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File #: 163427

July 20, 2018

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 III Energy Efficiency and Conservation Plan - Docket No. M-2015-2515642

Dear Secretary Chiavetta:

Enclosed for filing is the Petition of PPL Electric Utilities Corporation for Approval of Changes to Its Act 129 Phase III Energy Efficiency and Conservation Plan. Copies will be provided as indicated on the Certificate of Service.

Respectfully submitted,

Devin Ryan

DTR/jl
Enclosures

cc: Certificate of Service

CERTIFICATE OF SERVICE
(Docket No. M-2015-2515642)

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).

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Date: July 20, 2018

Devin T. Ryan

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase III Energy Efficiency and Conservation Plan	: : : :	Docket No. M-2015-2515642

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

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Dated: July 20, 2018

Attorneys for PPL Electric Utilities Corporation

Table of Contents

I. INTRODUCTION

PPL Electric Utilities Corporation ("PPL Electric" or the "Company"), by and through its attorneys, hereby petitions the Pennsylvania Public Utility Commission ("Commission"), pursuant to Sections 5.41 and 5.572 of the Commission's Rules of Administrative Practice and Procedure, 52 Pa. Code §§ 5.41, 5.572, for permission to modify its Phase III Energy Efficiency and Conservation Plan ("EE&C Plan") approved by the Commission. *See Petition of PPL Electric Utilities Corp. for Approval of its Act 129 Phase III Energy Efficiency and Conservation Plan*, Docket No. M-2015-2515642 (Order Entered Mar. 17, 2016) ("*March 2016 Order*"); *Petition of PPL Electric Utilities Corp. for Approval of its Act 129 Phase III Energy Efficiency and Conservation Plan*, Docket No. M-2015-2515642 (Tentative Order Entered June 9, 2016) ("*June 2016 Order*"); Secretarial Letter, Docket No. M-2015-2515642 (June 27, 2016) ("*June 2016 Secretarial Letter*") (stating that PPL Electric's compliance EE&C Plan had become final without further action by the Commission).

Pursuant to the Commission's established review process[1] for approving EE&C plan changes proposed by electric distribution companies ("EDCs"), PPL Electric requests Commission approval of eight changes, both major and minor, to its Phase III EE&C Plan. PPL Electric discussed many of these proposed changes to the Phase III EE&C Plan at the stakeholder meeting on December 13, 2017. The Commission's 2011 *Minor Plan Change Order* established an expedited review process for approving minor EE&C Plan modifications. In its *Phase III Implementation Order*,[2] the Commission determined that it would continue to use the

[1] *See Energy Efficiency and Conservation Program*, Docket No. M-2008-2069887 (Order Entered June 10, 2011) ("*Minor Plan Change Order*").

[2] *See Energy Efficiency and Conservation Program*, Docket No. M-2014-2424864 (Order Entered June 19, 2015) ("*Phase III Implementation Order*").

minor EE&C plan change approval process described in the *Minor Plan Change Order* in Phase III. *Phase III Implementation Order*, at pp. 115-18. Although most of the modifications proposed by PPL Electric in this Petition constitute "minor" changes, PPL Electric is submitting its proposed modifications in a single petition and requesting that the Commission review the modifications under the procedures for changes that do not meet the minor change criteria (*i.e.*, "major changes") set forth in the Commission's *Minor Plan Change Order*.[3] Accordingly, comments, answers, or both would be filed within 30 days of service, and all parties will have 20 days to file replies to any comments or answers.

The Company is submitting a single petition to ensure that the Commission and any interested parties have a complete representation of all the proposed changes in a single black-line EE&C Plan[4] and a single supporting petition. A single petition and black-line EE&C Plan better illustrate the collective impacts of all of the changes proposed by the Company.

Since time is of the essence and given the compressed time frame to achieve its requirements under Act 129 of 2008 ("Act 129"),[5] as well as the lead time the Company needs to implement some of the changes, the Company respectfully requests that the Commission resolve issues, if possible, on the basis of comments and replies to comments on the proposed

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[3] In addition to establishing a new expedited review process for minor changes, the *Minor Plan Change Order* detailed the review process for non-minor (*i.e.*, major) changes. Specifically, the Commission provided that "EDCs seeking approval of changes that do not fit within the Minor EE&C Plan change criteria . . . must file a petition requesting that the Commission rescind and amend its prior order approving the plan." *Minor Plan Change Order*, p. 20. Furthermore, "[t]his petition shall be served on all parties, who will have 30 days to file comments, an answer or both." *Id.* Then the parties "have 20 days to file replies, after which the Commission will determine whether to rule on the changes or refer the matter to an Administrative Law Judge for hearings and a recommended decision." *Id.* These procedures superseded those previously established for EE&C Plan changes and "apply to all petitions for approval of an EE&C Plan change, other than petitions seeking review under the expedited process" for minor changes. *Id.* at p. 21.

[4] The black-line Phase III EE&C Plan is attached to this Petition as Appendix A.

[5] Act 129 of 2008, P.L. 1592, 66 Pa.C.S. §§ 2806.1 and 2806.2.

modifications.[6] Consistent with the Commission's actions regarding previous petitions to revise EE&C Plans,[7] PPL Electric respectfully requests that the Commission review and approve of any proposed changes that no party opposes or about which the parties' comments fail to raise any legitimate issues of law or fact. Further, PPL Electric respectfully requests that the Commission review and approve the proposed changes to the EE&C Plan quickly so that the Company can be in a position to continue to comply with its Phase III Act 129 requirements.

In support of this Petition, PPL Electric states as follows:

II. BACKGROUND

1. On November 30, 2015, PPL Electric filed its initial Phase III EE&C Plan with the Commission pursuant to Act 129 and various related Commission orders. PPL Electric's Phase III EE&C Plan included a broad portfolio of energy efficiency and energy education programs and initiatives. PPL Electric's portfolio of programs was designed to provide customer benefits and to meet the energy conservation and demand reduction goals set forth in Act 129 and related Commission orders. The initial Phase III EE&C Plan included a range of energy efficiency programs that included every customer sector in PPL Electric's service territory. These programs are the key components of a comprehensive electric energy efficiency initiative designed to achieve the Company's required energy conservation and demand reduction goals.

[6] *See, e.g., Petition of PPL Electric Utilities Corp. for Approval of its Act 129 Phase II Energy Efficiency and Conservation Plan*, Docket No. M-2012-2334388 (Order Entered Mar. 6, 2014) (approving changes to PPL Electric's Phase II EE&C Plan based upon comments and reply comments); *Petition of West Penn Power Company for Amendment of the Orders Approving Energy Efficiency and Conservation Plans and Petition for Approval of its Amended Energy Efficiency and Conservation Plans*, Docket No. M-2009-2093218 (Interim Order and Opinion Entered Oct. 28, 2011) (The Commission stated that any delay in ruling on the proposed EE&C Plan changes would further limit the time the company had to implement the revisions. The Commission approved some elements of the petition and referred the remaining elements to the Office of Administrative Law Judge for the issuance of a Recommended Decision on an expedited basis).

[7] *Id.*

2. The Commission approved PPL Electric's initial Phase III EE&C Plan, with modifications, on March 17, 2016. *See March 2016 Order*, at pp. 57-61. 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 approved PPL Electric's compliance filing, as amended, on June 27, 2016. *See June 2016 Secretarial Letter.*

3. On September 21, 2016, PPL Electric filed a petition for approval of a minor plan change to its Phase III EE&C Plan ("Revision I"). On November 4, 2016, the Commission issued a Secretarial Letter evidencing that its staff had approved of the minor plan change. On November 14, 2016, the PP&L Industrial Customer Alliance ("PPLICA") filed a petition for appeal of the Commission staff's decision. PPL Electric filed an answer to PPLICA's petition on November 28, 2016. On January 26, 2017, the Commission denied PPLICA's petition for appeal.

4. On June 6, 2017, PPL Electric filed a petition for approval of major and minor changes to its Phase III EE&C Plan ("Revision 2" or "June 6, 2017 Petition"). Because the June 6, 2017 Petition included both major and minor changes, the Company opted to proceed under the Commission's review procedures for major changes.[8] On November 21, 2017, the Commission entered its Order approving most of the proposed changes, as clarified by the Company.[9] One proposed minor change—the Enhanced Localized Incentives Pilot—was referred to the Office of Administrative Law Judge ("OALJ") for hearings and a recommended

[8] *See* June 6, 2017 Petition, p. 2; *Minor EE&C Plan Change Order*, 2011 Pa. PUC LEXIS 1796, at *31-33 (detailing the major plan change review procedures).

[9] *Petition of PPL Elec. Utils. Corp. for Approval of its Act 129 Phase III Energy Efficiency and Conservation Plan*, Docket No. M-2015-2515642, pp. 41-42 (Order entered Nov. 21, 2017).

decision.[10] On February 16, 2018, PPL Electric filed a Petition for Leave to Withdraw Without Prejudice the Remainder of Its June 6, 2017 Petition ("Petition to Withdraw"). On February 26, 2018, the PP&L Industrial Customer Alliance ("PPLICA") filed an Answer in opposition to a withdrawal of the proposed change without prejudice, arguing that the withdrawal should be with prejudice for the remainder of Phase III. On April 9, 2018, Administrative Law Judge Benjamin J. Myers issued his Recommended Decision ("RD") rejecting PPLICA's arguments and granting PPL Electric's Petition for Leave to Withdraw without prejudice. On April 30, 2018, PPLICA filed its Exceptions to the RD. On May 10, 2018, PPL Electric filed its Replies to PPLICA's Exceptions. PPLICA's Exceptions and the Company's Replies thereto remain pending before the Commission.

5. The resolution of PPLICA's Exceptions and PPL Electric's Replies thereto will have no effect on the eight changes proposed in the instant Petition.

III. PROPOSED MODIFICATIONS TO THE EE&C PLAN

6. PPL Electric's Phase III EE&C Plan represents a comprehensive electric energy efficiency initiative designed to achieve 1,582,984 MWh/yr of total energy savings and annual peak demand reductions of 115 MW in each Program Year. PPL Electric researched and developed the initial Phase III EE&C Plan between August and October 2015 and filed its initial Phase III EE&C Plan in November 2015 using the most current data available at the time.

7. After receiving Commission approval of the Phase III EE&C Plan, the Company continued to fine tune its key assumptions and the mix of measures and programs for its Phase III EE&C Plan. The Company has now benefited from over two years of Phase III program

[10] *Id.*, pp. 32-37, 42.

delivery, additional market research, evaluation results, and input from stakeholders about desired changes, including pilots and adjustments to rebates and measures. PPL Electric met with stakeholders in December 2017 to review some potential Phase III EE&C Plan changes and to obtain their input.

8. In summary, PPL Electric proposes the following changes to its Phase III EE&C Plan through this Petition:

a. Shift $2.7 Million from the Large C&I Sector Budget in the Non-Residential Energy Efficiency Program to the Large C&I Sector Budget in the Demand Response Program (*Minor Change*);

b. Shift $5.6 Million from the GNE Sector Budget in the Demand Response Program to the GNE Sector Budget in the Non-Residential Energy Efficiency Program (*Minor Change*);

c. Reduce the Estimated Small C&I Savings in the Non-Residential Energy Efficiency Program and the Demand Response Program (*Major Change*);

d. Add a Low-Income Home Energy Education Measure to Low-Income Winter Relief Assistance Program ("WRAP") (*Minor Change*);

e. Add a Low-Income Student Energy Efficient Education Measure to Low-Income WRAP (*Minor Change*);

f. Add Additional Measures to the Energy Efficient Home Program (*Minor Change*);

g. Shift $1.5 Million in Common Costs from Plan Development and Plan Management to Evaluation Measurement & Verification ("EM&V") (*Minor Change*); and

h. Make Grammatical and Editorial Changes to Correct or Clarify Wording or Figures in the EE&C Plan (*Minor Change*).

9. The proposed changes are reasonable and are designed, among other things, to enable the Company to meet its Phase III compliance targets within its Phase III budget, to better reflect actual participation in and experience with the Phase III programs, to increase opportunities for low-income customers to participate in the EE&C Plan and obtain energy savings, and to enhance the delivery of the low-income new homes measure.

10. The eight proposed changes do not change the total estimated savings or the total estimated cost of the EE&C Plan.

11. PPL Electric has provided detailed support for all of the changes below.

12. In addition, appended to this Petition is a black-line version of the Company's proposed revised Phase III EE&C Plan, which incorporates and reflects all of the modifications that are proposed in this Petition. All of the changes, discussed herein, were identified by the Company through: (1) its experience in Phase III of Act 129; (2) input from stakeholders, trade allies, conservation service providers ("CSPs"), and program participants; (3) Program Year 8 ("PY8") and Program Year 9 ("PY9") evaluation results; and (4) the Company's ongoing coordination activities with other Pennsylvania EDCs. As mentioned previously, PPL Electric discussed most of these proposed modifications to the Phase III EE&C Plan at its December 13, 2017 stakeholder meeting.

13. If the Company's proposed changes are implemented, the Company continues to project that it will meet all of the compliance targets, within the funding cap, with a distribution

of programs, costs, and savings to the five customer sectors that is reasonable and equitable.[11] In addition, the TRC benefit-cost ratios of the revised EE&C Plan will be 1.44 for energy efficiency and 2.01 for demand response (1.45 for energy efficiency and demand response combined), which meet the Act 129 cost-effectiveness compliance requirements.[12]

14. Further, the Phase III EE&C Plan, as revised by the changes proposed herein, continues to meet the standard required in 66 Pa. C.S. § 2806.1(a)(5) and the *Phase III Implementation Order*. Indeed, the Phase III EE&C Plan, as revised, offers each customer class at least one energy efficiency measure and contains a reasonable mix of energy efficiency programs for all customers.

15. The following sections set forth PPL Electric's proposed changes to the Phase III EE&C Plan.

A. PROPOSED CHANGES

1. Shift $2.7 Million from the Large C&I Sector Budget in the Non-Residential Energy Efficiency Program to the Large C&I Sector Budget in the Demand Response Program (*Minor Change*)

16. The Company proposes to shift $2.7 million from the Large C&I sector budget in the Non-Residential Energy Efficiency Program to the Large C&I sector budget in the Demand Response Program. The change would facilitate an additional 54.6 MW in projected demand reductions for the Large C&I sector in the Demand Response Program and would have no projected effect on the Large C&I sector's savings under the Non-Residential Energy Efficiency

[11] The Commission's EE&C Program must include "[s]tandards to ensure that each plan includes a variety of energy efficiency and conservation measures and will provide the measures equitably to all classes of customers." 66 Pa. C.S. § 2806.1(a)(5). Each EDC is required to demonstrate that its plan "provides a diverse cross section of alternatives for customers of all rate classes." 66 Pa. C.S. § 2806.1(b)(1)(i)(I). The Commission previously concluded that the Phase III EE&C Plan includes a variety of energy efficiency and conservation programs that are equitably distributed among all classes of customers. *March 2016 Order*, p. 27.

[12] *See* 66 Pa. C.S. § 2806.1(b)(1)(i)(I).

Program. The proposed change also does not affect the total dollars budgeted for the Large C&I sector in the EE&C Plan.

17. The change is necessary because the amount of Large C&I customers' demand reductions under the Demand Response Program is greater than originally estimated in the EE&C Plan. In fact, the estimated costs and demand reduction figures for the Demand Response Program were developed approximately three years ago, before the Demand Response CSP contract was awarded and well before enrollment in the program began.

18. More importantly, the first demand response season completed in September 2017, and the proportion of Large C&I demand reductions in the program and the resulting costs were greater than estimated for that program year. Specifically, PPL Electric's original plan initially estimated 57.5 MW of demand reductions from the Large C&I sector; however, the Large C&I sector participants actually produced 121.3 MW in demand reductions in PY9. The Company expects the Large C&I sector's increased levels of demand reductions and their associated costs to continue for the remainder of Phase III.

19. Further, the Company projects that the demand reductions for the Small C&I and GNE sectors will be approximately 11.4 MW and 43.2 MW lower than originally estimated, as explained in the follow sections. Those 54.6 MW will be offset by the additional 54.6 MW in demand reductions resulting from the increase in Large C&I demand response funding. Thus, the proposed change is necessary to help ensure that the Company remains able to achieve its demand reduction compliance target for Phase III.

2. Shift $5.6 Million from the GNE Sector Budget in the Demand Response Program to the GNE Sector Budget in the Non-Residential Energy Efficiency Program (*Minor Change*)

20. PPL Electric proposes to shift $5.6 million from the GNE sector budget in the Demand Response Program to the GNE sector budget in the Non-Residential Energy Efficiency

Program. This change would result in an additional approximately 120,000 MWh (from 83,500 MWh to 203,500 MWh) in GNE energy savings and would accommodate additional Combined Heat and Power ("CHP") projects expected from GNE customers, based on the Non-Residential Energy Efficiency Program's current queue of projects and the Company's forecast. This change does not affect the total dollars budgeted for the GNE sector in the EE&C Plan.

21. The change is necessary because the GNE sector's interest in energy efficiency is much greater than expected for this Phase and is much greater than previous phases. Indeed, a significant portion of the GNE projects are CHP projects that are greater in number and in size than originally estimated in the Phase III EE&C Plan.

22. The current GNE sector budget in the Non-Residential Energy Efficiency Program is almost fully subscribed based on actual expenditures and approved projects in the queue. In fact, a waitlist was established January 2018. If this GNE budget is not increased, no more GNE projects in the Non-Residential Energy Efficiency Program can be funded.

23. Additional GNE projects and savings, however, are likely to materialize if additional GNE funding is approved. GNE savings from CHP projects are more certain than Small C&I savings (see Proposed Change 3 below) and cost much less (approximately $0.03/kWh for GNE CHP projects versus approximately $0.23/kWh for Small C&I). Therefore, it is reasonable for PPL Electric to pursue 120,000 MWh of relatively certain savings from GNE than to pursue the less certain and more costly savings from Small C&I generally.

24. Further, PPL Electric could miss its overall savings compliance target if GNE funding and savings are not increased and the Small C&I sector savings are 120,000 MWh less than currently estimated in the EE&C Plan (see Proposed Change 3 below). Consequently, the

proposed change is necessary to help ensure that the Company is able to meet its overall savings compliance target.

25. In addition, the proposed change will not negatively affect the Demand Response Program or GNE sector. As referenced earlier, the GNE sector's demand reductions under the Demand Response Program are much lower than initially estimated in the EE&C Plan. Specifically, PPL Electric originally projected 46 MW of demand reductions for the GNE sector in its EE&C Plan, but the Company was only able to recruit 3.4 MW worth of demand reductions from GNE participants.

26. As a result, PPL Electric estimates that the GNE sector's costs in the Demand Response Program will be approximately $5.6 million under the approved budget in the EE&C Plan. Further, the estimated 43.2 MW decrease in the projected demand reductions from the GNE sector will be offset by the 54.6 MW increase in the projected demand reductions from the Large C&I sector. *See* Section III.A.1, *supra*.

27. Thus, PPL Electric can accommodate the shift of $5.6 million from the GNE sector budget in the Demand Response Program to the GNE sector budget in the Non-Residential Energy Efficiency Program, with no change to the total dollars budgeted for the GNE sector in the EE&C Plan and no adverse effect on the Demand Response Program.

3. Reduce the Estimated Small C&I Savings in the Non-Residential Energy Efficiency Program and the Demand Response Program (*Major Change*)

28. PPL Electric proposes to reduce the Small C&I sector's estimated energy savings in the Non-Residential Energy Efficiency Program and the demand reductions in the Demand Response Program by approximately 120,000 MWh and 11.4 MW, respectively, with no change to the total estimated costs for the Small C&I sector.

29. The proposed change is necessary to reflect the Company's current estimates of the Small C&I sector's energy savings and demand reductions for Phase III. Based on the current forecast and market insight, the projected energy savings are expected to be approximately 120,000 MWh less than the 462,861 MWh set forth in the EE&C Plan, and the projected demand reductions are expected to be approximately 11.4 MW less than the 11.5 MW set forth in the EE&C Plan.

30. The decreased savings are due to Small C&I customers' program acquisition costs being higher than originally estimated in developing the Phase III EE&C Plan. To obtain Small C&I participants in the Non-Residential Energy Efficiency and Demand Response Programs, the Company must engage in increased outreach and offer increased incentives. Therefore, the program acquisition cost of the Small C&I sector will increase from approximately $0.15 per annual kWh saved to $0.23 per annual kWh saved in the Non-Residential Energy Efficiency Program.

31. As mentioned previously, the Company is proposing to increase the GNE sector's projected energy savings in the Non-Residential Energy Efficiency Program by 120,000 MWh and to increase the Large C&I sector's projected demand reductions by 54.6 MW. Therefore, these proposed increases will offset the reductions in projected savings for the Small C&I sector.

4. Add a Low-Income Home Energy Education Measure to Low-Income WRAP (*Minor Change*)

32. The Company proposes to add a Low-Income Home Energy Education measure to Low-Income WRAP. This measure would offer home energy reports ("HERs") to low-income customers and would be delivered by the same CSP and subcontractor as the Home Energy Education Program. The messages and tips in the HERs for low-income customers would be different than the HERs for non-low-income customers. Moreover, the new HERs

would encourage low-income customers to enroll in the Company's Low-Income Usage Reduction Program WRAP and OnTrack, *i.e.*, PPL Electric's customer assistance program.

33. The proposed change is necessary because the Company needs an additional 1,600 MWh/yr of savings to exceed its low-income compliance target by at least 10%, which accounts for operational and evaluation uncertainties.

34. The addition of this measure will not change the total costs or savings in the EE&C Plan, nor will it change the total costs borne by the Residential customer class. The estimated savings of this measure are approximately 1,600 MWH/yr, and the estimated cost of this measure is approximately $66,000. Accordingly, the Company simply will reallocate those savings and dollars from the Home Energy Education Program to Low-Income WRAP, both of which are funded exclusively by residential customers.

5. Add a Low-Income Student Energy Efficient Education Measure to Low-Income WRAP (*Minor Change*)

35. PPL Electric proposes to add a Low-Income Student Energy Efficient Education measure to its Low-Income WRAP. The new measure would be substantially similar to the Student Energy Efficient Education Program but would focus on schools in low-income areas of PPL Electric's service territory. The measure would be delivered by the Residential CSP and subcontractor that currently oversee the Student Energy Efficient Education Program.

36. The proposed change is necessary because the Company needs an additional 6,000 MWh/yr of savings to exceed its low-income compliance target by at least 10%, which accounts for operational and evaluation uncertainties.

37. The addition of this measure will not change the total costs or savings in the EE&C Plan, nor will it change the total costs borne by the Residential customer class. The estimated savings of this measure are approximately 6,000 MWh/yr, and the estimated cost of

this measure is $1,350,000. Both the Student Energy Efficient Program and Low-Income WRAP are funded exclusively by residential customers. Thus, the Company simply will reallocate those savings and dollars from the Student Energy Efficient Education Program to Low-Income WRAP.

6. Add Additional Measures to the Energy Efficient Home Program (*Minor Change*)

38. PPL Electric proposes to add three measures to the Energy Efficient Home Program, specifically an air source heat pump tune-up, duct sealing, and sealing/insulation measures.

39. The air source heat pump tune-up measure would be eligible for systems at least seven years old, and each system is limited to one rebate for the entirety of Phase III. The duct sealing measure would be eligible for a home with an electric ducted heating system after a duct leakage test if performed by a BPI-certified trade ally. Lastly, the sealing/insulation measure would be available to customers who install insulation, conduct air sealing, and/or duct sealing within three months of a qualifying HVAC installation.

40. The addition of these measures promotes additional energy efficient products and allows customers to receive incentives for doing additional work after installing an energy efficient HVAC system. The tune-up measure allows a customer whose system is still operating to be more efficient until a new system is needed.

41. The addition of these measures will not change the total projected costs or savings of the program or any customer sector.

7. Shift $1.5 Million in Common Costs from Plan Development and Plan Management to Evaluation Measurement & Verification ("EM&V") (*Minor Change*)

42. In the Company's common cost budget, PPL Electric proposes to shift $500,000 from the Plan Development common cost budget and $1 million from the Plan Management common cost budget to the EM&V common cost budget (see Table 77).

43. The proposed change is reasonable because it is needed to accommodate additional site inspections that support the midstream Interim Measure Protocol and continuous energy improvement ("CEI").

