls.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Suction pipe insulation for walk-in coolers and freezers	Per Foot	No	Insulate bare refrigeration suction pipes for walk-in coolers and freezers according to the current PA TRM requirements.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Air cooled refrigeration condenser	Per Ton	No	Installing an efficient, close-approach air-cooled refrigeration condenser that meets the current PA TRM requirements.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Refrigerated case light occupancy sensors	Per Watt Controlled	No	Installation of motion-based lighting controls that allow the LED case lighting to be dimmed or turned off completely during unoccupied conditions.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Refrigeration economizers	Per Compressor Horsepower	No	Economizers installed on a walk-in refrigeration system.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Clothes washer	Per Product	No	ENERGY STAR, installed in commercial laundromats or multifamily complex laundry rooms.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR bathroom ventilation fan	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Snack machine controls	Per Product	No	Added to non-ENERGY STAR, non-refrigerated machines.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Electric steam cooker	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Combination oven	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial convection oven	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial fryer	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial hot food holding cabinet	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
ENERGY STAR Commercial Dishwasher	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial Griddle	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Wall and Ceiling Insulation	Per SQFT	No	Applies to buildings that are heated and/or cooled using electricity. Existing construction buildings are required to meet or exceed the code requirement. New construction buildings must exceed the code requirement.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Office Equipment - Network power management enabling	Per Workstation	No	Applicable to any software that manages workstations in a networked environment that meets the current PA TRM requirements.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Advanced power strips	Per Workstation	No	Installation of an Advanced Power Strip.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Servers	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Server virtualization	Per Product	No	Servers must be consolidated to increase utilization of the remaining servers, and the virtualized servers must be either a) removed or b) physically disconnected from power.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Air-entraining air nozzle	Per Product	No	Replace non-air entraining air nozzle (open copper tube of 1/8-inch or 1/4-inch orifice diameter) with an energy efficient air-entraining air nozzle that uses less than 15 cfm at 100 psi for industrial applications.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Air tanks for Load/No load compressors	Per Horsepower	No	Minimum storage ratio of 4 gallons per cfm.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Compressed air controller	Per Horsepower	No	The baseline condition is having no existing pressure/flow controller and an existing compressed air system with a total compressor motor capacity ≥ 40 hp. This measure requires a minimum storage of 3gal/cfm.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Compressed air low pressure drop filters	Per Horsepower	No	The baseline condition is a standard coalescing filter with a pressure drop of 3 psi when new and 5 psi or more at element change. The efficient condition is a low pressure drop filter with pressure drop not exceeding 1 psi when new and 3 psi at element change.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Compressed air mist eliminators	Per Horsepower	No	The compressed air system must be greater than 50 HP to qualify, and the mist eliminator must have less than a 1 psig pressure drop and replace a coalescing filter.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High efficiency transformer	Per Product	No	Transformers more efficient than the federal standard.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Engine block heat timer	Per Product	No	Agricultural Application: Installation of a timer on an engine block heater.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High frequency battery chargers	Per Product	No	The baseline equipment is a SCR or ferroresonant battery charger system with minimum 8-hour shift operation five days per week. The energy efficient equipment is a high frequency battery charger system with a minimum power conversion efficiency of 90% and 8-hour shift operation five days per week.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Automatic Milker takeoffs	Per Cow	No	Agricultural Application: Automatic milker take-offs that determine milking end time, and the vacuum pump system serving the impacted milking units must be equipped with a variable speed drive.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Dairy scroll compressors	Per Product	No	Agricultural Application: Installation of a scroll compressor to replace an existing reciprocating compressor or to be installed in a new construction application.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Heat reclaimers	Per Product	No	Agricultural Application: Installation of heat recovery equipment on dairy parlor milk refrigeration systems to heat hot water. This measure only applies to dairy parlors with electric water heating equipment.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
High Volume Low Speed fans	Per Product	No	Agricultural Application: Installation of HVLS fans to replace conventional circulating fans. HVLS fans are a minimum of 16 feet long in diameter.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
Livestock waterer	Per Product	No	Agricultural Application: Thermostatically controlled with 2-inches or more of factory-installed insulation.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Low pressure irrigation system	Per Acre	No	Agricultural Application: Replace systems operating on 50% or less than existing system pressure.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
New Construction Lighting	Per SQFT	No	Eligible lighting equipment and fixture/lamp types include fluorescent fixtures (lamps and ballasts), compact fluorescent lamps, HID lamps, interior and exterior LED lamps and fixtures, CCFLs, induction lamps, and lighting controls.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Electric steam cooker Midstream	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Combination oven Midstream	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial convection oven Midstream	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial Dishwasher Midstream	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
ENERGY STAR Commercial Griddle Midstream	Per Product	No	ENERGY STAR	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Automatic Milker takeoffs Midstream	Per Cow	No	Agricultural Application: Automatic milker take-offs that determine milking end time, and the vacuum pump system serving the impacted milking units must be equipped with a variable speed drive.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Dairy scroll compressors Midstream	Per Product	No	Agricultural Application: Installation of a scroll compressor to replace an existing reciprocating compressor or to be installed in a new construction application.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Heat reclaimers Midstream	Per Product	No	Agricultural Application: Installation of heat recovery equipment on dairy parlor milk refrigeration systems to heat hot water. This measure only applies to dairy parlors with electric water heating equipment.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure[1]	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [2,3]
High Volume Low Speed fans Midstream	Per Product	No	Agricultural Application: Installation of HVLS fans to replace conventional circulating fans. HVLS fans are a minimum of 16 feet long in diameter.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Livestock waterer Midstream	Per Product	No	Agricultural Application: Thermostatically controlled with 2-inches or more of factory-installed insulation.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Door gaskets for walk-in and reach-in coolers and freezers Direct Discount	Per Door	No	Replace worn-out gaskets with new better-fitting gaskets.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Evaporator coil defrost controls Direct Discount	Per Evaporator Unit	No	Adding defrost controls to existing walk-in coolers or freezers without defrost controls.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
LED Exit Signs Direct Discount	Per Product	No	Early replacement of existing incandescent or fluorescent exit signs with a new LED exit sign.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Night covers for display cases Direct Discount	Per Foot	No	Install on existing open-type refrigerated display cases, where covers are deployed during the facility's unoccupied hours.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Snack machine controls Direct Discount	Per Product	No	Added to non-ENERGY STAR, non-refrigerated machines.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Suction pipe insulation for walk-in coolers and freezers Direct Discount	Per Foot	No	Insulate bare refrigeration suction pipes for walk-in coolers and freezers according to the current PA TRM requirements.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

[1] All eligible measures are listed in this table regardless of participation projections. N/A indicates measure may be offered in future program years but not at the launch of Phase IV.

[2] PPL Electric Utilities does not pay incentives on a per unit basis, but rather on a cents per kWh/yr and/or dollars per kW basis.

[3] Note that incentive rates may vary due to availability of program funds and/or changes made to encourage participation in a certain measure.

All measures may not be available at all times. PPL Electric Utilities may suspend a measure depending on popularity, pace of the component savings and costs, free ridership, evaluation requirements, complexity of the information required from customers, administrative requirements for the measure, or other reasons. PPL Electric Utilities will review the component continually and may adjust available measures or eligibility qualifications to achieve savings and cost budgets.

PPL Electric Utilities may offer tiered incentives that encourage the installation of multiple measures or a more comprehensive whole facility approach. Measures, eligibility requirements, and incentives may change to reflect progress, changes in the TRM, market conditions, or other factors. PPL Electric Utilities shall strive to keep the rebates and per-site caps as consistent as possible while recognizing the need to adjust incentives and caps to control the pace of components within their savings and cost budgets.

PPL Electric Utilities may also implement a minimum TRC requirement for qualifying measures if it is necessary to help ensure the Non-Residential Program or portfolio TRC is greater than 1.0. PPL Electric Utilities will notify customers, trade allies, and stakeholders at least 60 days before the effective date of this TRC requirement or a subsequent change in the TRC requirement. Any TRC requirement would be in effect for new applications submitted after the effective date.

Deadline for Rebate Applications

The rebate application website and portal will state the deadline for final submission. The deadline will not exceed 180 days from the date the measure was installed. For some measures, PPL Electric Utilities will allow customers to request project preapproval to lock in the stipulated incentive level and guarantee the funding. PPL Electric Utilities will require preapproval for some non-custom measures or specific customer sectors to allow sufficient time to identify budget commitments and reduce the likelihood of exceeding budgets for the component or customer sectors. PPL Electric Utilities reserves the right to waive the preapproval requirement with 60 days' notice to customers, trade allies and stakeholders.

Start Date with Key Schedule Milestones

Table 43 lists the estimated key schedule milestones for the Efficient Equipment component. PPL Electric Utilities will lead implementation or provide management oversight of all tasks.

Table 43. Efficient Equipment Component Schedule and Milestones

Schedule	Milestones
11/30/2020	Phase IV EE&C Plan submitted to Pa PUC
06/01/2021	Launch Phase IV component
Annually starting 01/15/2022	EDCs submit semiannual program report
Annually starting 09/30/2022	EDCs submit final annual program report
05/31/2026	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electric Utilities' Evaluation Plan, which will be submitted to the SWE for review. PPL Electric Utilities and its EM&V CSP will conduct annual evaluations of each component in compliance with all Pa PUC requirements and the Evaluation Framework. As part of this process, the EM&V CSP will review a sample of participant rebate applications and Non-Residential CSP records to verify quantity, efficiency level, and qualifying equipment. The EM&V CSP will follow all applicable methods in the TRM and the Evaluation Framework to calculate energy savings and peak demand reduction.

For the Non-Residential Efficient Equipment component, PPL Electric Utilities anticipates conducting annual impact and process evaluations (activities vary by year).

The EM&V CSP will develop an evaluation plan and sampling protocol that fits the Efficient Equipment component and all associated delivery channels. The EM&V CSP will review a sample of participant and Non-Residential CSP records to verify quantity, efficiency level, and qualifying equipment. On-site assessment may be included as a verification activity.

Administrative Requirements

The Non-Residential CSP will administer and provide operational management of the Efficient Equipment component. PPL Electric Utilities will provide oversight and operational support to establish effective deployment.

Estimated Participation

Table 44 and Table 45 show the order of magnitude participation estimates for Large and Small C&I Efficient Equipment. Actual quantities will vary, and PPL Electric Utilities will manage the component to stay within budget.

Table 44. Pa PUC Table 8-Large C&I Efficient Equipment Projected Participation [1]

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Lighting Improvements	Energy Savings (MWh/year)	46,451	46,451	44,128	41,806	41,341	220,177
	Demand Reduction (MW)	6.720	6.720	6.384	6.048	5.981	31.854
	Projected Participation	445	445	423	401	396	2,111
LED Exit Signs	Energy Savings (MWh/year)	10	10	10	9	9	50
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.006
	Projected Participation	42	42	40	38	38	201
HVAC Systems	Energy Savings (MWh/year)	421	421	421	421	421	2,107
	Demand Reduction (MW)	0.084	0.084	0.084	0.084	0.084	0.422
	Projected Participation	83	83	83	83	83	415

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Electric Chillers	Energy Savings (MWh/year)	11	11	11	11	11	53
	Demand Reduction (MW)	0.008	0.008	0.008	0.008	0.008	0.040
	Projected Participation	0.5	0.5	0.5	0.5	0.5	2.4
Water Source and Geothermal Heat Pumps	Energy Savings (MWh/year)	0.5	0.5	0.5	0.5	0.5	2.5
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0004
	Projected Participation	0.4	0.4	0.4	0.4	0.4	1.9
Ductless mini-split heat pumps < 5.4 tons	Energy Savings (MWh/year)	49	49	49	49	49	244
	Demand Reduction (MW)	0.005	0.005	0.005	0.005	0.005	0.023
	Projected Participation	11	11	11	11	11	56
ENERGY STAR Room A/C	Energy Savings (MWh/year)	1	1	1	1	1	4
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.002	0.008
	Projected Participation	21	21	21	21	21	105
Guest Room Occupancy Sensor controls	Energy Savings (MWh/year)	82	82	82	82	82	412
	Demand Reduction (MW)	0.015	0.015	0.015	0.015	0.015	0.073
	Projected Participation	210	210	210	210	210	1,048
Economizer controls	Energy Savings (MWh/year)	26	26	26	26	26	130
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	2	2	2	2	2	12
VFD Improvements	Energy Savings (MWh/year)	365	365	365	365	365	1,825
	Demand Reduction (MW)	0.033	0.033	0.033	0.033	0.033	0.167
	Projected Participation	25	25	25	25	25	124
ECM Circulating fan	Energy Savings (MWh/year)	3	3	3	3	3	17
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.006
	Projected Participation	8	8	8	8	8	42
VSD on Kitchen Exhaust Fan	Energy Savings (MWh/year)	2	2	2	2	2	11
	Demand Reduction (MW)	0.0003	0.0003	0.0003	0.0003	0.0003	0.0014
	Projected Participation	1	1	1	1	1	4

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
ENERGY STAR Refrigeration/Freezer Cases	Energy Savings (MWh/year)	3	3	4	4	4	18
	Demand Reduction (MW)	0.0003	0.0004	0.0004	0.0005	0.0005	0.0022
	Projected Participation	6	7	8	9	9	40
High efficiency evaporator fan motors for walk in or reach in cases	Energy Savings (MWh/year)	99	118	128	138	148	632
	Demand Reduction (MW)	0.012	0.015	0.016	0.017	0.018	0.077
	Projected Participation	215	258	279	301	322	1,376
Evaporator Fan controllers	Energy Savings (MWh/year)	2	2	2	2	2	11
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.003
	Projected Participation	3	3	3	3	3	13
Anti-sweat heater controls	Energy Savings (MWh/year)	14	17	18	19	21	88
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.002	0.010
	Projected Participation	5	7	7	8	8	35
Variable speed refrigeration compressor	Energy Savings (MWh/year)	0.01	0.01	0.01	0.01	0.01	0.06
	Demand Reduction (MW)	0.000001	0.000002	0.000002	0.000002	0.000002	0.000008
	Projected Participation	0.0	0.1	0.1	0.1	0.1	0.3
Strip curtains for walk-in freezers and coolers	Energy Savings (MWh/year)	1	1	1	2	2	7
	Demand Reduction (MW)	0.0002	0.0002	0.0002	0.0002	0.0002	0.0010
	Projected Participation	0.1	0.2	0.2	0.2	0.2	0.9
Night covers for display cases	Energy Savings (MWh/year)	0.002	0.002	0.002	0.002	0.003	0.011
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	0.0	0.1	0.1	0.1	0.1	0.3
Auto door closers	Energy Savings (MWh/year)	0.3	0.3	0.3	0.4	0.4	1.7
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0002	0.0006
	Projected Participation	0.2	0.3	0.3	0.3	0.4	1.6
Door gaskets for walk-in and reach-in coolers and freezers	Energy Savings (MWh/year)	0.2	0.2	0.2	0.2	0.2	1.0
	Demand Reduction (MW)	0.00002	0.00003	0.00003	0.00003	0.00003	0.00014
	Projected Participation	1	1	1	1	1	5

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Low or No anti-sweat heat for reach-in freezers and coolers	Energy Savings (MWh/year)	0.0	0.1	0.1	0.1	0.1	0.3
	Demand Reduction (MW)	0.00001	0.00001	0.00001	0.00001	0.00001	0.00003
	Projected Participation	0.1	0.1	0.1	0.1	0.1	0.6
Refrigerated Display cases with doors replacing open cases	Energy Savings (MWh/year)	0.3	0.3	0.3	0.4	0.4	1.6
	Demand Reduction (MW)	0.00003	0.00004	0.00004	0.00004	0.00005	0.00020
	Projected Participation	1	1	1	1	1	5
Adding doors to existing refrigerated display cases	Energy Savings (MWh/year)	0	1	1	1	1	3
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003
	Projected Participation	1	1	2	2	2	7
ENERGY STAR Ice machines	Energy Savings (MWh/year)	2	2	2	3	3	12
	Demand Reduction (MW)	0.000	0.000	0.001	0.001	0.001	0.003
	Projected Participation	1	2	2	2	2	8
Beverage machine controls	Energy Savings (MWh/year)	0.1	0.1	0.1	0.1	0.1	0.4
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	0.0	0.1	0.1	0.1	0.1	0.3
ENERGY STAR Office equipment	Energy Savings (MWh/year)	0.5	0.5	0.5	0.5	0.5	2.4
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003
	Projected Participation	6	6	6	6	6	30
Cycling refrigerated thermal mass dryer	Energy Savings (MWh/year)	0.03	0.03	0.03	0.03	0.03	0.16
	Demand Reduction (MW)	0.00001	0.00001	0.00001	0.00001	0.00001	0.00003
	Projected Participation	1	1	1	1	1	3
No-loss condensate drains	Energy Savings (MWh/year)	3	3	3	3	3	14
	Demand Reduction (MW)	0.0005	0.0005	0.0005	0.0005	0.0005	0.0024
	Projected Participation	1	1	1	1	1	7
Variable speed drive air compressor	Energy Savings (MWh/year)	0.3	0.3	0.3	0.3	0.3	1.5
	Demand Reduction (MW)	0.00005	0.00005	0.00005	0.00005	0.00005	0.00024
	Projected Participation	0.4	0.4	0.4	0.4	0.4	2.2

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
High efficiency ventilation fans with and w/o thermostats	Energy Savings (MWh/year)	0.3	0.3	0.3	0.3	0.3	1.6
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003
	Projected Participation	1	1	1	1	1	4
VSD Controller on dairy vacuum pumps	Energy Savings (MWh/year)	2	2	2	2	2	11
	Demand Reduction (MW)	0.0003	0.0003	0.0003	0.0003	0.0003	0.0017
	Projected Participation	0.3	0.3	0.3	0.3	0.3	1.5
Lighting Improvements for Midstream	Energy Savings (MWh/year)	5,709	5,713	5,427	5,142	5,085	27,077
	Demand Reduction (MW)	1.064	1.065	1.012	0.959	0.948	5.047
	Projected Participation	6,521	6,525	6,199	5,874	5,808	30,927
Lighting Improvements for Midstream	Energy Savings (MWh/year)	309	309	294	278	275	1,465
	Demand Reduction (MW)	0.063	0.063	0.060	0.056	0.056	0.297
	Projected Participation	6,521	6,525	6,199	5,874	5,808	30,927
HVAC Systems Midstream	Energy Savings (MWh/year)	136	271	339	339	339	1,423
	Demand Reduction (MW)	0.024	0.047	0.059	0.059	0.059	0.247
	Projected Participation	21	42	52	52	52	220
Ductless mini-split heat pumps < 5.4 tons Midstream	Energy Savings (MWh/year)	28	57	71	71	71	297
	Demand Reduction (MW)	0.002	0.005	0.006	0.006	0.006	0.024
	Projected Participation	5	10	13	13	13	54
ENERGY STAR Ice machines Midstream	Energy Savings (MWh/year)	1	1	1	1	1	4
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0007
	Projected Participation	0.4	0.4	0.4	0.4	0.4	2.2
ENERGY STAR Commercial fryer Midstream	Energy Savings (MWh/year)	1	1	1	1	1	6
	Demand Reduction (MW)	0.0002	0.0002	0.0002	0.0002	0.0002	0.0009
	Projected Participation	0.4	0.4	0.4	0.4	0.4	2.2
ENERGY STAR Commercial hot food holding cabinet Midstream	Energy Savings (MWh/year)	1	1	1	1	1	4
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0006
	Projected Participation	0.4	0.4	0.4	0.4	0.4	2.2

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
High efficiency ventilation fans with and w/o thermostats Midstream	Energy Savings (MWh/year)	0.2	0.4	0.5	0.5	0.5	1.9
	Demand Reduction (MW)	0.0000	0.0001	0.0001	0.0001	0.0001	0.0003
	Projected Participation	0	1	1	1	1	4
VSD Controller on dairy vacuum pumps Midstream	Energy Savings (MWh/year)	1	1	2	2	2	7
	Demand Reduction (MW)	0.0001	0.0002	0.0002	0.0002	0.0002	0.0009
	Projected Participation	0.1	0.1	0.2	0.2	0.2	0.7

[1] To show numerical values in the Pa PUC Table 8 tables, deviation from the standard use of decimals throughout Section 3 may have been applied.
[2] Total values may not equal the sum of all program year values due to rounding.

Table 45. Pa PUC Table 8-Small C&I Efficient Equipment Projected Participation [1]

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Lighting Improvements	Energy Savings (MWh/year)	46,451	46,451	44,128	41,806	41,341	220,177
	Demand Reduction (MW)	6.720	6.720	6.384	6.048	5.981	31.854
	Projected Participation	445	445	423	401	396	2,111
LED Exit Signs	Energy Savings (MWh/year)	10	10	10	9	9	50
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.006
	Projected Participation	42	42	40	38	38	201
HVAC Systems	Energy Savings (MWh/year)	421	421	421	421	421	2,107
	Demand Reduction (MW)	0.084	0.084	0.084	0.084	0.084	0.422
	Projected Participation	83	83	83	83	83	415
Electric Chillers	Energy Savings (MWh/year)	11	11	11	11	11	53
	Demand Reduction (MW)	0.008	0.008	0.008	0.008	0.008	0.040
	Projected Participation	0.5	0.5	0.5	0.5	0.5	2.4
Water Source and Geothermal Heat Pumps	Energy Savings (MWh/year)	0.5	0.5	0.5	0.5	0.5	2.5
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0004
	Projected Participation	0.4	0.4	0.4	0.4	0.4	1.9
Ductless mini-split heat pumps < 5.4 tons	Energy Savings (MWh/year)	49	49	49	49	49	244
	Demand Reduction (MW)	0.005	0.005	0.005	0.005	0.005	0.023
	Projected Participation	11	11	11	11	11	56
ENERGY STAR Room A/C	Energy Savings (MWh/year)	1	1	1	1	1	4
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.002	0.008

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
	Projected Participation	21	21	21	21	21	105
Guest Room Occupancy Sensor controls	Energy Savings (MWh/year)	82	82	82	82	82	412
	Demand Reduction (MW)	0.015	0.015	0.015	0.015	0.015	0.073
	Projected Participation	210	210	210	210	210	1,048
Economizer controls	Energy Savings (MWh/year)	26	26	26	26	26	130
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	2	2	2	2	2	12
VFD Improvements	Energy Savings (MWh/year)	365	365	365	365	365	1,825
	Demand Reduction (MW)	0.033	0.033	0.033	0.033	0.033	0.167
	Projected Participation	25	25	25	25	25	124
ECM Circulating fan	Energy Savings (MWh/year)	3	3	3	3	3	17
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.006
	Projected Participation	8	8	8	8	8	42
VSD on Kitchen Exhaust Fan	Energy Savings (MWh/year)	2	2	2	2	2	11
	Demand Reduction (MW)	0.0003	0.0003	0.0003	0.0003	0.0003	0.0014
	Projected Participation	1	1	1	1	1	4
ENERGY STAR Refrigeration/Freezer Cases	Energy Savings (MWh/year)	3	3	4	4	4	18
	Demand Reduction (MW)	0.0003	0.0004	0.0004	0.0005	0.0005	0.0022
	Projected Participation	6	7	8	9	9	40
High efficiency evaporator fan motors for walk in or reach in cases	Energy Savings (MWh/year)	99	118	128	138	148	632
	Demand Reduction (MW)	0.012	0.015	0.016	0.017	0.018	0.077
	Projected Participation	215	258	279	301	322	1,376
Evaporator Fan controllers	Energy Savings (MWh/year)	2	2	2	2	2	11
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.003
	Projected Participation	3	3	3	3	3	13
Anti-sweat heater controls	Energy Savings (MWh/year)	14	17	18	19	21	88
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.002	0.010
	Projected Participation	5	7	7	8	8	35
Variable speed refrigeration compressor	Energy Savings (MWh/year)	0.01	0.01	0.01	0.01	0.01	0.06
	Demand Reduction (MW)	0.000001	0.000002	0.000002	0.000002	0.000002	0.000008
	Projected Participation	0.0	0.1	0.1	0.1	0.1	0.3
Strip curtains for walk-in freezers and coolers	Energy Savings (MWh/year)	1	1	1	2	2	7

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
	Demand Reduction (MW)	0.0002	0.0002	0.0002	0.0002	0.0002	0.0010
	Projected Participation	0.1	0.2	0.2	0.2	0.2	0.9
Night covers for display cases	Energy Savings (MWh/year)	0.002	0.002	0.002	0.002	0.003	0.011
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	0.0	0.1	0.1	0.1	0.1	0.3
Auto door closers	Energy Savings (MWh/year)	0.3	0.3	0.3	0.4	0.4	1.7
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0002	0.0006
	Projected Participation	0.2	0.3	0.3	0.3	0.4	1.6
Door gaskets for walk-in and reach-in coolers and freezers	Energy Savings (MWh/year)	0.2	0.2	0.2	0.2	0.2	1.0
	Demand Reduction (MW)	0.00002	0.00003	0.00003	0.00003	0.00003	0.00014
	Projected Participation	1	1	1	1	1	5
Low or No anti-sweat heat for reach-in freezers and coolers	Energy Savings (MWh/year)	0.0	0.1	0.1	0.1	0.1	0.3
	Demand Reduction (MW)	0.00001	0.00001	0.00001	0.00001	0.00001	0.00003
	Projected Participation	0.1	0.1	0.1	0.1	0.1	0.6
Refrigerated Display cases with doors replacing open cases	Energy Savings (MWh/year)	0.3	0.3	0.3	0.4	0.4	1.6
	Demand Reduction (MW)	0.00003	0.00004	0.00004	0.00004	0.00005	0.00020
	Projected Participation	1	1	1	1	1	5
Adding doors to existing refrigerated display cases	Energy Savings (MWh/year)	0	1	1	1	1	3
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003
	Projected Participation	1	1	2	2	2	7
ENERGY STAR Ice machines	Energy Savings (MWh/year)	2	2	2	3	3	12
	Demand Reduction (MW)	0.000	0.000	0.001	0.001	0.001	0.003
	Projected Participation	1	2	2	2	2	8
Beverage machine controls	Energy Savings (MWh/year)	0.1	0.1	0.1	0.1	0.1	0.4
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	0.0	0.1	0.1	0.1	0.1	0.3
ENERGY STAR Office equipment	Energy Savings (MWh/year)	0.5	0.5	0.5	0.5	0.5	2.4
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003
	Projected Participation	6	6	6	6	6	30

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Cycling refrigerated thermal mass dryer	Energy Savings (MWh/year)	0.03	0.03	0.03	0.03	0.03	0.16
	Demand Reduction (MW)	0.00001	0.00001	0.00001	0.00001	0.00001	0.00003
	Projected Participation	1	1	1	1	1	3
No-loss condensate drains	Energy Savings (MWh/year)	3	3	3	3	3	14
	Demand Reduction (MW)	0.0005	0.0005	0.0005	0.0005	0.0005	0.0024
	Projected Participation	1	1	1	1	1	7
Variable speed drive air compressor	Energy Savings (MWh/year)	0.3	0.3	0.3	0.3	0.3	1.5
	Demand Reduction (MW)	0.00005	0.00005	0.00005	0.00005	0.00005	0.00024
	Projected Participation	0.4	0.4	0.4	0.4	0.4	2.2
High efficiency ventilation fans with and w/o thermostats	Energy Savings (MWh/year)	0.3	0.3	0.3	0.3	0.3	1.6
	Demand Reduction (MW)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003
	Projected Participation	1	1	1	1	1	4
VSD Controller on dairy vacuum pumps	Energy Savings (MWh/year)	2	2	2	2	2	11
	Demand Reduction (MW)	0.0003	0.0003	0.0003	0.0003	0.0003	0.0017
	Projected Participation	0.3	0.3	0.3	0.3	0.3	1.5
Lighting Improvements for Midstream	Energy Savings (MWh/year)	15,644	15,573	15,004	14,436	14,182	74,838
	Demand Reduction (MW)	2.916	2.903	2.797	2.691	2.644	13.950
	Projected Participation	17,869	17,787	17,138	16,488	16,198	85,480
Lighting Improvements for Midstream	Energy Savings (MWh/year)	847	843	812	781	767	4,050
	Demand Reduction (MW)	0.172	0.171	0.165	0.158	0.156	0.821
	Projected Participation	17,869	17,787	17,138	16,488	16,198	85,480
HVAC Systems Midstream	Energy Savings (MWh/year)	271	542	678	678	678	2,846
	Demand Reduction (MW)	0.047	0.094	0.118	0.118	0.118	0.495
	Projected Participation	42	84	105	105	105	441
Ductless mini-split heat pumps < 5.4 tons Midstream	Energy Savings (MWh/year)	57	113	142	142	142	595
	Demand Reduction (MW)	0.005	0.009	0.011	0.011	0.011	0.048
	Projected Participation	10	20	26	26	26	107
ENERGY STAR Ice machines Midstream	Energy Savings (MWh/year)	2	2	2	2	2	8
	Demand Reduction (MW)	0.0003	0.0003	0.0003	0.0003	0.0003	0.0015
	Projected Participation	1	1	1	1	1	4

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
ENERGY STAR Commercial fryer Midstream	Energy Savings (MWh/year)	2	2	2	2	2	11
	Demand Reduction (MW)	0.0004	0.0004	0.0004	0.0004	0.0004	0.0019
	Projected Participation	1	1	1	1	1	4
ENERGY STAR Commercial hot food holding cabinet Midstream	Energy Savings (MWh/year)	2	2	2	2	2	8
	Demand Reduction (MW)	0.0002	0.0002	0.0002	0.0002	0.0002	0.0012
	Projected Participation	1	1	1	1	1	4
High efficiency ventilation fans with and w/o thermostats Midstream	Energy Savings (MWh/year)	0	1	1	1	1	4
	Demand Reduction (MW)	0.0001	0.0001	0.0002	0.0002	0.0002	0.0007
	Projected Participation	1	2	2	2	2	8
VSD Controller on dairy vacuum pumps Midstream	Energy Savings (MWh/year)	1	3	3	3	3	14
	Demand Reduction (MW)	0.0002	0.0003	0.0004	0.0004	0.0004	0.0018
	Projected Participation	0.1	0.3	0.3	0.3	0.3	1.4
Adding doors to existing refrigerated display cases Direct Discount	Energy Savings (MWh/year)	1	1	2	2	2	7
	Demand Reduction (MW)	0.0001	0.0002	0.0002	0.0002	0.0002	0.0008
	Projected Participation	1	3	4	4	4	16
Air tanks for Load/No load compressors Direct Discount	Energy Savings (MWh/year)	0.1	0.2	0.2	0.2	0.2	0.7
	Demand Reduction (MW)	0.00001	0.00002	0.00002	0.00002	0.00002	0.00011
	Projected Participation	0.2	0.4	0.4	0.4	0.4	1.9
Air-entraining air nozzle Direct Discount	Energy Savings (MWh/year)	4	4	4	5	4	22
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.001	0.003
	Projected Participation	2	2	2	3	2	11
Anti-sweat heater controls Direct Discount	Energy Savings (MWh/year)	88	183	204	225	226	928
	Demand Reduction (MW)	0.010	0.020	0.022	0.025	0.025	0.102
	Projected Participation	28	58	65	72	72	295
Auto door closers Direct Discount	Energy Savings (MWh/year)	15	26	27	27	26	120
	Demand Reduction (MW)	0.005	0.009	0.009	0.009	0.009	0.042
	Projected Participation	11	19	19	20	19	88
Beverage machine controls Direct Discount	Energy Savings (MWh/year)	13	18	18	16	16	82
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	9	13	13	12	12	58

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Compressed air controller Direct Discount	Energy Savings (MWh/year)	0.2	0.2	0.2	0.3	0.3	1.2
	Demand Reduction (MW)	0.00002	0.00004	0.00004	0.00004	0.00004	0.00018
	Projected Participation	1	1	1	1	1	6
Compressed air low pressure drop filters Direct Discount	Energy Savings (MWh/year)	0.02	0.02	0.02	0.02	0.02	0.08
	Demand Reduction (MW)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000012
	Projected Participation	0.4	0.4	0.4	0.4	0.4	2.1
Compressed air mist eliminators Direct Discount	Energy Savings (MWh/year)	0.02	0.02	0.02	0.02	0.02	0.08
	Demand Reduction (MW)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000012
	Projected Participation	0.2	0.2	0.2	0.2	0.2	1.1
Cycling refrigerated thermal mass dryer Direct Discount	Energy Savings (MWh/year)	0.01	0.01	0.01	0.01	0.01	0.06
	Demand Reduction (MW)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000009
	Projected Participation	0.2	0.2	0.2	0.2	0.2	1.1
Economizer controls Direct Discount	Energy Savings (MWh/year)	6	12	12	12	6	46
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	0	1	1	1	0	3
Evaporator Fan controllers Direct Discount	Energy Savings (MWh/year)	1	1	1	1	1	4
	Demand Reduction (MW)	0.0002	0.0002	0.0002	0.0003	0.0003	0.0011
	Projected Participation	1	1	1	1	1	4
High efficiency evaporator fan motors for walk in or reach in cases Direct Discount	Energy Savings (MWh/year)	4	8	9	10	10	41
	Demand Reduction (MW)	0.000	0.001	0.001	0.001	0.001	0.005
	Projected Participation	7	14	16	18	18	73
LED Refrigeration Display Case Lighting Direct Discount	Energy Savings (MWh/year)	32	56	54	53	49	245
	Demand Reduction (MW)	0.005	0.009	0.008	0.008	0.007	0.037
	Projected Participation	70	122	118	115	107	533
Lighting Controls Direct Discount	Energy Savings (MWh/year)	37	64	63	61	57	282
	Demand Reduction (MW)	0.007	0.012	0.012	0.012	0.011	0.054
	Projected Participation	42	73	71	69	64	320
Lighting Improvements Direct Discount	Energy Savings (MWh/year)	18,104	18,670	18,104	17,538	16,972	89,388
	Demand Reduction (MW)	2.592	2.673	2.592	2.511	2.430	12.800
	Projected Participation	168	174	168	163	158	831

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Low Flow Pre-rinse Sprayers Direct Discount	Energy Savings (MWh/year)	11	13	13	13	13	62
	Demand Reduction (MW)	0.002	0.002	0.002	0.002	0.002	0.010
	Projected Participation	11	13	13	13	13	61
No-loss condensate drains Direct Discount	Energy Savings (MWh/year)	1	1	1	1	1	5
	Demand Reduction (MW)	0.0001	0.0002	0.0002	0.0002	0.0002	0.0007
	Projected Participation	0.2	0.4	0.4	0.4	0.4	1.9
Refrigerated case light occupancy sensors Direct Discount	Energy Savings (MWh/year)	0.02	0.03	0.03	0.03	0.03	0.13
	Demand Reduction (MW)	-	-	-	-	-	-
	Projected Participation	6	10	9	9	9	43
Strip curtains for walk-in freezers and coolers Direct Discount	Energy Savings (MWh/year)	4	6	8	10	12	40
	Demand Reduction (MW)	0.001	0.001	0.001	0.001	0.002	0.005
	Projected Participation	0	1	1	1	1	4
Variable speed drive air compressor Direct Discount	Energy Savings (MWh/year)	2	4	4	4	4	17
	Demand Reduction (MW)	0.000	0.001	0.001	0.001	0.001	0.003
	Projected Participation	3	4	4	5	4	20
Variable speed refrigeration compressor Direct Discount	Energy Savings (MWh/year)	1	1	1	1	2	6
	Demand Reduction (MW)	0.0001	0.0002	0.0002	0.0002	0.0002	0.0008
	Projected Participation	3	5	6	6	7	27
Lighting Improvements Direct Install	Energy Savings (MWh/year)	1,623	1,894	1,860	1,826	1,758	8,962
	Demand Reduction (MW)	0.233	0.272	0.267	0.262	0.252	1.286
	Projected Participation	758	884	868	852	821	4,182
Low Flow Pre-rinse Sprayers Direct Install	Energy Savings (MWh/year)	105	157	167	172	167	768
	Demand Reduction (MW)	0.018	0.028	0.029	0.030	0.029	0.135
	Projected Participation	126	189	202	208	202	928

[1] To show numerical values in the Pa PUC Table 8 tables, deviation from the standard use of decimals throughout Section 3 may have been applied.

[2] Total values may not equal the sum of all program year values due to rounding.

Custom Component

The Custom component is the same for both large C&I and small C&I customers unless noted otherwise.

Description

Through the Custom component, PPL Electric Utilities will offer incentives to support completion of complex and comprehensive projects that involve measures not covered by the Efficient Equipment component. These measures include, but are not limited to, operational process improvements, retro-commissioning, equipment optimization, CHP, solar, advanced lighting controls, compressed air, and other custom measures.

As with Efficient Equipment, PPL Electric Utilities' Custom component will be offered through a downstream approach. The Non-Residential CSP will work with customers and trade allies to identify and qualify custom projects. Customers or trade allies will submit applications for review. Eligible projects will be processed, and incentives will be paid upon project completion and final savings review.

In Phase IV, an HVAC Optimization delivery channel will be added to serve customers with packaged HVAC systems. The Non-Residential CSP will work with a network of trade allies to implement this channel to produce additional, cost-effective energy and peak demand savings. A Strategic Energy Management ("SEM") offering may also be implemented at some time during Phase IV. Though the SEM would be a measure in the Custom component, incentive levels may differ from the standard custom incentive amount.

Objectives

The objectives of the Custom component are:

- Provide energy and peak demand-savings opportunities and incentives to qualified customers.
- Encourage customers to take a comprehensive, whole-facility approach to energy efficiency by installing high-efficiency custom measures or processes.
- Encourage qualifying equipment repairs, optimization, and operational or process changes that reduce electricity consumption.
- Increase customer awareness of the features and benefits of energy efficient equipment.
- Support emerging technologies and nontypical efficiency solutions in cost-effective applications.
- Encourage advanced energy efficiency strategies required for certification by national market transformation programs such as Leadership in Energy and Environmental Design ("LEED"), Architecture 2030, or ENERGY STAR Buildings.
- Engage trade allies to stock, promote, and provide high-efficiency technology options to customers.
- Promote other PPL Electric Utilities energy efficiency components.

- Collect energy, peak demand, and operating data from customers, as required to confirm customer and measure eligibility and to determine energy and peak demand savings and cost-effectiveness.
- Achieve a total energy reduction of approximately 601,221 MWh/year and 82 MW[27] gross verified savings that will target large C&I and small C&I customers, or business types.

Implementation Strategy

The Non-Residential CSP will deliver the Custom component, promoting the various energy efficiency options available to the non-residential customer segment with a range of marketing and outreach tactics. The Custom component relies on projects being initiated by customers, trade allies, distributors, and the Non-Residential CSP. The Non-Residential CSP will build on trade ally and distributor relationships to co-market energy efficient equipment and the value of participation.

For custom measures, the Non-Residential CSP will work directly with trade allies and customers to help identify, develop, and implement custom projects. The Non-Residential CSP will develop project scopes, analyze costs, determine potential energy and peak demand savings of proposed projects, conduct field verification of completed projects, and help determine the reported energy and peak demand savings from installed projects. The EM&V CSP will conduct independent evaluations to determine verified savings. The Non-Residential CSP will develop, update, and process rebate applications and payments. PPL Electric Utilities will manage the Non-Residential CSP.

Key steps include the following:

- Educate customers on energy efficiency opportunities and direct them to the appropriate path through marketing activities, the website, or direct contact with equipment distributors or equipment installation contractors/trade allies.
- Have customers complete applications or work with customers, equipment/appliance retailers, midstream distributors, and installation contractors to complete program applications.
- Ensure customers/contractors submit the required documentation for processing.
- Review pending and completed project documentation to verify applicant is a PPL Electric Utilities customer and the completed project and installed equipment meet eligibility criteria.
- When possible, work with customers to confirm project preapproval before ordering energy efficiency equipment.
- Recruit and develop an effective trade ally network.
- Process applications and issue rebates for qualified projects/equipment.
- Verify completed equipment/appliance installation for a sample of participants to confirm component integrity as part of M&V.

[27] Peak Demand is at generation.

Issues, Risks, and Risk Management Strategy

Table 46 presents market risks associated with the Custom component and strategies PPL Electric Utilities will use to manage each risk.

Table 46. Custom Component Issues, Risks, and Risk Management Strategies

Component Issue	Risk	Risk Management Strategies
Customer or building owner does not prioritize energy efficiency.	• Decision-makers choose to install cheaper, less efficient equipment with shorter payback/IRR, resulting in lower savings. • Owners are not informed about how their facility uses energy. • Existing debt may limit funds to purchase new efficient equipment. • Customers place a priority on fluctuating commodity prices.	• PPL Electric Utilities offers incentives and programs to reduce payback and IRR for business owners. • Non-Residential CSP offers planning assistance to enhance energy savings. • Non-Residential CSP educates customers about the long-term benefits of energy efficiency, available incentives, and other components.
Customers typically replace equipment only upon failure.	• Customers see no need to replace functioning equipment. • Customers are not informed about the most efficient equipment available when the need to replace it is immediate. Some efficient equipment may have a longer delivery time that would affect customer operations.	• Non-Residential CSP educates trade allies and customers about available energy efficient choices before equipment fails and encourages businesses to plan for equipment replacement. • PPL Electric Utilities provides incentives for trade allies to stock, promote, and install efficient measures.
Customers are unaware of the benefits of installing and properly maintaining energy efficient equipment.	• Customers do not properly maintain equipment, and savings benefits erode over time.	• Non-Residential CSP promotes the importance and value of equipment maintenance and training.

Anticipated Costs to Participating Customers

Costs incurred by customers participating in the Custom component will vary based on the specific type of efficient equipment installed.

Ramp-Up Strategy

The Custom component is an existing, mature offering being carried forward from Phase III. The Non-Residential CSP will develop marketing material to facilitate the transition to Phase IV. The Non-Residential CSP has developed a transitional strategy to bridge incentives for customers whose participation spans Phase III and Phase IV.

PPL Electric Utilities expects to implement the following transition plan between Phase III and Phase IV:

- Projects on the Phase III waitlist will receive comparable incentives if completed and installed early in Phase IV. Comparable is defined as the Phase III rebate, up to $0.05 (Efficient Equipment), $0.06 (Custom)/annual kWh saved and subject to Phase III per project or per

customer incentive caps. Projects must be completed by August 31, 2021, for most measures. PPL Electric Utilities will consider exceptions to that deadline on a case-by-case basis, depending on the project details.

- Projects approved (funds reserved) in Phase III that are installed (placed in service) in early Phase IV may be eligible for the approved Phase III rebate and will be accounted for as Phase IV projects.

Marketing Strategy

PPL Electric Utilities will work with the Non-Residential CSP to develop and execute a marketing plan that captures sector-level economies of scale and employs targeted outreach where practical. The marketing strategy may include the following:

- Take advantage of trade ally and manufacturer relationships to co-market energy efficient equipment and products.
- Host webinars.
- Participate in trade shows and other outreach events.
- Communicate and provide access to program component information on the Company's EE&C website.
- Promote the components in newsletters.
- Advertise using newspaper, radio, direct mail, bill inserts, cross component advertisements, commercial ads, and other mass media.
- Coordinate advertising opportunities with trade allies.
- Conduct one-on-one marketing to small C&I customers through trade allies, business accounts specialists, and Non-Residential CSP outreach.
- Target marketing to facility managers, building or process engineers, building owners and managers associations, HVAC contractors, energy services firms, architects and engineers, real estate developers, economic development organizations, customer advocacy groups, trade associations, and other trade allies to encourage installation of new energy efficient technologies and adoption of best-operating practices.
- Provide specific outreach to individual tenants as well as building owners and property managers in leased commercial buildings to encourage participation.
- Target specific sectors identified as having a high unrealized energy efficiency potential.
- Publish marketing materials including charts, brochures, and case studies.
- Provide newsletters and coordinate with key market partners, including trade associations and agencies.
- Use limited time offers, special promotions, and no-cost measures to promote energy efficiency.
- Offer trade ally incentives and rewards.
- Cross-promote through other PPL Electric Utilities energy efficiency components.
- Provide information and training on specific technologies directed towards niche markets.
- Incorporate customers in area- or territory-focused promotions.