44. Further, the proposed change will have no impact on the allocation of common costs among the customer sectors, as seen in Table 77. In other words, no customer sector's allocation of common costs will increase or decrease as a result of this change.

45. Moreover, based on experience thus far in Phase III, the costs for Plan Development and Plan Management will be able to be accommodated under the new budgets.

46. For these reasons, the proposed change is reasonable and should be approved.

8. Make Grammatical and Editorial Changes to Correct or Clarify Wording or Figures in the EE&C Plan (*Minor Change*)

47. As set forth in the Appendix A to this Petition, the Company proposes a number of grammatical and editorial changes to correct or clarify wording or figures in the Phase III EE&C Plan.

IV. NOTICE

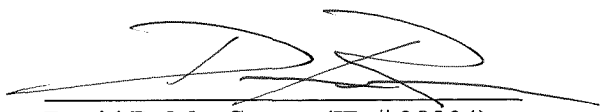
48. Pursuant to the *Minor Plan Change Order*, PPL Electric is serving copies of this filing on the Pennsylvania Office of Consumer Advocate, the Pennsylvania Office of Small Business Advocate, the Commission's Bureau of Investigation and Enforcement, and all other

parties of record in PPL Electric's Phase III EE&C Plan proceeding (Docket No. M-2015-2515642). *See Minor Plan Change Order*, at pp. 18-19 (requiring service of a petition on "all parties"). PPL Electric will also post the black-line version of the EE&C Plan on its Act 129 website (http://www.pplelectric.com/e-power/stakeholders/index.htm).

V. CONCLUSION

WHEREFORE, PPL Electric Utilities Corporation respectfully requests that the Pennsylvania Public Utility Commission review and approve the proposed major and minor changes to the EE&C Plan, as set forth in this Petition. Further, PPL Electric requests that the Commission resolve issues on the basis of comments and replies to comments on the proposed modifications.

Respectfully submitted,



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Dated: July 20, 2018

Attorneys for PPL Electric Utilities Corporation

APPENDIX A

BLACK-LINE EE&C PLAN

Before the

PENNSYLVANIA PUBLIC UTILITY COMMISSION

PPL Electric Utilities Corporation

Energy Efficiency and Conservation Plan

Act 129 Phase III

Docket No. M-2015-2515642

~~December 2017~~July 2018

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Tables

Figures

Acronyms and Abbreviations

Acronym	Definition
ACR	Act 129 Compliance Rider
AMCA	Air Movement & Control Association
BLS	Bureau of Labor Statistics
C&I	Commercial and industrial
CBO	Community based organization
CFL	Compact Fluorescent Lamp
CFM	Cubic feet per minute
CHP	Combined heat and power
CIP	Continuous improvement process
Commission	Pennsylvania Public Utility Commission
CSP	Conservation service providers
DEER	California Database for Energy -Efficiency Resources
DSM	Demand-side management
ECM	Electronically commutated motor
EDC	Electric distribution company
EE&C Plan	Act 129 Phase III Energy Efficiency and Conservation Plan
EEMIS	Energy Efficiency Management Information System
EISA	Energy Independence and Security Act of 2007
ELRP	Emergency Load Response Program
EM&V	Evaluation, measurement, and verification
FHPC	Floating Head Pressure Control
FPIG	Federal Poverty Income Guidelines
GNE	Government/Nonprofit/Educational
HER	Home energy report
hp	Horsepower
Hub	Customer Engagement Hub
IEEE	Institute of Electrical and Electronics Engineers
IRR	Internal rate of return
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LIHEAP	Low-Income Home Energy Assistance Program
LIURP	Low-Income Usage Reduction Program
LMP	Locational Marginal Price
M&V	Measurement and verification
NTG	Net-to-gross
NYMEX	New York Mercantile Exchange
Pa PUC	Pennsylvania Public Utility Commission
PC	Personal computer
Phase III Plan	Act 129 Phase III Energy Efficiency and Conservation Plan
PJM	PJM International
Plan	Act 129 Phase III Energy Efficiency and Conservation Plan
PSC	Permanent-split capacitor
QA/QC	Quality assurance/quality control
RFP	Requests for proposals
RTF	Regional Technical Forum
RTO	Regional transmission organization
SP	Shaded-pole

Acronym	Definition
SWE	Statewide Evaluator
TRC	Total Resource Cost
TRM	Technical Reference Manual
VFD	Variable frequency drive
VSD	Variable speed drive
WRAP	Winter Relief Assistance Program

1 Overview of PPL Electric's Act 129 Phase III Plan

1.1 Summary Description of the Plan

PPL Electric Utilities Corporation ("PPL Electric," or "the Company") hereby submits its Act 129 Phase III Energy Efficiency and Conservation Plan ("EE&C Plan," "Plan," or "Phase III Plan") in compliance with Act 129 of 2008, P.L. 1592, 66 Pa. C.S. §§ 2806.1, 2806.2 ("Act 129") and pursuant to the Pennsylvania Public Utility Commission's ("Pa PUC" or "the Commission") Implementation Order entered on June 19, 2015, at Docket No. M-2014-2424864 ("Implementation Order"), the Commission's Clarification Order entered on August 20, 2015, at Docket No. M-2014-2424864 ("Clarification Order"), and the Commission's 2016 Total Resource Cost ("TRC") Test Order entered on June 22, 2015, at Docket No. M-2015-2468992 ("2016 TRC Test Order"). The Plan includes a portfolio of 11 energy efficiency and demand reduction sector-specific program components[1] comprising five customer sectors, outlined in Table 1.

Table 1. PPL Electric Phase III Programs

#	Program Name	Continuing	New
Residential Sector Programs			
1	Appliance Recycling	●	
2	Efficient Lighting	●	
3	Energy Efficient Home	●*	
4	Student Energy Efficient Education	●*	
5	Home Energy Education	●*	
6	Demand Response ***		●
Low-Income Sector Programs			
7	Low-Income Winter Relief Assistance Program ("WRAP")	●*	
8	Energy Efficiency Kits and Education	●	
Non-Residential Sector Programs			
9	Non-Residential Energy Efficiency	●	
10	Low-Income WRAP Master Metered Multifamily **	●*	
11	Demand Response		●

* Continued with changes.
** Part of the LI WRAP program
***Optional. Part of Demand Response Program. See section 3.2

[1] As shown in Figure 3, there are 9 unique programs. The Non-residential Energy Efficiency Program and the Demand Response Program have separate cost and savings estimates for each sector (i.e., Small C&I, Large C&I, GNE and possibly residential). WRAP has separate cost and savings estimates for Low-income, Small C&I Master Metered Multifamily, and GNE Master Metered Multifamily.

The portfolio offers PPL Electric 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 (see summary in Table 2). Each individual program is described in Section 3.

Table 10~~Table 10~~ provides a more complete summary of costs, savings, and cost-effectiveness for each program and customer sector.

Table 2. Summary of Compliance Targets

	Compliance Target	EE&C Plan
Overall energy reductions (MWh/year)	1,443,035	1,587,984
Overall peak reductions (MW)	92	115
Low-income energy reductions (MWh/year)	79,367	100,886~~93~~,~~147~~[1]
GNE energy reductions (MWh/year)	50,507	~~81,000~~201,000[2]
Budget cap (excluding SWE costs)	$307,500,000	$307,479,000
Cost Effectiveness (per TRC)	1.0	1.44 (energy efficiency) ~~1.90~~2.01 (demand response)

[1] The Low-income energy reductions shown here include low-Income savings from the Master Metered Multifamily component of the Low-Income WRAP program. These savings are applied toward sector-level compliance targets and are shown only in Table 10.

[2] To avoid double counting, these values exclude 2,500 MWh/yr. that counts toward the Low Income Compliance target (From GNE Low Income WRAP Master Metered Multifamily).

1.1.1 Portfolio Objectives

PPL Electric designed the Phase III Plan to meet the requirements set forth by the Commission's Implementation Order. Those requirements are that PPL Electric must:

- Offer programs for a five-year term, beginning in June 2016 and concluding in May 2021.
- 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[2] over the five-year Phase III period and an average program acquisition cost of approximately $0.20/annual kWh saved.
- Achieve 3.8% reduction in overall energy consumption from the baseline (i.e., forecast kWh sales for June 1, 2009, to May 31, 2010), which is equivalent to 1,443,035 MWh/year gross verified savings. The EE&C Plan must be designed to achieve at least 15% of the cumulative annual energy reduction target in each of the five program years, which equates to 216,455 MWh/year.

[2] This figure excludes approximately $5 million for PPL Electric's portion of the statewide evaluator's costs that are not subject to the funding cap.

- Achieve required energy reduction set-aside targets, including:
  - A minimum of 3.5% (i.e., 50,507 MWh/year gross verified savings) of the total required energy reductions from the GNE sector.
  - A minimum of 5.5% (i.e., 79,367 MWh/year gross verified savings) of the total required energy reductions from the low-income customer sector (i.e., those at <150% of the Federal Poverty Income Guidelines ["FPIG"]). Compliance savings must come entirely from income-qualified programs and may not accrue from low-income customer participation in general residential programs.
- Achieve peak demand reduction of 92 MW gross verified savings at the generator level in each of the last four years of Phase III, based on the average MW reduction in each hour of mandated four-hour events for that program year. In addition, each event must achieve 85% of the 92 MW compliance target.
- Offer at least one energy efficiency program for each customer sector.
- Offer at least one comprehensive program for residential customers and one comprehensive program for nonresidential customers.
- Ensure the portfolio is cost-effective based on the TRC test, separately for the energy efficiency portfolio and the demand response portfolio.
- Allocate the cost of measures to the customer class that receives the benefit of those measures.
- Include high-level plans to measure, evaluate, and verify the performance of individual programs and the Plan as a whole.

In addition, PPL Electric has designed the EE&C Plan to:

- Exceed compliance targets by a minimum of approximately 10% to allow for evaluation and other uncertainties.
- Achieve broad stakeholder consensus to the extent practical.
- Provide significant energy efficiency education to customers and encourage customers to take a more comprehensive, holistic approach to energy efficiency (e.g., multiple measures, whole house, whole building).
- Provide programs that achieve high customer satisfaction.
- Provide a transition for customers from Phase II to Phase III programs. This includes:
  - Offering residential customers a comparable mix of measures and incentive levels provided during Phase II for the first three months of Phase III;
  - Offering comparable incentives to customers with nonresidential projects on the Phase II waitlist that are completed in early Phase III. and
  - Allowing approved nonresidential Phase II projects to be eligible for a Phase III rebate if the project is completed in Phase III and is installed during the first six months of Phase III, although PPL Electric may grant exceptions to this deadline on a case-by-case basis depending on the nature and schedule of the project.

- Provide low-income programs at no cost to participants, although Act 129 Compliance Rider ("ACR") charges will appear on their bills.

- Provide as much of the low-income savings as possible, within budget constraints, from direct-install measures.
- Provide a customer-sector centric approach that is flexible enough to control the pace of programs if customer preferences or market conditions change.
- Achieve a reasonable net-to-gross ("NTG") ratio for each program.
- Significantly reduce program administrative costs (per annual kWh saved) compared to Phase II.
- Develop an effective trade ally network (such as HVAC and lighting contractors) that stocks and promotes efficient equipment.
- Achieve an equitable distribution of programs, savings, and costs for all customer sectors (i.e., Residential, Low-Income, Small C&I, Large C&I, and GNE).

PPL Electric 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 III. PPL Electric designed its programs to provide residential, low-income, Small C&I, Large C&I, and GNE customers with a comprehensive range of options intended to drive participation. PPL Electric uses targeted marketing techniques that capitalize on ongoing market research and customer/trade ally feedback to match outreach and messaging strategies with likely participants' primary participation drivers. Education, customer care, technical support, quality assurance ("QA"), quality control ("QC"), and evaluation, measurement, and verification ("EM&V") are common features of all programs.

The entire portfolio is supported by financial incentives, an active trade ally network, tracking, and a delivery approach focused on providing customers with the support they need to achieve their energy efficiency objectives and encourage their continued engagement with PPL Electric 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 programs.

1.1.2 Overall Strategy to Achieve Energy Efficiency and Conservation Goals

Achieving the Phase III energy reduction compliance targets will be more challenging than achieving the Phase II targets because the Phase III per-unit program acquisition budget[3] is approximately 30% lower than PPL Electric's approved Phase II EE&C Plan. In addition, the Phase III low-income set-aside target is 25% higher than Phase II and can only be met with income-qualified residential customers, whereas in Phase II, low-income participation in general residential programs counted toward compliance, a significantly less costly solution. Therefore, to achieve the more challenging Phase III energy reduction compliance targets, PPL Electric established the following strategy:

[3] The program acquisition cost is defined as PPL Electric's total cost to implement the program (including administration and incentives) divided by annual kWh saved.

- Reducing and controlling program administrative costs. PPL Electric designed its Phase III programs to have a 30% lower program acquisition cost than its Phase II programs. To achieve this reduction in program acquisition cost, PPL Electric reduced its administrative costs (i.e., all costs except for incentives) by consolidating all sector-level programs under a single Conservation Service Provider ("CSP"), in order to:
  - Gain economies of scale associated with cross-program functions (e.g., call center, rebate processing, market research, marketing, analytics, website development, program management);
  - Develop a single view of the customer across all programs to improve the effectiveness of marketing, customer communications, and program cross-promotion, thereby increasing participation and project comprehensiveness and reducing outreach and recruitment costs;
  - Implement contracts that tie payments to CSP performance to ensure they are accountable for successful program delivery (i.e., cost and savings);
  - Obtain earlier program design input from CSPs;
  - Consolidate PPL Electric oversight and program management;
  - Improve the effectiveness of the trade ally network; and
  - Automate rebate applications, QA/QC, rebate processing, and other functions where practical.
- Taking additional steps to reduce administrative costs by:
  - Reducing the cost and improve the functionality of the programs tracking system; and
  - Reducing the cost of evaluation.
- Emphasizing more comprehensive projects and measures for residential and nonresidential customers by:
  - Providing significantly more customer education about energy efficiency, especially personalized information for a customer's specific home/business;
  - Promoting the implementation of multiple-measure, comprehensive projects (whole home/whole building);
  - Offering trade ally incentives, if necessary, to compensate trade allies for stocking more efficient measures and for spending time to inform customers about higher efficiency equipment and multi-measure installations;
  - Offering tiered incentives to encourage multi-measure, whole home/whole building projects; and
  - Aligning and promoting HVAC and other equipment rebates in conjunction with manufacturer rebates.
- Providing a transition from Phase II to Phase III programs to maximize customer satisfaction and provide incentives (and savings) for projects that straddle both phases.[4]

[4] The in-service date of the project determines whether the funding is provided by Phase III or Phase II.

- Focusing on cost-effective measures with high savings, low program acquisition cost, and reasonable NTG ratios.
- Ensuring that PPL Electric program staff are effective, knowledgeable, and accountable to defined performance metrics, by requiring they:
  - Have a full understanding of all aspects of their programs and the markets in which they operate;
  - Develop program-specific performance metrics in order to track, monitor, and analyze program success;
  - Benchmark program metrics with similar programs in the U.S.;
  - Maintain effective relationships with trade allies by frequently communicating with trade allies and understanding their practices and business needs; and
  - Possess a strong knowledge of customer behavioral triggers, motivations, and barriers.
- Enhancing the customer and trade ally experience by:
  - Simplifying incentive applications and offering multiple submission formats (e.g., paper/mail in, online, tablet entry by trade allies);
  - Improving rebate processing time; and
  - Increasing the level of customer service through focused interactions that are personalized and flexible, when practical.

Shortly after the Commission issued the Implementation Order, PPL Electric developed separate budgets, savings targets, and performance objectives for a Demand Response CSP, as well as three separate customer sector-level CSPs: Residential, Low-Income, and Nonresidential. To accomplish this, the Company relied on Phase III Market Potential Studies, its Phase II experience, Phase II evaluation results, and an analysis of the Phase III compliance target requirements, including the overall, low-income, GNE, and demand reduction compliance targets (as well as the demand reduction budget suggested by the Commission). PPL Electric reviewed these budgets and savings objectives with stakeholders.

PPL Electric issued four requests for proposals ("RFPs") for the design and delivery of Residential, Nonresidential, Low-Income, and Demand Response programs. These RFPs were necessary to confirm that PPL Electric's savings targets and budgets (including the 30% reduction in overall program acquisition costs) were achievable for each sector, and to determine an appropriate mix of programs and measures to include in the EE&C Plan. In addition, PPL Electric engaged The Cadmus Group, Inc. (Cadmus)[5] to conduct a cost-effectiveness analysis of the EE&C Plan and estimate NTG ratios for each program. This process is described in greater detail in Section 1.2.2 and Section 8. PPL Electric engaged stakeholders throughout this process to obtain their input on the EE&C Plan.

[5] 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 and demand savings.

As a result of this process, PPL Electric identified five Residential programs, two Low-Income programs (including components for master-metered low income multifamily buildings in the Small C&I and GNE sectors), two[6] Nonresidential programs for each Nonresidential customer sector (i.e., Small C&I, Large C&I, and GNE), and one Demand Response program for each Nonresidential customer sector (and possibly the residential sector) that together will comprise its Phase III EE&C Portfolio. The portfolio is projected to be cost-effective (i.e., the estimated energy efficiency portfolio benefit/cost ratio is ~~1.52~~1.44; the estimated demand response portfolio benefit/cost ratio is ~~1.90~~2.01), producing five-year energy savings of 1,587,984 MWh/year and demand reductions of 115 MW, which exceeds PPL Electric's compliance targets by 144,95~~049~~ MWh/year (~10%) and 23 MW (25%), respectively, at or below the Company's budget cap.

1.2 Plan Development Process and Key Assumptions

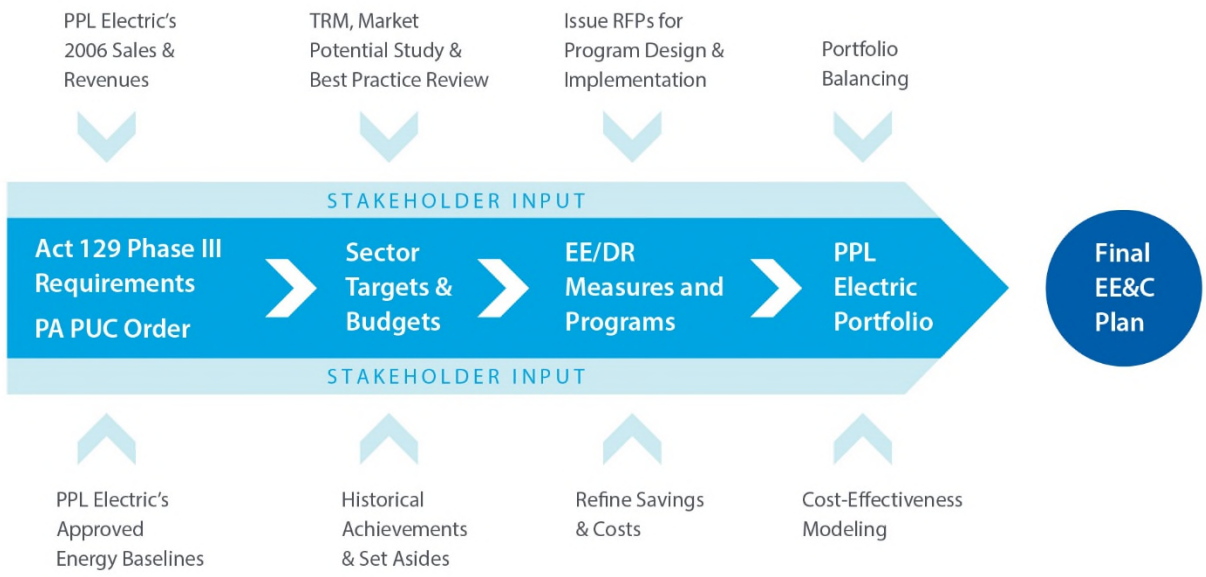
PPL Electric began developing the EE&C Plan shortly after the Pa PUC entered the Tentative Implementation Order on March 11, 2015, at Docket No. M-2014-2424864. After more than five years of offering Act 129 programs, PPL Electric has cultivated an experienced professional staff of energy efficiency and demand response program managers who have worked closely with CSPs, trade allies, customers, and stakeholders to seek their input on programs and measures.

An in-house steering committee of executives and managers with involvement in Act 129 guided the overall Plan development process. The Plan is primarily based on Act 129 requirements, the Commission's Implementation Order, the Phase III Market Potential Studies (for energy efficiency and demand response), experience from Phase I and Phase II, stakeholder input, and the RFPs for program implementers.

In order to achieve the Commission's energy savings targets within the required budget caps, PPL Electric 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. PPL Electric conducted five formal (i.e., whole group) stakeholder meetings and many meetings/teleconferences with individual stakeholders and smaller groups from July through October 2015 to solicit input for the EE&C Plan. Figure 1 summarizes PPL Electric's process for developing the Plan. Additional detail is provided in the sections that follow.

[6] These 2 programs (Custom and Efficient Equipment) ~~are~~ were combined into a single program (Non-residential Energy Efficiency) with ~~this~~ the revision of the EE&C Plan- dated December 2017, Docket No. M-2015-2515642.

Figure 1. Process for Developing the Plan



1.2.1 Principles Guiding Development of the Plan

PPL Electric has a long-standing commitment to energy efficiency and helping customers use electricity wisely and save on their electricity bills. The following guiding principles served as a backdrop to developing the measures, programs, and implementation strategies in PPL Electric's portfolio:

- ***Customer focus:*** During its Phase I and Phase II programs, PPL Electric 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. The Plan offers a diverse range of information, education, and incentives to help PPL Electric 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 developed a portfolio of cost-effective energy efficiency and demand response programs that account for stakeholders' input and will generate the energy savings and demand reductions needed to meet the goals required by Act 129 and the Commission. The Plan is designed to exceed PPL Electric's compliance targets by a minimum of approximately 10% and within the budget cap.
- ***Flexibility to address changing market conditions:*** PPL Electric 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 Plan has flexible solutions that will enable PPL Electric and its selected CSPs to address changing market conditions in a timely and cost-effective manner. The Plan achieves this objective by:

  - Relying on a diverse set of proven, market-ready, and cost-effective energy efficiency (electric) technologies and conservation strategies;
  - Using CSPs that will help achieve economies of scale by consolidating multiple program-level administrative and delivery functions, by encouraging customer participation in multiple programs through effective cross-promotion and by having a single view of the customer across all measures and programs;
  - Leveraging existing market activity and brand awareness through consistent program offerings that allow customers to access rebates for any measures they committed to late in Phase II (but are placed in service in Phase III), thereby enabling a transition from Phase II to Phase III programs; and
  - Providing multiple program options and controls that help PPL Electric manage the pace of programs (i.e., 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 sought stakeholder input on priorities, opportunities, and challenges faced by the range of customer sectors, trade allies, and market partners that its programs serve. The EE&C Plan includes a range of measures and programs designed to meet the needs of all of PPL Electric's customers with savings and costs distributed equitably across all customer sectors.
- ***Market acceptance:*** PPL Electric 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 and stakeholders, and an active awareness campaign to increase customer knowledge about and acceptance of the benefits of energy efficient equipment and keep them informed about new advances in energy efficient products. PPL Electric 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 its programs' performance and adjust them as required if programs are not successful or if there are low NTG ratios.
- ***Commitment to low-income customers:*** The EE&C Plan continues PPL Electric's commitment to helping low-income customers reduce their electricity consumption. PPL Electric will continue its successful Low-Income WRAP and E-Power Wise Program (renamed the Energy Efficiency Kits and Education Program for Phase III). In Phase III, PPL Electric expects the Low-Income WRAP to reach approximately twice the number of homes per year than in Phase II, and expects to reduce the low-income program acquisition cost by approximately 50%.

1.2.2 Developing the Portfolio

In its RFPs, the Company challenged bidders to propose a portfolio of programs that could achieve the required sector-level savings targets within the allocated budget, adhere to PPL Electric's overall guiding principles, and comply with additional program design features tailored to each customer sector, as described below.

Residential Sector

PPL Electric designed the residential portfolio to achieve verified gross energy savings of approximately ~~656,000~~649,000 MWh/year over the five-year Plan and at least 15% of the total cumulative verified gross savings in each program year. Additionally, the Company designed the residential portfolio to meet its savings objective at a total direct program cost (excluding the allocation of common, portfolio-level costs) of approximately ~~$96,000,000~~$95,000,000 and total program cost (including the allocation of common costs) of approximately ~~$111,000,000~~$110,000,000. The program acquisition cost (including the allocation of common costs and excluding demand response) for the Residential sector is approximately $0.17 per annual kWh saved, which is 39% lower than the planned acquisition cost in Phase II. PPL Electric further designed programs within the Residential sector to:

- Achieve acceptable NTG ratios as determined by PPL Electric, its evaluator, or the statewide evaluator ("SWE");
- Wherever possible, be cost-effective as determined by the Pennsylvania 2016 TRC test method;
- Offer diverse and comprehensive measure choices to all residential customers across PPL Electric's entire service territory; and
- Achieve high customer satisfaction (i.e., ≥80% of customers are very satisfied/satisfied).

Low-Income Sector

PPL Electric designed its low-income portfolio to achieve verified gross energy savings of approximately ~~93,000~~101,000 MWh/year, including low-income savings from Master Metered Multifamily, which is ~~17%~~27% greater than the low-income compliance target.[7] The program is also designed to meet its savings objective at a total direct program cost (excluding common portfolio-level costs) of approximately ~~$47,000,000~~$49,000,000, and a total program cost of approximately ~~$55,000,000~~$56,000,000 including the allocation of common costs. PPL Electric's low-income program acquisition cost (including the allocation of common costs and excluding demand response) will be approximately ~~$0.62~~$0.58 per annual kWh saved, which is ~~39%~~42% lower than in Phase II.

PPL Electric will offer its low-income portfolio at no cost to households that are at or below 150% of the FPIG. The Company will provide a variety of energy efficiency measures through its low-income programs and will strive to maximize savings within budget constraints, from direct install measures.

[7] Low-income savings from participation in PPL Electric residential (non-low-income) programs do not count toward the low-income sector verified gross energy savings in Phase III.

Finally, PPL Electric designed the low-income portfolio to achieve at least 15% of the total cumulative verified gross savings in each program year. In addition, individual programs in the low-income portfolio are designed to:

- Achieve high customer satisfaction (i.e., ≥80% of customers are very satisfied/satisfied);
- Address: renters and owners of (1) single family homes, (2) multifamily buildings that are in a residential rate class and are occupied by low-income customers, (3) multifamily buildings that are master metered and are in a nonresidential rate class but have low-income occupants, and (4) manufactured homes; and
- Offer information to Low-Income WRAP and Energy Efficiency Kit and Education Program participants regarding PPL Electric's other low-income programs (such as payment assistance).

Individual programs, such as Low-Income WRAP, are not required to be cost-effective (per the 2016 TRC Test Order) as long as the EE&C portfolio as a whole is cost-effective.

Nonresidential Sector

PPL Electric designed the Nonresidential sector portfolio to achieve combined verified gross energy savings of approximately 843,000 MWh per year (from three customer segments: Small C&I, Large C&I, and GNE) with at least 15% of the total verified gross savings in each program year. PPL Electric designed the nonresidential portfolio to achieve its savings objectives at the approximate total program costs for each sector shown below:

- Small C&I: total direct costs (excluding the allocation of common costs) $62,000,000, and total cost (including the allocation of common costs) $72,000,000;
- Large C&I: total direct costs (excluding the allocation of common costs) $44,000,000, and total cost (including the allocation of common costs) $51,000,000; and
- GNE: total direct costs (excluding the allocation of common costs) $20,000,000, and total cost (including the allocation of common costs) $24,000,000.

The program acquisition cost for nonresidential programs (excluding demand response) is approximately $0.16 per annual kWh saved, which is 38% lower than in Phase II (approximately ~~34%~~11% lower for Small C&I, ~~18%~~23% lower for Large C&I and ~~43%~~69% lower for GNE). Additionally, PPL Electric designed the programs within its nonresidential portfolio to:

- Achieve high customer satisfaction (≥ 80% of customers are very satisfied/satisfied);
- Offer a broad selection of energy efficiency measures across multiple end uses and three nonresidential customer segments (i.e., Small C&I, Large C&I, and GNE) across PPL Electric's service territory;
- Achieve acceptable NTG ratios as determined by PPL Electric, its evaluator, or the SWE;
- Be cost-effective as determined by the TRC test method; and

- Achieve approximately ~~81,000~~201,000 MWh/year of savings ~~from~~, which exceeds the GNE set-aside compliance target by ~~60%~~298% ~~-~~.[8]

Demand Response

PPL Electric designed its demand response programs to meet the following verified gross peak reduction targets at the generator level:

- PY8 (June 2016 – May 2017): 0 MW
- PY9 (June 2017 – May 2018): 92 MW
- PY10 (June 2018 – May 2019): 92 MW
- PY11 (June 2019 – May 2020): 92 MW
- PY12 (June 2020 – May 2021): 92 MW

In accordance with the Implementation Order, PPL Electric will limit demand response events to the months of June through September, calling events for the first six days that the peak hour of PJM Interconnection LLC's ("PJM") day-ahead forecast for the PJM regional transmission organization (RTO) is greater than 96% of the PJM RTO summer peak demand forecast. Additionally, PPL Electric designed its demand response program such that:

- Each curtailment event will last four consecutive hours and be called to occur during the day's forecasted peak hours above 96% of PJM's RTO summer peak demand forecast;
- Once six demand response events have been called in a program year, the demand response program will be suspended for that program year; and
- Customers participating in PJM's Emergency Load Response Program ("ELRP") are eligible to participate in PPL Electric's demand response program; however, the cost to acquire dually enrolled customers (i.e., customers who participate in an Act 129 demand response program and PJM's ELRP) shall not exceed half the cost to acquire single-enrolled customers (i.e., customers who only participate in an Act 129 demand response program). PPL Electric will track actual costs and provide documentation to the Commission (or SWE, if directed by the Commission) to confirm compliance. To the extent possible and if in the Company's reasonable judgment the following information would not identify individual customers, PPL Electric will include in its Final Phase III Annual Report: (1) the aggregate number of customers dual enrolled in PPL Electric's Act 129 Demand Response and PJM's Demand Response Programs; (2) the aggregate number of customers only enrolled in PPL Electric's Act 129 Demand Response Program; (3) the total amount of incentives paid to customers dual enrolled in PPL Electric's Act 129 Demand Response and PJM's Demand Response Programs; and (4) the total amount of incentives paid to customers only enrolled in PPL Electric's Act 129 Demand Response Program.

[8] To avoid double counting, this number excludes 2,500 MWH/yr. that counts toward the Low Income Compliance target (From GNE Low-Income WRAP Master Metered Multifamily).

PPL Electric shall require its Demand Response CSP to comply with all applicable PJM tariff rules, to the extent the CSP interacts with PJM as part of its Act 129 demand response responsibilities. Additionally, PPL Electric acknowledges that dual enrolled customers (Act 129 Demand Response participants who are also enrolled in PJM's Demand Response program) may require coordination between the Act 129 Demand Response CSP and their PJM Curtailment Service Providers, if they are different entities.

In the RFP, PPL Electric asked bidders to provide technical specifications (including program and measure types), incentive levels, and peak demand reductions, costs, and participation projections for each measure, program, and customer sector. Based on a detailed bid review and interviews, bidders and PPL Electric identified the type of demand response program the Company would offer for the Phase III EE&C Plan. PPL Electric program staff reviewed proposals to compare expected costs and savings to: (1) past achievements (such as results from the Phase I demand response programs); and (2) achievable potential savings, costs, and cost-effectiveness results from the SWE's 2015 Demand Response Market Potential Study.

Finally, during Program Year 8, PPL Electric will work with its Residential CSP or other contractors to evaluate a pilot for residential demand response using smart thermostats. The Company will review the recommendations of the evaluation with stakeholders in early Program Year 9. If the evaluation recommends implementing a pilot program for residential demand response using smart thermostats, the Company will submit, within a reasonable time, a description of the pilot program to the Commission and stakeholders prior to implementation in accordance with Section 9.1.5 of the Phase III EE&C Plan. If the pilot requires a change to the EE&C Plan, the Company will review the change with stakeholders and submit the change to the Commission with the next petition to modify the EE&C Plan. If the evaluation recommends not implementing a pilot program for residential demand response using smart thermostats, the evaluation will provide the reasons for this recommendation to stakeholders.

Cost-Effectiveness Testing and Portfolio Iterations

Next, PPL Electric worked with Cadmus to model program-, sector-, and portfolio-level cost-effectiveness (separately for the energy efficiency and demand response portfolios) based on projected peak load reductions, energy savings, and costs (e.g., program delivery, incentives, incremental measure costs, and participant costs). PPL Electric provided the lifecycle costs, savings, and avoided cost benefits for each measure, enabling Cadmus to compute the measures' cost-effectiveness from a TRC perspective.[9] Key assumptions used to determine cost-effectiveness are listed in Table 79 through Table 86 in Section 8 of the EE&C Plan.

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

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

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

The following tables summarize the estimated savings, budget, and cost-effectiveness for PPL Electric's entire portfolio. The tables are numbered sequentially, with the formats based on those provided in the EE&C Plan Template issued by the Commission on September 22, 2015, at Docket No. M-2014-2424864 ("EE&C Plan Template"). Each table heading includes a reference to the corresponding table number provided in the EE&C Plan Template.

These include:

- Table 3: **Pa PUC Table 1a -** Portfolio Summary of Lifetime Costs and Benefits for PPL Electric's Energy Efficiency Measures
- Table 4: **Pa PUC Table 1b -** Portfolio Summary of Lifetime Costs and Benefits of Demand Response Measures
- Table 5: **Pa PUC Table 2** - Summary of Portfolio Energy Savings and Demand Reduction
- Table 6: **Pa PUC Table 3** - Summary of Portfolio Costs

Table 3. Pa PUC Table 1a - Portfolio Summary of Lifetime Costs and Benefits of Energy Efficiency Measures [1]

Portfolio	Discount Rate	Total Discounted Lifetime Costs ($1000)	Total Discounted Lifetime Benefits ($1000)	Total Discounted Net[2] Lifetime Benefits ($1000)	TRC Ratio[4]
Residential Sector (exclusive of Low-Income)[3]	7.63%	$168,232 ~~$169,386~~	$225,988 ~~$228,678~~	$57,756 ~~$59,292~~	1.34~~1.35~~
Low Income	7.63%	$48,363 ~~$47,210~~	$38,297 ~~$35,608~~	($10,066)~~($11,602)~~	0.79~~0.75~~
Small C&I	7.63%	$142,983 ~~$142,989~~	$195,824 ~~$260,592~~	$52,841 ~~$117,603~~	1.37~~1.82~~
Large C&I	7.63%	$100,385 ~~$101,621~~	$137,160	$36,776 ~~$35,539~~	1.37~~1.35~~
GNE	7.63%	$31,545 ~~$29,386~~	$112,814 ~~$45,119~~	$81,269 ~~$15,732~~	3.58~~1.54~~
Total	**7.63%**	**$491,507 ~~$490,592~~**	**$710,083 ~~$707,157~~**	**$218,576 ~~$216,565~~**	**1.44**

[1] Discounted common costs are included in the appropriate sector totals. See Table 77 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 June 11, 2015 Implementation Order disallowed the inclusion of low-income participation in standard, non-low-income-specific residential programs in the calculation of savings towards the 5.5% low-income carve-out. See June 11, 2015 Implementation Order at page 69.
[4] TRC ratios include costs and benefits from energy efficiency only and exclude costs and benefits from demand response. TRC ratios shown in Table 8 include costs and benefits from both energy efficiency and demand response.

Table 4. Pa PUC Table 1b - Portfolio Summary of Lifetime Costs and Benefits of Demand Response Measures [1,3]

Portfolio	Discount Rate	Total Discounted Lifetime Costs ($1000)	Total Discounted Lifetime Benefits ($1000)	Total Discounted Net[2] Lifetime Benefits ($1000)	TRC Ratio
Small C&I	7.63%	$1,102	$25 ~~$2,487~~	($1,077)~~$1,385~~	0.02~~2.26~~
Large C&I	7.63%	$7,042 ~~$5,510~~	$16,608 ~~$8,517~~	$9,565 ~~$3,006~~	2.36~~1.55~~
GNE	7.63%	$418 ~~$4,408~~	$597 ~~$9,947~~	$179 ~~$5,538~~	1.43~~2.26~~
Total	**7.63%**	**$8,562 ~~$11,021~~**	**$17,229 ~~$20,950~~**	**$8,667 ~~$9,929~~**	**2.01~~1.90~~**

[1] Common costs are not included in this table; they are subsumed in Table 3
[2] 'Net' refers to the arithmetic difference between the previous two columns. It does not refer to net verified savings.
[3] TRC ratios are not expected to materially change if the DR portfolio includes Residential Direct Load Control (DLC)

Table 5. Pa PUC Table 2 - Summary of Portfolio Energy Savings and Demand Reduction

MWh/year and MW Saved for Consumption Reductions	PY8		PY9		PY10		PY11		PY12		Total	
	MWh/year	MW[3]	MWh/year	MW[3]	MWh/year	MW[3]	MWh/year	MW[3]	MWh/year	MW[3]	MWh/year	MW[3,4,6]
Baseline [1]	38,214,368		38,214,368		38,214,368		38,214,368		38,214,368		38,214,368	
Cumulative Projected Portfolio Savings												
Residential (exclusive of Low-Income)	154,665		308,166		436,132~~439,070~~		551,522~~557,380~~		648,737~~656,476~~		648,737~~656,476~~	
Low-Income [5]	17,575		35,835		57,358~~54,420~~		79,231~~73,373~~		95,886~~88,147~~		95,886~~88,147~~	
Small C&I	79,202		159,659	~~11.5~~	223,260~~262,526~~	~~11.5~~	286,847~~366,639~~	~~11.5~~	342,861~~462,861~~	~~11.5~~	342,861~~462,861~~	~~11.5~~
Large C&I	45,103		92,606	1125~~7.5~~	161,675	1125~~7.5~~	229,365	11257~~.5~~	297,000	11257~~.5~~	297,000	11257~~.5~~
GNE	16,480		33,100	~~346.0~~	91,120~~49,900~~	~~346.0~~	149,140~~66,700~~	~~346.0~~	203,500~~83,500~~	~~346.0~~	203,500~~83,500~~	~~346.0~~
EE&C Plan Total	313,024		629,365	115.0	969,545~~967,590~~	115.0	1,296,105~~1,293,456~~	115.0	1,587,984	115.0	1,587,984	115.0
Total Cumulative Projected Savings Phase III	313,024		629,365		969,545~~967,590~~		1,296,105~~1,293,456~~		1,587,984		1,587,984	
EE&C Plan Total – Percentage of Target to be Met [2]	22%		44%		67%		90%		110%		110%	125%
Percent Reduction from Baseline	1%		2%		3%		3%		4%		4%	
Commission Identified Goal [1]											1,443,035	92
Percent Savings due to Portfolio Above or Below Commission-Identified Goal	22%		44%		67%		90%		110%		110%	

[1] As defined in the June 11, 2015 Implementation Order.
[2] The June 11, 2015 Implementation Order directed that at least 15% of an EDC's target amount in each program year.
[3] Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, therefore, are not included in this table. Cumulative demand reduction from the demand response programs is reported as the average annual reduction.
[4] Total cumulative annual demand reduction from energy efficiency is expected to be approximately ~~249,194~~250,041 kW for Phase III.
[5] Excludes savings from master-metered multifamily buildings with low-income occupants. These savings count toward the low-income compliance target but are accounted for under the customer sector corresponding to the rate class of the building's meter (generally Small C&I or GNE).
[6] Potential for 7-15 MW of demand reduction from a Residential Direct Load Control measure and 0 – 5 MW of demand reduction from Residential Home Energy Education Program

Table 6. Pa PUC Table 3 - Summary of Portfolio Costs

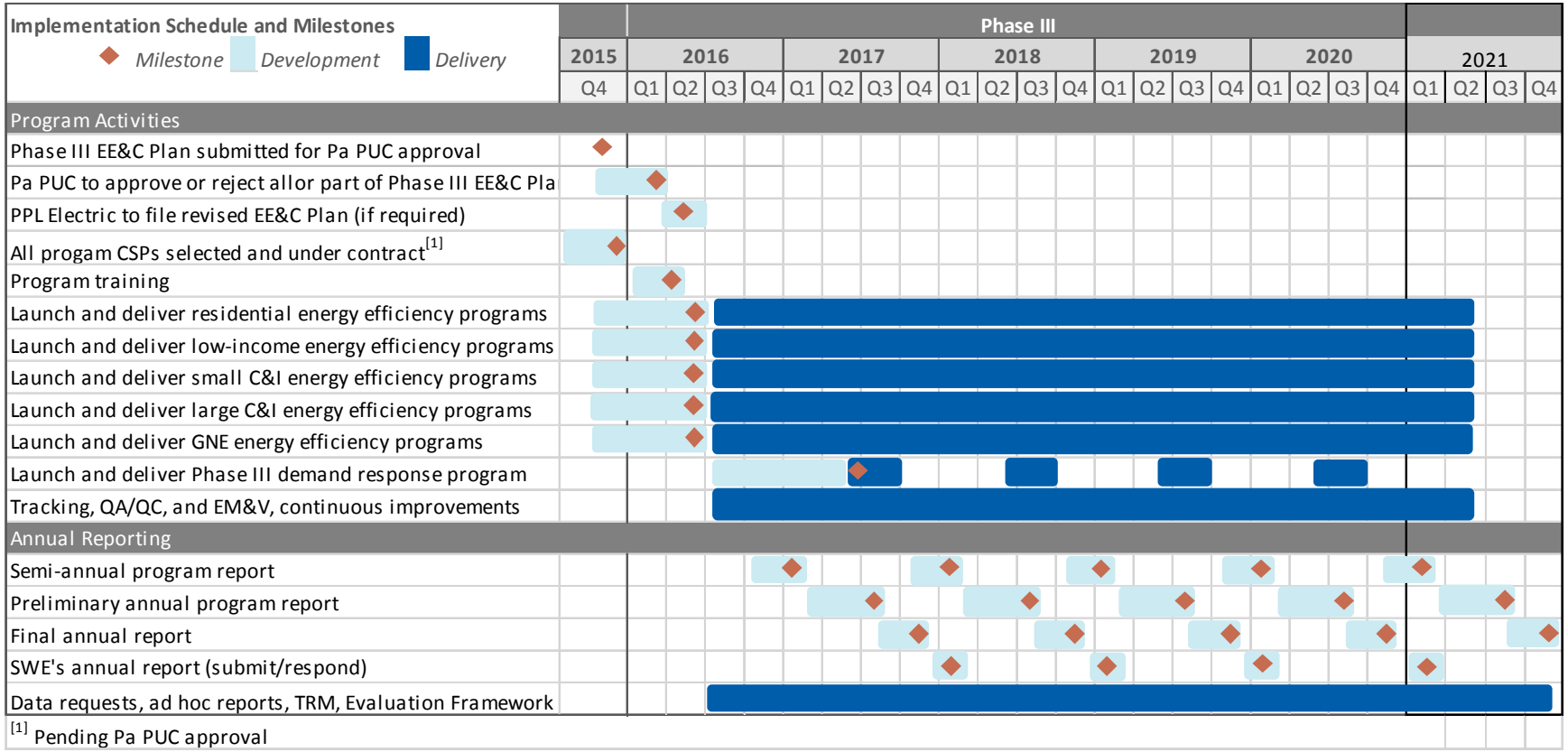
Sector	PY8		PY9		PY10		PY11		PY12		Total[3]	
	$1000	%	$1000	%	$1000	%	$1000	%	$1000	%	$1000	%
Residential Annual Budget[2]	$26,115	42%	$22,431	~~38%~~39%	$21,156~~$21,715~~	~~32%~~31%	$21,426~~$21,992~~	~~32%~~31%	$18,695~~$18,987~~	~~34%~~33%	$109,823~~$111,240~~	~~36%~~35%
Low-Income Annual Budget	$9,949	16%	$9,816	17%	$13,317~~$12,758~~	~~19%~~20%	$13,589~~$13,024~~	~~19%~~20%	$9,259~~$8,967~~	16%	$55,930~~$54,513~~	~~17%~~18%
Small C&I Annual Budget	$14,171	23%	$13,289	~~22%~~23%	$15,630~~$15,637~~	23%	$15,590~~$15,685~~	23%	$12,946~~$12,846~~	23%	$71,627	23%
Large C&I Annual Budget	$8,837~~$8,969~~	14%	$9,259~~$9,396~~	16%	$11,214~~$11,446~~	17%	$11,073~~$11,392~~	~~17%~~16%	$11,010~~$10,190~~	~~18%~~19%	$51,393	16%
GNE Annual Budget	$2,896~~$3,268~~	5%	$2,902~~$4,154~~	~~7%~~5%	$6,586~~$6,019~~	~~9%~~10%	$6,586~~$6,019~~	~~9%~~10%	$4,736~~$4,244~~	8%	$23,706	8%
Total Portfolio Annual Budget[3]	**$61,968~~$62,472~~**	**100%**	**$57,697~~$59,086~~**	**100%**	**$67,902~~$67,575~~**	**100%**	**$68,265~~$68,112~~**	**100%**	**$56,646~~$55,234~~**	**100%**	**$312,479**	**100%**

[1] Common costs are included in the appropriate sector totals. See Table 77 for allocation of common costs.
[2] Total Residential sector costs may increase by as much as $2.5M as a result of the inclusion of a Residential Direct Load Control measure.
[3] The sum of columns or rows may not equal the total column or row due to rounding.

1.4 Summary of Program Implementation Schedule

Figure 2 provides a visual summary of PPL Electric's implementation schedule in accordance with the Commission's EE&C Plan Template.

Figure 2. PPL Electric Implementation Schedule



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

Consistent with the Commission's Implementation Order, PPL Electric 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 measures and programs that will continue from Phase II. PPL Electric has significant experience with those measures and programs and believes it can control the programs' pace. In addition, PPL Electric designed the EE&C Plan to introduce new measures and delivery channels gradually over time, giving them time to ramp up and gain market acceptance.

PPL Electric will monitor actual performance, adjusting marketing, advertising, incentive levels, and eligible measures to manage participation as necessary.

1.6 Strategy to Manage EE&C Portfolios and Engage Customers and Trade Allies

For its implementation strategy, 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.

PPL Electric will use three sector-level CSPs (i.e., Residential, Low-Income, and Nonresidential), and one program-specific CSP (i.e., Demand Response) to deliver its portfolio. These CSPs 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, although CSPs and PPL Electric will jointly develop marketing plans. In addition, PPL Electric will provide some overarching marketing and customer care for EE&C programs.

PPL Electric 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. Key strategies include:

- Conducting targeted market research to:
  - 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; and
  - Assess customer response to programs and evaluate whether programs are meeting customer needs.
- Offering a range of voluntary customer programs that provide tangible benefits;
- Emphasizing customer service among PPL Electric staff, CSPs, and trade allies;
- Evaluating customer satisfaction and response;
- Modifying programs as necessary to improve programs and customer satisfaction; and

- Coordinating 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 programs, are able to effectively articulate program features and benefits to potential customers, and can support customers in their decision to take energy efficiency and demand reduction actions.

In addition to CSPs' and PPL Electric's marketing, the success of Phase III 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 who promote, stock, and install efficient measures included in the EE&C Plan.

The Company's objective is to comply with all Act 129 requirements while striking a reasonable balance between costs, ratepayer value, customer choice, quality service, and energy and capacity savings.

1.7 Data Management, Quality Assurance, and Evaluation Processes

The following sections summarize the Company's approach to implementing data management, quality assurance, and evaluation processes.

1.7.1 Data Management

Each CSP's tracking system and PPL Electric's energy efficiency management information system ("EEMIS") allow for program activities to be tracked daily. These systems generate reports and queries to allow ongoing monitoring, management, analysis, and reporting of activities.

1.7.2 Quality Assurance and Quality Control

During planning and design, PPL Electric will establish QA procedures to promote consistency and avoid faults. QC activities and inspection points during the implementation and evaluation phases help guide correcting errors and identifying areas for improvement. Together, QA and QC will improve program performance.

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

- Anticipating, detecting, and preventing problems or errors rather than reacting to them;
- Striving to perform work correctly the first time;
- Establishing screening and qualification protocols to confirm that qualified individuals perform all work functions;

- Training staff, CSPs, and trade allies to maintain current knowledge and skills needed for their positions;
- Documenting data collection and QA/QC protocols and conducting a full review of collected data to confirm that the proper data are collected consistently, resources are allocated appropriately, and program performance can be measured accurately;
- Conducting adequate planning, coordination, supervision, and technical direction;
- Defining and developing a clear understanding of job requirements and procedures; and
- Conducting post-installation inspections of an appropriately sized random sample of participants to confirm that program-reported measures were installed, installation followed best practices procedures, and measures function as expected.