- Work with distributors to promote and encourage purchases of efficient equipment to capture savings opportunities missed by other outreach methods.

Eligible Measures and Incentive Strategy

PPL Electric Utilities will offer rebates and incentives to qualified customers (or trade allies, depending on the delivery channel) who submit completed applications and documentation of the efficiency measures installed. Customers will have the option to assign rebate payments to a third party.

PPL Electric Utilities offers performance incentives based on the avoided or reduced kWh/year or kW peak demand reductions resulting from the project. Incentives may be capped at 50% to 100% of the total project costs (excluding internal labor) or $500,000 and are subject to an annual cap for each project and each participating customer. The per-customer-site cap is defined as one building with one or more meters. A parent company cap of $1 million per year will apply to a campus setting or multiple buildings (on the same property or in different locations) with a common owner. For all measures offered through the Custom component, PPL Electric Utilities will provide incentives in the range of $0.02 to $0.22 per annual kWh saved and/or $30 to $1,200 per kW peak demand.

Table 47 and Table 48 lists PPL Electric Utilities' proposed measures and minimum eligibility qualifications for large C&I and small C&I, respectively.

Table 47. Pa PUC Table 7-Large C&I Custom Eligible Measures and Incentives

Measure	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [1,2]
Custom Combined Heat and Power	Per Project	No	Preapproval is required for all CHP projects.	$2,174,821	15	$180,043	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom HVAC Optimization	Per Product	No	Applies to documented tune-ups for package or split systems up to 20 tons. All HVAC applications other than comfort cooling and heating, such as process cooling, are ineligible for this measure. Preapproval is required for all custom projects.	$263	3	$329	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Compressed Air Retrofit	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$57,969	15	$18,543	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom Horticultural Lighting	Per Project	No	Agricultural Application: Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$71,602	15	$28,686	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom VFD Improvements	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$140,710	15	$26,752	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom Refrigeration	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$43,554	15	$3,306	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [1,2]
Custom Process Improvement	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$215,583	15	$38,684	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom HVAC	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$711,897	15	$34,642	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom Solar	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$1,169,564	15	$119,881	Up to $0.22/kWh and/or up to $1,200/kW first year savings
LCI-Behavioral operational improvements	Per Project	No	Must be PPL Electric Utilities customer	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

[1] All eligible measures are listed in this table regardless of participation projections. N/A indicates measure may be offered in future program years but not at the launch of Phase IV.[2] PPL Electric Utilities does not pay incentives on a per unit basis, but rather on a cents per kWh/yr and/or dollars per kW basis.
[3] Note that incentive rates may vary due to availability of program funds and/or changes made to encourage participation in a certain measure.

Table 48. Pa PUC Table 7-Small C&I Custom Eligible Measures and Incentives

Measure	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [1,2]
Custom Combined Heat and Power	Per Project	No	Preapproval is required for all CHP projects.	$2,174,821	15	$180,043	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom HVAC Optimization	Per Product	No	Applies to documented tune-ups for package or split systems up to 20 tons. All HVAC applications other than comfort cooling and heating, such as process	$263	3	$329	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [1,2]
			cooling, are ineligible for this measure. Preapproval is required for all custom projects.				
Compressed Air Retrofit	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$57,997	15	$18,543	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom Horticultural Lighting	Per Project	No	Agricultural Application: Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$71,602	15	$28,686	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom VFD Improvements	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$148,642	15	$26,752	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom Refrigeration	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$43,554	15	$3,306	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom Process Improvement	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$215,689	15	$38,684	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom HVAC	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$423,863	15	$34,642	Up to $0.22/kWh and/or up to $1,200/kW first year savings

Measure	Unit	Low-Income Measure (Yes/No)	Eligibility Requirements	Incremental Cost ($/unit)	Estimated Useful Life	Incentive Amount ($/unit)	Incentive Amount or Incentive Range ($/unit) [1,2]
Custom Solar	Per Project	No	Per project cap will range from $250,000 to $500,000 per customer site per year or $1 million per parent company per year for customers with multiple sites. Incentive cannot exceed 50% - 100% of the total project cost (excluding internal labor). Preapproval is required for all custom projects.	$1,169,564	15	$119,881	Up to $0.22/kWh and/or up to $1,200/kW first year savings
Custom HVAC Optimization Direct Discount	Per Product	No	Applies to documented tune-ups for package or split systems up to 20 tons. All HVAC applications other than comfort cooling and heating, such as process cooling, are ineligible for this measure. Preapproval is required for all custom projects.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings
SCI-Behavioral operational improvements	Per Project	No	Must be PPL Electric Utilities customer.	N/A	N/A	N/A	Up to $0.22/kWh and/or up to $1,200/kW first year savings

[1] All eligible measures are listed in this table regardless of participation projections. N/A indicates measure may be offered in future program years but not at the launch of Phase IV.[2] PPL Electric Utilities does not pay incentives on a per unit basis, but rather on a cents per kWh/yr and/or dollars per kW basis.

[3] Note that incentive rates may vary due to availability of program funds and/or changes made to encourage participation in a certain measure.

For Custom measures, projects must meet a minimum TRC of 0.7 for CHP and a minimum TRC of 0.85 for other types of projects (non-CHP). PPL Electric Utilities may implement a new minimum TRC requirement for projects if it is necessary to help ensure the Non-Residential Program or portfolio TRC is greater than 1.0. PPL Electric Utilities will notify customers, trade allies, and stakeholders at least 60 days before the effective date of a change in the TRC requirement. Any TRC requirement would be in effect for new applications submitted after the effective date.

All measures may not be available at all times. PPL Electric Utilities may suspend a measure depending on popularity, pace of the component savings and costs, free ridership, evaluation requirements, complexity of the information required from customers, administrative requirements for the measure, or other reasons. PPL Electric Utilities will review the component continually and may adjust available measures or eligibility qualifications to achieve savings and cost budgets.

PPL Electric Utilities may offer tiered incentives that encourage the installation of multiple measures or a more comprehensive whole facility approach. Measures, eligibility requirements, and incentives may change to reflect progress, changes in the TRM, market conditions, or other factors. PPL Electric Utilities shall strive to keep the rebates and per-site caps as consistent as possible while recognizing the need to adjust incentives and caps to control the pace of components within their savings and cost budgets.

Deadline for Rebate Applications

The rebate application website and portal will state the deadline for its submission. The deadline will not exceed 180 days from the date the measure was installed.. For Custom measures, PPL Electric Utilities will require preapproval to allow it (or the Non-Residential CSP) sufficient time to qualify the project, minimize free ridership, screen for cost-effectiveness, determine the site-specific M&V plan, and conduct any required pre-metering.

Start Date with Key Schedule Milestones

Table 49 lists the estimated key schedule milestones for the Custom component. PPL Electric Utilities will lead implementation or provide management oversight of all tasks.

Table 49. Custom Component Schedule and Milestones

Schedule	Milestones
11/30/2020	Phase IV EE&C Plan submitted to Pa PUC
6/01/2021	Launch Phase IV component
Annually starting 01/15/2022	EDCs submit semiannual program report
Annually starting 09/30/2022	EDCs submit final annual program report
05/31/2026	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electric Utilities' Evaluation Plan, which will be submitted to the SWE for review. PPL Electric Utilities and its EM&V CSP will conduct annual evaluations of each component in compliance with all Pa PUC requirements and the Evaluation Framework. As part

of this process, the EM&V CSP will review a sample of participant rebate applications and CSP records to verify quantity, efficiency level, and qualifying equipment. The EM&V CSP will follow all applicable methods in the TRM and the Evaluation Framework to calculate energy savings and peak demand reduction.

For the Custom component, PPL Electric Utilities anticipates conducting annual impact and process evaluations (activities vary by year).

The EM&V CSP will develop an evaluation plan and sampling protocol that fits the Custom component and all associated delivery channels. The EM&V CSP will review a sample of participant and CSP records to verify quantity, efficiency level, and qualifying equipment. On-site assessment may be included as a verification activity. The EM&V CSP will also develop an evaluation plan and sampling protocol that fits the Custom component and develop site-specific EM&V plans to meet Act 129 evaluation requirements.

Administrative Requirements

The Non-Residential CSP will administer and provide operational management of the Custom component. PPL Electric Utilities will provide oversight and operational support to establish effective deployment.

Estimated Participation

Table 50 and Table 51 show the order of magnitude participation estimates for the Large and Small C&I Custom component. Actual quantities will vary, and PPL Electric Utilities will manage the component to stay within budget.

Table 50. Pa PUC Table 8-Large C&I Custom Projected Participation [1]

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total[2]
Custom Combined Heat and Power	Energy Savings (MWh/year)	8,805	8,805	8,805	8,805	8,805	44,025
	Demand Reduction (MW)	1.274	1.274	1.274	1.274	1.274	6.369
	Projected Participation	3	3	3	3	3	16
Custom HVAC Optimization	Energy Savings (MWh/year)	160	160	160	160	160	801
	Demand Reduction (MW)	0.077	0.077	0.077	0.077	0.077	0.386
	Projected Participation	105	105	105	105	105	524
Compressed Air Retrofit	Energy Savings (MWh/year)	11,413	11,869	12,782	12,782	12,782	61,629
	Demand Reduction (MW)	1.443	1.500	1.616	1.616	1.616	7.790
	Projected Participation	35	36	39	39	39	187
Custom Horticultural Lighting	Energy Savings (MWh/year)	432	432	432	432	432	2,160
	Demand Reduction (MW)	0.089	0.089	0.089	0.089	0.089	0.446
	Projected Participation	1	1	1	1	1	7
Custom VFD Improvements	Energy Savings (MWh/year)	15,243	17,148	17,783	17,783	17,783	85,739
	Demand Reduction (MW)	1.998	2.248	2.331	2.331	2.331	11.239
	Projected Participation	33	37	39	39	39	187
Custom Refrigeration	Energy Savings (MWh/year)	3,068	3,452	3,580	3,580	3,580	17,260
	Demand Reduction (MW)	0.247	0.278	0.288	0.288	0.288	1.389
	Projected Participation	33	37	39	39	39	187
Custom Process Improvement	Energy Savings (MWh/year)	24,968	28,089	29,130	29,130	29,130	140,447
	Demand Reduction (MW)	2.690	3.026	3.138	3.138	3.138	15.129
	Projected Participation	33	37	39	39	39	187
Custom HVAC	Energy Savings (MWh/year)	19,041	21,421	22,214	22,214	22,214	107,104

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total[2]
	Demand Reduction (MW)	2.575	2.897	3.004	3.004	3.004	14.486
	Projected Participation	33	37	39	39	39	187
Custom Solar	Energy Savings (MWh/year)	1,258	1,258	1,258	1,258	1,258	6,291
	Demand Reduction (MW)	0.373	0.373	0.373	0.373	0.373	1.865
	Projected Participation	1	1	1	1	1	7

[1] To show numerical values in the Pa PUC Table 8 tables, deviation from the standard use of decimals throughout Section 3 may have been applied.
[2] Total values may not equal the sum of all program year values due to rounding.

Table 51. Pa PUC Table 8-Small C&I Custom Projected Participation [1]

Measure	Metric	PY13	PY14	PY15	PY16	PY17	Total [2]
Custom Combined Heat and Power	Energy Savings (MWh/year)	2,935	2,935	2,935	2,935	5,870	17,610
	Demand Reduction (MW)	0.425	0.425	0.425	0.425	0.849	2.547
	Projected Participation	1	1	1	1	2	6
Custom HVAC Optimization	Energy Savings (MWh/year)	569	569	569	569	569	2,843
	Demand Reduction (MW)	0.274	0.274	0.274	0.274	0.274	1.370
	Projected Participation	372	372	372	372	372	1,859
Compressed Air Retrofit	Energy Savings (MWh/year)	2,283	2,739	3,652	3,652	3,652	15,978
	Demand Reduction (MW)	0.289	0.346	0.462	0.462	0.462	2.020
	Projected Participation	7	8	11	11	11	49
Custom Horticultural Lighting	Energy Savings (MWh/year)	432	432	432	432	432	2,160
	Demand Reduction (MW)	0.089	0.089	0.089	0.089	0.089	0.446
	Projected Participation	1	1	1	1	1	7
Custom VFD Improvements	Energy Savings (MWh/year)	3,176	3,811	5,081	5,081	5,081	22,229
	Demand Reduction (MW)	0.416	0.500	0.666	0.666	0.666	2.914
	Projected Participation	7	8	11	11	11	49
Custom Refrigeration	Energy Savings (MWh/year)	511	895	1,023	1,023	1,023	4,475
	Demand Reduction (MW)	0.041	0.072	0.082	0.082	0.082	0.360
	Projected Participation	6	10	11	11	11	49
Custom Process Improvement	Energy Savings (MWh/year)	4,161	7,282	8,323	8,323	8,323	36,412
	Demand Reduction (MW)	0.448	0.784	0.897	0.897	0.897	3.922
	Projected Participation	6	10	11	11	11	49
Custom HVAC	Energy Savings (MWh/year)	3,173	5,554	6,347	6,347	6,347	27,768
	Demand Reduction (MW)	0.429	0.751	0.858	0.858	0.858	3.756
	Projected Participation	6	10	11	11	11	48
Custom Solar	Energy Savings (MWh/year)	1,258	1,258	1,258	1,258	1,258	6,291
	Demand Reduction (MW)	0.373	0.373	0.373	0.373	0.373	1.865
	Projected Participation	1	1	1	1	1	7

[1] To show numerical values in the Pa PUC Table 8 tables, deviation from the standard use of decimals throughout Section 3 may have been applied.
[2] Total values may not equal the sum of all program year values due to rounding.

4 Management and Implementation Strategies

4.1 Overview of EDC Management and Implementation Strategies

PPL Electric Utilities has over a decade of successfully managing and implementing its EE&C programs. It will apply this knowledge and experience, lessons learned, and best practices and will rely on the strong relationships it has built to deliver programs in Phase IV. Programs will be effectively managed by PPL Electric Utilities' EE&C staff and implemented by qualified CSPs.

4.1.1 Services to Be Provided by EDCs, Consultants, Trade Allies, and CSPs

For its implementation strategy, PPL Electric Utilities relies on qualified CSPs, preferred partners, trade allies, and other entities engaged in energy efficiency to promote, deliver, and support the deployment of its programs. PPL Electric Utilities' EE&C Plan will use CSPs to manage delivery of its residential, low-income, and non-residential (small and large C&I) programs. PPL Electric Utilities will use another CSP to provide EM&V services and will issue an RFP for a CSP to coordinate the sale of peak demand into the PJM FCM.

PPL Electric Utilities also depends on trade allies and other market partners to engage customers, promote the programs, evaluate projects, furnish and install energy efficient equipment, and provide ancillary energy efficiency services. PPL Electric Utilities will draw on the expertise available from trade allies, such as contractors and retailers, to support the local economy and allow customers to interact with the trade allies of their choice.

Conservation Service Providers

CSPs are individuals or firms registered with the Pa PUC that, pursuant to contract with EDCs, provide consultation, design, administration, management, and/or implementation services related to the delivery of EE&C program components. PPL Electric Utilities anticipates that CSPs will have a major role in delivering its Phase IV programs and their respective components.

As indicated in Table 52, implementation CSP roles involve the delivery of programs and their associated components and cross-program activities. PPL Electric Utilities will train its implementation CSPs on reporting requirements, use of the Company's data management and tracking system, customer service requirements, QA/QC standards, and protocols for addressing quality issues should they arise.
PPL Electric Utilities will require all implementation CSPs to submit data and reports that include customer data and detailed information on installed measures and incentive transactions to support EM&V, tracking against the Plan budgets and goals, and reporting to the Commission.

To facilitate implementation of the Phase IV EE&C portfolio, PPL Electric Utilities will engage two CSPs—one will deliver the Residential and Non-Residential (small C&I and large C&I) Programs and one will deliver the Low-Income Program. Each will be responsible for implementing all program components in their designated sector(s), including overseeing subcontractors. An EM&V CSP will be responsible for independently evaluating the entire portfolio of EE&C programs and functions.

Table 52. Program Conservation Service Provider Implementation Roles and Responsibilities

<table>
<tr><th colspan="4">Program Function</th></tr>
<tr><td>Portfolio Planning</td><td colspan="3" rowspan="4">PPL Electric Utilities</td></tr>
<tr><td>Research & Development</td></tr>
<tr><td>Marketing Strategy</td></tr>
<tr><td>CSP Management & Coordination</td></tr>
<tr><td>Trade Ally Network Management</td><td rowspan="8">Residential CSP</td><td rowspan="8">Low-Income CSP</td><td rowspan="8">Non-Residential CSP</td></tr>
<tr><td>Marketing & Advertising</td></tr>
<tr><td>Customer Intake & Routing</td></tr>
<tr><td>Project Delivery</td></tr>
<tr><td>Application Review & Approval</td></tr>
<tr><td>Incentive Processing</td></tr>
<tr><td>Customer Care</td></tr>
<tr><td>QA/QC</td><td colspan="3" rowspan="2">Implementation CSPs, PPL Electric Utilities, and EM&V CSP</td></tr>
<tr><td>Measurement & Verification</td></tr>
<tr><td>Program Tracking</td><td colspan="3">PPL Electric Utilities</td></tr>
<tr><td>Evaluation and Pa PUC Annual/Mid-Year Reports</td><td colspan="3">EM&V CSP</td></tr>
</table>

PPL Electric Utilities will hire other companies, not classified as CSPs, to perform functions such as providing/hosting the tracking system, legal support, and marketing and advertising (overarching or specific campaigns other than the marketing and advertising provided by each implementation CSP).

Trade Allies

Trade allies provide products and services directly to customers in support of program components but are not under contract to PPL Electric Utilities. Examples of the types of trade allies PPL Electric Utilities will use to deliver its program components are:

- ***Lighting and other contractors, retailers, distributors/dealers and installers*** that provide sales, equipment or building diagnostics, audits, maintenance, and installation services for energy efficient equipment, such as lighting, energy management systems and controls, HVAC, water heaters, insulation, commercial and industrial equipment, and appliances. These trade allies will inform customers about PPL Electric Utilities' applicable programs and rebates; provide essential information for customers to understand the costs and benefits of equipment or services and encourage customers to take advantage of PPL Electric Utilities' program components.
- ***Residential and commercial builders,*** **developers, remodelers, contractors, architects, engineers, or other market participants** that design, develop, and build residential and commercial buildings and that will deliver services to support the Energy Efficient Home component and applicable Efficient Equipment components.
- ***Technical engineering and energy services firms*** that install energy efficiency projects for small and large C&I customers.

Market Partners

Market partners are independent entities that may provide support or services to PPL Electric Utilities' customers, typically in an effort to achieve mutually beneficial results or to serve mutual target

populations. Market partners are not generally supported by Company funding and are not under contract to the Company. For example, schools that engage with PPL Electric Utilities' Student Energy Efficient Education component are considered market partners because they act as a conduit for reaching the school community, but they do not receive a direct financial benefit. Stakeholders and community based organizations are also market partners.

Preferred Partners
Preferred partners are service providers with whom the CSP has an agreement to perform services for a specific program component.

4.1.2 Performance, Technology, Market, and Evaluation Risks and Risk Management Strategies

As described previously, the MWh compliance targets set forth in the Implementation Order are lower than the Phase III goals, but the MW goals are higher and must be met within the same average cost cap. This means that the Phase IV program acquisition cost is slightly higher than in Phase III ($0.246 annual kWh compared to $0.20 in Phase III).

Though this slight improvement in acquisition cost could be expected to alleviate some risk associated with delivery of PPL Electric Utilities' EE&C portfolio and improve its ability to achieve its savings targets, as of the time of this Plan's development, the U.S. is facing unprecedented challenges and uncertainties that could significantly alter the program delivery environment.

PPL Electric Utilities has identified the following market risks:

- **Economic conditions.** The advent of the COVID-19 pandemic, and associated economic impacts, could have significant implications for PPL Electric Utilities' portfolio. As the pandemic has continued to pervade across the U.S., utilities and their customers in all sectors are facing related challenges on multiple fronts:
  - **Residential sector.** Although restrictive stay-at-home orders have been lifted in Pennsylvania, residential customers continue to be wary of participating in programs that involve at-home contractor visits. Many utilities, including PPL Electric Utilities, have introduced program modifications to protect customer health and safety (such as curbside appliance recycling pickup, expanded access to efficient products through mail or other alternative methods, and virtual energy audits), but programs that have historically relied on direct measure installation have seen significant reductions in participation. Furthermore, many residential customers have suffered job losses, wage disruptions, and evictions. Declining economic conditions now—or uncertainty about the future—may be limiting customers' ability to invest in nonessential efficiency upgrades.
  - **Low-income sector.** Lower-income individuals have borne a greater share of economic hardship than any other customer class; the COVID-19 pandemic is creating a larger low-income population and worsening the conditions for those already existing below the poverty line. In light of this situation, these customers will probably need help to reduce

their utility bills more than in typical years, yet they face the same risks and concerns about direct engagement with contractors in their homes.