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

1.7.3 Evaluation Processes

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

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

Evaluations will be conducted by PPL Electric's EM&V CSP. The EM&V CSP will conduct impact evaluations yearly, focused 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 the Pa PUC's Implementation Order. In process evaluations, the CSP will focus on qualitative assessments of the programs' design, operation, and implementation. The process evaluation also will include an assessment to confirm all data required for the impact evaluation are collected (evaluability assessment). The CSP will conduct cost-effectiveness evaluations yearly to determine the cost-effectiveness of the programs and portfolio (separately for energy efficiency and demand response) using the TRC test method specified by the Commission in its 2016 TRC Test Order. Finally, the CSP will conduct net savings evaluations annually or every other year (depending on the program, program changes, and rebated measures) 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 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 III EE&C Plan, PPL Electric expects to revisit and revise a number of assumptions to confirm they reflect updated market conditions. PPL Electric will submit required revisions to the Commission for review and approval in accordance with the Commission's requirements for revising EE&C Plans.

1.8 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 include this mechanism in its EE&C Plan. 66 Pa. C.S. § 2806.1(b)(1)(i)(H), (k)(1). Attached as Appendix E to the Phase III EE&C Plan is the Company's proposed ACR III, which is a reconcilable adjustment clause under Section 1307 that will 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. Section 7 and Appendix E provide additional information about PPL Electric's ACR III.

2 Energy Efficiency Portfolio/Program Summary Tables and Charts

The following tables provide a quantitative overview of the Phase III 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 headings include references to the corresponding table numbers provided in the EE&C Plan Template.

Tables in this section include:

- Table 7: **Pa PUC Table 4** - Residential, Commercial and Industrial Small, Commercial and Industrial Large, and Governmental/Educational/Nonprofit Portfolio Summaries
- Table 8: Plan Data - Costs, Cost-Effectiveness, and Savings by Program, Sector and Portfolio
- Table 9: **Pa PUC Table 5** - Budget and Parity Analysis
-
- Table 10~~Table 10~~: Summary of Costs and Savings by Program and Customer Sector
- As discussed in section 3.2, PPL may implement up to 15 MW and up to $2.5 million for residential demand response (direct load control) in the Demand Response Program. The possibility of residential demand response is noted in most tables.

2.1 Sector Level Portfolio Summaries

Table 7. Pa PUC Table 4 - Program Summary Residential

	Program Name	Program Market	Program Summary	Program Years Operated	Lifetime MWh Savings	Lifetime kW Savings	Percentage of Portfolio and Total Lifetime MWh Savings	
							Portfolio MWh Savings %	Lifetime MWh Savings %
Residential Portfolio Programs *(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.	PY8-12	525,031	70,024	4.13%	2.86%~~2.87%~~
	Efficient Lighting	All customers (primarily residential)	Upstream retail promotion and incentives applied to eligible light emitting diode ("LED") bulbs. Other distribution channels Include online, mail, directly to customers, welcome kits, etc.	PY8-12	3,714,234	677,740	16.71%	20.20%~~20.29 %~~
	Energy Efficient Home	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.	PY8-12	914,689	55,003	4.64%	4.97%~~5.00%~~
	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.	PY8-12	197,162~~2 63,922~~	25,633~~34 ,312~~	1.13%~~1.51%~~	1.07%~~1.44%~~
	Home Energy Education	Residential single and multifamily	Education, online home energy surveys and Home Energy Reports comparing energy use to other customers in PPL territory, and offering energy efficiency and demand response tips.	PY8-12	226,268~~2 27,938~~	29,417~~29 ,634~~	14.25% ~~14.35%~~	1.23%~~1.24%~~
			Totals for Residential Sector		**5,577,385 ~~5,645,814~~**	**857,816~~8 66,712~~**	**40.85% ~~41.34%~~**	**30.33%~~30.84 %~~**

Pa PUC Table 4 - Program Summary – Residential Low-Income

	Program Name	Program Market	Program Summary	Program Years Operated	Lifetime MWh Savings	Lifetime kW Savings	Percentage of Portfolio and Total Lifetime MWh Savings	
							Portfolio MWh Savings %	Lifetime MWh Savings %
Residential Low-Income Sector Programs	WRAP	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.	PY8-12	656,510~~588,080~~[10]	89,181~~80,285~~	3.67% ~~3.18%~~	3.57%~~3.21%~~
	Energy Efficiency Kits and Education	All income qualified residential customers	Offers free energy efficiency kits and education to customers whose incomes are at or below 150% of FPIG.	PY8-12	310,990	44,731	2.37%	1.69%~~1.70%~~
				Totals for Low-Income Sector	**967,500~~899,071~~**	**133,912~~125,016~~**	**6.04% ~~5.55%~~**	**5.26%~~4.91%~~**

Note: There may be additional residential lifetime kW savings from the DR portion of the Home Energy Education Program.

[10] Excludes savings from master-metered multifamily buildings with low-income occupants. These savings count toward the low-income compliance target but are accounted for under the customer sector corresponding to the rate class of the building's meter (generally Small C&I or GNE).

Pa PUC Table 4 - Program Summary – Commercial/Industrial Small

	Program Name	Program Market	Program Summary	Program Years Operated	Lifetime MWh Savings	Lifetime kW Savings	Percentage of Portfolio and Total Lifetime MWh Savings	
							Portfolio MWh Savings %	Lifetime MWh Savings %
Commercial/Industrial Small Portfolio Programs	Non-Residential Energy Efficiency	Small C&I	Provides rebates/incentives for a list of qualified energy efficiency measures and custom measures not included in PPL Electric's other programs. Includes CHP, continuous energy improvement, a behavioral pilot, process upgrades, retro-commissioning, and other measures.	PY8-12	4,357,920 ~~6,078,557~~	867,749 ~~1,159,085~~	19.70% ~~27.26%~~	23.70% ~~33.20%~~
	Small C&I Efficient Lighting*	Small C&I	Upstream retail promotion and incentives applied to eligible LED bulbs through the Residential Efficient Lighting Program.	PY8-11	385,714	79,955	1.73%	2.10%~~2.11%~~
	Demand Response	Small C&I	Offers incentives to eligible customers for reducing demand when called upon to do so.	PY9-12		460~~46,000~~	0.00%	0.00%
	Small C&I Low-Income WRAP Master Metered Multifamily	Small C&I	Offers a range of free direct install energy efficiency measures in the tenant units of low-income residents living in master-metered multifamily buildings in the Small C&I rate class.	PY8-12	37,500	6,349	0.16%	0.20%
			Totals for C&I Small Sector		**4,781,133 ~~6,501,771~~**	**954,513~~1,291,389~~**	**21.59% ~~29.15%~~**	**26.00% ~~35.51%~~**

*To account for cross-sector sales, PPL Electric allocates a portion of costs and savings from the Efficient Lighting (Residential) program to the small commercial sector.

Pa PUC Table 4 - Program Summary – Commercial/Industrial Large

	Program Name	Program Market	Program Summary	Program Years Operated	Lifetime MWh Savings	Lifetime kW Savings	Percentage of Portfolio and Total Lifetime MWh Savings	
							Portfolio MWh Savings %	Lifetime MWh Savings %
Commercial/Industrial Large Portfolio Programs	Non-Residential Energy Efficiency	Large C&I	Provides rebates/incentives for a list of qualified energy efficiency measures and custom measures not included in PPL Electric's other programs. Includes CHP, continuous energy improvement, a behavioral pilot, process upgrades, retro-commissioning, and other measures.	PY8-12	4,111,560	556,428	18.70%	22.36% ~~22.46%~~
	Demand Response	Large C&I	Offers incentives to eligible customers for reducing demand when called upon to do so.	PY9-12	0	448,500~~230,000~~	0.00%	0.00%
	Totals for C&I Large Sector				**4,111,560**	**1,004,928~~786,428~~**	**18.70%**	**22.36%~~22.46%~~**

Pa PUC Table 4 - Program Summary – Government/Education/Nonprofit

	Program Name	Program Market	Program Summary	Program Years Operated	Lifetime MWh Savings	Lifetime kW Savings	Percentage of Portfolio and Total Lifetime MWh Savings	
							Portfolio MWh Savings %	Lifetime MWh Savings %
Governmental/Educational/Nonprofit Portfolio Programs	Non-Residential Energy Efficiency	Government, educational, and nonprofit customers	Provides rebates/incentives for a list of qualified energy efficiency measures and custom measures not included in PPL Electric's other programs. Includes CHP, continuous energy improvement, a behavioral pilot, process upgrades, retro-commissioning, and other measures.	PY8-12	2,913,079~~1, 113,084~~	498,617~~193, 844~~	12.66%~~5.10 %~~	15.84%~~6.08 %~~
	Demand Response	Government, educational, and nonprofit customers	Offers incentives to eligible customers for reducing demand when called upon to do so.	PY9-12	0	11,040~~184,0 00~~	0.00%	0.00%
	GNE Low-Income WRAP Master Metered Multifamily	Government, educational, and nonprofit customers	Offers a range of free direct install energy efficiency measures in the tenant units of low-income residents living in master-metered multifamily buildings that qualify under GNE eligibility rules.	PY 8-12	37,500	6,349	0.16%	0.20%
	Totals for GNE Sector				**2,950,579~~1, 150,584~~**	**516,007~~384, 194~~**	**12.81%~~5.26 %~~**	**16.05%~~6.28 %~~**

2.2 Plan Data: Costs, Cost-Effectiveness and Savings by Program, Sector, and Portfolio

Table 8. TRC Costs, Cost-Effectiveness, and Savings Summary ~~($1,000)~~

	Program Name	Total TRC Cost[1]	Cost Effectiveness (Benefit/Cost Ratio)	Lifetime MWh savings
Residential Sector	Appliance Recycling	$10,135,768	2.12	525,031
	Efficient Lighting	$70,019,692	2.17	3,714,235
	Energy Efficient Home	$61,507,216	0.57	914,689
	Student Energy Efficient Education	$8,705,725~~$6,020,418~~	1.15~~1.75~~	226,268~~263,922~~
	Home Energy Education	$4,920,196~~$8,759,197~~	1.61~~1.15~~	197,162~~227,938~~
	Common Costs	**$12,943,432**	0.00	0
	Residential Sector Total	**$168,232,029 ~~$169,385,723~~**[(2)]	**1.34~~1.35~~**	**5,577,385~~5,645,815~~[2]**
Low-Income Sector	WRAP	$5,989,288~~$34,877,527~~	2.10~~0.66~~	310,990~~588,080~~[3]
	Energy Efficiency Kits and Education	$36,031,220~~$5,989,288~~	0.71~~2.10~~	656,510~~310,990~~
	Common Costs	$6,342,923	0.00	0
	Low Income Sector Total	**$48,363,431~~$47,209,738~~**	**0.79~~0.75~~**	**967,500~~899,071~~**
Small C&I Sector				
	Non-Residential Energy Efficiency	$127,532,861~~$127,539,405~~	1.40~~1.90~~	4,357,920~~6,078,557~~
	Small C&I Efficient Lighting	$6,005,176	2.73	385,714
	Demand Response	$1,102,068	0.02~~2.26~~	0
	Small C&I Low-Income WRAP Master Metered Multifamily	$1,058,212	1.36	37,500
	Common Costs	$8,386,602	0.00	0
	Small C&I Sector Total	**$144,084,919~~$144,091,463~~**	**1.36~~1.83~~**	**4,781,134~~6,501,771~~**
Large C&I Sector				
	Non-Residential Energy Efficiency	$93,565,882 ~~$94,802,231~~	1.47~~1.45~~	4,111,560
	Demand Response	$7,042,340~~$5,510,349~~	2.36~~1.55~~	0
	Common Costs	$6,818,655	0.00	0

	Program Name	Total TRC Cost[1]	Cost Effectiveness (Benefit/Cost Ratio)	Lifetime MWh savings
	Large C&I Sector Total	**$107,426,877~~$107,131,235~~**	**1.43~~1.36~~**	**4,111,560**
GNE Sector				
	Non-Residential Energy Efficiency	$27,570,857~~$25,412,581~~	4.04~~1.72~~	2,913,079~~1,113,084~~
	Demand Response	$418,030~~$4,408,281~~	1.43~~2.26~~	0
	GNE Low Income WRAP Master Metered Multifamily	$1,058,212	1.36	37,500
	Common Costs	$2,915,580	0.00	0
	GNE Sector Total	**$31,962,679~~$33,794,654~~**	**3.55~~1.63~~**	**2,950,579 ~~1,150,584~~**
Portfolio Total		**$500,069,934~~$501,612,814~~**	**1.45**	**18,388,159~~18,308,801~~**

[1] Represents the sum of EDC and participant costs on a net present value basis.

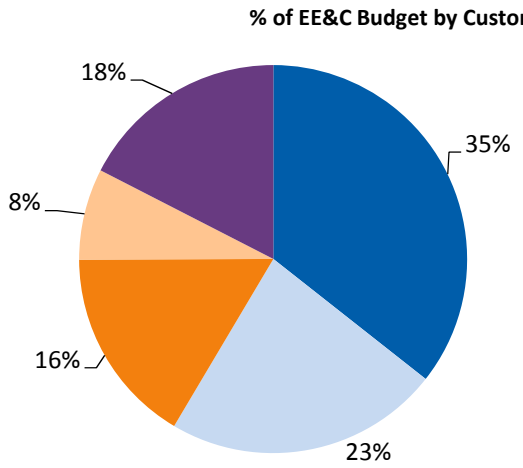
[2] Potential to have costs and savings shifted from Large C&I, Small C&I and GNE to account for the inclusion of Residential participation in the Demand Response Program. Residential participation in the DR Program is not expected to materially change the benefit-cost ratio for the portfolio, DR Program, or any of the customer sectors

[3] Excludes savings from master-metered multifamily buildings with low-income occupants. These savings count toward the low-income compliance target but are accounted for under the customer sector corresponding to the rate class of the building's meter (generally Small C&I or GNE).

2.3 Budget and Parity Analysis

Table 9. Pa PUC Table 5 - Budget and Parity Analysis Summary

Customer Class	Budget ($1,000)	% of Total EDC Budget	% of Total Budget Excluding Other Expenditures	% of Total Customer Revenue	Difference
Residential	$109,823~~$111,240~~	35%~~36%~~	35%~~36%~~		
Residential Low-Income	$55,930 ~~$54,513~~	18% ~~17%~~	18% ~~17%~~		
Residential Subtotal	$165,753	53%	53%	45%	8%
C&I Small	$71,627	23%	23%	32%	-9%
C&I Large	$51,393	16%	16%	23%	-7%
C&I Subtotal	$123,020	39%	39%	55%	-16%
GNE	$23,706	8%	8%	Included in Small & Large C&I	8%
GNE Subtotal	$23,706	8%	8%		
Residential, C&I, and GNE Subtotal	$312,479	100%	100%	100%	
Other Expenditures	N/A				
EDC TOTAL	**$312,479**				



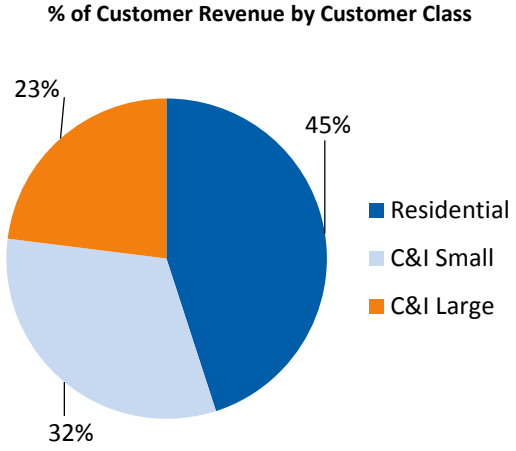


Table 10. Summary of Costs and Savings by Program and Customer Sector

Program	Residential		Low-Income		Small C&I		Large C&I		GNE		Total Cost ($1000)	Total MWh/yr Reduction[4] *	$/kWh[3]	TRC
	Costs ($1000)	Savings MWh/yr	Costs ($1000)	Savings* MWh/yr	Costs ($1000)	Savings* MWh/yr	Costs ($1000)	Savings* MWh/yr	Costs ($1000)	Savings* MWh/yr				
Appliance Recycling	$11,802	65,522	$0	0	$0	0	$0	0	$0	0	$11,802	65,522	$0.18	2.12
Efficient Lighting	$32,571	265,302	$0	0	$3,766	27,551	$0	0	$0	0	$36,337	292,853	$0.12	2.21
Energy Efficient Home	$34,734	73,721	$0	0	$0	0	$0	0	$0	0	$34,734	73,721	$0.47	0.57
Student Energy Efficient Education	$5,662 ~~$7,012~~	17,924~~2 3,993~~	$0	0	$0	0	$0	0	$0	0	$5,662 ~~$7,012~~	17,924~~23,993~~	$0.3200 ~~$0.29~~	1.61~~1.75~~
Home Energy Education[11]	$10,141 ~~$10,208~~	226,268 ~~227,938~~	$0	0	$0	0	$0	0	$0	0	$10,141 ~~$10,208~~	226,268~~227,9 38~~	$0.04	1.15
Low-Income WRAP	$0	0	$41,723 ~~$40,306~~	58,285~~5 0,546~~	$1,250	2,500[8]	$0	0	$1,250	2,500[8]	$44,223 ~~$42,806~~	63,285~~55,546~~	$0.7000 ~~$0.77~~	0.75~~0.70~~
Energy Efficiency Kits/Education	$0	0	$6,899	37,601	$0	0	$0	0	$0	0	$6,899	37,601	$0.18	2.10
Non-Residential Energy Efficiency	$0	0	$0	0	$55,418	312,810 ~~432,810~~	$33,187 ~~$35,887~~	297,000	$18,577 ~~$12,977~~	201,000 ~~81,000~~	$107,181 ~~$104,282~~	810,810	$0.13	1.72~~1.71~~
Demand Response	$0[10]	0	$0	0	$1,530	0	$10,350~~$ 7,650~~	0	$520~~$6, 120~~	0	$12,400 ~~$15,299~~		~~N/A~~	2.01 [5]~~1.90~~
Total - Direct Program Cost	$94,910~~$ 96,327~~		$48,622 ~~$47,205~~	-	$61,964		$43,537		$20,346 [12]		$269,379			
Percent of Total Direct Costs	35%~~36%~~		18%		23%		16%		8%		100%			
Common Cost Allocation[1]	$14,913		$7,308		$9,663		$7,856		$3,359		$43,100			
TOTAL ESTIMATED COST	**$109,823 ~~$111,240~~**		**$55,930 ~~$54,513~~**		**$71,627**		**$51,393**		**$23,706** [12]		**$312,479**			**1.45**[6]
Total Estimated Phase III Reduction[2,4]		648,737 ~~656,476~~		95,886~~8 8,147~~		342,862 ~~462,861~~		297,000		203,500 ~~83,500~~		1,587,984		
Low-income savings from master metered multifamily				5,000						-2,500				
Total Savings (including Master metered multifamily)				100,886 ~~93,147~~						201,000 ~~81,000~~[7]				
Energy Reduction Target[4]				79,367						50,507		1,443,035		
$/kWh (direct & common) for energy efficiency programs only[3]	$0.17		$~~0.62~~0.58		$~~0.15~~0.20		$~~0.15~~ 0.14		$~~0.21~~ 0.11				$0.19	
Total Estimated MW Reduction for						~~11~~1		~~57~~112		~~46~~3		115		

Program	Residential		Low-Income		Small C&I		Large C&I		GNE		Total Cost ($1000)	Total MWh/yr Reduction[4] *	$/kWh [3]	TRC
	Costs ($1000)	Savings MWh/yr	Costs ($1000)	Savings* MWh/yr	Costs ($1000)	Savings* MWh/yr	Costs ($1000)	Savings* MWh/yr	Costs ($1000)	Savings* MWh/yr				
DR programs only [4,5,9]														
MW Reduction Target*												92		

* Demand response savings are gross verified MW at the generator level (grossed up to reflect T&D line losses)

[1] Includes $5 million SWE costs that are not subject to the cost cap.

[2] Savings are for measures installed and operable 6/1/16-5/31/21.

[3] Program acquisition cost for energy efficiency programs equals program costs divided by first year's savings.

[4] MWh/year and MW are on a verified gross basis.

[5] Program acquisition cost for demand response programs equals program costs divided by (MW x 4 years) and is represented in $/MW-year.

[6] TRC is 1.44 for energy efficiency programs, and 1.45 for entire portfolio of energy efficiency and demand response programs. These TRC ratios include common costs.

[7] To avoid double counting, this number excludes 2,500 MWH/yr. that counts toward the Low Income Compliance target (From GNE Low-Income WRAP Master Metered Multifamily).

[8] Master metered multifamily savings to be applied to the low income sector compliance target.

[9] There could be up to 15MW of demand reduction from a Residential Direct Load Control measure

[10] Overall TRC will not materially change if a Residential Direct Load Control measure is enacted and up to $2.5M is reallocated from the other sectors to the residential sector

[11] Approximately $400,000 for this program may be used for the behavioral demand response component of the program.

[12] Total does not match the sum of rows due to rounding.

3 Program Descriptions

3.1 Process Used for Selection of Programs

3.1.1 Portfolio Objectives and Metrics that Define Success

Portfolio Objectives

PPL Electric designed the Phase III EE&C Plan to meet the requirements set forth by the Commission's Implementation Order and to achieve a range of additional objectives associated with customer satisfaction and operational efficiency. These objectives are described in detail in Section 1.1.1 of this Plan.

Metrics that Define Success

The primary objectives of the proposed Plan are to meet the requirements of Act 129 and encourage more efficient use of electric power by PPL Electric customers. PPL Electric will monitor its progress in meeting these objectives by tracking specific performance indicators and, when deficiencies are found, identifying corrective action when necessary. The Company will employ a range of EM&V, QA/QC, and data tracking activities to assess and monitor program performance and customer/trade ally satisfaction throughout the Phase III Plan cycle. Table 11 identifies the performance indicators and metrics PPL Electric will use to measure its programs' 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 Average project size
Customer and trade ally satisfaction	Responses to participant surveys administered as part of QA and/or EM&V
Operating efficiency	Application processing time Incentive processing time Expenditures in each category Acquisition cost ($/kWh saved)* Levelized cost ($/kWh saved)*
Cost-effectiveness	TRC benefit/cost ratio

*Acquisition cost is ratio of total EDC expenditures to annual kWh. Levelized cost is the full TRC cost (including participant cost) over lifetime kWh. The levelized cost is the present value of TRC cost divided by levelized lifetime ~~M~~kWh (i.e., ~~$473,905,339~~$500,069,934/10,489,827,077~~11,064,152~~) and is equal to $0.04767~~$0.04283~~

3.1.2 How Programs Were Constructed

As described earlier, PPL Electric developed separate budgets, savings targets, and performance objectives for five customer sectors: Residential, Low-Income, Small C&I, Large C&I, and GNE, as well as for its demand response programs. To accomplish this, the Company drew on the Phase III Market Potential Studies and its Phase II experience, combined with an analysis of Phase III requirements, including the overall, low-income, GNE, and demand reduction compliance targets (as well as the demand reduction budget suggested by the Pa PUC).

With the sector-level budgets and targets defined, PPL Electric issued RFPs for the design and implementation (i.e., delivery) of residential, nonresidential (including Small C&I, Large C&I, and GNE), low-income, and demand response programs. These RFPs were necessary to confirm that PPL Electric's savings targets and budgets (including the 30% reduction in overall program acquisition cost) were achievable and realistic for each sector, and to confirm the types of programs and measures to include in the EE&C Plan.

At various points in the program development process, the Company met with stakeholders individually and in large groups to seek input, discuss progress, and generate new ideas and perspectives. PPL Electric incorporated the stakeholder input into this EE&C Plan.

Once PPL Electric identified the sector-level eligible measures and program structures and calculated program costs and savings estimates, the Company completed an extensive technical and economic program screening analysis (see Section 8), and examined a number of other factors to determine program-, sector-, and portfolio-level cost-effectiveness. PPL Electric used this analysis as the basis for iteratively adjusting individual elements to balance the portfolio. The objective of this balancing exercise was to provide a reasonable mix of programs that meet all of the Act 129 requirements, including the GNE and low-income set aside targets, the overall cost cap, equity across the various customer segments, and cost-effectiveness at the portfolio level.