- **Small commercial sector.** COVID-19 has had a profound, disruptive effect on businesses across the U.S. Small businesses have particularly suffered, with more than 100,000 businesses closed across the country. These conditions significantly reduce the population of potential PPL Electric Utilities program participants, and they are expected to create long-term adverse economic ripples across the state.

- **Supply disruptions**. In addition to the potentially catastrophic economic effects of the COVID-19 pandemic, equipment industry representatives are reporting supply chain disruptions that have implications for PPL Electric Utilities' programs. There are indicators that the pandemic has affected retail purchasing habits. Lighting sales are declining at traditional utility partner retailers like big box stores and shifting to grocery and drug stores while many other product sales are moving online. At the same time, industrial production in China has fallen significantly, affecting many efficient products such as lighting, thermostats, and other high-efficiency equipment.
- **Market dynamics.** In nearly every industry, customer choice, personalized services, and competitive pricing have become the norm. Customers are increasingly demanding that their service providers offer a variety of simple, low-cost options from which to customize their engagement experience and to communicate with them using a variety of digital and traditional platforms. To keep pace, the utility industry must continue to offer value, customized solutions, a personalized experience, and, increasingly, a total digital engagement solution. Additionally, reaching key energy decision-makers in non-residential sectors can present a special challenge to PPL Electric Utilities and its CSPs. Rental properties—both residential and commercial—entail barriers associated with split incentives.
- **Changing equipment standards.** Changing building codes and new equipment standards tend to lower baseline energy use, thereby reducing the potential savings from affected measures. The 2020 Phase IV Energy Efficiency and Peak Demand Reduction Market Potential Study illustrates this phenomenon. For example, lighting savings, which has historically been among the lowest cost resources, is expected to diminish in the residential sector and to a lesser extent in the small C&I and large C&I sectors. The 2020 Potential Study cited regulatory uncertainty impacting lighting savings resulting from the U.S. Energy Independence and Security Act of 2007 ("EISA") and, more recently, the DOE's December 2019 final determination that rescinds EISA and leaves the current efficiency standards for light bulbs in place.[28] Despite the December 2019 action, multiple lawsuits filed against DOE's decision, possible changes to the DOE in 2021, and a rapidly

[28] *See* U.S. Department of Energy, 2019. "Department of Energy Issues Final Determination for General Service Incandescent Lamps, Finds More Stringent Standards Are More Costly to the American People and Not Economically Justified." DOE news release, December 20. https://www.energy.gov/articles/department-energy-issues-final-determination-general-service- incandescent-lamps-finds-more.

transforming lighting market will almost certainly extend and may exacerbate the market uncertainty around the potential for lighting savings.

- **Distributed energy resources and storage.** A growing share of customers have installed distributed energy solutions, and more are planning to do so in the next few years. A recent study found that although only 4% of consumers currently own a rooftop solar system, 34% expressed interest in getting one.[29] Meanwhile, as storage costs decline, downstream meter storage will likely accelerate the rate of solar adoption, which will, in turn, impact utilities' load growth projections.
- **Focus on climate policy.** In light of differing priorities at the federal level, many states are enacting their own climate goals and policies. Twenty states and the District of Columbia have adopted specific greenhouse gas reduction targets and are experimenting with policies including carbon pricing, emission limits, and steps to promote cleaner transportation alternatives. The Pennsylvania Climate Action Plan, developed by the Climate Change Advisory Committee and submitted to Governor Wolf in 2019, recommends legislative changes to the General Assembly necessary to reach a goal of 26% reduction in greenhouse gas emissions by 2025 and 80% reduction by 2050, as required by the Pennsylvania Climate Change Act of 2008. The implications of any legislative action as a result of these recommendations on PPL Electric Utilities' ability to achieve its EE&C Plan objectives are as yet unknown. As state-level energy and environmental policy continues to evolve and become increasingly intertwined, PPL Electric Utilities expects to engage with its stakeholders, policymakers, and regulators to help ensure it can make a meaningful contribution to any future energy policy while still continuing to provide safe, affordable energy services to its customers.

4.1.3 Plans to Address Human Resource and Contractor Resource Constraints

PPL Electric Utilities' EE&C Plan balances program component delivery needs and resource allocation across an experienced pool of internal staff, CSPs, trade allies, and market partners. PPL Electric Utilities' professional staff has extensive experience and a proven record of success managing the CSPs that deliver program components and engaging with trade allies.

Over more than 10 years, PPL Electric Utilities has developed a robust network of trade allies to provide the proposed services, and the EE&C Plan continues to emphasize ongoing contractor recruitment, outreach, and training to maintain continued success. PPL Electric Utilities offers training so contractors are up to date on the latest technologies, program rules, and rebates being offered. Through its market research and engagement efforts, the Company frequently solicits feedback from its customers and contractors, especially contractors who meet face to face with customers, and this feedback has provided valuable insights on gaps in contractor resources that can be quickly resolved.

[29] Association of Energy Service Professionals and Essense Partners. *Distributed Energy Resources*. Part 3 of 4. October 2017.

The Company will assign managers and support staff to oversee its CSPs and the programs and their associated components. PPL Electric Utilities regularly evaluates workloads and staffing needs and makes adjustments if necessary.

A description of PPL Electric Utilities' EE&C Plan management structure and an organizational chart are provided in Section 4.2.1.

4.1.4 Early Warning System

PPL Electric Utilities continually monitors program performance (such as savings and costs) through its tracking database, the CSPs' tracking systems, and management oversight. PPL Electric Utilities and its EM&V CSP also regularly solicit customer and trade ally feedback and conduct other market research to monitor the portfolio's compliance with the Company's other corporate objectives. These mechanisms provide the means for promptly identifying programs or components that are not meeting their objectives.

4.1.5 Implementation Schedule with Milestones

On July 2, 2020, PPL Electric Utilities issued a competitive RFP for implementation CSPs, and on July 16 2020, issued a competitive RFP for an EM&V CSP. At the time of this filing, PPL Electric Utilities has selected its Residential, Low-Income, Non-Residential and EM&V CSPs. Most of the Phase IV program components are continuing from Phase III, and implementation will continue uninterrupted to facilitate the transition for customers and trade allies. Table 53 lists the key schedule milestones for the EE&C Plan.

Table 53. PPL Electric Utilities' Phase IV Implementation Schedule and Milestones

Schedule	Milestones
11/30/2020	Phase IV EE&C Plan submitted to the Pa PUC
06/01/2021	Launch of all Phase IV energy efficiency programs
Annually starting 01/15/2022	EDCs submit semiannual program reports
Annually starting 09/30/2022	EDCs submit final annual program reports
05/31/2026	Programs end

4.1.6 Stakeholder Engagement

PPL Electric Utilities is committed to obtaining stakeholder input and consensus and to keeping customers, stakeholders, and the general public informed about the results of the energy efficiency programs and progress toward Plan goals. It meets regularly with its CSPs and trade allies to review Plan progress, consider new products and services, and/or identify opportunities to improve EE&C programs.

PPL Electric Utilities intends to continue to meet with other interested stakeholders as needed but not less than twice annually until May 31, 2026, to discuss progress, review results, and solicit input for possible changes to the EE&C Plan during Phase IV. The Company also provides Act 129 information,

including its EE&C Plan and semiannual and annual reports, in a dedicated stakeholder section on www.pplelectric.com. Additionally, the Company shares success stories with customers, trade allies, and the public by publishing and distributing case studies.

4.2 Executive Management Structure

4.2.1 Structures for Addressing Portfolio Strategy

PPL Electric Utilities staff will design, implement, and manage programs and associated components; oversee sector and cross-functional CSPs; and support the requirements of delivery, such as marketing, advertising, and customer education.

PPL Electric Utilities' **Director – Customer Service Project Management** is responsible for PPL Electric Utilities' Act 129 energy efficiency programs, non-Act 129 regulatory programs, and innovation delivery including the PPL Electric Utilities energy efficiency website.

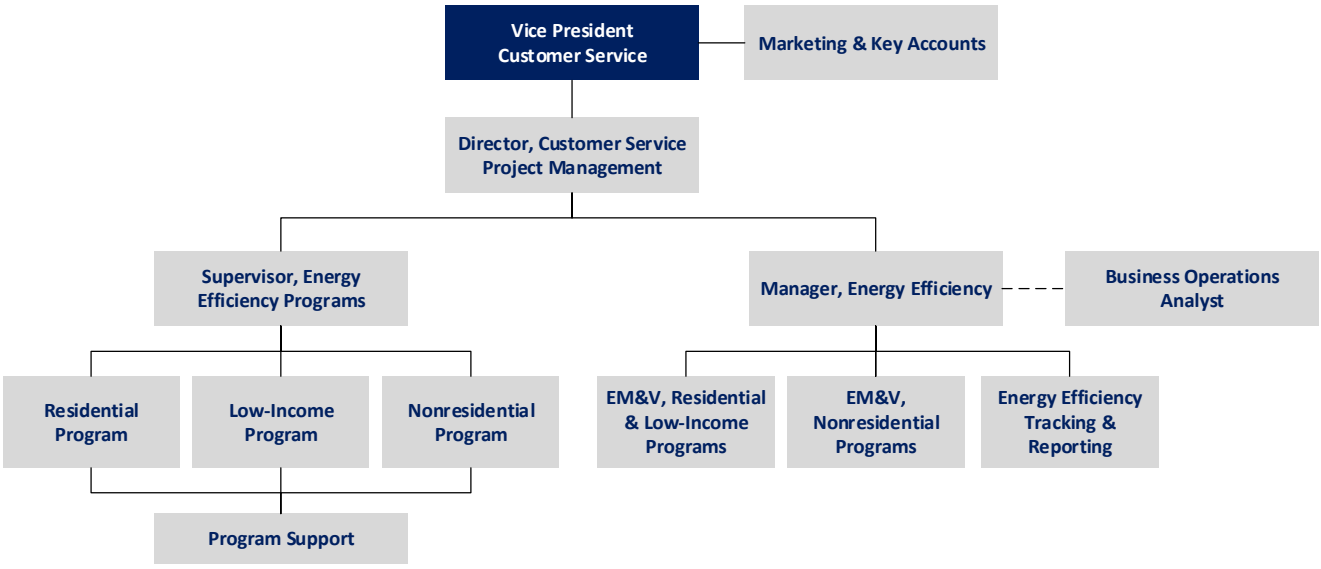
PPL Electric Utilities' **Manager – Energy Efficiency** has overall responsibility for the development, implementation, operation, evaluation, reporting, and compliance of PPL Electric Utilities' Act 129 energy efficiency programs.

PPL Electric Utilities' **Program Manager** staff manages each program and the respective program implementation CSPs. PPL Electric Utilities' Key Account Managers support and help promote the Non-Residential Program.

PPL Electric Utilities also has staff responsible for EE&C program administration, operational and technical support, program planning, and evaluation.

Figure 3 summarizes PPL Electric Utilities' EE&C management structure.

Figure 3. PPL Electric Utilities EE&C Plan Management Structure



4.2.2 Approach to Overseeing the Performance of Subcontractors and Implementers

PPL Electric Utilities oversees its CSPs to confirm they meet the requirements of their contracts and performance expectations and, as needed, will modify programs and components (e.g., design, incentives, measures, marketing) to meet its savings, costs, cost-effectiveness, and customer satisfaction objectives. PPL Electric Utilities' oversight process includes the following elements:

- ***Sector-level CSPs.*** To reduce administrative costs and provide sufficient accountability for objectives, PPL Electric Utilities will use two CSPs that will have overall responsibility for their program and program components.
- ***PPL Electric Utilities staff.*** PPL Electric Utilities management and program staff are responsible for confirming that each program meets its objectives. They will continually monitor performance and oversee each program CSP.
- ***EM&V CSP.*** PPL Electric Utilities' EM&V CSP will provide independent evaluations of program components to verify impacts (such as savings, costs, and cost-effectiveness) and to determine if components are operating effectively.

4.2.3 Administrative Budget

Administrative costs include all utility costs to develop, implement, and manage the Plan, excluding payments to customers/trade allies (rebates and incentives). Administrative costs consist of all expenses associated with PPL Electric Utilities' labor and materials, CSP labor and material, marketing, QA/QC, EM&V, tracking systems, legal services, and the SWE. The cost of goods and services provided to low-income and other customers at no cost is classified as incremental measure costs, with offsetting incentives, as directed by the 2021 TRC Test Order.

4.3 Conservation Service Providers

4.3.1 Selected CSPs and Basis for Selection

PPL Electric Utilities issued RFPs for three sector-level implementation CSPs (for Residential, Non-Residential, and Low-Income) and one CSP to provide EM&V. PPL Electric Utilities conducted its RFP processes in accordance with the procedures approved by the Commission. At the time this EE&C Plan was submitted, PPL Electric Utilities was preparing the implementation CSP contracts.

4.3.2 Work and Measures Being Performed by CSPs

See Section 4.1.1 for a description of the work and measures being performed by CSPs. The CSPs' roles are also described within each individual component description in Section 3.

4.3.3 Pending RFPs

PPL Electric Utilities will solicit bids from qualified third-party vendors to provide technical support to nominate a portion of its peak demand reduction as a capacity resource in PJM's FCM. PPL Electric Utilities intends to issue the RFP in February 2021.

5 Reporting and Tracking Systems

PPL Electric Utilities' reporting and tracking system protocols are described below.

5.1 Semiannual and Annual Reports

PPL Electric Utilities will provide semiannual, annual, and *ad hoc* reports to the Commission and the SWE in accordance with the schedule, format, and content prescribed by the Commission and the SWE. PPL Electric Utilities expects the schedule, format, and content to be comparable with Phase III reports.

5.2 Project Management Tracking System

5.2.1 Overview of Data Tracking System

PPL Electric Utilities will continue to use its tracking database to record energy efficiency transactions and calculate reported savings. PPL Electric Utilities uses its corporate accounting system to track all energy efficiency cost information at the program-component level and its tracking database and its corporate business intelligence system for internal analysis and internal reporting on energy efficiency activities. PPL Electric Utilities will modify these management and tracking systems as necessary to incorporate Phase IV changes to program components, reports to the Commission and the SWE, data extracts, and other requirements.

5.2.2 Software Format, Data Exchange Format, and Database Structure

PPL Electric Utilities' information system is based on a commercially available database platform, which enables program implementation CSPs to record and track all the data necessary to calculate energy savings impacts at all levels. Examples of data fields the system captures include these:

- Participant contact information
- Measure name
- Measure type
- Measure life and installed cost
- Number of measures installed
- Building and space type
- Space heating, cooling, and water heating fuel types
- Rebate amount
- Existing conditions and equipment

The information system will include the features and capabilities described below.

Database Structure

- Allows for multiple levels of data resolution (e.g., measure, project, premise, customer site, sector, program type, CSP).
- Allows users to navigate through layers of data (e.g., measures, project, program, component).
- Provides a place to store electronic documents related to program participants and other functions.
- Provides a straightforward interface for adding programs and components.

Functionality

- Records energy efficiency transaction information such as customer account number, unique record ID, installation date of the measure, description and parameters of the measure (e.g., quantity, size, efficiency rating, end use), program and component name, customer, sector, and data required to calculate savings, as well as other required information about each transaction
- Allows CSPs to file transactions via a secure web link or other secure method.
- Calculates and allocates reported gross savings to the program and component, customer sector, and reporting period.
- Allows data extracts to be securely exported to external parties such as PPL Electric Utilities' EM&V CSP and the SWE.

Data Quality Control

- Has intelligent use of drop-down lists, menus, and keyboard shortcuts.
- Allows data parameters (e.g., maximum/minimum) to be set for each data element to avoid erroneous entries.
- Checks for and alerts users to possible duplicate data entry before posting data.
- Provides an audit trail for all corrected data entry errors, deletions, etc.
- Tracks transactions and workflow.
- Generates standard and customized reports for PPL Electric Utilities' day-to-day portfolio analysis and management.

5.2.3 Mechanism for Access for Commission and Statewide EE&C Plan Evaluator

PPL Electric Utilities' information system provides accessibility to external parties through the following features.

- Is accessible through the Internet or direct links, as appropriate, and will be traceable, that is, maintaining a log of users' access.
- Controls access via security rights assigned to each user or groups of users.
- Allows for appropriate security (e.g., releases, encryption) of customer data.
- Allows varying levels of security-controlled access by PPL Electric Utilities staff, program CSPs, and system administrators. Direct access (read-only) is not recommended for Commission personnel, the SWE, or PPL Electric Utilities' EM&V CSP because they would need significant training to understand the system. PPL Electric Utilities provides data extracts to those parties instead.

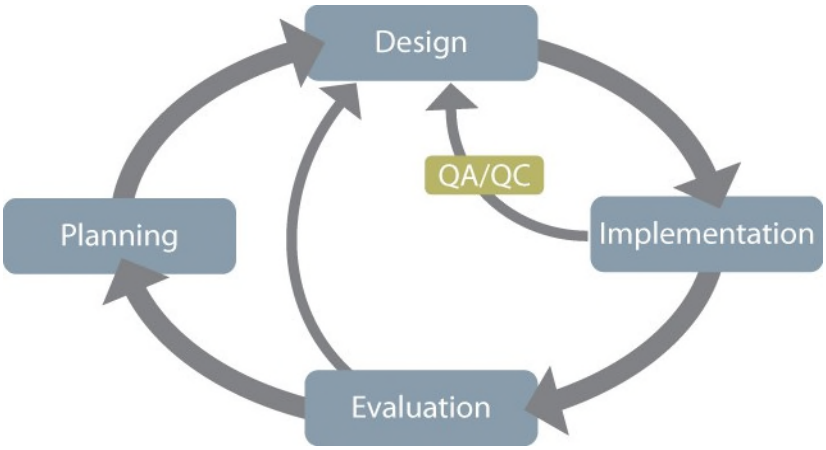
6 Quality Assurance and Evaluation, Measurement, and Verification

6.1 Quality Assurance/Quality Control

6.1.1 Approach to Quality Assurance and Quality Control

PPL Electric Utilities will use a continuous improvement process ("CIP") as the framework for managing its Phase IV portfolio. The basic principle of CIP, illustrated in Figure 4, is establishing effective QA/QC and EM&V procedures to track program and component activities, monitor performance and progress toward targets, and take corrective actions when warranted. The process integrates QA/QC procedures with implementation activities and allows feedback to flow back into the design and delivery processes. The CIP will consist of three essential elements—activity tracking, QA/QC, and process and impact evaluations.

Figure 4. PPL Electric Utilities' Continuous Improvement Process



QA/QC is integral to the design and delivery of all program components in PPL Electric Utilities' EE&C Plan. The QA procedures establish standards to follow during the planning and design phases to proactively promote consistency and avoid errors. QC activities and inspection points during the implementation and evaluation phases help guide the repair of errors and identification of areas for improvement. Activities and procedures that comprise QA and QC are described in greater detail below.

Quality Assurance

QA procedures comprise proactive activities that occur throughout the program lifecycle to align processes with objectives, avoid risk, and promote efficiency. At PPL Electric Utilities, QA includes activities to confirm that the Company's program and component rules and requirements are documented and current, its CSPs and participating trade allies are properly licensed and trained and maintain high quality standards in all customer interactions, and all data captured are accurate and sufficient to allow for rigorous energy savings analysis.

These activities include, but are not necessarily limited to, the following:

- Developing component-level logic models and process maps that document the goals, processes, and expected outcomes associated with key activities.
- Implementing training protocols that describe training procedures and requirements for key stakeholders, such as CSPs and trade allies.
- Applying rigorous screening and qualifying protocols to CSPs, trade allies, and field staff that interact directly with customers.
- Documenting data collection protocols, including data and customer information needed to track activities and calculate savings for each component.
- Summarizing CSPs' gross energy savings calculation methods that are reported at the measure and/or project level to support consistency and accuracy across each component.

Quality Control

PPL Electric Utilities conducts QC to test and verify that component activities adhere to industry best practices and established QA procedures and conform to performance expectations at the program, component, and portfolio levels. In conducting QC activities, PPL Electric Utilities addresses operational procedures, data and records, and measure installation, as described below.

- Ongoing tracking of component activities and costs.
- Reviewing all data and records to confirm that the proper data are collected consistently, resources are allocated appropriately, and performance can be measured accurately. For measure-based components, this activity involves verifying the collection of all information (including signatures, dates, and project-specific data) required to verify customer eligibility, calculate incentive payments, estimate and report energy savings and peak demand reduction, and confirm that recommended measures were installed.
- Conducting follow-up calls to participants to evaluate their satisfaction with the rendered services and to identify opportunities to improve the effectiveness of energy efficiency programs.
- Conducting post-installation inspections of an appropriately sized, random sample of all participants to confirm that program-reported measures were installed, installation followed best practice procedures, and measures function as expected.

6.1.2 Procedures for Measure and Project Installation Verification, Quality Assurance and Control, and Savings Documentation

PPL Electric Utilities documents and tracks all component, program, and portfolio activity through its participant tracking database, which can record and/or calculate reported gross energy savings. The Company designed the tracking system with input interfaces customized to individual components and coordinated with EM&V personnel so that they collect appropriate data to feed into the evaluation processes and to meet the needs of the SWE. PPL Electric Utilities trains implementation CSPs to use the tracking system. In cases where a turnkey CSP delivers all aspects of a component, the Company will

expect that the CSP track all activity via secure Internet access or upload. CSPs may also collect and store additional data required for evaluation in their internal tracking systems.

Section 3 contains summary information about EM&V approaches specific to each component. The EM&V CSP will develop detailed EM&V plans describing all evaluation activities and sampling plans for the impact and process evaluations.

6.1.3 Process for Collecting and Addressing Feedback

Customers may submit suggestions, comments, and complaints by telephone, by email, and in writing. PPL Electric Utilities publishes telephone numbers, addresses, and an email link on its website and on applications. PPL Electric Utilities and CSPs are responsible for following up, in a timely manner, on all comments and complaints. The Company requires CSPs to keep a log of complaints and resolutions, which they regularly provide to PPL Electric Utilities.

PPL Electric Utilities, in conjunction with the EM&V CSP, will implement an evaluation plan for each component. The EM&V CSP typically conducts ongoing customer and periodic trade ally surveys as part of the impact and process evaluations. The EM&V CSP will provide survey results and findings to PPL Electric Utilities on a regular basis.

PPL Electric Utilities and implementation CSPs may also conduct customer satisfaction surveys in addition to those conducted by the EM&V CSP.

6.2 Planned Market and Process Evaluations

The Pa PUC and the SWE are responsible for conducting formal baseline studies and market potential studies. If requested by PPL Electric Utilities, the EM&V CSP may also conduct market potential or baseline studies.

The EM&V CSP will conduct process evaluations for the Phase IV portfolio of components. These process evaluations are a principal component of PPL Electric Utilities' CIP, allowing the Company to monitor the progress of individual components and provide timely feedback to internal and external stakeholders. These evaluations also provide the necessary context for interpreting impact evaluation results. For each program in the Plan, the EM&V CSP will focus the process evaluation on improving component operations and delivery efficiency.

A primary objective of the process evaluations is to assess which processes work well and which present challenges or may be improved. The EM&V CSP begins process evaluations by creating a logic model for each program, describing the component theory in terms of its goals, processes, outcomes, and metrics that enable assessment performance relative to its objectives.

PPL Electric Utilities uses the results of process evaluation activities, benchmarking, and market effects studies to assess the components' effectiveness in terms of market reach, measure adoption, and customer satisfaction. These activities and evaluations uncover opportunities to improve market

penetration and identify barriers that may impede participation and the adoption of efficiency measures.

The main sources of data for the process evaluation will be documentation reviews, logic models, interviews with internal PPL Electric Utilities program staff and with CSPs and key market actors, secondary research, and participant and nonparticipant surveys. Key market actors will vary from component to component and may include equipment vendors, contractors, distributors, and retailers.

The EM&V CSP will survey participants and, where necessary and specified in the Evaluation Plan, will survey a comparable sample of nonparticipants. The EM&V CSP will design and execute survey sample plans to meet criteria for statistical confidence and precision specified in the Act 129 Evaluation Framework.

For each component, the EM&V CSP may stratify samples, as appropriate, by customer sector, market segment, technology, geographic area, and project size (i.e., savings) so samples are representative of the population. The EM&V CSP will implement the process evaluations in a manner that provides timely feedback to planners and CSPs and that allows enough time to implement any recommended changes. Process evaluation activities will vary by component and by program year, as needed to provide desired information.

6.3 Strategy for Coordinating with the Statewide EE&C Plan Evaluator

PPL Electric Utilities expects that, for Phase IV, the SWE will develop an Evaluation Framework, requirements for the Evaluation Plan, a process for creating savings protocols for new measures (not currently in the TRM), standard formats for semiannual and annual reports, and standard formats for data requests and data extracts. The Implementation Order provides a reporting calendar with dates when the reports and data must be provided to the SWE. PPL Electric Utilities and its EM&V CSP shall strive to adhere to those requirements or request approval for exceptions.

Impact evaluations will serve as the principal means of verifying the installation of EE&C measures and quantifying the resulting energy and demand impacts. Methods for measuring and verifying savings can vary by measure, according to the TRM and Evaluation Framework. Methods can also vary by program, component, and sector. The Evaluation Plan for each program details the evaluation methodology and sampling and verification plans. The EM&V CSP will submit these plans to the SWE for review and approval and will adjust them where required by the SWE. The EM&V CSP will update the evaluation plans annually, if needed, and provide them to the SWE for review.

The SWE and the Commission may call quarterly evaluation group meetings for all EDCs and their evaluators. The SWE may also call *ad hoc* working group sessions to discuss TRM protocols, net savings approaches, or other Act 129 matters. PPL Electric Utilities and the EM&V CSP will attend these meetings to provide input and stay informed of the SWE's activities and decisions.

PPL Electric Utilities and its EM&V CSP may also contact the SWE with requests for clarification of TRM protocols, decisions, net savings approaches, or any other relevant matter. The communications among all parties will remain open and flexible.

7 Cost Recovery Mechanism

7.1 Total Annual Revenues as of December 31, 2006

Section 2806.1(g) of the Public Utility Code requires that the total cost of any EE&C Plan cannot exceed 2% of the EDC's total annual revenue as of December 31, 2006. PPL Electric Utilities' total annual revenues for calendar year 2006 were approximately $3 billion. Accordingly, the 2% cost cap established by Act 129 is approximately $61.5 million.

In its Implementation Order, the Commission stated that the 2% budgetary cap applies to the EDC's annual budget and not to the budget for the entire Phase IV.[30] In addition, the Commission determined that certain implementation costs recoverable under Act 129 are not subject to the 2% cost cap, including PPL Electric Utilities' share of the costs for the SWE.

7.2 Plan to Fund the EE&C Measures, Including Administrative Costs

PPL Electric Utilities will spend most of its $307.5 million budget to implement its EE&C Plan during Phase IV.[31] This budget also includes costs PPL Electric Utilities incurs to develop and modify its EE&C Plan. The Implementation Order states that EDCs should be permitted to recover the incremental cost incurred to design, create, and obtain Commission approval of an EE&C Plan. The Company proposes to amortize and recover those deferred costs ratably over the 60-month life of its Phase IV EE&C Plan (June 1, 2021, through May 31, 2026).

7.3 Data Tables

The tables on the following pages provide cost data for each program. Cost-effectiveness calculations by program are provided in Section 8. The table captions make reference to the corresponding table numbers provided in the EE&C Plan Template.

Tables in this section include the following:

- Table 54: Pa PUC Table 10 –Summary of EE&C Costs
- Table 55: Pa PUC Table 11 – Allocation of Common Costs to Applicable Customer Sector
- Table 56: Pa PUC Table 12 – Summary of Portfolio EE&C Costs

[30] Implementation Order at 11.

[31] $307.5 million is the allowable budget under PPL Electric Utilities' Act 129 cost cap. In addition to this cost, PPL Electric Utilities expects to incur approximately $5 million for its share of the SWE's cost, which are not subject to the cost cap.

Table 54. Pa PUC Table 10 - Summary of EE&C Costs[1]

Portfolio											
EE&C Program	Cost Elements ($) [3]							Total Cost	Expected Acquisition Cost [2] ($/MWh)	Levelized Cost [3] ($/MWh)	Expected Acquisition Cost ($/MW)
	Incentives	*CSP Program Design*	*CSP Administrative*	*CSP Delivery Fees*	*CSP Marketing*	*EDC Administrative*	*EDC Other*				
Residential	$40,977,331	$ 46,000	$ 3,114,935	$17,011,974	$2,496,277	$ 1,100,000	-	$64,746,517	$ 324.85	$ 70.40	$ 1,473,330
Low-Income	$23,811,371	-	$2,780,500	$12,958,126	$1,250,000	$ 1,100,000	-	$41,899,997	$ 560.21	$ 115.17	$ 4,619,367
Small C&I	$53,022,270	$128,786	$3,778,092	$17,324,983	$2,034,357	$550,000	-	$76,838,488	$ 140.99	$ 39.19	$ 940,368
Large C&I	$57,689,951	$100,776	$ 4,343,105	$20,883,928	$2,338,595	$ 550,000	-	$85,906,355	$ 119.05	$ 49.45	$ 881,807
Sector Total	**$175,500,922**	**$275,562**	**$14,016,632**	**$68,179,011**	**$8,119,229**	**$3,300,000**	**-**	**$269,391,356**	**$ 174.85**	**$ 49.65**	**$ 1,160,429**

[1] Common Costs are not included in this table

[2] The numerator in the acquisition cost calculation is the full direct program cost. Acquisition costs based on first-year savings.

[3] Levelized costs are lifetime. Appendix A of the 2021 TRC Test Order provides formulas to calculate levelized cost. See 2021 TRC Test Order, available at http://www.puc.pa.gov/pcdocs/1648126.docx.

Table 55. Pa PUC Table 11 - Allocation of Common Costs to Applicable Customer Sector

Common Cost Element	**Total Cost ($)**	**Basis for Cost Allocation**	**Sector Cost Allocation ($)**		
			Residential (Including Low-Income)	**Commercial/ Industrial -- Small**	**Commercial/ Industrial -- Large**
Advertising & Marketing	$10,400,000	% of Direct Program Cost	$4,117,360	$2,966,080	$3,316,560
Phase IV Tracking System/Technical Support	$7,800,000	% of Direct Program Cost	$3,088,020	$ 2,224,560	$2,487,420
EE&C Phase IV Plan Development	$1,100,000	% of Direct Program Cost	$435,490	$313,720	$350,790
Evaluation and Measurement	$15,000,000	% of Direct Program Cost	$5,938,500	$4,278,000	$4,783,500
Plan Management	$2,400,000	% of Direct Program Cost	$950,160	$684,480	$765,360
Major Accounts	$1,400,000	% of Direct Program Cost (excluding residential)	-	$660,950	$739,050
Statewide Evaluator	$5,000,000	% of Direct Program Cost	$1,979,500	$1,426,000	$1,594,500
Totals	**$ 43,100,000**		**$16,509,030**	**$12,553,790**	**$14,037,180**

Table 56. Pa PUC Table 12 - Summary of Portfolio EE&C Costs

Portfolio	Total Sector Portfolio-Specific Costs	Total Common Costs	Total of All Costs
Residential (Including Low-Income)	$106,646,514	$16,509,030	$123,155,544
Commercial/Industrial -- Small	$76,838,488	$12,553,790	$89,392,278
Commercial/Industrial -- Large	$85,906,355	$14,037,180	$99,943,535
Totals	**$269,391,356**	**$43,100,000**	**$312,491,356**

7.4 Tariffs and Cost Recovery Mechanism

Section 2806.1(k)(1) of the Public Utility Code authorizes EDCs to recover the costs of their EE&C Plan through a reconcilable adjustment clause under Section 1307 of the Public Utility Code

Because all programs in PPL Electric Utilities' proposed EE&C Plan will benefit both shopping and non-shopping customers, the Company designed its cost recovery mechanism to be non-bypassable. The ACR-IV will be calculated separately for PPL Electric Utilities' three major customer classes—residential, small C&I, and large C&I. For residential customers, PPL Electric Utilities will apply the cost recovery mechanism as a cents per kWh component of the distribution charge. For small C&I customers, the Company will apply the cost recovery mechanism as a cents per kWh charge as a separate line item on the customers' bill. For large C&I customers, PPL Electric Utilities will apply the cost recovery mechanism as a dollars per kW charge, as a separate line item on the customers' bill, where the demand (kW) is a customer's PJM peak load contribution (which may change yearly).

PPL Electric Utilities proposes to calculate the ACR-IV on an annual basis according to the projected program costs that it anticipates it will incur during that Phase IV program year. PPL Electric Utilities proposes an annual reconciliation of the ACR-IV for each of its three major customer classes. Specifically, each year PPL Electric Utilities will compare actual ACR-IV revenues to actual expenses and will recover or refund any over or under-collections in the next ACR-IV application year.

In addition to the annual reconciliation, upon determination that a customer class's ACR-IV rate, if left unchanged, would result in a material over- or under-collection of Phase IV Act 129 costs incurred or expected to be incurred during the current 12-month period, the Company, in its discretion, may file with the Commission for an interim revision of the ACR-IV rate.

7.5 Cost Recovery Mechanism to Ensure Approved Measures Are Financed by Corresponding Customer Class

Section 2806.1(a)(11) of the Public Utility Code requires that EE&C measures be paid for by the same customer class that receives the energy and conservation benefits of those measures. PPL Electric Utilities will directly assign costs to the customer class that received the benefits of the EE&C measures whenever those costs can be directly assigned.

However, some costs, such as common costs and/or portfolio-level costs, relate to EE&C measures that are applicable to more than one customer class or that provide systemwide benefits. In Phases I, II, and III, the Commission directed PPL Electric Utilities to allocate those costs, and general administrative costs, using reasonable and generally acceptable cost of service principles that are commonly utilized in base rate proceedings. In Phase IV, as in Phases I, II, and III, PPL Electric Utilities proposes to allocate such costs using an allocation factor equal to the percentage of the total actual EE&C costs directly assigned to each customer class.

7.6 Phase IV Cost Accounting

PPL Electric Utilities will account for Phase IV costs separately from those incurred in prior phases using separate and distinct account numbers that break out charges by program, sector, and cost category (e.g., incentives, CSP costs, and payroll). The Company will use different account numbers for Phase IV from those used in prior phases. Any costs associated with energy efficiency measures installed and operable on or before May 31, 2021, will be accounted for as Phase III costs. Any costs associated with energy efficiency measures installed and operable after May 31, 2021, will be accounted for as Phase IV costs.

7.7 PJM FCM Cost Recovery

PPL Electric Utilities will nominate a portion of the expected peak demand savings in its Phase IV program into PJM's FCM. PPL Electric Utilities will update the annual report template to include and clearly show FCM proceeds or penalties. Cost recovery will be assigned by the customer class that provides the capacity and will be adjusted to reflect the proceeds or penalties from this activity.

8 Cost-Effectiveness

8.1 Plan Cost-Effectiveness as Defined by the Total Resource Cost Test

The cost-effectiveness of the proposed portfolio was demonstrated in data presented in Section 3 and in Table 59 and Table 60 for each program in the EE&C Plan, PPL Electric Utilities determined cost-effectiveness in accordance with the Commission's 2021 TRC Test Order.

PPL Electric Utilities began assessing the cost-effectiveness of each program in the Plan by creating a valuation of the total resource benefits ("TRC Benefits") over the life of each conservation measure, for a maximum of 15 years as directed in the 2021 TRC Test Order. The Company also determined each program's total resource costs ("TRC Costs") using the SWE Team Incremental Measure Cost Database and program delivery and administration costs. The 2021 TRC Test Order indicates that the portfolio of programs is cost-effective if its TRC Benefits exceed its TRC costs or the benefit/cost ratio is at least 1.0, as shown by the following equations:

$$\text{TRC Benefits} - \text{TRC Costs} \geq 0$$

or

$$\text{TRC Benefits}/\text{TRC Costs} \geq 1$$

The TRC Benefits data in this EE&C Plan are estimates based on the planning assumptions in this EE&C Plan. The Company will complete a cost-effectiveness evaluation using actual program results as part of its yearly evaluations.

8.1.1 Calculation of Avoided Costs of Supplying Electricity

PPL Electric Utilities calculated the avoided costs of delivered electricity for a 15-year planning horizon in three segments, using the SWE avoided cost calculator, as follows:

- ***Years 1-4 (June 2021-May 2025).*** The Company used the NYMEX Electricity Futures Price at the PJM West Hub as of September 1, 2020, and applied a locational basis adjustment from PJM West Hub to the Company's Zone.
- ***Years 5-10 (June 2025-May 2031).*** PPL Electric Utilities used NYMEX Henry Hub Natural Gas Futures and the EIA AEO Natural Gas Price Forecast for Mid-Atlantic Region as of September 1, 2020, converted to electric prices using an on-peak and off-peak heat rate and spark spread.
- ***Years 11-15 (June 2031-May 2036).*** PPL Electric Utilities used Middle Atlantic Natural Gas Prices for Electric Power from the Energy Information Administration Annual Energy Outlook, Energy Prices by Sector and Source, converted to electric prices using the on-peak and off-peak heat rate and including on-peak and off-peak spark price spreads.

The Company estimated avoided generation capacity costs using PJM base residual auction results for 2021/2022. Subsequent years are inflated by 2% as specified in the 2021 TRC Test Order. Avoided T&D costs for PY13 are from the SWE Demand Response Potential study, with the subsequent years

escalated by 2% as specified in the 2021 TRC Test Order. The assumptions used to calculate avoided costs are summarized by sector in Table 57.

Table 57. Main Assumptions Used in Avoided Costs and TRC Calculations

Discount Rates (Nominal)	Utility Discount Rate	5.00%
	Participant Discount Rate	5.00%
	Societal Discount Rate	5.00%
	TRC Discount Rate	5.00%
Line Losses[1]	**Energy**	
	Residential	108.75%
	Commercial (Small C&I)	108.75%
	Industrial (Large C&I)	104.20%
	Demand	
	Residential	108.75%
	Commercial (Small C&I)	108.75%
	Industrial (Large C&I)	104.20%
T&D Prices[2]	Average BLS Escalator	-
	Transmission & Distribution ($/kW-year 2021-2022)	$121.21
	Transmission Only ($/kW-year 2021-2022)	$0.00

[1] Line losses are consistent with those provided in the 2021 TRM Volume 1 Table 1-4. The line loss factor in this table represents meter to the generator.

[2] T&D prices are consistent with those provided on page 47 (Table 2) of the 2021 TRC Test Order.

Table 58 shows PPL Electric Utilities' calculated avoided costs of delivered electricity for a 15-year planning horizon.

Table 58. Overall Avoided Costs (All Sectors)

Program Year	Electric Energy Avoided Costs ($/kWh)					Capacity Avoided Costs ($/kW-Year)		
	Winter		Summer		Yearly	Generation	T&D	Transmission Only
	On Peak	Off Peak	On Peak	Off Peak	Average			
2022	$0.04	$0.03	$0.03	$0.02	$0.03	$52.32	$121.21	$0.00
2023	$0.04	$0.03	$0.03	$0.02	$0.03	$41.70	$123.63	$0.00
2024	$0.04	$0.03	$0.03	$0.02	$0.03	$42.54	$126.11	$0.00
2025	$0.04	$0.03	$0.03	$0.02	$0.03	$43.39	$128.63	$0.00
2026	$0.04	$0.03	$0.03	$0.02	$0.03	$44.26	$131.20	$0.00
2027	$0.04	$0.03	$0.03	$0.02	$0.03	$45.14	$133.83	$0.00
2028	$0.05	$0.04	$0.04	$0.02	$0.04	$46.04	$136.50	$0.00
2029	$0.05	$0.04	$0.04	$0.03	$0.04	$46.97	$139.23	$0.00
2030	$0.06	$0.04	$0.04	$0.03	$0.04	$47.90	$142.02	$0.00
2031	$0.06	$0.05	$0.04	$0.03	$0.05	$48.86	$144.86	$0.00
2032	$0.06	$0.05	$0.04	$0.03	$0.05	$49.84	$147.75	$0.00
2033	$0.06	$0.05	$0.04	$0.03	$0.05	$50.84	$150.71	$0.00
2034	$0.07	$0.05	$0.04	$0.03	$0.05	$51.85	$153.72	$0.00
2035	$0.07	$0.05	$0.05	$0.03	$0.05	$52.89	$156.80	$0.00
2036	$0.07	$0.05	$0.05	$0.03	$0.05	$53.95	$159.93	$0.00
2037	$0.07	$0.06	$0.05	$0.03	$0.05	$55.03	$163.13	$0.00
2038	$0.08	$0.06	$0.05	$0.03	$0.05	$56.13	$166.40	$0.00
2039	$0.08	$0.06	$0.05	$0.04	$0.05	$57.25	$169.72	$0.00
2040	$0.08	$0.06	$0.05	$0.04	$0.06	$58.40	$173.12	$0.00
2041	$0.08	$0.06	$0.05	$0.04	$0.06	$59.56	$176.58	$0.00

8.1.2 Measure Data

PPL Electric Utilities obtained estimates of savings, incremental cost, and measure life for this EE&C Plan primarily from the TRM, the Pennsylvania Incremental Cost Database, and the SWE's Energy Efficiency Market Potential Study. The Company compiled data for new measures not found in the TRM from secondary sources, including the California Database for Energy Efficiency Resources ("DEER").

8.1.3 Program Benefit Components

The benefits used in the TRC calculation include the full value of time and seasonally differentiated generation, transmission and distribution, and capacity costs, and they account for avoided line losses. To capture the full value of time and seasonal impacts of each program measure, PPL Electric Utilities adjusted hourly (8,760) system-avoided costs by the hourly load shape of the end user affected by the measure. The Company included quantifiable non-energy benefits, such as water savings.

8.1.4 Cost Components

The cost component of the TRC analysis includes the incremental measure costs/participant costs and direct utility costs. Incremental measure costs are the expenses associated with installing energy efficiency measures and ongoing operation and maintenance costs, where applicable.

EDC costs consist of expenses associated with development, delivery, and ongoing operation, and fit into the four categories listed here.

EDC Labor, Material, and Supplies

- Costs to administer energy efficiency program components include (but are not limited to) PPL Electric Utilities' fully loaded incremental personnel costs, employee expenses, office supplies, and external legal costs.

Customer Incentives

- Rebates or other incentives paid to customers or trade allies (by PPL Electric Utilities or CSPs) for implementing measures.
- Incentive payments from PPL Electric Utilities to LED manufacturers and retailers who, in turn, discount those products at the point of sale.

CSP Labor, Materials, and Supplies

- Costs associated with performing implementation tasks, including (but not limited to) lead intake, customer service, rebate application processing and problem resolution, equipment installation inspections, and individual component reporting. CSPs' marketing costs are segregated under the next category, Marketing.

Marketing

- EDC and CSP expenditures related to promotion of EE&C program components include, but are not limited to, the production of energy efficiency literature, advertising, promotion and promotional items, displays, events, and communications. Advertising encompasses all forms of media, such as direct mail, print, radio, and the Internet.
- Costs associated with training and educating the trade ally community, including training associated with delivering, marketing, and promoting its programs and components, as well as best practices training (e.g., quality installation training). This category also includes vendor recruitment and coordination costs. Trade allies include, but are not limited to, HVAC contractors, weatherization contractors, equipment and product dealers, installers, and C&I auditors. Trade allies may also include community groups and trade associations.