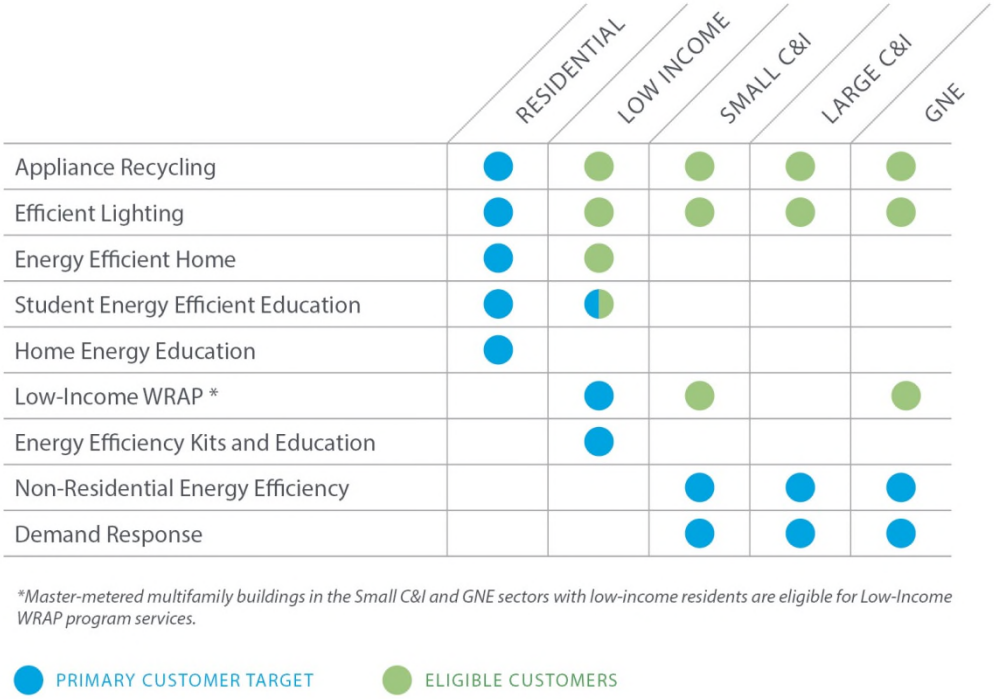
The result is a mix of proven energy efficiency and demand response strategies that will enable PPL Electric to reach its program goals within the parameters set forth in Act 129, the Implementation Order and the Clarification Order. Overall, the programs are very similar to the successful programs offered during Phase I and Phase II and were enhanced by the substantial program implementation experience of PPL Electric's sector-level CSPs. This strategy allows PPL Electric and its CSPs to capitalize on the existing programs' momentum and awareness and facilitates the transition from Phase II to Phase III programs (since many customers and trade allies are unaware of Act 129 phases).

This EE&C Plan presents separate programs to establish separate estimates for cost, savings, and cost-effectiveness. However, the delineation of these offerings as separate programs will be largely invisible to customers, especially those in the Residential sector. When residential customers search for information about available energy efficiency measures, PPL Electric will not present those measures and associated applications in terms of a specific program.

For the launch and delivery of programs or components in Phase III, PPL Electric will capitalize on existing activities and relationships with market partners, leverage the relevant sector-level CSP's delivery experience, and account for the seasonal nature of some programs to achieve its Act 129 goals. To account for program ramping, PPL Electric assigned ramp rates to each program's participation estimates that account for a gradual increase in customer outreach and acceptance, leading to market adoption rates that are realistic but sufficiently aggressive to support the Company's goals. For these programs, the Company estimates that participation will start at a low level, increase throughout PY8, and level off to full participation rates that represent expected total saturation by the end of PY9. These assumptions were guided by the SWE Energy Efficiency Market Potential Study and the market characteristics in PPL Electric's territory, and were tempered by the experience of sector-level CSPs that have offered similar programs in other jurisdictions.

PPL Electric differentiated its programs and estimates (i.e., savings and costs) according to the five customer sectors identified in the EE&C Plan Template. Program eligibility is summarized in Figure 3.

Figure 3. Customer Eligibility by Program



3.1.3 Measures Included in the Portfolio of Programs

The measures to be offered in the Phase III programs are described in Sections 3.2 – 3.5 (see the Eligible Measures and Incentive Strategy section in each program 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 nonresidential customers."[11] To satisfy this requirement for residential customers, PPL Electric will continue to offer Low-Income WRAP, which provides energy efficiency education and a comprehensive mix of direct-install efficiency measures for low-income residential customers in single family, multifamily (including master-metered multifamily housing in the Small C&I and GNE sectors) and manufactured homes, including an in-home audit, weatherization, lighting, water heating, HVAC, water conservation, and appliance measures. In addition, PPL Electric will offer the Energy Efficient Home Program, which offers in-home energy audits and a comprehensive mix of measures for non-low-income residential customers, including weatherization, water heating, lighting (available through the lighting program), HVAC, and appliances. Both low-income and non-low-income residential customers will receive energy efficiency education and will be encouraged to implement multiple measures and take a comprehensive approach to energy efficiency.

To meet the requirement for the nonresidential customers, PPL Electric will offer the Custom Program to each nonresidential customer sector (i.e., Small C&I, Large C&I, and GNE). Through its Custom Program, PPL Electric will provide financial incentives to customers who install any cost-effective project that includes measures that are not in PPL Electric's other programs, including measures that are not in the TRM. Custom Program measures cover a comprehensive set of nonresidential needs, including new or replacement energy efficient equipment, retro-commissioning, repairs, equipment optimization, building management or industrial process controls, new construction projects, combined heat and power ("CHP"), continuous energy improvement (e.g., behavioral and strategic energy initiatives), and operational and process improvements that result in cost-effective energy efficiency savings. PPL Electric expects CHP to provide at least approximately 10% of the total energy savings for the nonresidential sector. In addition, through its efficient equipment program, PPL Electric offers a comprehensive mix of measures including HVAC, lighting, and water heating that, if installed collectively, provide a comprehensive solution for customers.

[11] Implementation Order at page 61.

3.2 Residential Sector Programs

The following sections summarize PPL Electric's proposed Residential sector programs. Please note that participation levels, savings, costs, and incentive ranges are estimates.

In addition to the programs outlined in this Plan, PPL Electric will reserve approximately $3 million in funding for residential pilots and new technologies. Apart from the specific pilot programs described in the following sections, these residential pilots and new technologies could include items such as whole-home energy management systems, integration of smart thermostats with HVAC devices, limited time offers on efficient HVAC measures, or more cost-effective distribution models for equipment incentives. As in Phase II, PPL Electric will submit details of each pilot to Commission staff and stakeholders prior to implementation.

EE&C Plan includes the option to implement fast response direct load control (DLC) for residential customers within the Demand Response Program. The residential component would be up to $2.5 million and is included in the overall budget for the Demand Response Program. This residential component is expected to provide significant operational flexibility to add peak reductions quickly during DR events. This flexibility is important to meet the per-event compliance and the overall compliance target, especially if other demand response participants (load curtailment component of the program) do not perform as expected during events. This flexibility is also important to address the uncertainty associated with the difference between the EM&V method used to monitor DR performance in real-time compared to the EM&V method used to determine verified DR (the basis of compliance) well after the end of the DR season. The residential DR component would provide up to 15MW of demand response from the residential sector and would not change the TRCs for demand response by a material amount. The residential component would be available only to existing participants of the PA Peak Saver Program (not administered by PPL).

The Plan also includes the option for up to $400,000 for Behavioral demand response as part of the Energy Education Program. If PPL implements the Residential Direct Load Control and Residential Behavioral Demand Response components beginning in Program Year 2017 PPL will review the actual verified savings achieved from the Residential Behavioral Demand Response components for program year 2017 with the stakeholders. If the Residential Behavioral Demand Response component(s) is not achieving the expected level of savings at the end of Program Year 2017, then PPL and the stakeholders will convene a meeting to discuss what strategies could be implemented to address any concerns related to the Residential Behavioral Demand Response component(s)

Appliance Recycling Program

Program Description

Through the Appliance Recycling Program, PPL Electric offers free pick-up and recycling of refrigerators, freezers, room air conditioners, and possibly consumer electronics (without savings or incentive) and dehumidifiers. 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 (if offered) are eligible for pick up with a refrigerator/freezer, but are not eligible as a stand-alone service.

PPL Electric offers scheduling, picking-up, and decommissioning of all units at a site; transporting the materials to a Pennsylvania-based processing center; and disposing of the parts in an environmentally responsible manner. This 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 the Appliance Recycling Program are to:

- 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-site to prevent resale in a secondary market;
- Promote other PPL Electric energy efficiency programs;
- Achieve a total energy reduction of approximately 65,000 MWh/year gross verified savings; and
- Achieve high customer and trade ally satisfaction with the program.

Target Market

The Appliance Recycling Program targets residential customers but it is available to customer in all sectors with working, residential-grade refrigerators, freezers, and/or room air-conditioning units. In addition, PPL Electric encourages landlords and multifamily property managers/owners in its service territory to recycle refrigerators and freezers located in their tenant units.

Implementation Strategy

The Residential CSP will manage the program, with support from a subcontractor that specializes in appliance recycling who will deliver the program to customers, including scheduling, picking up appliances, decommissioning, recycling components, training retailer staff to promote the program, and tracking data. The Residential CSP will also support sector-level program functions, including operating a customer call center, marketing and advertising, processing incentives, and tracking program activities. PPL Electric’s energy efficiency staff will provide overall strategic direction and program management. The EM&V CSP will provide evaluation services.

Program Issues, Risks, and Risk Management Strategy

Table 12~~Table 12~~ presents market risks associated with the Appliance Recycling Program, as well as strategies PPL Electric will use to manage each risk.

Table 12. Appliance Recycling Program Issues, Risks, and Risk Management Strategies

Program 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 the available time	Residential CSP works with customers to provide a pick-up that is as convenient as possible. On a case-by-case basis, special pick-up times may be arranged to meet customer needs.
Lack of program awareness among customers	Customer participation might be low	Residential CSP manages a robust marketing strategy, including distributing materials at community events and to retailers and community based organizations ("CBOs"), as well as running a media campaign and designing PPL Electric bill inserts.
Customer may not see the benefit of recycling qualified appliance(s)	Customer disposes of units through channels other than this program	Residential CSP works with retailers where new units are sold to display information about the benefits of recycling. PPL Electric offers free pick-up 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 program.

Ramp-up Strategy

The Appliance Recycling Program is an existing, mature program being carried forward from Phase II. The Residential CSP will develop marketing material to facilitate the transition to Phase III.

Marketing Strategy

PPL Electric's 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:

- Promoting the program through "Connect," bill inserts, Home Energy Reports ("HERs"), the energy efficiency hub, and e-mail blasts;
- Providing online access to the program via the EE&C program website;
- Distributing program materials at community events and to CBOs;
- Advertising through multiple channels;
- Educating retailer staff and customers through in-store events;
- Distributing point-of-purchase materials to local retailers;
- Training local retailer store staff to cross-promote the program when customers purchase a new refrigerator; and
- Conducting targeted outreach to PPL Electric customers that submit a refrigerator rebate application.

Eligible Measures and Incentive Strategy

Qualified customers receive free pick-up and disposal, as well as an incentive for recycling working refrigerators, freezers, room air conditioners, and possibly consumer electronics (without savings or incentives) and dehumidifiers. Room air conditioners, consumer electronics, and dehumidifiers may be picked up along with a qualified refrigerator or freezer, but are not eligible for pick-up up as stand-alone items.

Table 13~~Table 13~~ identifies PPL Electric's proposed list of program measures, minimum eligibility qualifications, and incentive level ranges.

Table 13. Appliance Recycling Program Eligible Measures and Incentives

Measure	Eligibility Qualifications	Incentive Range*
Refrigerator	Working unit Tiered incentives based on age of unit > 10 cubic feet and ≤ 30 cubic feet	$20 - $75
Freezer	Working unit > 10 cubic feet and ≤ 30 cubic feet	$20 - $75
Room air conditioner	Working unit removed from mounting	$10 - $25
Consumer electronics	Must fit inside accompanying, recycled refrigerator/freezer	N/A
Dehumidifier	Eligibility requirements contingent upon approval of TRM protocol	$10 - $25

* PPL Electric may offer other forms of incentives of equivalent value, such as LEDs, advanced power strips, or other measures at no cost to the participant.

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

Deadline for Rebate Applications

There is no rebate application for this program.

Program Start Date with Key Schedule Milestones

The Appliance Recycling Program is currently offered in Phase II, and PPL Electric will facilitate the transition to the Phase III program. Table 14 lists the estimated key schedule milestones for the Appliance Recycling Program. PPL Electric program staff will lead implementation or provide management oversight of all tasks.

Table 14. Appliance Recycling Program Schedule and Milestones

Schedule	Milestones
11/30/2015	Phase III EE&C Plan submitted to Pa PUC
06/01/2016	Launch Phase III program
Annually by 01/15	EDCs submit semi-annual program report
Annually by 07/15	EDCs submit preliminary annual program report
Annually by 11/15	EDCs submit final annual program report
05/31/2021	Program ends

Evaluation, Measurement, and Verification

EM&V requirements will be detailed in PPL Electric's Evaluation Plan, which will be submitted to the SWE for review. PPL Electric and its EM&V CSP will conduct annual evaluations of each program in compliance with all Pa PUC requirements and the SWE's Evaluation Framework. As part of this process, the EM&V CSP will review a sample of participant rebate applications and Residential CSP records to verify the 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 demand reduction. For the Appliance Recycling Program, PPL Electric anticipates conducting annual impact and process evaluations (activities vary by year).

Administrative Requirements

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

Estimated Participation

Table 15~~Table 15~~ shows order of magnitude participation estimates for the Appliance Recycling Program. Actual quantities will vary, and PPL Electric will manage the program to stay within budget.

Table 15. Appliance Recycling Program Projected Participation

Measure	PY8	PY9	PY10	PY11	PY12	Total
Freezers Recycling	2,200	2,200	2,200	2,200	2,933	11,733
Leave Behind LED, in lieu of a cash incentive	5,473	5,473	5,473	5,474	0	21,893
Room A/C Recycling	917	917	917	917	1,222	4,890
Refrigerator Recycling	8,798	8,798	8,798	8,798	11,731	46,923
Total	17,388	17,388	17,388	17,389	15,886	85,439

Estimated Program Budget, Savings, and Cost-Effectiveness

Table 16 displays estimated program savings and costs by program year and in total. Approximately 12% of the Residential sector budget is attributed to the Appliance Recycling Program.

Table 16. Appliance Recycling Program Costs and Benefits by Program Year ($1000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	13,120	12,734	12,358	11,994	15,316	65,522
Demand Reduction (MW)*	1.78	1.73	1.68	1.63	2.07	8.88
Total TRC Costs	$2,113	$2,108	$2,345	$2,431	$2,806	$11,802
Participant Costs	$00	$00	$00	$00	$00	$00
Direct Utility Costs	$2,113	$2,108	$2,345	$2,431	$2,806	$11,802
Customer Incentives	$433	$428	$433	$439	$628	$2,362
EDC Labor, Materials, Supplies	$59	$59	$59	$59	$59	$296
CSP Labor, Materials, Supplies	$1,461	$1,443	$1,669	$1,708	$1,836	$8,116
CSP Marketing	$159	$178	$183	$225	$282	$1,027

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

The Appliance Recycling Program is projected to be cost-effective, with a TRC test ratio of 2.12. Table 17~~Table 17~~ shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 60%.

Table 17. Appliance Recycling Program Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$21,471
NPV Costs	$10,136
Net Benefits	$11,335
Benefit/Cost Ratio	2.12

Efficient Lighting Program

Program Description

Through the Efficient Lighting Program, PPL Electric primarily encourages residential customers to purchase and install LED bulbs.[12] Participating customers will be able to purchase a variety of discounted LED bulbs at local retail stores. The Residential CSP will manage program operations and provide support to participating retailers and manufacturers that promote and sell program-eligible bulbs.

Objectives

The objectives of the Efficient Lighting Program are to:

- Provide a mechanism for customers to easily obtain discounted LED bulbs in local retail stores;
- Achieve widespread visibility through independent and regional retailers that carry program-eligible LED bulbs;
- Develop and execute strategies aimed at transforming the market for LED bulbs;
- Educate customers on new lighting technologies;
- Engage retailers by educating and training retail sales associates about LED bulbs;
- Obtain approximately 293,000 MWh/year gross verified savings; and
- Achieve high customer and trade ally satisfaction with the program.

Target Market

The Efficient Lighting Program targets residential customers, but it is available to all PPL Electric customers.

Implementation Strategy

The Residential CSP will administer the program 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 sector-level program functions, including operating a customer call center, managing marketing and branding guidelines, and tracking activities. PPL Electric's energy efficiency staff will provide overall strategic direction and program management. The selected EM&V CSP will provide evaluation services.

Program Issues, Risks, and Risk Management Strategy

Table 18 presents market risks associated with the Efficient Lighting Program, as well as strategies PPL Electric will use to manage each risk.

[12] Based on actual results from Phase II, PPL Electric estimated a portion of costs and savings associated with the Efficient Lighting Program for the Small C&I sector due to 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.

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

Program 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 offers incentives to offset the cost of efficient bulbs at retail locations. PPL Electric will likely use other distribution channels such as offering free bulbs at customer give-away events, free bulbs for completing an online energy survey or customer profile, and in welcome kits for new customers. • PPL Electric educates customers on the long-term energy cost-saving benefits of higher efficiency lighting measures.
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 increasing Energy Independence and Securities Act of 2007 ("EISA") standards	Higher acquisition costs	PPL Electric determines the proper product mix to offset the savings changes for specific bulbs while optimizing the program's energy savings, given budget constraints.
Energy efficient bulb performance	Customer may not purchase energy efficient bulbs if they perceive that the 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 adds new programs/ measures as efficiency improves.

Anticipated Costs to Participating Customers

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

Ramp-up Strategy

The Efficient Lighting Program is an existing, mature program being carried forward from Phase II. The Residential CSP will develop marketing material to facilitate the transition to Phase III.

Marketing Strategy

PPL Electric's 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:

- Promoting the program through "Connect," bill inserts, HERs, the energy efficiency hub, and e-mail blasts;
- Providing online access to the program via the EE&C program website;
- Advertising through multiple channels;
- Educating retailer staff and customers through in-store events;
- Distributing point-of-purchase materials to local retailers;
- Collaborating with ENERGY STAR® and lighting manufacturers; and
- Cross-promoting the lighting program in other energy efficiency program educational materials.

Eligible Measures and Incentive Strategy

Table 19 identifies PPL Electric's proposed list of program measures, minimum eligibility qualifications, and incentive level ranges. In general, the incentives provided at the retail level are designed to cover approximately 25% to 50% of the retail cost of LEDs.

Table 19. Efficient Lighting Program Eligible Measures and Incentives

Measure	Eligibility Qualifications	Incentive Range*
LED General Service	General purpose, dimmable, or three-way 250- 2,600 lumens	$1.00- $6.00
LED Specialty	Decorative, mini-base, or globe 250- 2,600 lumens	$2.00- $7.00
LED Reflectors	Reflectors or outdoor 250- 2,600 lumens	$2.00- $8.00
LED Fixtures	Downlight fixture ≥ 400 lumens	$2.00- $8.00

* Some delivery channels, such as give-away promotions and LEDs in new customer welcome kits, may provide LEDs at no cost to the customer.

All measures may not be available at all times. In some cases, PPL Electric may suspend a measure depending on popularity, pace of the program (savings and costs), free-ridership, evaluation requirements, the complexity of information required from customers, administrative requirements for the measure, etc. PPL Electric will review the program continually and may adjust available measures or eligibility qualifications to achieve program savings and cost budgets.

Deadline for Rebate Applications

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

Program Start Date with Key Schedule Milestones

The Efficient Lighting Program is currently offered in Phase II, and PPL Electric will facilitate the transition to the Phase III program. Table 20 lists the estimated key schedule milestones for the Efficient Lighting Program. PPL Electric program staff will lead implementation or provide management oversight of all tasks.

Table 20. Efficient Lighting Program Schedule and Milestones

Schedule	Milestones
11/30/2015	Phase III EE&C Plan submitted to Pa PUC
06/01/2016	Launch Phase III program
Annually by 01/15	EDCs submit semi-annual program report
Annually by 07/15	EDCs submit preliminary annual program report
Annually by 11/15	EDCs submit final annual program report
05/31/2021	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electrics Evaluation Plan which will be submitted to the SWE for review. PPL Electric and its EM&V CSP will conduct annual evaluations of each program in compliance with all Pa PUC requirements and the SWE's Evaluation Framework. As part of this process, the EM&V CSP will verify savings attributable to this program, including sales to nonresidential customers (known as cross-sector sales). The EM&V CSP will verify bulb quantities and savings for lighting distributed through other channels (such as giveaways or in welcome kits), 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 demand reduction. For the Efficient Lighting Program, PPL Electric anticipates conducting annual impact and process evaluations (activities vary by year).

Administrative Requirements

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

Estimated Participation

PPL Electric anticipates delivering an average of approximately 1,722,000 energy efficient LED bulbs per year through the Efficient Lighting Program. Actual quantities will vary, and PPL Electric will manage the program to stay within budget.

Estimated Program Budget, Savings, and Cost-Effectiveness

Table 21~~Table 21~~ displays anticipated program benefits and costs by program year and in total. Approximately 34% of the Residential sector budget is attributed to the Efficient Lighting Program.

Table 21. Efficient Lighting Program Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	88,864	84,566	57,357	34,515	0	265,302[13]
Demand Reduction (MW)*	16.22	15.43	10.47	6.30	0.00	48.41
Total TRC Costs	$36,579	$21,383	$10,689	$5,307	$120	$74,079
Participant Costs	$23,753	$12,195	$4,294	$1,266	$0	$41,507
Direct Utility Costs	$12,826	$9,188	$6,395	$4,042	$120	$32,571
Customer Incentives	$11,240	$7,738	$4,634	$2,422	$0	$26,034
EDC Labor, Materials, Supplies	$120	$120	$120	$120	$120	$600
CSP Labor, Materials, Supplies	$1,190	$1,022	$1,422	$1,268	$0	$4,901
CSP Marketing	$276	$308	$219	$232	$0	$1,036

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

The Efficient Lighting Program is projected to be cost-effective, with a TRC test ratio of 2.17. Table 22~~Table 22~~ shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 75%.

Table 22. Efficient Lighting Program Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$151,692
NPV Costs	$70,020
Net Benefits	$81,672
Benefit/Cost Ratio	2.17

[13] This is for Residential only. There is an additional 27,551 MWh/yr for Small C&I participants in this program.

Energy Efficient Home Program

Program Description

Through the Energy Efficient Home Program, PPL Electric 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 PPL Electric customers increase their home's efficiency. The program includes three components:

- **A new homes component** that encourages the 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 is inclusive of both multifamily and single-family homes/buildings.
- **A comprehensive in-home audit (approximately 1,500 over the entire five-year phase) with some direct-install or give-away measures, online audit, and weatherization component,** for which, based on audit recommendations, customers may qualify for insulation and air sealing rebates, and will learn about the benefits of other energy efficiency measures such as appliance recycling, lighting, HVAC, water heating, etc. Customers who participate in the online energy audit will also receive an energy efficiency kit.
- **An energy efficiency equipment component** through which PPL Electric provides rebates for measures such as high-performance heat pumps, heat pump water heaters, pool pumps, and central air conditioning units.
- **A pilot program to provide programmable thermostats** designed to control baseboard electric heaters of residential or low income customers. PPL Electric will use commercially reasonable efforts to obtain 20 participants for the pilot, but the parties acknowledge that the program is voluntary and that PPL Electric cannot guarantee the actual number of participants. The Company will strive to start the pilot by June 2017, but the completion date is contingent on the design of the program, delivery channels for the thermostats, and participation by customers. The Company will publish the results of the pilot to stakeholders.

The Company will provide builders and customers with one central point of entry for program participation. The Residential CSP will implement the program by maintaining a call and rebate processing center, recruiting and educating trade allies, and marketing the program to provide sufficient program participation.

Objectives

The objectives of the Energy Efficient Home Program are to:

- Encourage customers to view energy efficiency in a holistic manner;
- Provide customers with education, audits, surveys, and energy-saving solutions;
- Promote the construction of energy efficient new homes;
- Educate construction industry professionals and other trade allies about the benefits of energy efficient homes;

- Reduce energy consumption by approximately 73,000 MWh/year gross verified savings; and
- Achieve high customer and trade ally satisfaction with the program.

Target Market

The Energy Efficient Home Program is targeted to residential homebuilders and customers residing in single family and individually-metered multifamily homes. Customers residing in a rental property must have the owner/landlord's approval to participate.

Implementation Strategy

The Residential CSP will deliver the Energy Efficient Home Program to customers and homebuilders, including marketing, participant recruitment, and trade ally recruitment and support. Because the program consists of three separate offerings, trade ally support will vary by program component:

- **New homes:** The Residential CSP's responsibilities will include identifying, recruiting, and training potential builders; assisting new home builders with paperwork; answering program-specific questions; testing new home performance; and issuing incentives to builders and homeowners.
- **Audit and weatherization:** The Residential CSP's responsibilities will include conducting in-home audits; hosting and maintaining the online program energy audit tool; distributing kits; identifying, recruiting, and training HVAC contractors; forming and maintaining a trade ally network; and answering program-specific questions.
- **Energy efficient equipment:** The Residential CSP's responsibilities will include working with retailers, trade allies, and manufacturers to promote program energy efficient equipment.

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

Program Issues, Risks, and Risk Management Strategy

Table 23 presents market risks associated with the Energy Efficient Home Program, as well as strategies PPL Electric will use to manage each risk.

Table 23. Energy Efficient Home Program Issues, Risks, and Risk Management Strategies

Program 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/building practices	Residential CSP educates builders on the performance standards and building practices required to qualify for program rebates.
• Economic environment may limit builders' and customers' ability to purchase energy efficient equipment and appliances because: • 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 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 Home Program participants will vary by program component and the type of qualifying equipment installed through the program.

Ramp-up Strategy

The Energy Efficient Home Program is an existing, mature program being carried forward from Phase II. The Residential CSP will develop marketing material to facilitate the transition to Phase III.

Marketing Strategy

PPL Electric's 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:

- Promoting the program through "Connect," bill inserts, HERs, the energy efficiency hub, and e-mail blasts;
- Providing online access to the program via the EE&C program website;
- Advertising through multiple channels;
- Identifying builders through collaboration with state and regional builders' associations and providing them with program details;
- Educating retailer staff and customers through in-store events;
- Distributing point-of-purchase materials to local retailers; and
- Recruiting and training retailers on qualifying technology, rebates, and cross-promotion.

Additionally, the Residential CSP will conduct outreach to previously participating and new trade allies (i.e., retailers, manufacturers, distributors, homebuilders, and contractors) to provide them with rebate information, educate them on Phase III program changes, and offer ongoing program support.

Eligible Measures and Incentive Strategy

Table 24 identifies PPL Electric's proposed list of expected program measures, minimum eligibility qualifications, and incentive level ranges.

Table 24. Energy Efficient Home Program Expected Eligible Measures and Incentives

Measure	Eligibility Qualifications	Incentive Range
Refrigerator	ENERGY STAR	$10-$75
	ENERGY STAR Most Efficient	$20-$100
Heat pump water heater	≥ 2.3 EF	Up to $500
Non-electric high efficiency central heat (gas, oil, propane). Maximum of 250 units across all customer sectors/programs	Natural gas or propane – AFUE 95 Oil furnace – AFUE 85 Fossil Fuel Boilers – AFUE 85	Up to $300
Efficient non-electric water heater (oil, gas, propane) – Maximum of 250 units across all customer sectors/programs	Switch from electric to non-electric. Excluding new construction and non-electric to non-electric replacement. Tankless units –EF>=0.90; storage natural gas or propane – EF>=0.67; oil - EF>=0.585.	Up To $200
Smart thermostat	Kept up to date on PPL Electric's website as products evolve to comply with the eligibility requirements of the Interim Measure Protocol (IMP)	Up to $250
Manufactured Home	ENERGY STAR	Up to $1,500
Air source heat pump	≥ 16 SEER and ENERGY STAR qualified	$100-$800
Ductless heat pump	≥ 16 SEER and ENERGY STAR qualified	$100-$350/ton
Central air conditioner	≥ 16 SEER and ENERGY STAR qualified	$100-$400
Air source heat pump tune-up	System must be at least seven years old. Limited to one rebate per system for entirety of Phase III	$25-$175
Duct Sealing	Home has electric ducted heating system. Requires duct leakage test by BPI-certified trade ally	$25-$175
Incentive for sealing/insulation measures	Install insulation and/or conduct air sealing and/or duct sealing within three months of qualifying HVAC installation	$25-$175
Pool pump (In-Ground Pools)	Variable speed	Up to $350
Attic and wall insulation	Home has electric main source heat or central air conditioning. Minimum of R11 above code installed	Up to 75% of installed cost, not to exceed $750 each insulation type
Air sealing	Home has electric main source heat or central air	Up to $200 per home

Measure	Eligibility Qualifications	Incentive Range
	conditioning.	
Trade ally SPIFF	N/A	$20-$200
Professional home energy audit	Home has electric main source heat or central air conditioning. Approximately 1,500 audits	$20-$250[14]
New home – Single Family[15]	ENERGY STAR and/or HERS-rated	Up to $2,500
New home – Multi Family [15]	ENERGY STAR and/or HERS-rated	Up to $2,500
Custom Measures	Minimum TRC requirement may be implemented as a requirement for projects if necessary to ensure the program or portfolio TRC is greater than 1.0 and incentives capped at 25%-50% of total project costs (excluding internal labor)	Up to $0.14 per annual kWh saved

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

PPL Electric will offer comprehensive in-home diagnostic audits throughout Phase III, approximately a total of 1,500 audits. The cost of a comprehensive audit may vary depending on the auditor chosen by the customer. Customers will receive a rebate of varying amounts based on the type of heating and cooling equipment installed in the customer's home.

PPL Electric will add a pilot designed to provide programmable thermostats that control baseboard electric heaters in residential or low-income customers' homes. PPL Electric will use commercially reasonable efforts to obtain 20 participants for the pilot, but since the pilot program is voluntary, PPL Electric cannot guarantee the actual number of participants. The company will strive to start the pilot by June 2017, but the completion date is contingent on the design of the program, delivery channels for the thermostats, and participation by customers.

[14] Any alternative incentive structures will be reviewed with stakeholders.

[15] Smart thermostats are an eligible measure under the New Homes Component. Specifically, smart thermostats are an eligible measure to achieve the HERs rating home, and smart thermostats with adaptive recovery technology are an eligible measure for an Energy Star rated home.

The Company will work with interested stakeholders to 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, to the extent that a project is eligible under the new construction component of the Energy Efficient Home Program.

Deadline for Rebate Applications

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

Program Start Date with Key Schedule Milestones

The Energy Efficient Home Program is currently offered in Phase II as the Home Comfort Program and the Residential Efficient Equipment Program, and PPL Electric will facilitate the transition to the Phase III program. Table 25~~Table 25~~ lists the estimated key schedule milestones for the Energy Efficient Home Program. PPL Electric program staff will lead implementation or provide management oversight of all tasks.

Table 25. Energy Efficient Home Program Schedule and Milestones

Schedule	Milestones
11/30/2015	Phase III EE&C Plan submitted to Pa PUC
06/01/2016	Launch Phase III program
Annually by 01/15	EDCs submit semi-annual program report
Annually by 07/15	EDCs submit preliminary annual program report
Annually by 11/15	EDCs submit final annual program report
05/31/2021	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electric's Evaluation Plan which will be submitted to the SWE for review. PPL Electric and its EM&V CSP will conduct annual evaluations of each program in compliance with all Pa PUC requirements and the SWE's Evaluation Framework. As part of this process, the EM&V CSP will review a sample of participant rebate applications and Residential CSP records to verify the 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 demand reduction. For the Energy Efficient Home Program, PPL Electric anticipates conducting annual impact and process evaluations (activities vary by year).

Through the Energy Efficient Home Program, PPL Electric offers incentives for new home construction, home energy audits, and a variety of weatherization and equipment, each requiring 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 based on measure type. Because the Company offers a variety

of program 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 Evaluation Framework, which is likely 85/15 (confidence/precision) at the program level, the same as it was in Phase II.

Administrative Requirements

The Residential CSP will provide overall administrative and operational management of the Energy Efficient Home Program. PPL Electric staff will provide oversight and operational support to establish effective program deployment.

Estimated Participation

PPL Electric estimates approximately 150,000 measures will be installed through this program during Phase III. PPL Electric estimates approximately 50,000 to 100,000 customers will participate, depending on the number of measures they choose to install per project, PPL Electric has estimated the total savings for this program to be approximately 73,000 MWh/year. PPL Electric will manage the program to stay within budget.

Estimated Program Budget, Savings, and Cost-Effectiveness

Table 26 displays anticipated program benefits and costs by program year and in total. Approximately ~~36%~~37% of the Residential sector budget is attributed to the Energy Efficient Home Program.

Table 26. Energy Efficient Home Program Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	7,357	9,941	14,408	19,454	22,561	73,721
Demand Reduction (MW)*	0.66	0.85	1.07	1.22	1.25	5.04
Total TRC Costs	$8,651	$9,773	$14,371	$18,804	$21,859	$73,458
Participant Costs	$3,545	$4,651	$7,721	$9,939	$12,868	$38,724
Direct Utility Costs	$5,106	$5,123	$6,650	$8,864	$8,991	$34,734
Customer Incentives	$1,703	$2,018	$3,092	$4,782	$5,372	$16,967
EDC Labor, Materials, Supplies	$119	$119	$119	$119	$119	$593
CSP Labor, Materials, Supplies	$3,093	$2,772	$3,159	$3,626	$3,139	$15,790
CSP Marketing	$191	$213	$280	$338	$362	$1,384

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

The Energy Efficient Home Program is not projected to be cost-effective, with a TRC test ratio of 0.57. Although this program is not expected to be cost-effective, PPL Electric believes it is important to offer this type of program and its related measures to customers, especially to help promote a comprehensive approach to energy efficiency. Table 27 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 65%.

Table 27. Energy Efficient Home Program Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$34,865
NPV Costs	$61,507
Net Benefits	($26,642)
Benefit/Cost Ratio	0.57

Student Energy Efficient Education Program

Program Description

Through the Student Energy Efficient Education Program, PPL Electric offers energy efficiency kits and education to students and teachers. The program consists of three separate components:

- **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.

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

During Phase III, the Company will aim to drive students and their families to the Customer Engagement Hub ("Hub") for follow-up educational activities (e.g., completing an online home energy audit). PPL Electric will also provide participating teachers with energy efficiency measures, such as a smart power strip, to use as instructional aides to educate students about energy efficiency.

Objectives

The objectives of the Student Energy Efficient Education Program are to:

- Expand and promote energy efficiency literacy through education outreach programs;
- 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;
- Obtain participation by approximately ~~115,000~~85,000 students and teachers through 2021, and approximately ~~24,000~~18,000 MWh/year gross verified savings; and
- Achieve high customer and trade ally satisfaction with the program.

Target Market

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

Implementation Strategy

The Residential CSP will deliver the program to schools, having sole responsibility for marketing to and recruiting potential schools and teachers; creating curriculum correlated to Pennsylvania Education Academic Standards; securing program endorsement by the Pennsylvania Department of Education; conducting the various energy efficiency presentations; and assembling and shipping the take-home energy efficiency kits.

The Residential CSP will also support sector-level program functions, including operating a customer call center, managing marketing and branding guidelines, and tracking activities. PPL Electric's energy efficiency staff will provide overall strategic direction and program management. The EM&V CSP will provide evaluation services.

Program Issues, Risks, and Risk Management Strategy

Table 28 presents market risks associated with the Student Energy Efficient Education Program, as well as strategies PPL Electric will use to manage each risk.

Table 28. Student Energy Efficient Education Program Issues, Risks, and Risk Management Strategies

Program Issue	Risk	Risk Management Strategies
Teachers may not have the 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 PA 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 program 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 service call center for participants who have questions about the kits or how to install the measures.

Anticipated Costs to Participating Customers

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

Ramp-up Strategy

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

Marketing Strategy

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

Eligible Measures and Incentive Strategy

Participants in each component receive a take-home energy efficiency kit that includes a variety of low-cost measures, such as LEDs. PPL Electric will review the program continually and may adjust available measures or eligibility qualifications as warranted by changing market conditions or to manage program delivery, participation, and budgets.

Deadline for Rebate Applications

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

Program Start Date with Key Schedule Milestones

The Student Energy Efficient Education Program is currently offered in Phase II, and PPL Electric will facilitate the transition to the Phase III program. Table 29 lists the estimated key schedule milestones for the Student Energy Efficient Education Program. PPL Electric program staff will lead implementation or provide management oversight of all tasks.

Table 29. Student Energy Efficient Education Program Schedule and Milestones

Schedule	Milestones
11/30/2015	Phase III EE&C Plan submitted to Pa PUC
06/01/2016	Launch Phase III program
Annually by 01/15	EDCs submit semi-annual program report
Annually by 07/15	EDCs submit preliminary annual program report
Annually by 11/15	EDCs submit final annual program report
05/31/2021	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electrics Evaluation Plan which will be submitted to the SWE for review. PPL Electric and its EM&V CSP will conduct annual evaluations of each program in compliance with all Pa PUC requirements and the SWE's Evaluation Framework. As part of this process, the EM&V CSP will review a sample of Residential CSP records and student surveys, and will follow all applicable methods in the TRM and the Evaluation Framework to calculate energy savings and demand reduction. For the Student Energy Efficient Education Program, PPL Electric anticipates conducting annual impact and process evaluations (activities vary by year).

Through the Student Energy Efficient Education Program, PPL Electric 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 that students 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 the Student Energy Efficient Education Program. PPL Electric staff will provide oversight and operational support to establish effective program deployment.

Estimated Participation

Table 30 shows order of magnitude participation estimates of for the Student Energy Efficient Education Program by measure. Actual quantities will vary, and PPL Electric will manage the program to stay within budget.

Table 30. Student Energy Efficient Education Program Projected Participation

Measure	PY8	PY9	PY10	PY11	PY12	Total
Schools - Intermediate Kit	14,000	14,000	7,611~~14,000~~	7,611~~14,000~~	~~14,000~~8,264	~~70,000~~51,486
Schools - Primary Kit	5,000	5,000	2,718~~5,000~~	2,718~~5,000~~	0	~~20,000~~15,436
Schools - Secondary Kit	5,000	5,000	2,718~~5,000~~	2,718~~5,000~~	2,952~~5,000~~	18,388~~25,000~~
Total	24,000	24,000	~~24,000~~13,047	~~24,000~~13,047	~~19,000~~11,216	~~115,000~~85,310*

*Approximately 29,690 students that were in the residential program will participate under Low-Income WRAP.

Estimated Program Budget, Savings, and Cost-Effectiveness

Table 31 displays anticipated program benefits and costs by program year and in total. Approximately ~~7%~~6% of the Residential sector budget is attributed to the Student Energy Efficient Education Program.

Table 31. Student Energy Efficient Education Program Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	5,180	5,180	2,8165,180	2,8165,180	1,9333,274	17,92423,993
Demand Reduction (MW)*	0.67	0.67	0.370.67	0.370.67	0.250.43	2.333.12
Total TRC Costs	$1,243	$1,271	$8541,390	$8761,419	$1,4191,689	$5,6627,012
Participant Costs	$00	$00	$00	$00	$00	$00
Direct Utility Costs	$1,243	$1,271	$8541,390	$8761,419	$1,419$1,689	$5,6627,012
Customer Incentives	$00	$00	$00	$00	$00	$00
EDC Labor, Materials, Supplies	$40	$40	$40	$40	$40	$198
CSP Labor, Materials, Supplies	$1,054	$1,065	$6431,180	$6401,183	$1,1181,388	$4,5205,870
CSP Marketing	$149	$166	$171	$197	$262	$944

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

The Student Energy Efficient Education Program is projected to be cost-effective, with a TRC test ratio of 1.751.61. Table 32 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 100%.

Table 32. Student Energy Efficient Education Program Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$7,92310,537
NPV Costs	$4,9206,020
Net Benefits	$3,0034,516
Benefit/Cost Ratio	1.611.75

Home Energy Education Program

Program Description

For the Home Energy Education Program, PPL Electric focuses on educating customers about behaviors and measures they can adopt to reduce energy consumption in their homes. The program's education and awareness is separate from the advertising and promotion of PPL Electric's specific energy efficiency programs. In addition, PPL Electric may provide some program participants with targeted messages and tips for reducing peak demand during DR events. This behavioral demand response component may help PPL reach its peak reduction compliance target and would be limited to approximately $400,000 (included in the program's budget.)

Through the program, the Residential CSP will send residential, high energy-use customers a series of HERs, which will likely contain the following types of information.

- A comparison of recipients' usage to that of other, comparable customers in the same geographical area.
- Energy efficiency education and recommendations, such as turning down the thermostat, turning off the lights, taking shorter showers, and information about energy efficiency measures such as LEDs, weatherization, smart thermostats, smart strips, appliances, water heaters, HVAC, recycling old refrigerators, etc. Where practical, these recommendations will be personalized for each home, especially if the participant has completed an online energy profile.
- Messaging to encourage recipients to visit the Hub and complete an online energy profile/survey.

- Messages and tips to help participants reduce peak demand during DR events.

Customers can opt-out of the program if they no longer wish to receive the HERs. The Residential CSP will identify customers that do not engage in any energy-saving actions and categorize them as low propensity participants. The Residential CSP will flag these customers for potential removal from the program. Customers who are identified as low propensity and removed from the program will have to opt-in to continue receiving HERs.

Objectives

The objectives of the Home Energy Education Program are to:

- Encourage customers to adopt energy efficient behaviors and install high-efficiency measures;
- Help customers become more aware of how their behavior and practices affect energy usage;
- Educate customers about no- and low-cost measures and behavior changes that may reduce energy consumption;
- Educate customers about PPL Electric's online resources;
- Promote other PPL Electric energy efficiency programs;
- Obtain participation by approximately 123,000 customers through 2021, and obtain approximately ~~228,000~~226,000 MWh/year gross verified savings;

- PPL may strive to obtain approximately 0-5 MW of peak demand reductions from a subset of program participants who receive targeted messages and tips for reducing peak demand during DR events.
- Achieve high customer and trade ally satisfaction with the program.

Target Market

PPL Electric targets the Home Energy Education Program to residential customers with high energy consumption.

Implementation Strategy

The Residential CSP will deliver the program to customers, including identifying a pool of potential HERs recipients (i.e., treatment and control groups), developing and delivering HERs to the treatment group (i.e., customers who receive HERs), and tracking program outcomes. The Residential CSP will also support sector-level program functions, including operating a customer call center, marketing, and tracking activities. PPL Electric's energy efficiency staff will provide overall strategic direction and program management. At least once per program year, PPL Electric will review the general contents of the home energy reports with stakeholders and consider comments from the stakeholders regarding the general content of these reports. The EM&V CSP will provide evaluation services.

Program Issues, Risks, and Risk Management Strategy

Table 33 presents market risks associated with the Home Energy Education Program, as well as strategies PPL Electric will use to manage each risk.

Table 33. Home Energy Education Program Issues, Risks, and Risk Management Strategies

Program Issue	Risk	Risk Management Strategies
A large number of customers may opt-out of the program	Fewer customers participating in the program would negatively affect energy savings	• Residential CSP monitors opt-outs on a monthly basis to ensure the number of participating customers remains at an acceptable level. • Residential CSP ensures there is a pool of customers available who meet the selection criteria to receive HERs to maintain program participation.
Customers do not change behavior based on recommended tips	Tips do not resonate with customers and they do not change their behavior	• Residential CSP monitors savings on a monthly basis. • Residential CSP adjusts and changes HER messaging if monthly savings do not meet targets.
Customers think like-household comparisons are not accurate	Customers disregard HER information as incorrect and do not change their behavior	• Residential CSP allows customers to call or use the online HERs located on PPL Electric's website and the Hub to modify the information about their household. • Residential CSP periodically reviews the accuracy of the data used in household comparisons to determine if there is

Program Issue	Risk	Risk Management Strategies
		additional public information available, and/or if there are other ways to increase the accuracy of customer data (e.g., heating source).

Anticipated Costs to Participating Customers

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

Ramp-up Strategy

The Home Energy Education Program is an existing, mature program being carried forward from Phase II, with changes. The Residential CSP will develop an implementation plan to facilitate the transition to Phase III.

Marketing Strategy

PPL Electric will provide more targeted messaging to customers as part of the Home Energy Education Program. If the savings for the Home Energy Education Program do not meet expectations, the Company may adjust the program, including the messaging sent to customers.

Eligible Measures and Incentive Strategy

PPL Electric will not provide any specific incentives through this program; rather, by virtue of providing energy conservation education, information, and strategies, customers will make behavioral changes and gain energy savings. HERs recipients may also participate in other PPL Electric energy efficiency programs (receiving incentives from PPL Electric) as a result of receiving the HERs.

Deadline for Rebate Applications

PPL Electric offers all Home Energy Education Program services at no cost to customers; therefore, there are no rebate applications.

Program Start Date with Key Schedule Milestones

Table 34~~Table 34~~ lists the estimated key schedule milestones for the Home Energy Education Program. PPL Electric program staff will lead implementation or provide management oversight of all tasks.

Table 34. Home Energy Education Program Schedule and Milestones

Schedule	Milestones
11/30/2015	Phase III EE&C Plan submitted to Pa PUC
06/01/2016	Launch Phase III program
Annually by 01/15	EDCs submit semi-annual program report
Annually by 07/15	EDCs submit preliminary annual program report
Annually by 11/15	EDCs submit final annual program report
05/31/2021	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electrics Evaluation Plan which will be submitted to the SWE for review. PPL Electric and its EM&V CSP will conduct annual evaluations of each program in compliance with all Pa PUC requirements and the SWE's Evaluation Framework. The EM&V CSP will follow all applicable methods in the TRM and the Evaluation Framework to calculate energy savings and demand reduction. For the Home Energy Education Program, PPL Electric anticipates conducting annual impact and process evaluations (activities vary by year).

Through the Home Energy Education Program, PPL Electric provides selected customers with a periodic report about their energy usage and offers energy saving tips. No rebates are offered to the customers. As part of the evaluation, the EM&V CSP will likely verify savings using a randomized control trial, encompassing a treatment group (i.e., the group that receives HERs) and a control group (i.e., the group that does not receive HERs).

Administrative Requirements

The Residential CSP will provide overall administrative and operational management of the Home Energy Education Program. PPL Electric staff will provide oversight and operational support to establish effective program deployment.

Estimated Participation

PPL Electric estimates approximately 123,000 customers will be in the treatment group (i.e., those receiving HERs) each year. Actual quantities will vary, and PPL Electric will manage the program to stay within budget.

Estimated Program Budget, Savings, and Cost-Effectiveness

Table 35 displays anticipated program benefits and costs by program year and in total. Approximately 11% of the Residential sector budget is attributed to the Home Energy Education Program.

Table 35. Home Energy Education Program Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	40,144	41,080	41,026~~41,600~~	46,611~~47,168~~	57,406~~57,946~~	226,268~~227,938~~
Demand Reduction (MW)*	5.22	5.34	5.33~~5.41~~	6.06~~6.13~~	7.46~~7.53~~	29.42~~29.63~~
Total TRC Costs	$1,845	$1,759	$1,930~~$1,952~~	$2,230~~$2,253~~	$2,376~~$2,398~~	$10,141~~$10,208~~
Participant Costs	$00	$00	$00	$00	$00	$00
Direct Utility Costs **	$1,845	$1,759	$1,930~~$1,952~~	$2,230~~$2,253~~	$2,376~~$2,398~~	$10,141~~$10,208~~
Customer Incentives	$00	$00	$00	$00	$00	$00
EDC Labor, Materials, Supplies	$59	$59	$59	$59	$59	$296
CSP Labor, Materials, Supplies	$1,595	$1,487	$1,621~~$1,643~~	$1,890~~$1,912~~	$1,978~~$2,000~~	$8,570~~$8,636~~
CSP Marketing	$191	$213	$250	$281	$339	$1,275

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

** Costs include up to approximately $400,000 for behavioral DR, if implemented.

The Home Energy Education Program is projected to be cost-effective, with a TRC test ratio of 1.15. Table 36 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 100%.