PPL Electric Utilities also categorizes costs as follows:

- **Direct costs.** These costs are directly related and charged to a specific component. PPL Electric Utilities will assign costs directly to program components where possible.
- **Common costs (also known as portfolio-level costs).** These costs are applicable to more than one customer class, are applicable to more than one component or program, or provide portfolio-wide benefits.
- **EDC costs.** These costs—the four categories described above—are incurred by PPL Electric Utilities and include all direct and common costs. These costs are in the Plan budget and include the SWE costs that are not subject to the funding cap.
- **Participant costs.** These costs are incurred by the customer, such as for the purchase and installation of efficient measures. Often, the participant cost is determined by subtracting Act 129 EE&C incentives from the incremental cost of the measure. PPL Electric Utilities uses participant costs only in the TRC evaluation.

8.2 Data Tables

The tables on the following pages provide TRC benefits data for each program component and sector. Note that tables in this section are numbered sequentially, but table formats are based on those provided in the Commission EE&C Plan Template. Each table caption includes a reference to the corresponding table number provided in the EE&C Plan Template.

Tables in this section include these:

Table 59. Pa PUC Table 13A – Gross TRC Benefits, By Program and Total Portfolio

Portfolio	NTGR & TRC Ratio			TRC Costs By Program Per Year ($000)				TRC Benefits By Program Per Year ($000)				
Program	Program Year	NTGR	TRC[1,2]	Incremental Measure Cost		Program Administration Cost	Total TRC Costs [2]	Capacity Benefits	Energy Benefits	Fossil Fuel and Water Benefits	O&M Benefits	Total TRC Benefits
				Paid by EDC	Paid by Participants							
Residential	PY13	1	1.28	$8,820	$14,614	$4,397	$27,831	$20,483	$14,555	$557	$0	$35,594
Residential	PY14	1	1.28	$8,544	$14,895	$4,456	$27,894	$20,097	$15,111	$539	$0	$35,747
Residential	PY15	1	1.19	$7,340	$13,545	$4,318	$25,202	$15,198	$14,263	$557	$0	$30,018
Residential	PY16	1	1.15	$6,605	$12,540	$4,231	$23,376	$12,492	$13,753	$556	$0	$26,802
Residential	PY17	1	1.13	$6,128	$11,820	$4,183	$22,132	$11,029	$13,510	$547	$0	$25,086
Residential	Total	1	1.21	$37,436	$67,414	$21,585	$126,435	$79,298	$71,192	$2,757	$0	$153,247
Low-Income	PY13	1	0.47	$4,221	$0	$2,944	$7,165	$1,448	$2,006	-$50	$0	$3,403
Low-Income	PY14	1	0.50	$4,707	$0	$3,492	$8,199	$1,715	$2,429	-$60	$0	$4,083
Low-Income	PY15	1	0.51	$4,810	$0	$3,742	$8,553	$1,824	$2,634	-$64	$0	$4,394
Low-Income	PY16	1	0.52	$4,581	$0	$3,680	$8,261	$1,772	$2,608	-$63	$0	$4,317
Low-Income	PY17	1	0.50	$3,324	$0	$2,576	$5,901	$1,197	$1,793	-$44	$0	$2,947
Low-Income	Total	1	0.50	$21,644	$0	$16,435	$38,080	$7,956	$11,469	-$281	$0	$19,144
Small C&I	PY13	1	1.58	$10,342	$29,587	$4,340	$44,270	$31,541	$41,835	-$6,852	$3,594	$70,117
Small C&I	PY14	1	1.61	$10,325	$31,047	$4,509	$45,881	$32,559	$44,668	-$6,801	$3,445	$73,872
Small C&I	PY15	1	1.66	$9,786	$29,819	$4,421	$44,026	$31,740	$44,647	-$6,500	$3,138	$73,025
Small C&I	PY16	1	1.70	$9,062	$27,516	$4,204	$40,781	$29,869	$42,821	-$6,217	$2,852	$69,325
Small C&I	PY17	1	1.69	$8,687	$27,639	$4,169	$40,496	$29,469	$43,062	-$6,946	$2,666	$68,251
Small C&I	Total	1	1.65	$48,203	$145,608	$21,643	$215,454	$155,179	$217,032	-$33,316	$15,695	$354,590
Large C&I	PY13	1	1.03	$11,270	$57,869	$5,129	$74,268	$25,639	$55,058	-$6,409	$2,371	$76,659
Large C&I	PY14	1	1.05	$11,183	$59,177	$5,301	$75,661	$25,792	$57,718	-$6,315	$2,256	$79,451
Large C&I	PY15	1	1.08	$10,632	$56,974	$5,226	$72,832	$24,769	$57,577	-$6,079	$2,040	$78,306
Large C&I	PY16	1	1.10	$9,934	$53,542	$5,038	$68,514	$23,385	$55,961	-$5,858	$1,839	$75,327
Large C&I	PY17	1	1.13	$9,425	$50,861	$4,935	$65,220	$22,587	$55,113	-$5,790	$1,730	$73,641
Large C&I	Total	1	1.08	$52,444	$278,422	$25,628	$356,495	$122,172	$281,427	-$30,451	$10,236	$383,384
Total			1.24	$159,727	$491,444	$85,291	$736,463	$364,605	$581,119	-$61,291	$25,931	$910,364

[1] The TRC ratio will reflect the lifetime TRC, not an annual TRC ratio.

[2] Does not include common portfolio costs; whereas Tables 2 and 3 do include common costs.

Table 60. Pa PUC Table 13B - Net Benefits, By Program and Total Portfolio

Portfolio	NTGR & TRC Ratio			TRC Costs By Program Per Year ($000)				TRC Benefits By Program Per Year ($000)				
Program	Program Year	NTGR	TRC[1, 2]	Incremental Measure Cost		Program Administration Cost	Total TRC Costs [2]	Capacity Benefits	Energy Benefits	Fossil Fuel and Water Benefits	O&M Benefits	Total TRC Benefits
				Paid by EDC	Paid by Participants							
Residential	PY13	0.79	1.28	$8,820	$9,367	$2,566	$20,753	$15,485	$10,526	$529	$0	$26,539
Residential	PY14	0.79	1.28	$8,544	$9,560	$2,662	$20,766	$15,138	$10,888	$512	$0	$26,538
Residential	PY15	0.79	1.17	$7,340	$8,550	$2,736	$18,625	$11,096	$10,188	$526	$0	$21,809
Residential	PY16	0.79	1.11	$6,605	$7,835	$2,783	$17,222	$8,879	$9,775	$524	$0	$19,178
Residential	PY17	0.79	1.09	$6,128	$7,346	$2,825	$16,299	$7,692	$9,580	$515	$0	$17,786
Residential	Total	0.79	1.19	$37,436	$42,657	$13,572	$93,665	$58,289	$50,956	$2,605	$0	$111,850
Low-Income	PY13	1.00	0.47	$4,221	$0	$2,944	$7,165	$1,448	$2,006	-$50	$0	$3,403
Low-Income	PY14	1.00	0.50	$4,707	$0	$3,492	$8,199	$1,715	$2,429	-$60	$0	$4,083
Low-Income	PY15	1.00	0.51	$4,810	$0	$3,742	$8,553	$1,824	$2,634	-$64	$0	$4,394
Low-Income	PY16	1.00	0.52	$4,581	$0	$3,680	$8,261	$1,772	$2,608	-$63	$0	$4,317
Low-Income	PY17	1.00	0.50	$3,324	$0	$2,576	$5,901	$1,197	$1,793	-$44	$0	$2,947
Low-Income	Total	1.00	0.50	$21,644	$0	$16,435	$38,080	$7,956	$11,469	-$281	$0	$19,144
Small C&I	PY13	0.70	1.50	$10,607	$17,838	$1,700	$30,145	$20,129	$27,112	-$4,436	$2,284	$45,089
Small C&I	PY14	0.70	1.52	$10,552	$19,031	$1,864	$31,447	$20,832	$29,104	-$4,403	$2,189	$47,722
Small C&I	PY15	0.70	1.56	$10,004	$18,393	$1,921	$30,318	$20,250	$29,189	-$4,211	$1,994	$47,222
Small C&I	PY16	0.70	1.59	$9,284	$16,968	$1,898	$28,150	$19,059	$28,020	-$4,031	$1,813	$44,861
Small C&I	PY17	0.70	1.57	$8,896	$17,212	$1,960	$28,068	$18,842	$28,222	-$4,563	$1,695	$44,196
Small C&I	Total	0.70	1.55	$49,342	$89,442	$9,343	$148,128	$99,113	$141,646	-$21,644	$9,974	$229,090
Large C&I	PY13	0.70	1.00	$11,270	$42,403	$2,548	$56,220	$18,453	$40,505	-$4,619	$1,642	$55,982
Large C&I	PY14	0.70	1.01	$11,183	$43,470	$2,734	$57,387	$18,601	$42,541	-$4,551	$1,563	$58,154
Large C&I	PY15	0.70	1.04	$10,632	$41,918	$2,798	$55,349	$17,898	$42,508	-$4,386	$1,413	$57,433
Large C&I	PY16	0.70	1.06	$9,934	$39,425	$2,785	$52,143	$16,918	$41,355	-$4,231	$1,273	$55,315
Large C&I	PY17	0.70	1.09	$9,425	$37,456	$2,800	$49,681	$16,345	$40,734	-$4,183	$1,198	$54,095
Large C&I	Total	0.70	1.04	$52,444	$204,673	$13,664	$270,781	$88,215	$207,642	-$21,969	$7,089	$280,977
Total			1.16	$160,867	$336,772	$53,015	$550,654	$253,573	$411,713	-$41,289	$17,064	$641,061

[1] The TRC ratio will reflect the lifetime TRC, not an annual TRC ratio.

[2] Does not include common portfolio costs; whereas Tables 2 and 3 do include common costs.

9 Plan Compliance and Other Key Issues

9.1 Plan Compliance Issues

9.1.1 Variety of EE&C Measures with Equitable Distribution

PPL Electric Utilities' EE&C Plan offers a variety of measures and distributes costs and energy savings equitably across all customer sectors. The Company's process for developing the Plan, including an overview of the considerations and steps taken to help ensure compliance with the Implementation Order, is described in Section 1.2 and Figure 2 in Section 3.1.2 shows that PPL Electric Utilities will offer each a range of energy efficiency and demand reduction measures to serve all customers. PPL Electric Utilities included education, which is fundamental to understanding and making informed choices about energy efficiency, as an element of all program components.

Program components for residential customers (including low-income) comprise approximately 39% of the total cost and 18% of the total savings projected in this Plan. Program components for non-residential customers comprise approximately 61% of the total cost and 82% of the total savings.

These proportions demonstrate an equitable distribution of savings among customer sectors and are reasonably close to the percentages of market potential attributable to the sectors and the percentage of total PPL Electric Utilities revenue attributable to each sector. The percentage of residential (including low-income) cost is greater than the percentage of residential savings (and vice versa for non-residential) because the component acquisition cost is higher for residential (including low-income) than for non-residential, primarily because the component acquisition cost of low-income is much higher than for non-low-income components.

9.1.2 Manner in which the EE&C Plan Will Achieve Requirements Under 66 Pa. C.S. §§ 2806.1(c) & (d)

By its Implementation Order, the Commission requires PPL Electric Utilities to achieve 3.3% energy savings by May 31, 2026, which equates to 1,250,157 MWh/year. The Commission also requires PPL Electric Utilities to achieve 72,509 MWh/year of energy savings from the low-income sector and to achieve 229 MW of peak demand reduction during Phase IV. PPL Electric Utilities designed its Plan to achieve all of these objectives. As previously described, the Company designed the Plan to exceed the 1,250,157 MWh/year and 229 MW targets by approximately 39% MWh and 8% MW, respectively, to allow for uncertainties, such as evaluation results that are not available until significantly after the conclusion of each program year.

9.1.3 Manner in which the EE&C Plan Will Achieve Low-Income Requirements

The Implementation Order requires that a minimum of 72,509 MWh/year of the total required reductions come from the Low-Income customer sector. Consistent with Phase III, these savings may not accrue from low-income participation in general Residential Program components.

All low-income measures will be available at no cost to low-income customers. Though low-income customers can participate in Residential Program components, these specific measures are offered exclusively to the low-income sector. These measures comprise 12.5% of the total measures offered. As required under Act 129, this exceeds the fraction of the electric consumption of the utility's low-income households divided by the total electricity consumption in the PPL Electric Utilities territory (9.95%).

Table 61. Low-Income Sector Compliance (Number of Measures)[1]

	Low-Income Sector	All Sectors	Percentage Low-Income	Goal: Low-Income Measures as % of All Measures Offered
Number of measures offered	16	128	12.50%	9.95%

[1] Act 129 includes a provision requiring EDCs to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66 Pa.C.S. §2806.1(b)(i)(G).

PPL Electric Utilities designed its Low-Income Program to achieve the Commission's low-income set-aside target through the Phase IV program.

9.1.4 Funds Allocated to Experimental Equipment or Devices

All of the measures in this Plan are proven technologies that are commercially available and technically sound, and most, if not all, are in the TRM, will be added to the TRM, or will be treated as custom measures. As was done in Phase III, the Company will submit descriptions of any pilot programs or proposed technology additions to the Pa PUC and stakeholders prior to implementation. Table 62 shows the funds PPL Electric Utilities allocated to pilots, new technology, and experimental equipment by customer sector.

Table 62. PPL Electric Utilities Funds Allocated to Pilots, New Technology, and Experimental Equipment

Sector	Allocated Funds
Residential and Low-Income	$3 million
Small C&I and Large C&I	$3 million
Total	**$6 million**

PPL Electric Utilities will track and limit expenditures on measures determined as experimental to help ensure that no more than 2% of Act 129 funds are allocated for this purpose.

9.1.5 How the EE&C Plan Will Be Competitively Neutral to All Distribution Customers

As described in Section 9.1.1, each customer class has an opportunity to choose among a range of programs, components, and measures. All program components are available to customers regardless of whether they receive default generation service from PPL Electric Utilities or obtain competitive supply from an electric generation supplier. Based on their contracted generation supply rate, competitive-

supply customers may experience different monthly bill savings than default generation service customers as a result of participating in one of PPL Electric Utilities' programs.

9.2 Other Key Issues

9.2.1 How EE&C Plan Will Lead to Long-Term, Sustainable Energy Efficiency Savings

PPL Electric Utilities designed its five-year portfolio of EE&C Plan programs to satisfy the performance requirements set forth in Act 129 and the Commission's Implementation Order. Many of the measures installed under the proposed program components will continue to perform and produce savings well beyond the term of the Plan. In addition, as described throughout the Plan, PPL Electric Utilities will encourage customers to take a comprehensive approach to energy efficiency and peak demand reduction by offering education and incentives designed to implement multiple measures and to take a whole-home/building approach.

Furthermore, PPL Electric Utilities program components have and will continue to stimulate demand for energy efficient and peak demand reduction products and encourage distributors and retailers to stock such equipment. For example, PPL Electric Utilities launched a midstream program for C&I lighting in Phase III. This innovative delivery channel encouraged lighting distributors to stock and promote efficient lighting technologies by providing them with incentives that they could pass onto the end user. The program was a success, with the number of participating distributors increasing throughout the phase. PPL Electric Utilities plans to build upon the success of this delivery channel by expanding midstream offerings to residential HVAC and pool pump measures in Phase IV.

9.2.2 How EE&C Plan Will Leverage and Utilize Other Financial Resources

PPL Electric Utilities encourages customers to maximize financial resources that are external to Act 129 funding. The Company monitors funding resources, such as state and federal rebates, tax credits, and equipment manufacturers' incentives that might benefit customers, to help offset some of their capital outlay for installing energy efficient products in addition to Act 129 EE&C incentives. The Company includes information about external resources in its annual program training and in regular updates to its CSPs, trade allies, and market partners, and provides relevant information to customers on its website and in relevant materials.

9.2.3 How PPL Electric Utilities Will Address Consumer Education

PPL Electric Utilities understands that educating customers about the value of energy efficiency and peak demand reduction is critical to achieving its goals, and it includes education as a key element of all its Phase IV program components. PPL Electric Utilities and its CSPs treat every customer touch point as an opportunity to provide customer education (see Section 3 for details).

9.2.4 How PPL Electric Utilities Will Provide Information on Federal and State Funding Programs

PPL Electric Utilities provides information about federal and state funding for EE&C on its energy efficiency website. Funding, including tax credits, has significantly diminished since the start of Act 129.

9.2.5 How PPL Electric Utilities Will Provide the Public with Information about Program Component Results

PPL Electric Utilities is committed to keeping customers, stakeholders, and the general public informed about the results of the energy efficiency program components and progress toward Plan goals. PPL Electric Utilities hosts a dedicated section on www.pplelectric.com that provides Act 129 information, including semiannual and annual evaluation reports. The Company will periodically meet with stakeholders to review results, provide semiannual and annual reports to stakeholders, and post those reports on its website. Additionally, PPL Electric Utilities shares customer success stories with customers, trade allies, and the public by publishing and distributing case studies.

Appendix A: Approval of CSP Contracts

PPL Electric Utilities filed its EM&V CSP contract for Pa PUC approval on November 30, 2020. In addition, PPL Electric Utilities is currently negotiating implementation CSP contracts to implement the Residential, Non-Residential, and Low-Income Programs.

Appendix B: Calculations of Annual Savings and Costs

The PPL Electric Utilities Phase IV Plan includes tables showing calculations of savings and costs for each program and program year (see Section 7.3). Please refer to Table 54 (Pa PUC Table 10) in the Plan for portfolio specific assignment of EE&C costs. Table 55 (Pa PUC Table 11) provides detail on the allocation of common costs to applicable customer sectors. Table 56 (Pa PUC Table 12) provides a summary of portfolio EE&C costs.

Section 8 of the Plan provides a complete overview of program costs and benefits. The Plan includes cost-effectiveness calculations by program and program year in Section 8.2. Specifically, Table 59 (Pa PUC Tables 13A) and Table 60 (Pa PUC Tables 13B) show TRC benefits by program and program year for each sector.

Appendix C: Calculations Methods and Assumptions

PPL Electric Utilities based its savings and cost estimates on experience from Phase I, Phase II, Phase III, the TRM, and input from stakeholders and trade allies. The CSPs generated measure cost data using a variety of sources, including the SWE's Phase IV incremental cost database, Phase III program data, and for data not found in the incremental cost database, the CSPs used secondary sources, including the DOE's Technical Support Documents and other state-wide TRMs.

Many variables can impact the cost and effectiveness of a measure or program, and these variables led to numerous TRM changes during Phase I, Phase II, and Phase III that influenced program savings, acquisition cost, and TRC test results. In Phase IV, PPL Electric Utilities will use the experience and knowledge gained from prior phases to monitor and adjust measures and programs that help ensure the optimum balance of cost and benefits.

In most instances, the sector-level CSPs based their Phase IV savings calculations on the current TRM algorithms and industry practices. For measures that were not in the TRM, PPL Electric Utilities worked with the sector-level CSPs or used its experience gained from delivering programs in prior phases to calculate measure- and program-level savings, such as the average savings per lighting retrofit or custom project.

The CSPs based incentive and rebate levels on the percentage of incremental cost or the first-year unit-energy and unit-demand savings potential from the Market Potential Studies, online research, and conversations with installation contractors, as well as prior phase experience. These incentive and rebate amounts ranged, on average, from 25% to 75% of the incremental cost of a measure. Some measures require a higher incentive to motivate customer action, while others can have a lower incentive because market transformation and other factors can affect customer behavior.

Marketing and advertising costs for Phase IV consist of two components:

- Sector-level CSPs calculated costs required for individual program and cross-sector marketing to generate sufficient participation to meet the Act 129 targets, based on their implementation experience and knowledge of PPL Electric Utilities' market.
- PPL Electric Utilities allocated a portion of common costs for overarching marketing and advertising campaigns. This entails developing consistent messaging and branding guidelines, conducting market research to contribute to targeted messaging strategies, and providing direction and oversight to support sector-level CSP marketing efforts.

Finally, administrative costs include all utility costs to develop, implement, and manage the Plan, except payments to customers/trade allies (rebates and incentives). These costs include PPL Electric Utilities labor and materials, CSP labor and material, marketing, QA/QC and EM&V, tracking systems, legal, and

the SWE costs.[32] These Phase IV costs were based on PPL Electric Utilities wage rates; tracking system cost from prior phases; and EM&V costs from prior phases to reflect efficiencies, lessons learned, and revisions to prior phase systems and processes to increase Phase IV operational efficiency.

[32] PPL Electric Utilities' share of the SWE costs is not subject to the Act 129 cost cap.

Attachment B

(PPL Electric's Direct Testimony and Exhibits)

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of PPL Electric Utilities Corporation for
Approval of its Act 129 Phase IV Energy Efficiency and Conservation Plan

Docket No. M-2020-3020824

PPL Electric Utilities Corporation

Statement No. 1

Direct Testimony of Dirk Chiles

List of Topics Addressed:
Overview of the Filing
Summary of Phase IV EE&C Plan and Programs
Details on CSP Contracts

Date: November 30, 2020

Direct Testimony of Dirk Chiles

Q. Please state your full name and business address.

A. My name is Dirk Chiles, and my business address is 827 Hausman Road, Allentown PA 18104.

Q. By whom are you employed and in what capacity?

A. I am employed by PPL Electric Utilities Corporation ("PPL Electric" or the "Company") as Manager-Energy Efficiency.

Q. What are your duties as Manager-Energy Efficiency Evaluation and Performance?

A. I am responsible for managing all aspects of PPL Electric's Act 129 Energy Efficiency and Conservation ("EE&C") programs, including the planning and development of the Phase IV Energy Efficiency and Conservation Plan ("Phase IV EE&C Plan" or "EE&C Plan") and the implementation, evaluation, and compliance of the Company's Phase III and Phase IV EE&C Plans.

Q. What is your educational background?

A. I received a B.A. in economics and an M.B.A. from Moravian College.

Q. Please describe your professional experience.

A. I have over 20 years of experience in the energy industry, including marketing, rates and tariffs, and finance, and approximately 11 years of experience developing, implementing, evaluating, and managing EE&C programs.

Q. Have you previously testified as a witness before the Pennsylvania Public Utility Commission ("Commission")?

A. No.

Q. Briefly describe the subject matter of your testimony in this proceeding.

A. I will explain the objectives, philosophy, and process that PPL Electric applied to the preparation of its Phase IV EE&C Plan filing as required by Act 129 of 2008 ("Act 129"), as well as the relevant Commission Orders for Phase IV. *See Energy Efficiency and Conservation Program*, Docket No. M-2020-3015228 (Order entered June 18, 2020) ("*Phase IV Implementation Order*"); *2021 Total Resource Cost (TRC) Test*, Docket No. M-2019-3006868 (Order entered Dec. 19, 2019) ("*2021 TRC Test Order*") (collectively, "*Phase IV Orders*").

Q. Please describe how PPL Electric's EE&C Plan filing is organized.

A. PPL Electric's filing consists of the following documents:

1. A petition requesting approval of the EE&C Plan and the Company's proposed cost recovery mechanism.
2. The EE&C Plan (PPL Electric Exhibit 1);
3. The direct testimony of Dirk S. Chiles (PPL Electric Statement No. 1);
4. The direct testimony of Terry Fry (PPL Electric Statement No. 2); and
5. The direct testimony of Scott R. Koch (PPL Electric Statement No. 3).

The Phase IV EE&C Plan is structured consistent with the Template for Energy Efficiency and Conservation Plans issued by the Commission via Secretarial letter dated September 9, 2020, at Docket No. M-2020-3015228. The EE&C Plan includes an overview of the Plan; program summary tables and charts; program descriptions; program management and implementation strategies; information about the reporting and tracking systems; the Company's plans for quality assurance, evaluation, measurement, and verification; details of the proposed cost recovery mechanism; an analysis of the EE&C Plan's and programs' cost-effectiveness; and other information to support the EE&C Plan.

Q. Are you sponsoring any exhibits in this proceeding?

A. Yes. Mr. Fry, Mr. Koch, and I are co-sponsoring PPL Electric Exhibit 1. Within that exhibit, I am primarily responsible for and am sponsoring Sections 1, 4, 5, 6, and 9, the program descriptions in Section 3, and Appendices A, B, and C. Mr. Fry is primarily responsible for and is sponsoring Sections 2 and 8 and the calculations in Section 3. Mr. Koch is primarily responsible for cost recovery issues and is sponsoring Section 7.

Q. Please provide a summary of PPL Electric's Phase IV EE&C Plan.

A. PPL Electric's Phase IV EE&C Plan includes a portfolio of EE&C programs for PPL Electric's customers that are designed to meet the Company's Phase IV consumption reduction and peak demand reduction targets and to comply with the other requirements set forth in the Commission's *Phase IV Orders*. As discussed below, the Phase IV EE&C Plan includes a range of EE&C programs for four customer sectors (*i.e.*, Residential,

Low-Income, Small Commercial and Industrial ("Small C&I"), and Large Commercial and Industrial ("Large C&I")). These programs are designed as a portfolio of options, which will offer all of PPL Electric's customers cost-effective, flexible, and wide-ranging choices and financial incentives to reduce their electric consumption and peak demand, which ultimately will help customers reduce their energy costs.

Q. What are the primary objectives of the Phase IV EE&C Plan?

A. PPL Electric aims to deliver a cost-effective portfolio of programs that will meet customers' needs, fulfill the Company's Phase IV EE&C Plan objectives, and achieve the results required by Act 129 and the Commission's *Phase IV Implementation Order*, including the following:

- Achieve 1,250,157 MWh gross verified energy savings by May 31, 2026;
- Achieve 72,509 MWh gross verified energy savings from low-income customers by May 31, 2026;
- Achieve 229 MW of peak demand savings (measured at the generator level) by May 31, 2026;
- Have a portfolio of EE&C programs that is cost-effective as determined by the Total Resource Cost ("TRC") Test; and
- Spend no more than $307.5 million plus the costs for the Commission's Statewide Evaluator ("SWE"), which PPL Electric estimates are approximately $5 million. I note that at the time PPL Electric prepared its EE&C Plan, the Commission had not awarded the Phase IV SWE contract.

Q. Please describe PPL Electric's overall strategy to achieve these objectives.

A. Section 1.1.2 of the EE&C Plan describes the strategy in detail. PPL Electric's portfolio reflects an approach that is targeted, yet flexible enough to meet changing market conditions and progress toward the Phase IV EE&C Plan goals. The portfolio builds on customer, trade ally, and stakeholder relationships established during Phases I , II and III through training, education, installation of energy efficient measures, marketing strategies, effective trade ally networks, and customer support. Education about energy efficiency will play a more significant role than in Phases I, II and III. In addition, education, marketing, and the incentive structure in the Phase IV EE&C Plan strives to promote a more-comprehensive, holistic approach to energy efficiency.

PPL Electric recognizes that no program can succeed unless it is accepted by the customers and is executed well. The Phase IV EE&C Plan includes specific plans for a smooth transition between Phases III and IV. This helps to provide consistency and certainty to customers and trade allies, particularly for projects that start in Phase III but go in-service in Phase IV and for non-residential customers who were placed on a waitlist when program funding was fully subscribed before the end of Phase III.

PPL Electric's Phase IV programs are designed with the flexibility to allow customers to use their own resources and trade allies and to combine incentives from multiple programs or from other sources to create the best solution for any facility or system in a way that utilizes normal market mechanisms for these activities. Programs are designed to engage trade allies and other local market participants through outreach, training, and potential co-marketing to make them aware of PPL Electric's programs, enable them to articulate program features and benefits to potential customers, and help

them support customers in their decision to take energy efficiency and peak demand reduction actions. Where appropriate, programs are designed to leverage existing market delivery channels to provide efficient and simple implementation from the customer's perspective.

Q. Please describe the process PPL Electric used to develop its Phase IV EE&C Plan.

A. PPL Electric formed a project team consisting of internal staff from a variety of groups and The Cadmus Group LLC ("Cadmus"), a nationally recognized energy consulting firm, to prepare its Phase IV EE&C Plan. The Company conducted a thorough review of: (1) the Phase IV Market Potential Study; (2) the Commission's *Phase IV Orders*, and (3) the results of PPL Electric's Phase III EE&C programs. PPL Electric established guiding principles, key objectives, and preliminary estimates of the savings and cost budgets for each customer sector (i.e., Residential, Low-Income, Small C&I, and Large C&I) that would satisfy the overall savings and peak demand targets, meet the Low-Income set-aside target, and provide an equitable distribution of savings and costs across the customer sectors.

PPL Electric issued requests for proposals ("RFPs") for its three program implementation conservation service provider ("CSP") contracts (*i.e.*, Residential, Low-Income, and Non-Residential). These proposals were essential to get confirmation from bidders that the budgets and objectives were realistic (especially the savings and costs for each sector), to better understand the types of programs and measures that were necessary to achieve these budgets and objectives, and to confirm that the CSPs would be able to achieve the program performance objectives. In addition, PPL Electric solicited bids for

its tracking system and for a CSP to conduct an independent evaluation of its EE&C Plan. This input was also necessary to confirm PPL Electric's cost estimates for these services were realistic.

Based on these RFPs, PPL Electric defined likely measures and programs, designed the programs, and estimated the savings and costs for each measure, program, and customer sector. PPL Electric used an iterative "bottom up" approach to align with the "top down" objectives, such as the savings and cost budgets for each sector, the overall energy savings and peak demand compliance targets, the set-aside target for the Low-Income sector, the cost-effectiveness requirement, and the overall cost cap.

Q. Please describe the programs included in PPL Electric's Phase IV EE&C Plan.

A. The programs in the Phase IV EE&C Plan include the following:

- The Residential Program, which consists of the following components[1]:
  - Appliance Recycling. This program component provides incentives for customers to remove and recycle refrigerators, freezers, windows, air conditioners, and dehumidifiers. This component is primarily for residential customers but is available for all customer sectors. This component is similar to the Phase III program.
  - Efficient Lighting. This program component provides discounts at the point of sale for specialty light emitting diode ("LED") light bulbs. This component also has other, less significant delivery channels available, such as give-away

[1] In Table 8 of the Phase IV EE&C Plan, PPL Electric also includes a "Home Energy Efficiency Report" component in the list of the Residential Program's components. Although PPL Electric Utilities does not currently project participation for home energy reports ("HERs") in the Phase IV EE&C Plan, the Company may decide to offer HERs within the Phase IV period, within the approved budget, and therefore includes the HERS component in Table 8.

promotions and new customer welcome kits. This component is primarily for residential customers but is available for all customer sectors.

- Energy Efficient Home. This program component provides incentives for energy efficient equipment in a home, such as heating, cooling, water heating, smart thermostats, appliances, pool pumps, insulation, and air sealing. This component is for residential customers only. This component offers measures that are similar to those delivered in Phase III.
- Student Energy Efficient Education. This program component provides energy efficiency education and kits to students in grades K-12. This component is similar to the Phase III program.

- The Low-Income Program, which consists of the following component:
  - Act 129 Low-Income Assessment (formerly known as Low-Income Winter Relief Assistance Program or "Low-Income WRAP"). This program component will have both an in-home and virtual delivery channel based on customer preference. The in-home assessment provides education and direct-install energy efficiency measures in low-income customers' homes at no cost to the customer and may include weatherization, lighting, heating, cooling, appliance, water heating, and water conservation measures. The virtual assessment provides education and non-direct install energy efficiency measures listed above and at no cost. A virtual walkthrough will be held with the customer to determine the customer's energy efficiency needs. Once the assessment is complete, the customer is sent a customized energy reduction package. This program is similar to the Phase III Low-Income WRAP but with a virtual component added to it.

- The Non-Residential Program, which consists of the following components:
  - Efficient Equipment. This program component provides incentives to non-residential customers for energy efficient equipment. Measures may include heating, cooling, lighting, refrigeration, motors, etc. This program is available to the Small C&I and Large C&I customer sectors. This program is similar to the Phase III program.
  - Custom. This program component provides incentives for any cost-effective measure that reduces electric usage and is not covered by another PPL Electric program component. These measures may include new or replacement energy-efficient equipment, retro-commissioning, combined heat and power ("CHP"), repairs, equipment optimization, new construction projects, operational and process improvements, and behavioral changes that result in cost-effective electric consumption reductions. This program is available to the Small C&I and Large C&I customer sectors. This program covers more measures than the Phase III Custom Program.

Q. Is the Phase IV EE&C Plan designed to meet the consumption reduction targets and the peak demand reduction target within the designated expenditure cap?

A. Yes. The EE&C Plan is designed to meet the overall consumption reduction target, the Low-Income set-aside consumption reduction target, and the peak demand reduction target, all within the expenditure cap. In fact, PPL Electric has designed its EE&C Plan to exceed all of the compliance targets, within the expenditure cap, to account for risks and uncertainties, such as evaluation results that differ from expectations.

As shown in Table 2 of the EE&C Plan, the estimated overall consumption reduction is 1,540,687 MWh, which exceeds the 1,250,157 MWh overall compliance target by approximately 23% (or by approximately 39% with 200,000 MWh of carryover savings from Phase III). The estimated consumption reduction from low-income customers is 74,793 MWh, which exceeds the 72,509 MWh Low-Income compliance target by approximately 3%. The estimated overall peak demand reduction of 248 MW exceeds the 229 MW peak demand reduction compliance target by approximately 8%.

Q. Please describe the Company's strategy to ensure the EE&C Plan is designed to achieve at least 15% of the total consumption reduction target in each program year.

A. As shown on Table 5 of the EE&C Plan, PPL Electric has designed its EE&C Plan to achieve 22% of the total consumption reduction target in Program Year 13, 23% in Program Year 14, 22% in Program Year 15, 21% in Program Year 16, and 20% in Program Year 17 by leveling projected program performance and pace. PPL Electric will also specify these objectives in the contracts for all program implementation CSPs.

Q. Does the EE&C Plan include at least one comprehensive program for residential customers and at least one comprehensive program for non-residential customers?

A. Yes. As described in Section 3.1.4 of the EE&C Plan, the EE&C Plan includes comprehensive measures in its Residential, Low-Income, and Non-Residential Programs. Specifically, both the Residential and Low-Income Programs will provide a comprehensive mix of cost-effective energy efficiency measures for all building types

(single-family, multifamily, and manufactured homes and existing and new construction). Both programs will offer in-home energy audits that assess end uses, including weatherization, water heating, lighting, HVAC, and appliances. All residential customers will receive energy efficiency and peak demand education and be encouraged to implement multiple measures and to take a comprehensive approach to energy efficiency.

For non-residential customers, PPL Electric's Non-Residential Program will target business customers of all sizes and in every segment, as well as government and educational institutions and master metered low-income multifamily buildings, with a comprehensive range of prescriptive measures (including HVAC, lighting, and water heating) as well as opportunities to implement a custom efficiency project for measures not included in PPL Electric's Energy Efficient Equipment (prescriptive) component and not included in the TRM. Custom component measures cover a comprehensive set of non-residential needs, including new or replacement energy efficient and peak demand-saving equipment, retro-commissioning, repairs, equipment optimization, building management or industrial process controls, new construction projects, CHP, and operational and process improvements that result in cost-effective energy efficiency savings.

Q. What process will the Company use to sell peak demand into PJM Interconnection LLC's ("PJM") Forward Capacity Market?

A. PPL Electric plans to issue an RFP sometime in the spring of 2021 to solicit bids from demand response providers asking them to bid a portion of the qualified peak demand

measures into the PJM Forward Capacity Market. At this time, PPL Electric plans to bid approximately 25% qualified measures into the market.

Q. What process is the Company proposing to evaluate and update its EE&C Plan?

A. PPL Electric's staff plans to carefully monitor actual program performance compared to estimates in the EE&C Plan. In addition, PPL Electric's independent evaluator will conduct an impact evaluation, an annual cost-effectiveness evaluation, and process evaluations of each program and the overall portfolio. If actual performance deviates from the estimates in the EE&C Plan, PPL Electric will work with its program implementation CSPs to adjust the performance of programs or will recommend changes to the EE&C Plan. This includes modifying marketing tactics, adjusting incentive levels within specified ranges, offering different measures at different times, and offering multiple delivery channels. To the extent that there are any changes that require Commission approval, PPL Electric will seek approval of such changes in accordance with the EE&C Plan change procedures outlined in the Commission's *Minor Plan Change Order* entered on June 10, 2011, at Docket No. M-2008-2069887, and the *Phase IV Implementation Order*.

Q. **Does the Phase IV EE&C Plan offer at least one energy-efficiency program for each customer sector?**

A. Yes. As shown in Table 1 and Figure 4 of the EE&C Plan (among numerous other sections, tables, and figures), there is at least one program available for each of the four customer sectors -- Residential, Low-Income, Small C&I, and Large C&I.

Q. Has PPL Electric competitively bid its relevant contracts for the Phase IV EE&C Plan?

A. Yes. As mentioned previously, PPL Electric has issued competitive RFPs for all of its CSPs and for a tracking system and has selected its CSPs and the tracking system vendor. On November 30, 2020, PPL Electric filed its Evaluation, Measurement, and Verification ("EM&V") CSP contract with the Commission. The Company is finalizing the other CSP contracts for submittal to the Commission for approval.

Q. Does this conclude your direct testimony?

A. Yes, it does. However, I reserve the right to supplement my testimony.

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of PPL Electric Utilities Corporation for
Approval of its Act 129 Phase IV Energy Efficiency and Conservation Plan

Docket No. M-2020-3020824

PPL Electric Utilities Corporation

Statement No. 2

Direct Testimony of Terry Fry

List of Topics Addressed:
Development of the Phase IV EE&C Plan
Total Resource Cost (TRC) Test Calculations

Date: November 30, 2020

Direct Testimony of Terry Fry

Q. Please state your full name and business address.

A. My name is Terry Fry, and my business address is 475 14th Street, Suite 260 Oakland, CA 94612.

Q. On whose behalf are you presenting testimony in this proceeding?

A. I am testifying on behalf of PPL Electric Utilities Corporation ("PPL Electric" or the "Company").

Q. By whom are you employed and in what capacity?

A. I am employed by The Cadmus Group LLC ("Cadmus") as Senior Vice President of Energy Sector.

Q. What are your duties as Senior Vice President of Cadmus's Energy Sector?

A. I am responsible for managing the firm's consulting practices in the energy sector and providing technical leadership in utility planning, assessment, measurement, and verification practice areas of the firm.

Q. What is your educational background?

A. I hold an MPhil degree in Economics and Politics of Development from Cambridge University and a BS in Mechanical Engineering from Stanford University.

Q. Please describe your professional experience.

A. Since 1987, I have worked in the energy utility industry in various capacities, including as a researcher, consultant, educator, and policy advisor. With the assistance of my staff, I have provided technical advice and consultation to energy utilities on matters related to resource planning, load research, grid modernization, market assessment, energy efficiency, demand response, portfolio assessment, and performance measurement and verification. Before joining Cadmus in 2017, I was Senior Vice President for Utility Services at Nexant from 2000 to 2017. I served as senior Project Director at Bechtel Technology and Consulting (the parent of Nexant's spin-out) from 1997-2000. Prior to that, I served as a principal in the consulting firm of Barakat & Chamberlin, where I led the firm's utility planning and strategy practice. I have also served as an appointed Advisor on renewable energy and energy efficiency to the US Department of Commerce Secretary since 2008 and am presently serving my fifth term.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to provide supplemental information regarding PPL Electric's proposed Phase IV Act 129 Energy Efficiency and Conservation Plan ("Phase IV EE&C Plan" or "EE&C Plan"), which is being submitted in accordance with Act 129 of 2008, P.L. 1592, 66 Pa. C.S. §§ 2806.1, 2806.2 ("Act 129"), the Commission's June 18, 2020 Implementation Order at Docket No. M-2020-3015228 ("*Phase IV Implementation Order*"), and the Commission's 2021 Total Resource Cost ("TRC") Test Order entered on December 19, 2019, at Docket No. M-2019-3006868 ("*2021 TRC Test Order*").

Q. What was your role in preparation of PPL Electric's proposed EE&C Plan?

A. I and my staff, working under my direct supervision, provided PPL Electric with technical information regarding the design of some of the programs in the proposed Phase IV EE&C Plan and assisted PPL Electric in preparing the portfolio, including the tables and charts in the EE&C Plan. I also oversaw the technical analyses and quantitative program and portfolio summaries prepared in accordance with the Commission's EE&C Plan Template issued on September 9, 2020, at Docket No. M-2020-3015228, as well as the benefit-cost analyses performed in accordance with the Commission's *2021 TRC Test Order*.

Q. Are you sponsoring any exhibits in the filing?

A. Yes. As Mr. Chiles explains in his direct testimony (PPL Electric Statement No. 1), he, Mr. Koch, and I are co-sponsoring PPL Electric's Phase IV EE&C Plan, which has been identified as PPL Electric Exhibit 1. Specifically, I am responsible for and am sponsoring Section 2, as well as calculations in Section 3 and Section 8 of that exhibit.

Q. Please describe your responsibilities for each of these sections of the EE&C Plan.

A. I, with support from my staff, made the following contributions to the various sections of the EE&C Plan:

- **Section 2 -** A quantitative overview of the entire Phase IV EE&C Plan for the five-year period, in accordance with the Commission's EE&C Plan Template. The overview consists of the following tables:
  - **Table 8** - Residential, Small Commercial and Industrial ("Small C&I"), and Large Commercial and Industrial ("Large C&I") Portfolio Summaries;
  - **Table 9** - Budget and Parity Analysis;

- **Table 10 -** Summary of Costs and Savings by Program and Customer Sector;

- **Section 3 -** Review of program-specific costs, savings, and cost-effectiveness calculations; and

- **Section 8 -** Determination of avoided costs and cost-effectiveness analysis for each program and the portfolio according to the Commission's *2021 TRC Test Order*.

Q. Does the Phase IV EE&C Plan contain a process for conducting an annual cost-effectiveness evaluation of the EE&C Plan in accordance with the Commission's *2021 TRC Test Order*?

A. Yes. The Phase IV EE&C Plan outlines a process for conducting an annual cost-effectiveness evaluation of the EE&C Plan in accordance with the Commission's *2021 TRC Test Order*. *See* Section 1.8.3 of the Phase IV EE&C Plan.

Q. What method was used to estimate the cost-effectiveness of the Phase IV EE&C Plan and its individual programs?

A. For each program in the Phase IV EE&C Plan and for the entire EE&C Plan (including portfolio-level common costs), cost-effectiveness was estimated in accordance with the procedures described in the Commission's *2021 TRC Test Order* and the California Standard Practice Manual ("SPM")[1].

[1] *See California Standard Practice Manual for Economic Analysis of Demand-Side Management Programs and Projects*, California Energy Commission, October 2001.

Q. Is the proposed Phase IV EE&C Plan cost-effective, as a whole, based on the TRC criterion?

A. Yes. The cost-effectiveness of the proposed portfolio is demonstrated using data presented in the Phase IV EE&C Plan, specifically in Section 3 and in Tables 59 and 60 in Section 8. For each program in the Phase IV EE&C Plan, PPL Electric determined cost-effectiveness in accordance with the Commission's *2021 TRC Test Order*.

PPL Electric's proposed Phase IV EE&C Plan is cost-effective as a whole. *See* Section 8 of the Phase IV EE&C Plan. Specifically, the TRC benefit-to-cost ratio for the overall Phase IV EE&C Plan, inclusive of energy efficiency and demand response, is 1.17. This exceeds the value of 1.0 required by Act 129 and is consistent with the benefit-cost ratio of well-performing programs in other states, especially considering Pennsylvania's set-aside savings requirement for the Low-Income customer sector.