Table 36. Home Energy Education Program Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$10,037~~$10,113~~
NPV Costs	$8,706~~$8,759~~
Net Benefits	$1,331~~$1,354~~
Benefit/Cost Ratio	1.15

3.2.1 Low-Income Sector Programs

The following sections summarize each of PPL Electric's proposed Low-Income sector programs. Please note that participation levels, savings, costs, and incentive ranges are estimates and may be subject to change.

Low-Income WRAP

Program Description

Through Low-Income WRAP, PPL Electric offers a broad selection of energy-saving improvements and education to low-income customers. The Company will offer services to income-qualified customers residing in single family homes, master-metered multifamily units, individually metered multifamily units, and manufactured homes.[16] For all qualifying customers in these building types, PPL Electric offers direct installation of a range of energy efficiency measures including HVAC, lighting, weatherization, and home health and safety (as shown in Table 38). In addition to the LEDs in tenant units of low-income residents in master-metered multifamily buildings, Low-Income WRAP will provide other eligible measures to these units under Low-Income WRAP (i.e., the same eligible measures as individually metered low income homes, as set forth in Table 38) subject to landlord approval, available program funds, within the overall program acquisition cost of Low-Income WRAP, and subject to a limit on cumulative spending of $2.5 million in direct costs during Phase III for Low-Income WRAP measures in the tenant units of low-income residents in master-metered multifamily buildings. If PPL Electric determines that it will need to spend more than $2.5 million for such measures, it will meet with stakeholders and revise its EE&C Plan to update the estimated funding for these measures, subject to Commission approval. Multifamily buildings' eligibility requirements are not affected by the number of living units in the buildings. Non-low-income residents in master-metered multifamily buildings are eligible to participate in PPL Electric's residential programs, provided that they have landlord/owner approval. PPL offers an incentive for new construction measures that exceed new construction energy code requirements. Incentives will be offered for LEDs at no cost for installation by the builder and up to $0.50/annual kWh saved for other qualifying measures purchased and installed by the builder. The incentive may be paid to the builder or the tenant/owner of the building. This applies to both multifamily and single-family homes/buildings.

The Low-income CSP will provide full weatherization services for up to 200 control group participants from the Company's Phase II Wise Home Efficiency Pilot Program (i.e., weatherization that was not provided in Phase II to this control group). Services may include, but are not limited to: direct install energy saving measures; weatherization, infiltration, and insulation measures inside the home; weatherization insulation measures outside the home; blower door testing; and combustion testing if needed (per Building Performance Institute technical requirements). The savings and costs for these participants are included in the Phase III estimates.

[16] Individually metered low-income multifamily residences are eligible for the same measures as individually metered single family low-income residences under Low-Income WRAP. Further, individually metered manufactured homes are eligible for the same measures as any other type of individually metered home receiving services from Low-Income WRAP.

Objectives

The objectives of Low-Income WRAP are to:

- Provide low-income customers with an array of no-cost energy-saving equipment and education to help reduce their energy costs;
- Increase the health and safety of low-income customers' homes by installing no-cost measures such as smoke and carbon monoxide detectors, which may be coordinated with or implemented by the Low-Income Usage Reduction Program ("LIURP") WRAP;
- Achieve high customer and trade ally satisfaction through high-quality service and an impactful program offering;
- Promote other PPL Electric energy efficiency programs, specifically other low-income assistance programs; and
- Achieve a total approximate reduction in energy use of 5~~80~~,000 MWh/year gross verified savings.

Target Market

Through Low-Income WRAP, PPL Electric targets low-income customers (renters and owners) living in single family homes, individually-metered multifamily buildings (residential rate class), tenant units in master-metered multifamily buildings (nonresidential rate class),[17] and manufactured homes. To qualify as low-income, the customer's household income must be at or below 150% of the FPIG; this includes enrollees in PPL Electric's OnTrack Program.[18] Individually metered low-income multifamily residences are eligible for the same measures as individually metered single family low-income residences under Low-Income WRAP. Tenants must obtain landlord approval to participate in the program, with the likely exception of those who only receive LED bulbs. Multifamily buildings' eligibility requirements are not affected by the number of living units in the buildings. Non-low-income residents in master-metered multifamily buildings are eligible to participate in PPL Electric's residential programs, provided that they have landlord/owner approval.

Implementation Strategy

The Low-Income CSP will deliver the program to customers and will be primarily responsible for outreach, customer recruitment, audits, education, and equipment installation. The Low-Income CSP will also support sector-level program functions, including operating a customer call center, marketing,

[17] The Pa PUC's 2016 TRC Test Order allows savings (prorated based on the percentage of consumption attributed to low-income occupants) from master-metered multifamily buildings to count toward the low-income savings compliance target. Costs for energy efficiency measures will be paid according to the rate class of the building because customers in that rate class are the ones receiving the benefits of the energy efficiency measures.

[18] Through its OnTrack Program, PPL Electric offers reduced monthly payments to low-income customers that fall behind on their utility bill payments.

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

Program Issues, Risks, and Risk Management Strategy

Table 37 presents market risks associated with Low-Income WRAP, as well as strategies PPL Electric will use to manage each risk.

Table 37. Low-Income WRAP Issues, Risks, and Risk Management Strategies

Program Issue	Risk	Risk Management Strategies
Homeowner and landlord lack of program awareness	Low program participation	• Low-Income CSP markets the program directly to income-eligible customers through agencies that support low-income customers, and through other partners/trade allies. • Low-Income CSP conducts neighborhood sweeps where there has not been a large number of customers participating in WRAP. • Low-Income CSP markets the program at town hall gatherings.
Difficulty getting landlord participation approval for low-income tenants	Low program participation among renters	• Low-Income CSP markets the program directly to landlords. • Low-Income CSP seeks joint ventures with equipment suppliers, trade allies, and other organizations to provide additional incentives/discounts to remove landlord barriers (such as financial incentives to eliminate code violations).
Possible saturation of eligible WRAP participants	Low program participation and savings	• PPL Electric strongly encourages that all OnTrack Program enrollees also participate in WRAP. • Low-Income CSP installs additional measures for customers who previously participated in WRAP. • Low-Income CSP reaches out to property landlords who refused to participate previously.

Anticipated Costs to Participating Customers

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

Ramp-up Strategy

The WRAP is an existing, mature program being carried forward from Phase II. The Low-Income CSP will develop marketing material and an implementation strategy to facilitate the transition to Phase III, including doubling the estimated number of participants compared to Phase II.

Marketing Strategy

PPL Electric's staff 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 its current targeted outreach to OnTrack customers for participation in its Low-Income WRAP, the Company will work with its Low-Income CSP to create and target marketing and outreach for its Low-Income WRAP to confirmed low income customers that are not enrolled in OnTrack. The Company will describe its Low-Income WRAP marketing efforts at its Act 129 EE&C Stakeholder meetings, and will allow stakeholders the opportunity to provide feedback and recommendations.

The marketing strategy may include:

- Promoting the program in "Connect";
- Providing online access to the program via the EE&C program website;
- Implementing direct outreach including neighborhood sweeps, community and town hall events, and door-to-door canvassing to create awareness about the program, which will include identifying low-income neighborhoods, multifamily buildings, and manufactured home parks that may benefit from Low-Income WRAP services and canvassing them with door hangers;
- Conducting targeted telemarketing and direct mailings to customers participating in PPL Electric's OnTrack Program and Low-Income Home Energy Assistance Program ("LIHEAP"), and to other income-eligible customers; and
- Developing partnerships with housing and redevelopment authorities, community action groups, and other social service agencies.

Encouraging multifamily building owners and tenants to implement energy efficiency measures.

No later than December 1, 2016, PPL Electric will conduct a stakeholder meeting with interested multifamily housing owners, developers, and other interested stakeholders. PPL Electric will work with the Housing Alliance of Pennsylvania, other interested groups (to be identified in collaboration with the Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania), and the Company's CSPs to identify multifamily housing owners and developers to invite to the meeting.

Eligible Measures and Incentive Strategy

Table 38 identifies PPL Electric's expected list of program measures. All services and measures are provided to income-qualified customers in all qualifying building types at no cost.

PPL Electric and the Low-Income CSP will work with stakeholders, trade allies, and various agencies (e.g., CBOs) to create partnerships that can leverage additional incentives or cost savings for low-income customers. PPL Electric shall ensure that its Low Income CSP meets with natural gas distribution companies ("NGDCs") to identify and evaluate opportunities for coordination of low-income energy efficiency programs in Phase III. PPL Electric will present its coordination efforts to stakeholders at its Act 129 Stakeholder meetings, and will allow stakeholders the opportunity to provide feedback and recommendations. To the extent practical, the Company will coordinate with Pennsylvania Housing Finance Agency ("PHFA") to align the eligibility of measures in Act 129 low-income multifamily buildings with PHFA's Qualified Allocation Plan and Energy Rebate Analysis. The Company will work with interested stakeholders in an effort to ensure that the funds provided through the Company's EE&C Plan are not substituted for funds otherwise provided through other assistance programs. Additional examples could include working with agencies, trade allies, equipment manufacturers, NGDCs and others who provide incentives (or donated/discounted products and services) in addition to PPL Electric's incentives to implement energy efficiency measures in low-income buildings or as part of a neighborhood makeover, especially if the joint venture can achieve more comprehensive savings. PPL Electric will prepare case studies to share the program benefits and encourage additional joint ventures.

Table 38. Low-Income WRAP Eligible Measures and Incentives

Measure	Eligibility Qualifications
Water reduction (low-flow showerheads and low-flow faucet aerators)	Electric hot water only Meets current TRM requirements
Water heater temperature setback	Electric hot water only Meets current TRM requirements
Water heater replacement (heat pump water heater where feasible)	Electric hot water only Meets current TRM requirements
Pipe insulation	Electric hot water only Meets current TRM requirements
Air sealing	Meets current TRM requirements
Duct sealing	Meets current TRM requirements
Insulation	Meets current TRM requirements Not applicable for individually metered multifamily units
HVAC system	Repair or replacement Meets current TRM requirements
LED lighting	Meets current TRM requirements
Furnace whistle	Meets current TRM requirements
Smart strips	Meets current TRM requirements
Smart thermostats[19]	Meets new TRM protocol for electric central heating
Education	N/A
Smoke and carbon monoxide detectors	Must be recommended by auditor
Other measures needed in the home	As recommended by auditor
New Construction – Single Family	TBD, but conceptually measures that exceed new energy code requirements. Incentives will be LEDs at no cost for installation by the builder and up to $0.50/annual kWh saved for other qualifying measures purchased and installed by the builder. Quantities may be limited and pre-approval may be required.
New Construction – Multi Family	TBD, but conceptually measures that exceed new energy code requirements. Incentives will be LEDs at no cost for installation by the builder and up to $0.50/annual kWh saved for other qualifying measures purchased and installed by the builder. Quantities may be limited and pre-approval may be required.
Student Education	Targets schools with reduced cost school lunch.
Home Energy Reports	Continue with existing Phase II low-income cohorts.~~.~~

[19] Smart thermostats are eligible measures for homes with central electric heat and subject to landlord approval, available program funds, and the overall program acquisition cost of Low-Income WRAP.

All measures may not be available at all times. PPL Electric will review the program continually and may adjust available measures, incentive levels, or eligibility qualifications to achieve program savings and cost budgets. PPL Electric will coordinate Low-Income WRAP with its LIURP WRAP to maximize the effectiveness of measures and services provided to participants. PPL Electric confirms that it will leverage funding between Act 129 WRAP and LIURP WRAP as the Company did in Phase II. If a low-income home is eligible for 'full cost measures,'[20] the Company will install eligible 'full cost measures' through its LIURP WRAP or Low-Income WRAP budget, provided that: (1) it receives landlord approval; (2) the customer has installed electric heat in at least 50% of the home; (3) the home did not previously receive 'full cost' services from Low-Income WRAP in Phase II; (4) there are no health or safety concerns in the home that prevent the installation of 'full cost' measures; and (5) the cost of the 'full cost' measures can be accommodated within the LIURP WRAP or Low-Income WRAP budget. In some cases, some of the measures provided in a home will be covered by Low-Income and other measures will be covered by LIURP. PPL Electric shall ensure that the process and level of coordination between LIURP and Low-Income WRAP in Phase III is substantially the same as in Phases I and II, with the exception that the entity responsible for delivering the Phase III Low-Income WRAP may be different than in the prior Phases.

For master-metered multifamily buildings (in a nonresidential rate class) with low-income occupants, PPL Electric will provide Low-Income WRAP measures at no cost in the tenant units, subject to landlord approval. If master-metered multifamily buildings desire energy efficiency improvements for common areas (e.g., vestibule, basement, hallways, exterior) or additional measures in the living units that are not covered under Low-income WRAP, PPL Electric will implement those measures pursuant to the applicable nonresidential programs and apply those programs' eligibility requirements and incentive levels. Consistent with the Pa PUC's 2016 TRC Test Order, the portion of savings attributable to low-income occupants in master-metered multifamily buildings will apply toward the low-income savings compliance target.

PPL Electric will work with the SWE and other Pennsylvania EDCs to determine how these savings will be reported. As requested by most stakeholders, PPL Electric recommends showing the total savings for each project under the customer sector corresponding to the meter (i.e., Small C&I or Large C&I) or to GNE if the customer qualifies. The portion of savings attributable to low-income occupants will be noted as applying toward the low-income compliance target and will be reported separately from other low-income savings (i.e., income-qualified customers in the residential rate class).

[20] In the context of this Settlement, "full cost" means energy efficiency measures related to homes with central electric heating and electric water heating. The Company may not use the terms "full cost job", "low cost job" or "Baseload job" for Phase III Low-Income WRAP, though the Company nonetheless commits to continue tracking the number of completed full cost, low cost, and baseload jobs, consistent with its LIURP reporting requirements, for the purpose of comparing program results for its Low-Income WRAP with its LIURP WRAP.

Similarly, the costs for measures installed in master-metered multifamily buildings will be assigned to the customer sector corresponding to the meter (i.e., Small C&I or Large C&I) or to GNE if the customer qualifies. [21] PPL Electric will limit the costs associated with implementing measures in the tenant units of master-metered multifamily buildings to $2.5 million.

The Company will work with interested stakeholders in an effort to ensure that the funds provided through the Company's EE&C Plan are not substituted for funds otherwise provided through other assistance programs.

Deadline for Rebate Applications

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

Program Start Date with Key Schedule Milestones

Table 39 lists the estimated key schedule milestones for Low-Income WRAP. PPL Electric program staff will lead implementation or provide management oversight of all tasks.

Table 39. Low-Income WRAP Schedule and Milestones

Schedule	Milestones
11/30/2015	Phase III EE&C Plan submitted to Pa PUC
06/01/2016	Launch Phase III program
Annually by 01/15	EDCs submit semi-annual program report
Annually by 07/15	EDCs submit preliminary annual program report
Annually by 11/15	EDCs submit final annual program report
05/31/2021	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electrics 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 demand reduction. For example, Section 3.3.3.3.1 of the Phase II Evaluation Framework states that if TRM fully or partially deemed measures are installed in low-income weatherization programs, the EDC may choose to use the deemed savings value for the measure. The EM&V CSP will use a billing regression analysis (i.e., IPMVP Option C) in cases where the measures offered include weatherization or other weather-dependent improvements. PPL Electric anticipates conducting annual impact evaluations and conducting process evaluations at least once during Phase III.

[21] GNE costs will be ultimately assigned to the rate class of the customer as described in the Cost Recovery Mechanism section of this EE&C Plan.

Through the Low-Income WRAP, PPL Electric will offer a variety of measures and may treat the whole home. Where the whole home is treated, the EM&V CSP will conduct an IPMVP Option C regression analysis using the customer's historical consumption data. Installation rates are not determined for individual measures since the regression analysis is used.

In cases where only equipment with TRM-based savings are installed, 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 WRAP and LIURP WRAP, the Evaluation Plan will describe how the savings will be allocated to Low-Income WRAP and LIURP WRAP. PPL Electric does not expect that it will jointly fund measures through LIURP WRAP and Low-Income WRAP. However, if measures are jointly funded by LIURP WRAP and Low-Income WRAP, PPL Electric shall allocate the actual costs and savings for these measures based upon the percentage of total costs paid by each funding source.

No later than December 1, 2016, PPL Electric will conduct a stakeholder meeting with interested multifamily housing owners, developers, and other interested stakeholders. PPL Electric will work with the Housing Alliance of Pennsylvania, other interested groups (to be identified in collaboration with CAUSE-PA), and the Company's CSPs to identify multifamily housing owners and developers to invite to the meeting. The purpose of the stakeholder meeting is to solicit feedback about the Company's multifamily offerings and to identify potential changes to the Company's programs related to multifamily housing.

Administrative Requirements

The Low-Income CSP will provide overall administrative and operational management of Low-Income WRAP. PPL Electric staff will provide oversight and operational support to establish effective program deployment. PPL Electric shall ensure that the process and level of coordination between LIURP and Low-Income WRAP in Phase III is substantially the same as in Phases I and II, with the exception that the entity responsible for delivering the Phase III Low-Income WRAP may be different than in the prior Phases.

Estimated Participation

PPL Electric anticipates delivering services to 7,000 Low-Income WRAP participants per year, achieving a total of approximately 35,000 participants during Phase III. This is approximately double the number of annual participants compared to Phase II. Actual quantities will vary, and PPL Electric will manage the program to stay within budget.

Estimated Program Budget, Savings, and Cost-Effectiveness

Table 40 displays anticipated program benefits and costs by program year and in total. Approximately 8~~6~~5% of the Low-Income sector budget is attributed to Low-Income WRAP.

Table 40. Low-Income WRAP Costs and Benefits by Program Year ($1,000)[22]

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	10,501	10,564	13,516~~10,578~~	13,555~~10,635~~	10,149~~8,268~~	58,285~~50,546~~
Demand Reduction (MW)*	1.45	1.46	1.84~~1.46~~	1.85~~1.47~~	1.29~~1.04~~	7.89~~6.88~~
Total TRC Costs	$7,225	$6,947	$10,355~~9,796~~	$10,531~~9,966~~	$6,664~~$6,372~~	$41,723~~$40,306~~
Participant Costs	$00	$00	$00	$00	$00	$00
Direct Utility Costs	$7,225	$6,947	$10,355~~9,796~~	$10,531~~9,966~~	$6,664~~$6,372~~	$41,723~~$40,306~~
Customer Incentives	$00	$00	$00	$00	$00	$00
EDC Labor, Materials, Supplies	$764	$314	$314	$314	$314	$2,018
CSP Labor, Materials, Supplies	$6,149	$6,322	$9,729~~$9,171~~	$9,906~~$9,340~~	$6,039~~5,747~~	$38,145~~$36,729~~
CSP Marketing	$312	$312	$312	$312	$312	$1,560

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

WRAP is projected to not be cost-effective, with a TRC test ratio of ~~0.66~~0.71. Table 41 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 100%.

Table 41. WRAP Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$25,728~~$23,038~~
NPV Costs	$36,031~~$34,878~~
Net Benefits	($10,303)~~($11,839)~~
Benefit/Cost Ratio	0.71~~0.66~~

Plans for Achieving Compliance with the Implementation Order

PPL Electric designed its Plan to achieve its low-income targets with Phase III transactions (i.e., projects that are implemented during Phase III) through income-qualified programs only (i.e., Low-Income WRAP, including through the Small C&I and GNE Low-Income WRAP Master Metered Multifamily components, and the Energy Efficiency Kits and Education Program).

[22] Excludes savings and costs for master-metered multifamily buildings with low-income occupants. Those savings count toward the low-income compliance target, but the costs and savings are accounted for under the customer sector corresponding to the rate class of the building's meter (generally Small C&I or GNE).

Energy Efficiency Kits and Education Program

Program Description

Through the Energy Efficiency Kits and Education Program, PPL Electric delivers energy efficiency kits and education to low-income customers through two delivery mechanisms: (1) direct mail, and (2) workshops held at CBOs.

- **Direct Mail Kits.** The Low-Income CSP conducts targeted mail outreach to invite qualified customers to participate in the Energy Efficiency Kits and Education Program. In order to receive a kit in the mail, recipients must return the business reply card attached to the mailing. To generate the list of targeted outreach recipients, PPL Electric identifies customers that: have received LIHEAP benefits; are enrolled in the Company's OnTrack Program; or are low-income qualified and have been identified by the Low-Income CSP via market research, data mining, or other means.
- **Energy Education Workshops.** Through their day-to-day interactions with clients, CBOs will assist the Low-Income CSP in recruiting qualified customers to participate in a one-hour energy-education workshop or a one-on-one session with CBO staff. To maximize attendance, the CBOs will offer the workshops at various times including days, evenings, and weekends. During the workshops and one-to-one sessions, CBO staff will introduce customers to the energy-saving measures and educational materials in the kits. To help CBO staff understand key elements of the workshops, the Low-Income CSP will conduct train-the-trainer sessions for CBO staff. These in-person sessions will provide CBO staff with the tools needed to introduce energy education and low-cost/no-cost energy efficiency measures to their low-income clients.

Objectives

The objectives of the Energy Efficiency Kits and Education Program are to:

- Provide low-income customers with a no-cost energy efficiency kit and education to help them conserve energy and reduce their energy costs;
- Maintain partnerships with local CBOs so customers receive maximum and timely customer assistance;
- Achieve high customer and trade ally satisfaction through quality service and an impactful program offering;
- Promote other PPL Electric energy efficiency programs, specifically other low-income assistance programs; and
- Achieve a total approximate reduction in energy use of 38,000 MWh/year gross verified savings.

Target Market

PPL Electric targets the program to customers at or below 150% of the FPIG.

Implementation Strategy

The Low-Income CSP is responsible for program operations and delivery, including marketing, CBO recruitment, kit production and distribution, inventory management, and CBO staff training.

Additionally, the Low-Income CSP will support sector-level program functions, including operating a customer call center, managing marketing, and tracking activities. PPL Electric's energy efficiency staff will provide overall strategic direction and program management. The EM&V CSP will provide evaluation services.

Program Issues, Risks, and Risk Management Strategy

Table 42 presents market risks associated with the Energy Efficiency Kits and Education Program, as well as strategies PPL Electric will use to manage each risk.

Table 42. Energy Efficiency Kits and Education Program Issues, Risks, and Risk Management Strategies

Program Issue	Risk	Risk Management Strategies
Customers do not install the energy efficiency measures in the kit	Although the program education component would be completed, measurable energy savings would not be achieved	• Low-Income CSP provides instructions on how to install kit measures. • CBOs instruct customers how to install the measures during educational workshops.
Lack of customer program awareness	Low program participation	• Low-Income CSP and CBOs market the program directly to income-eligible customers. • Low-Income CSP markets the program during town hall gatherings for multifamily buildings and manufactured home parks. • Low-Income CSP conducts neighborhood sweeps in areas where participation is low.

Anticipated Costs to Participating Customers

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

Ramp-up Strategy

The Energy Efficiency Kits and Education Program is an existing, mature program being carried forward from Phase II. The Low-Income CSP will develop marketing material to increase participation and awareness, and will facilitate the transition to Phase III.

Marketing Strategy

PPL Electric's staff 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. The marketing strategy may include:

- Promoting the program in "Connect";
- Providing online access to the program via the EE&C program website;
- Conducting community outreach at events;
- Conducting targeted telemarketing and direct mailings to customers participating in PPL Electric's OnTrack Program, LIHEAP, and other energy efficiency and weatherization programs; and
- Networking with community action groups and other social service agencies.

Additionally, participating CBOs may develop and sponsor their own marketing materials to increase awareness within their community.

Eligible Measures and Incentive Strategy

Through the Energy Efficiency Kits and Education Program, PPL Electric offers energy efficiency kits and education to customers, as well as train-the-trainer opportunities for CBO staff. Table 43 identifies PPL Electric's proposed list of program measures and minimum eligibility qualifications. The Company will offer all program measures and services at no cost to customers.

Table 43. Energy Efficiency Kits and Education Program Eligible Measures and Incentives

Measure	Eligibility Qualifications
Kitchen faucet aerator	1.5 gpm Meets current TRM requirements
LED night light	Meets current TRM requirements
Showerhead	1.5 gpm Meets current TRM requirements
Furnace whistle	Meets current TRM requirements
LED bulbs	ENERGY STAR Meets current TRM requirements
Smart strip	Tier 2 Meets current TRM requirements
Education	N/A

All measures may not be available at all times. In some cases, PPL Electric may suspend a measure depending on popularity, pace of the program (savings and costs), free-ridership, evaluation requirements, complexity of information required from customers, administrative requirements for the measure, etc. PPL Electric will review the program continually and may adjust available measures or eligibility qualifications to achieve program savings and cost budgets.