Tables 3 and 4 in the Phase IV EE&C Plan provide summaries of first-year and lifetime costs and benefits used to compute each program's cost-effectiveness from a TRC perspective. I note that PPL Electric determined the unit savings, unit counts, and effective useful life ("EUL") for each measure. To determine lifetime savings, the Company validated unit savings and EULs for each measure by assessing conformity with the Commission's *2021 TRM Update Amendment Tentative Order* entered on October 29, 2020, at Docket M-2019-3006867, and Phase III program data. The Company then determined incremental costs and avoided cost benefits for each measure.

Q. How did the Company assess the cost-effectiveness for each program?

A. Assessment of cost-effectiveness for each program in the Phase IV EE&C Plan began with determining each program's total resource benefits ("TRC Benefits") based on the savings of the individual measures over their lives, for a maximum of 15 years as directed in the *2021 TRC Test Order*,[2] as well as the program's total resource costs ("TRC Costs"). A program was deemed cost-effective if its TRC Benefits exceeded its TRC Costs or the benefit-to-cost ratio exceeded 1.0.

The TRC data used in this assessment were estimates based on the planning assumptions in this Phase IV EE&C Plan. The Company will complete a cost-effectiveness evaluation using actual program results as part of its annual evaluations.

Q. Please describe the calculation of avoided costs of supplying electricity.

A. The avoided costs of delivered electricity were calculated for a 15-year planning horizon in three segments, in accordance with the procedure prescribed in Sections IV.K and V.D of the Commission's *2021 TRC Test Order*, as follows:

- ***Years 1-4 (June 2021-May 2025).*** The Company used the New York Mercantile Exchange ("NYMEX") Electricity Futures Price at the PJM Interconnection LLC ("PJM") West Hub as of September 1, 2020, and applied a locational basis adjustment from PJM West Hub to the Company's Zone.
- ***Years 5-10 (June 2025-May 2031).*** PPL Electric used NYMEX Henry Hub Natural Gas Futures and the U.S. Energy Information Administration' ("EIA") Annual Energy Outlook ("AEO") Natural Gas Price Forecast for Mid-Atlantic Region as of September

[2] *2021 TRC Test Order* at 4, 6, 21.

1, 2020, converted to electric prices using an on-peak and off-peak heat rate and spark spread.

- ***Years 11-15 (June 2031-May 2036).*** PPL Electric used Middle Atlantic Natural Gas Prices for Electric Power from the EIA AEO, Energy Prices by Sector and Source, converted to electric prices using the on-peak and off-peak heat rate and including on-peak and off-peak spark price spreads.

The Company estimated avoided generation capacity costs using PJM base residual auction results for 2021/2022. Subsequent years are inflated by 2% as specified in the *2021 TRC Test Order*. Avoided transmission and distribution costs for PY13 are from the Statewide Evaluator's ("SWE") Demand Response Potential study, with the subsequent years escalated by 2% as specified in the *2021 TRC Test Order*.

Q. What are the sources for the Company's estimates of savings, incremental cost, and measure life?

A. PPL Electric obtained estimates of savings, incremental cost, and measure life for its Phase IV EE&C Plan primarily from the 2021 Pennsylvania Technical Reference Manual ("TRM"), the SWE's Phase IV incremental cost database, and Phase III program data. The Company compiled data for new measures not found in the TRM from secondary sources, including the Department of Energy Technical Support Documents and information provided by the program implementation conservation service providers ("CSPs").

Q. What benefits were used in the TRC calculation?

A. The benefits used in the TRC calculation include the full value of time and seasonally differentiated avoided generation, transmission and distribution, and capacity costs. These benefits also accounted for avoided line losses. To capture the full value of time and seasonal impacts of each program measure, the annual generation capacity value was assigned to each program measure according to the hourly load shape of the end user affected by the measure. The Company factored non-energy benefits, such as water and operations and maintenance ("O&M") savings, into the calculation because these benefits.

Q. What was included in the cost component of the TRC analysis?

A. The cost component of the TRC analysis included: (1) incremental measure costs; and (2) electric distribution company ("EDC") costs.

Incremental measure costs are the expenses associated with the installation of energy efficiency measures and ongoing O&M costs, where applicable. The incremental measure costs were obtained primarily from the SWE's Phase IV incremental cost database. Measure costs not included in this study were obtained from a variety of sources, including PPL Electric's actual experience, the results of the Company's Phase III evaluations (such as the actual project cost for an average custom commercial and industrial project), the Department of Energy Technical Support Documents and information provided by the program implementation CSPs.

EDC costs are costs that are in the EE&C Plan budget subject to the funding cap plus SWE costs that are not subject to the funding cap. EDC costs consist of expenses associated with program development, delivery, and ongoing operation, specifically: (1)

EDC labor, material, and supplies; (2) customer incentives[3]; (3) CSP labor, materials, and supplies; and (4) marketing.

PPL Electric's EDC costs fall into two general categories:

- **Direct Program Costs:** The costs that are directly related to and charged to a specific program; and
- **Common Costs (or "Portfolio-level Costs"):** The costs that are applicable to more than one customer class or more than one program, or that provide portfolio-wide benefits.

Q. Does this conclude your direct testimony?

A. Yes, it does. However, I reserve the right to supplement my testimony.

[3] Customer incentives are not included in calculation of TRC costs, in accordance with procedures described in the Commission's *2021 TRC Test Order*.

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of PPL Electric Utilities Corporation for
Approval of its Act 129 Phase IV Energy Efficiency and Conservation Plan

Docket No. M-2020-3020824

PPL Electric Utilities Corporation

Statement No. 3

Direct Testimony of Scott R. Koch

List of Topics Addressed:
Spending Cap for the Phase IV EE&C Plan
Phase IV EE&C Cost Recovery Mechanism

Date: November 30, 2020

Direct Testimony of Scott R. Koch

Q. Please state your full name and business address.

A. My name is Scott R. Koch, and my business address is Two North Ninth Street, Allentown, Pennsylvania 18101.

Q. By whom are you employed and in what capacity?

A. I am employed by PPL EU Services Corporation, an affiliate of PPL Electric Utilities Corporation ("PPL Electric" or the "Company"), as a Rates & Revenue Manager.

Q. What are your duties as Rates and Revenue Manager?

A. I am responsible for PPL Electric's compliance with the regulatory requirements of the Pennsylvania Public Utility Commission ("Commission") and the Federal Energy Regulatory Commission ("FERC"). This involves activities associated with the assembly and analysis of test period-related cost-of-service information for the preparation of distribution rate cases before the Commission and annual filings of the Company's Formula Rate before FERC. As part of this function, I am responsible for the preparation and analysis of rate and revenue related information for budget preparation, forecasts, actuals, and variance analysis. This includes Securities and Exchange Commission ("SEC") and FERC reporting as well as detailed analysis of the Company's revenue. In addition, I am also responsible for the preparation and coordination of several cost recovery mechanisms and the management of regulatory audits of these recovery mechanisms.

Q. What is your educational background and experience?

A. I graduated from Shippensburg University in 2002 with a Bachelor of Science Degree in Accounting. In 2010, I was employed by PPL Corporation, where I supported the accounting and financial reporting activities of the company. In 2011, company reorganization transferred me to PPL Electric providing the same support. In 2014, I assumed a position as Senior Analyst - Regulatory Compliance with PPL Electric. In 2015, a company reorganization transferred me to PPL EU Services Corporation providing the same support. In 2016, I became the Regulatory Operations Supervisor. In 2020, I assumed my current position.

Q. Have you previously testified as a witness before the Commission?

A. Yes. I testified and sponsored exhibits in PPL Electric's 2015 base rate case at Docket No. R-2015-2469275. I also testified at the en banc hearing on Alternative Rate Making Methodologies at Docket No. M-2015-2518883. I testified regarding Rate Schedule LPEP at Docket Nos. R-2016-2569975 and C-2016-2580526. Moreover, I recently testified in PPL Electric's Default Service Plan 5 proceeding at Docket No. P-2020-3019356.

Q. Briefly describe the subject matter of your testimony in this proceeding.

A. I will describe the calculation of PPL Electric's spending cap for the programs in its Phase IV Energy Efficiency and Conservation Plan ("Phase IV EE&C Plan" or "EE&C Plan"). I also will explain the Company's proposed mechanism for recovering the costs of its Phase IV EE&C Plan.

Q. Are you sponsoring any exhibits in this proceeding?

A. Yes. I am primarily responsible for and sponsoring Section 7 of PPL Electric Exhibit 1, the Company's Phase IV EE&C Plan. I also am sponsoring PPL Electric Exhibit SRK-1, which is a copy of the proposed *pro forma* tariff supplement for the Company's Act 129 Compliance Rider – Phase 4 ("ACR-4"), which is PPL Electric's proposed non-bypassable surcharge that will recover the costs associated with the Phase IV EE&C Plan consistent with Sections 1307 and 2806.1(k)(1) of the Public Utility Code.

Q. What is the spending cap for PPL Electric's Phase IV EE&C Plan?

A. The spending cap for PPL Electric's Phase IV EE&C Plan is $307,506,880, excluding approximately $5 million for the Company's share of the Statewide Evaluator ("SWE") costs. The SWE costs are not subject to the cost cap per the Commission's Implementation Order entered on June 18, 2020, at Docket No. M-2020-3015228 ("*Phase IV Implementation Order*"). Thus, the Company's total budget for its five-year Phase IV EE&C Plan is approximately $312.5 million, when including the SWE costs.

Q. How was that spending cap calculated?

A. The $307,506,880 cap is based on 2% of the Company's total annual revenue as of December 31, 2006, which was $3,075,068,825. The Commission stated in its *Implementation Order* that the 2% cap applies to the annual budget and not the budget for the entire phase of the EE&C Plan. Therefore, the approximately $307.5 million budget is for the full five-year period, derived from the 2% cap multiplied by $3,075,068,825 ($61,501,376 per year for five years).

Q. How are the costs to design and develop the Company's Phase IV EE&C Plan reflected in its budget for the EE&C Plan?

A. The Commission has allowed the Company to include the costs to design and develop its Phase IV EE&C Plan, and those costs incurred prior to the start of the Plan are permitted to be deferred. These costs are included in the $312.5 million budget. PPL Electric proposes to amortize and recover those costs ratably over the five-year, or 60-month, life of its Phase IV EE&C Plan.

Q. Please describe the Company's proposed rate mechanism for recovering the costs of its Phase IV EE&C Plan.

A. The Company plans to use the proposed ACR-4, which is a non-bypassable cost recovery mechanism that is authorized by Section 2806.1(k)(1) of the Public Utility Code and is designed consistent with Section 1307 of the Public Utility Code. The Company will calculate its ACR-4 rate for each of its three customer classes – Residential, Small C&I, and Large C&I. For Residential customers, the ACR-4 will be recovered as a cents per kilowatt hour ("kWh") component included in the distribution charge on the customer's bill. For Small C&I customers, the ACR-4 will be recovered as a cents per kWh component and will be shown as a separate line item from other charges but combined with any Act 129 Compliance Rider – Phase 3 ("ACR-3") charges, which have been recovering the costs associated with PPL Electric's currently-effective Phase III EE&C Plan. In other words, a Small C&I customer will see a single line item on the bill for all Act 129 charges. For Large C&I customers, the ACR-4 will be recovered as a cents per kilowatt ("kW") component of the customer's bill and will be shown similar to the Small C&I bill

presentment. All Act 129 charges (including ACR-3 and ACR-4) will be identified as a single ACR line item shown separately from other distribution charges. For Large C&I customers, the demand (kW) is the customer's PJM Interconnection LLC ("PJM") peak load contribution and may change yearly.

Q. How many different rates will be reflected in the ACR-4?

A. Three different rates will be reflected in the Company's ACR-4 rate. The three rates will be for each of the Company's customer classes – Residential, Small C&I, and Large C&I.

Q. Please describe how PPL Electric will set the annual rates under the ACR-4.

A. The Company will set the annual rates under its ACR-4 using an annual budget for all costs required for the Company to implement its approved Phase IV programs during the upcoming 12-month period. The annual budget, or annual projected program cost, is the sum of the direct and indirect costs incurred by the Company for each of the respective customer classes. The annual budget will also include the amortization of any deferred costs for the 12-month rate application period.

The total annual budgeted amount will be divided by the expected kWh for Residential and Small C&I customer classes and divided by the kW demand for the Large C&I customer class.

The Company also will include in each customer class's ACR-4 rate calculation the E-factor or prior period over or undercollection for the respective customer class. This over or undercollection will also be divided by expected kWh usage or kW demand for the customer class. The current period rate and the E-factor rate will be combined and include

an adjustment for gross receipts tax to obtain the ACR-4 rate for the customer class for the period.

Q. Please describe PPL Electric's proposed reconciliation mechanism for the ACR-4.

A. In accordance with the Commission's *Phase IV Implementation Order*, the Company proposes to file with the Commission a report of collections within 30 days following the end of each application year. This report will be the reconciliation of the ACR-4 by each of the three customer classes (*i.e.*, Residential, Small C&I, and Large C&I). The reconciliation will compare the actual expenses incurred and the actual revenues received for each of the customer classes at the end of each application year. In addition, as required by the *Phase IV Implementation Order* (page 142), the Section 1307(e) reconciliation statement will clearly identify the PJM Forward Capacity Market ("FCM") proceeds as cost reductions and PJM FCM deficiency charges as cost increases. No interest will be included monthly on the over or under collections, as directed by the Commission on page 142 of the *Phase IV Implementation Order*.

Q. Will the Phase IV cost recovery mechanism be a separate mechanism from the Phase III cost recovery mechanism?

A. PPL Electric proposes to include any remaining ACR-3 over or undercollection in its ACR-4 E-factor, as described on pages 142 and 143 of the *Phase IV Implementation Order*. This will effectively combine the ACR-3 with the ACR-4 effective June 1, 2021.

Q. Is the Company proposing to include any capital costs as part of its ACR-4?

A. No.

Q. Is the Company proposing to include any EE&C Plan-related costs that have been claimed and permitted recovery in base rates?

A. No.

Q. Does this conclude your direct testimony?

A. Yes, it does. However, I reserve the right to supplement my testimony.

Supplement No. ###
Electric Pa. P.U.C. No. 201

PPL Electric Utilities Corporation

GENERAL TARIFF

RULES AND RATE SCHEDULES
FOR ELECTRIC SERVICE

In the territory listed on pages 4, 4A, and 4B
and in the adjacent territory served.

ISSUED: TBD

EFFECTIVE: TBD

GREGORY N. DUDKIN, PRESIDENT
Two North Ninth Street
Allentown, PA 18101-1179

NOTICE

THIS TARIFF MAKES CHANGES **(C)** IN EXISTING RATES. SEE PAGE TWO.

PPL Electric Utilities Corporation

ACT 129 COMPLIANCE RIDER – PHASE 4

A Phase 4 Act 129 Compliance Rider (ACR 4) shall be applied, on a non-bypassable basis, to charges for electricity supplied to customers who receive distribution service from the Company under this Tariff. The ACR 4 will be implemented beginning June 1, 2021.

The ACR 4 shall be computed separately for each of the following three customer classes:

(1) Residential: Consisting of Rate Schedules RS and RTS (R),
(2) Small Commercial and Industrial (Small C&I): Consisting of Rate Schedules GS-1, GS-3, BL, SA, SM (R), SHS, SLE, SE, TS (R), and GH-2 (R), and
(3) Large Commercial and Industrial (Large C&I): Consisting of Rate Schedules LP-4, LP-5, and LPEP.

The ACR 4 will be computed for each customer receiving distribution service from the Company using the formulae described below. For residential customers, the ACR 4 charge shall be included in the distribution charges on a kWh basis of the monthly bill. For all other customers, the ACR charge shall be listed as a separate charge on the monthly bill. All charges shall be reconciled on an annual basis for undercollections and overcollections experienced during the previous year. Charges set forth in the residential rate schedules in this tariff have been adjusted to reflect application of the currently effective ACR 4.

The ACR 4 for the Residential class and the Small C&I class shall be computed using the following formula:

$$ACR\ 4 = [ACc/S - E/S] \times 1 / (1-T)$$

The ACR 3 for the Large C&I class shall be computed using the following formula:

$$ACR\ 4 = [ACc/D - E/D] \times 1 / (1-T)$$

Where:

ACc = An annual budget of all costs required for the Company to implement its Commission-approved Phase 4 Energy Efficiency and Conservation (EE&C) Plan during a compliance year. A compliance year is the 12-month period beginning June 1 of each calendar year and ending May 31 of the following calendar year. The annual project program cost is the sum of all direct and indirect costs (including all deferred design and development costs, general administrative costs, and applicable statewide evaluator costs) required to implement the Company's EE&C Plan divided by the number of months in the Company's EE&C Plan for the given application year. All deferred design and development cost, general administrative costs, and applicable statewide evaluator costs will be amortized over a 60 month period.

The costs of each EE&C program available to only one customer class will be directly assigned to that customer class. Costs of EE&C programs which cannot be directly assigned to one customer class will be allocated to the customer classes benefiting from those programs using an allocation factor determined by dividing the EE&C costs directly assigned to each customer class by the total of the Company's EE&C Plan costs directly assigned to all customer classes.

(Continued)

ACT 129 COMPLIANCE RIDER – PHASE 4 (CONTINUED)

D = For the Large C&I customer class, the total of the monthly billing demands for all customers in the class, projected for the computation year. The peak demand will be based on the customer's peak load contribution to the PJM peak load during the prior PJM Planning Year.

E = Net over or undercollection of the ACR 4 charges as of the end of the 12-month period ending March 31 immediately preceding the next compliance year. Reconciliation of the ACR 4 will be conducted separately for each of the three customer classes based upon the actual expenses incurred and actual revenues received for each customer class. No interest shall be computed monthly on over or undercollections. The reconciliation of ACR 3 revenues and expenses shall be adjusted during the 2022-2023 ACR 4 application year to reflect actual data for the months of April and May 2021, as well as any expenses incurred prior to May 31, 2021, but paid after that date.

S = The Company's total billed KWH sales in each customer class who receive distribution service under this tariff (including distribution losses), projected for the computation year.

T = The total Pennsylvania gross receipts tax rate in effect during the billing period, expressed in decimal form.

The ACR 4 shall be filed with the Pennsylvania Public Utility Commission (Commission) by May 1 of each year. The ACR 4 charge shall become effective for distribution service provided to all customers on or after the following June 1, unless otherwise ordered by the Commission, and shall remain in effect for a period of one year, unless revised on an interim basis subject to the approval of the Commission. Upon determination that a customer class's ACR 4, if left unchanged, would result in a material over or undercollection of Phase 4 Act 129 Compliance costs incurred or expected to be incurred during the current 12-month period ending May 31, the Company may file with the Commission for an interim revision of the ACR 4 to become effective ten (10) days from the date of filing, unless otherwise ordered by the Commission.

At the conclusion of the Phase 3 EE&C Plan on May 31, 2021, collections under the ACR 3 for each customer class will be reconciled to the total cost of the EE&C Plan allowed by the Commission for that customer class. Overcollections or undercollections will be reflected as a separate line item in the E factor calculation and will be refunded or recovered through application of the ACR 4 rate effective June 1, 2021 through May 31, 2022. If any over/under collection balance is expected to remain after March 31, 2022, the collection will be included in the ACR 4 rate going forward.

Minimum bills shall not be reduced by reason of the ACR 4 nor shall charges hereunder be a part of the monthly rate schedule minimum. The ACR 4 shall not be subject to any credits or discounts. The State Tax Adjustment Surcharge (STAS) included in this Tariff is applied to charges under this Rider. Charges under ACR 3 and ACR 4 will be combined for billing purposes only.

The Company shall file a report of collections under the ACR 4 within thirty (30) days following the conclusion of each compliance-year.

Application of the ACR 4 shall be subject to review and audit by the Commission at intervals it shall determine. The Commission shall review the level of charges produced by the ACR 4 and the costs included therein.

(Continued)

ACT 129 COMPLIANCE RIDER – PHASE 4 (CONTINUED)

ACT 129 COMPLIANCE RIDER – PHASE 4 CHARGE

Charges under the ACR 4 for the period June 1, 2021 through May 31, 2022 , as set forth in the applicable Rate Schedules.

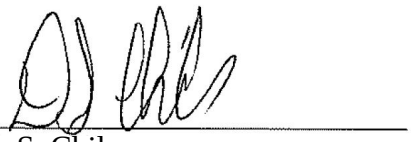
Customer Class	Large I&C -	Small I&C	Residential
Rate Schedule / Charge	LP4, LP-5, and LPEP $X.XXX /KW	GS-1, GS-3, BL, and GH-2 (R) $X.XXXXX /KWH	RS and RTS (R) $X.XXXXX /KWH

Small C&I – Street Lights											
Rate Schedule/ Charge	SA		SM (R)		SHS		SLE		SE	TS (R)	
	Nominal Lumens	Charge	Nominal Lumens	$/Lamp	Nominal Lumens	$/Lamp	Nominal Lumens	$/Fixture	$/KWH	$/Watt	
	HPS 9,500	X.XXX $/Lamp	3,350	X.XXX	5,800	X.XXX	2,600	X.XXX	X.XXXXX	X.XXXXX	
			6,650	X.XXX	9,500	X.XXX	3,300	X.XXX			
			10,500	X.XXX	16,000	X.XXX	3,800	X.XXX			
	LED 4,300	X.XXX $/Fixture	20,000	X.XXX	25,500	X.XXX	4,900	X.XXX			
			34,000	X.XXX	50,000	X.XXX	7,500	X.XXX			
			51,000	X.XXX			15,000	X.XXX			
							20,000	X.XXX			

VERIFICATION

I, DIRK S. CHILES, being the Manager – Energy Efficiency at PPL Electric Utilities Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: November 30, 2020



Dirk S. Chiles