Deadline for Rebate Applications

PPL Electric offers all the Energy Efficiency Kits and Education Program services at no cost to customers; therefore, there is no rebate application.

Program Start Date with Key Schedule Milestones

The Energy Efficiency Kits and Education Program is currently offered in Phase II, and PPL Electric will facilitate the transition to the Phase III program. Table 44~~Table 44~~ lists the estimated key schedule milestones for the Energy Efficiency Kits and Education Program. PPL Electric program staff will lead implementation and provide management oversight of all tasks.

Table 44. Energy Efficiency Kits and Education Program Schedule and Milestones

Schedule	Milestones
11/30/2015	Phase III EE&C Plan submitted to Pa PUC
06/01/2016	Launch Phase III program
Annually by 01/15	EDCs submit semi-annual program report
Annually by 07/15	EDCs submit preliminary annual program report
Annually by 11/15	EDCs submit final annual program report
05/31/2021	Program ends

Evaluation, Measurement, and Verification

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

Program participants receive free kits that include energy efficiency products and a paper survey where they document their energy efficiency actions. As part of the evaluation, the EM&V CSP will analyze data collected from all returned paper surveys. The EM&V CSP will review a sample of participant records to verify the quantity, efficiency level, and qualification based on measure type. The EM&V CSP will follow all applicable methods in the TRM and the Evaluation Framework to calculate energy savings and demand reduction. For the Energy Efficiency Kits and Education Program, PPL Electric anticipates conducting annual impact and process evaluations (activities vary by year).

Administrative Requirements

The Low-Income CSP will provide overall administrative and operational management of the Energy Efficiency Kits and Education Program. PPL Electric staff will provide oversight and operational support to establish effective program deployment.

Estimated Participation

PPL Electric anticipates delivering approximately 8,000 energy efficiency kits to targeted customers each year, and a total of 40,000 energy efficiency kits during Phase III. Actual quantities will vary, and PPL Electric will manage the program to stay within budget.

Estimated Program Budget, Savings, and Cost-Effectiveness

Table 45 displays anticipated program benefits and costs by program year and in total. Approximately ~~15%~~14% of the Low-Income sector budget is attributed to the Energy Efficiency Kits and Education Program.

Table 45. Energy Efficiency Kits and Education Program Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	7,074	7,696	8,007	8,318	6,506	37,601
Demand Reduction (MW)*	0.99	1.08	1.12	1.16	0.83	5.18
Total TRC Costs	$1,262	$1,408	$1,500	$1,596	$1,133	$6,899
Participant Costs	$00	$00	$00	$00	$00	$00
Direct Utility Costs	$1,262	$1,408	$1,500	$1,596	$1,133	$6,899
Customer Incentives	$00	$00	$00	$00	$00	$00
EDC Labor, Materials, Supplies	$45	$45	$45	$45	$45	$225
CSP Labor, Materials, Supplies	$1,096	$1,223	$1,303	$1,387	$903	$5,912
CSP Marketing	$121	$140	$152	$164	$185	$762

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

The Energy Efficiency Kits and Education Program is projected to be cost-effective, with a TRC test ratio of 2.10. Table 46 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 100%.

Table 46. Energy Efficiency Kits and Education Program Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$12,569
NPV Costs	$5,989
Net Benefits	$6,580
Benefit/Cost Ratio	2.10

Plans for Achieving Compliance with the Implementation Order

PPL Electric designed its Plan to achieve its low-income targets with Phase III transactions (i.e., projects that are implemented during Phase III) through income-qualified programs only (i.e., Low-Income WRAP and the Energy Efficiency Kits and Education Program).

3.3 Non-Residential Programs

The following section summarizes PPL Electric's proposed Non Residential Energy Efficiency and Demand Response programs. Participation levels, savings, costs, and incentive ranges are estimates and may be subject to change.

The Plan presents the Energy Efficiency and Demand Response Programs as separate programs with separate cost and savings estimates for each Nonresidential customer sector (i.e., Small C&I, Large C&I, and GNE), as required by the Commission's EE&C Plan Template. However, as was shown in Figure 3 in Section 3.1.2, PPL Electric will offer each of these programs to all Nonresidential customer sectors as unified nonresidential offerings. The programs are the same for each non-residential customer sector (Small C&I, Large C&I, and GNE) unless noted otherwise. There are separate cost budgets and savings estimates for each customer sector.

In addition to the LEDs in tenant units of low-income residents in master-metered multifamily buildings, Low-Income WRAP will provide other eligible measures to these units under Low-Income WRAP (i.e., the same eligible measures as individually metered low income homes, as set forth in Table 38) subject to landlord approval, available program funds, within the overall program acquisition cost of Low-Income WRAP, and subject to a limit on cumulative spending of $2.5 million in direct costs during Phase III for Low-Income WRAP measures in the tenant units of low-income residents in master-metered multifamily buildings. If PPL Electric determines that it will need to spend more than $2.5 million for such measures, it will meet with stakeholders and revise its EE&C Plan to update the estimated funding for these measures, subject to Commission approval. Multifamily buildings' eligibility requirements are not affected by the number of living units in the buildings and the non-low-income residents in master-metered multifamily buildings are eligible to participate in PPL Electric's residential programs, provided that they have landlord/owner approval. If the owners/managers of master-metered multifamily buildings desire energy efficiency improvements for common areas (e.g., vestibule, basement, hallways, exterior) or additional measures in the living units, those measures will be implemented pursuant to the applicable nonresidential programs and subject to those program's eligibility requirements and incentive levels.

Consistent with the Pa PUC's 2016 TRC Test Order, PPL Electric will apply the portion of savings attributable to low-income occupants in master-metered multifamily buildings toward the low-income savings compliance target. PPL Electric will work with the SWE and other Pennsylvania EDCs to determine how these savings will be shown in formal reports. As requested by most stakeholders, PPL Electric recommends showing the total savings for each project under the customer sector corresponding to the meter (i.e., Small C&I or Large C&I) or to GNE if the customer qualifies. PPL Electric will apply the portion of savings attributable to low-income occupants toward the low-income compliance target and will report these savings separately from other low-income savings (i.e., income-qualified customers in the residential rate class).

PPL Electric will assign the costs for measures installed in master-metered multifamily buildings to the customer sector corresponding to the meter (i.e., Small C&I or Large C&I) or to GNE if the customer

qualifies.[23] PPL Electric shall establish as single point of contact for intake and routing coordination of multifamily building owners/operators. PPL Electric shall encourage its program implementation CSPs to provide outreach that encourages multifamily buildings to implement energy efficiency measures.

During Program Year 9, PPL Electric will work with its Nonresidential CSP or other contractors to evaluate an Energy Intelligence Software pilot for Small C&I sector customers that includes a reasonable number of customers, and review the recommendations of the evaluation with stakeholders. If the evaluation recommends implementing a pilot program for Small C&I customers, the Company will include the pilot in a petition to modify the EE&C Plan, with the pilot program commencing no later than Program Year 10.

[23] GNE costs will be ultimately assigned to the appropriate customer rate class as described in the Cost Recovery Mechanism section of this EE&C Plan.

Non-residential Energy Efficiency Program

The program is the same for each non-residential customer sector (Small C&I, Large C&I, and GNE) unless noted otherwise. **There are separate cost budgets and savings estimates for each customer sector.**

Program Description

Through the Non-residential Energy Efficiency Program, PPL Electric promotes the purchase and installation of a wide range of high-efficiency measures, including lighting, HVAC, refrigeration, motors/drives, compressed air, office equipment, agricultural equipment, combined heat and power, equipment controls, custom measures, retro-commissioning, repairs, equipment optimization, new construction projects, operational and process improvements, and behavioral changes that result in energy efficiency savings. The program also includes a continuous energy improvement component, under which PPL Electric helps customers to identify ways to reduce their electricity usage through improved operations and maintenance and behavioral changes.

The Company provides customers with financial incentives based on the measure installed and savings provided, which offset the higher purchase costs of energy efficient equipment. Additionally, the Company offers program information on the features and benefits of energy efficient equipment.

PPL Electric will begin utilizing a midstream lighting delivery channel in Phase III, most likely in late PY8 or thereafter. PPL Electric designed the midstream lighting component to make choosing and procuring high-efficiency lighting more straightforward and faster than via typical downstream methods. In the midstream lighting approach, trade allies and customers may purchase LED lamps and bulbs directly from a participating and qualified midstream lighting distributor and receive an immediate rebate at the point of purchase. This approach has proven to: increase customer and trade ally satisfaction; reduce administrative expenses; increase the volume of installed, high-efficiency lighting and socket upgrades, particularly for customers implementing routine lighting projects; and reduce the number of contractors and customers who use high-efficiency lighting products but fail to submit program applications.

The Nonresidential CSP will provide all nonresidential customers with synergies and a streamlined “one stop” experience. The Nonresidential CSP will manage and coordinate the Non-residential Energy Efficiency Program, maintaining a call and rebate processing center, recruiting and educating trade allies, and marketing the program to facilitate achieving the desired program participation and to encourage customers to take a whole-building approach or implement multiple measures.

Objectives

The objectives of the Non-residential Energy Efficiency Program are to:

- Provide energy-saving opportunities to qualified customers;
- Increase the market penetration of high-efficiency technologies and building systems for customers by incentivizing high-efficiency and ENERGY STAR-rated appliances, lighting equipment, and HVAC systems;

- 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 non-typical 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 energy efficiency programs;
- Collect energy and operating data from customers, as required to confirm customer and measure eligibility, and to determine energy savings and cost-effectiveness;
- Obtain participation necessary to achieve approximately 810,810~~433,000~~ MWh/year gross verified savings; and
- Achieve high customer and trade ally satisfaction with the program.

Target Market

The Non-residential Energy Efficiency Program will be available to customers in a nonresidential rate class and any building or business type. Customers who occupy a rental property must have the owner's approval to participate. For the midstream lighting component, PPL Electric will target and leverage the midstream channel to deploy specific LED technologies and other potential equipment.

Implementation Strategy

The Non-residential CSP will deliver the Non-residential Energy Efficiency Program, promoting the various energy efficiency options available to this customer segment through a range of marketing and outreach tactics. The program relies on projects being initiated by customers, as well as on trade allies—including midstream equipment distributors—and the Nonresidential CSP. The Nonresidential CSP will leverage trade ally and manufacturer relationships to co-market energy efficient equipment and the value of program participation. For custom measures, the Nonresidential CSP will work directly with trade allies and customers to help identify, develop, and implement custom projects. The Nonresidential CSP will develop project scopes, analyze costs, and determine potential energy savings of proposed projects, conduct field verification of completed projects and help determine the reported energy savings from installed projects. The EM&V CSP will conduct independent evaluations to determine verified savings. The Nonresidential CSP will develop, update, and process rebate applications and payments. . PPL Electric staff will manage the Nonresidential CSP.

Key steps in this program include:

- Educating customers on energy efficiency opportunities and directing them to the program through marketing activities, the website, and/or direct contact with equipment distributors or equipment installation contractors/trade allies;
- Having customers complete program applications, or working with customers, equipment/appliance retailers, mid-stream distributors, and installation contractors to complete program applications;
- Ensuring customers submit the required documentation for processing;
- Reviewing pending and completed project documentation to verify the applicant is a PPL Electric customer and the completed project and installed equipment meets program eligibility criteria;
- When possible, working with customers to confirm project preapproval before ordering energy efficiency equipment;
- Recruiting and developing an effective trade ally network;
- Processing applications for completed projects and issuing rebates for qualified projects/equipment; and
- Verifying completed equipment/appliance installation for a sample of participants to confirm program integrity as part of measurement and verification ("M&V").

Program Issues, Risks, and Risk Management Strategy

Table 47~~Table 47~~ presents market risks associated with the Non-residential Energy Efficiency Program, as well as strategies PPL Electric will use to manage each risk.

Table 47. Non-residential Energy Efficiency Program Issues, Risks, and Risk Management Strategies

Program 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 priority on fluctuating commodity prices	• PPL Electric offers incentives and programs to reduce payback and IRR for business owners. • Nonresidential CSP offers planning assistance to enhance energy savings. • Nonresidential CSP educates customers about the long-term benefits of energy efficiency, available incentives, and other programs that may help.
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	• Nonresidential CSP educates trade allies and customers about available energy efficient choices before equipment fails, and encourages businesses to plan for equipment replacement. • PPL Electric provides incentives for trade allies to stock, promote, and

Program Issue	Risk	Risk Management Strategies
	would affect customer operations	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	Nonresidential CSP promotes the importance and value of equipment maintenance and training.

Anticipated Costs to Participating Customers

Costs incurred by customers participating in the Non-residential Energy Efficiency Program will vary based on the specific type of efficient equipment installed through the program.

Ramp-up Strategy

The Non-residential Energy Efficiency Program is an existing, mature program being carried forward from Phase II (combination of two programs—Efficient Equipment and Custom). The Nonresidential CSP will develop marketing material to facilitate the transition to Phase III. The Nonresidential CSP has developed a transitional incentive strategy aiming to bridge incentives for customers whose participation in the program spans Phase II and Phase III.

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

- Projects on the Phase II waitlist will receive comparable incentives if completed and installed in early Phase III. Comparable is defined as the Phase II rebate, up to $0.10/annual kWh saved and subject to Phase III per project and/or per customer incentive caps. Projects must be completed by September 30, 2016 for most measures. PPL Electric will consider exceptions to that deadline on a case-by-case basis depending on the project details.
- Projects approved (i.e., funds reserved) in Phase II that are installed (i.e., placed in-service) in Phase III will be eligible for the approved Phase II rebate and will be accounted for as Phase III projects.

Marketing Strategy

PPL Electric's staff will work with the Nonresidential 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:

- Leveraging trade ally and manufacturer relationships to co-market energy efficient equipment.
- Hosting webinars;
- Participating in trade shows and other outreach;
- Communicating and providing access to program information on the EE&C program website.
- Promoting the program in newsletters;
- Advertising using newspaper, radio, direct mail, bill inserts, cross-program advertisements, commercial ads, and other mass media;
- Coordinating advertising opportunities with trade allies;
- Developing, publishing, and distributing program brochure and case studies;

- Conducting one-on-one marketing to Small C&I customers through trade allies, business accounts specialists, and Nonresidential CSP outreach;
- Targeting 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 the installation of new energy efficient technologies and adoption of best operating practices;
- Providing specific outreach to individual tenants as well as building owners and property managers in leased commercial buildings to encourage participation in the program;
- Targeting specific sectors identified as having a high level of unrealized energy efficiency potential;
- Publishing marketing materials including charts, brochures, and case studies;
- Providing newsletters and coordinating with key market partners including trade associations and agencies;
- Advertising in local newspapers and other mass media;
- Using limited time offers, special promotions, and no-cost measures to promote energy efficiency;
- Offering trade ally incentives and rewards;
- Cross-promoting through other PPL Electric energy efficiency programs;
- Providing information and training on specific technologies directed towards niche markets;
- Incorporating customers in area- or territory-focused promotions; and
- Working with distributors to promote and incent lighting purchases to capture program opportunities missed by other outreach methods.

Eligible Measures and Incentive Strategy

PPL Electric 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.

The Company offers performance incentives based on the avoided or reduced kWh/year resulting from the project. Incentives may be capped at 50% to 100% of the total project costs (excluding internal labor) and are subject to an annual cap for each project and for each participating customer. The per-customer-site cap is defined as one building with one or more meters. Multiple sites and a parent company cap 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 Non-residential Energy Efficiency Program, PPL Electric will provide incentives in the range of $0.02 to $0.17 per annual kWh saved. Incentives may be capped at 50% to 100% of the total project costs (excluding internal labor).

PPL Electric may distribute lighting measures to customers through the traditional rebate, direct discount (i.e., incentive paid to a trade ally), or midstream mechanism. Table 48 identifies PPL Electric's proposed list of program measures and minimum eligibility qualifications.

PPL Electric and the Nonresidential CSP will work with stakeholders, trade allies, and various agencies (e.g., CBOs) to create partnerships that can leverage additional incentives for GNE customers. Examples could include a "non-profit makeover," where agencies, trade allies, equipment manufacturers, and others who provide incentives (or donate/discount products or services) that could be combined with PPL Electric's incentives to help GNE customers implement energy efficiency measures in a GNE building, especially if the joint venture could result in more-comprehensive savings. PPL Electric will prepare case studies to share the benefits and encourage additional joint ventures.

Table 48. Non-residential Energy Efficiency Program Eligible Measures and Incentives

Measure	Eligibility Qualifications
HVAC	
ASHP (< 5.4 tons)	Replacement or new installation of a Single Package or Split System heat pump (unitary air, water, or evaporative-cooled) exceeding IECC 2009
ASHP (> 5.4 tons)	Replacement or new installation of a Single Package or Split System heat pump (unitary air, water, or evaporative-cooled) exceeding IECC 2009
Air-Cooled DX (< 5.4 tons)	Replacement or new installation of a Single Package or Split System heat pump (unitary air, water, or evaporative-cooled) exceeding IECC 2009
Air-Cooled DX (> 5.4 tons)	Replacement or new installation of a Single Package or Split System heat pump (unitary air, water ,or evaporative-cooled) exceeding IECC 2009
Electric Chiller	Exceed IECC 2009 energy efficiency requirements
Water Source or Geothermal Heat Pump	Exceed IECC 2009 energy efficiency requirements
ECM Circulating Fan	Baseline: shaded-pole ("SP") or permanent-split capacitor ("PSC") evaporator fan motors in an air handling unit
Ductless Heat Pump	SEER $\geq$ 16
Other HVAC Measure Listed in the TRM	Meets current TRM requirements
VFD	
Variable Frequency Drive ("VFD")	Baseline: motor fan or pump without a VFD control
Food Service and Hospitality	
Variable Speed Drive ("VSD") Kitchen Exhaust Fan	Retrofit kitchen ventilation system with VSD, demand controls, and sensors
Low-Flow Pre-Rinse Sprayer (Food Service and Grocery)	Replace existing pre-rinse sprayer; must have electric water heating; Baseline: 2.25 gpm food service; 2.15 gpm grocery applications
Low-Flow Pre-Rinse Sprayer (Time of Sale/Retail)	Replace existing pre-rinse sprayer; must have electric water heating; Baseline: 1.52 gpm
Steam Cooker	ENERGY STAR
Ice Maker	ENERGY STAR or CEE tier 2
Beverage/Snack Machine Control	Added to non-ENERGY STAR machines
Guest Room Occupancy Sensor	Replace guest rooms occupancy sensors with manual heating/cooling set-point and fan on/off/auto thermostat controls
Lighting	
LED Exit Sign	Replace incandescent or fluorescent exit sign
Occupancy Sensor	Wall, ceiling, or fixture mounted
T5	New T5 lamps and ballasts

Measure	Eligibility Qualifications
T8 High Performance Fixture	Retrofit fixture with qualified high performance T8 lamps and ballast (cee1.org list)
High Performance T8 Lamp	Retrofit standard T8 with qualified high performance T8 (cee1.org list)
T8 Reduced Wattage Fixture	Retrofit fixture with qualified reduced wattage T8 lamps and ballast (cee1.org list)
Reduced Wattage T8 Lamp	Retrofit standard T8 with qualified reduced wattage T8 (cee1.org list)
High Bay T5, T8, LED	New T5, T8, LED fixture
De-Lamp and Install Reflectors	Replace existing T5, T8 fixture with one or more lamps removed, must include electronic ballast and reflector
LED Lamp	Replace existing incandescent lamp or compact fluorescent lamp ("CFL") lamp with ENERGY STAR or Lighting Facts LED
Metal Halide Pulse Start Lamps	Replace probe start (≤ 320watts, > 320 watts)
LED Street Light/Area Light	ENERGY STAR, Design Lights Consortium listed, or LM 79/LM 80 tested
LED Interior Lighting	ENERGY STAR, Design Lights Consortium listed, or LM 79/LM 80 tested
Induction Lighting	New fixtures or retrofit kits
Interior Lighting - New Construction	Baseline: ASHRAE 90.1 - 2007 and Building Area Method or Space-by-Space Method
Exterior Lighting - New Construction	Baseline: ASHRAE 90.1 - 2007; Baseline Exterior Lighting Power Densities
LED Wall Pack	ENERGY STAR, Design Lights Consortium listed, or LM 79/LM 80 tested
Reach-in Refrigeration Case Lighting	ENERGY STAR, Design Lights Consortium listed, or LM 79/LM 80 tested
Other Lighting and Controls Listed in the TRM	Listed in the TRM or PA Lighting Form Provides energy savings
Compressed Air	
VSD Air Compressor	Single VSD unit less than 75 horsepower ("hp")
Cycling Refrigerated Thermal Mass Dryer	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
Air-Entraining Air Nozzle	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.
No-Loss Condensate Drain	Retrofit existing timed drained system with new no-loss condensate drains
Air Tank for Load/No Load Compressor	Minimum storage ratio of 4 gallons per cubic feet per minute ("CFM")
Refrigeration	
High-Efficiency Refrigeration/Freezer Case	Must exceed federal efficiency standards
High-Efficiency Evaporator Fan Motor for Reach-In or Walk-in Refrigerated Case	Replace existing SP evaporator fan motors or PSC motors in reach-in or walk-in refrigerated display cases with an electronically commutated motor ("ECM")
Evaporator Fan Controller	Install in medium-temperature walk-in coolers and low-temperature walk-in freezers
Floating Head Pressure Control ("FHPC")	Baseline: refrigeration system without FHPC
Anti-Sweat Heater Control	Retrofit existing glass doors with uncontrolled heaters
Evaporator Coil Defrost Control	Retrofit existing walk-in coolers or freezers without defrost controls
VSD Refrigeration Compressor	Retrofit existing commercial refrigeration systems without VSD controls

Measure	Eligibility Qualifications	
Strip Curtains for Walk-In Coolers and Freezers	Install or retrofit strip curtains in commercial walk-in cooler and freezer doors	
Night Cover for Display Case	Install on existing open-type refrigerated display cases, where covers are deployed during the facility's unoccupied hours	
Auto Closer	Retrofit doors not equipped with auto-closers, and assume the doors have strip curtain for walk-in coolers and freezers	
Door Gaskets for Walk-in and Reach-in Coolers and Freezers	Replace worn-out gaskets with new better-fitting gaskets	
Doors with Low or No Anti-Sweat Heat for Low Temperature Cases	Install a no-heat/low-heat clear glass door on an upright display case	
Suction Pipe Insulation for Walk-In Coolers and Freezers	Insulate bare refrigeration suction pipes for walk-in coolers and freezers	
Refrigerated Display Case Doors	Retrofit existing vertical open display cases with zero heat doors	
Office Equipment		
ENERGY STAR Server	Replace existing servers in a data center or server closet with new ENERGY STAR servers of similar computing capacity	
Personal Computer ("PC") Power Management	Any software that meets Pacific Northwest Regional Technical Forum's ("RTF") Networked Computer Power Management Control Software Specifications	
Smart Strip Plug Outlet	Replace existing standard strip plug outlet with smart strip plug	
Agricultural		
Programmable Thermostat	Units controlling central air conditioner, electric heat, or resistance	
VSD Controller for Dairy Vacuum Pumps	UL listed, meets Institute of Electrical and Electronics Engineers ("IEEE") standards	
Circulating Fans	Must be tested by Air Movement & Control Association ("AMCA")	
High Volume, Low Speed Fans	Must be tested by AMCA; >16 feet in diameter	
Dairy Scroll Compressor Controller	VSD controllers for dairy vacuum pumps, UL listed and meeting IEEE harmonic control standards	
Low-Pressure Irrigation System	Replace systems operating on 50% or less than existing system pressure	
Livestock Waterer	Thermostatically-controlled with 2-inches or more of factory-installed insulation	
Heat Reclaimer	Meets current TRM requirements	
Automatic Milker Take-Offs	Automatic milker take-offs that determine milking end time	
Non-Electric High-Efficiency Central Heat (gas, oil, propane)	Meets current TRM requirements Maximum of 250 units across all customer sectors/programs	
Custom Measures		
Custom measures other than CHP	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)	$0.05 - $0.14 per annual kWh saved
CHP	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% of the total project cost (excluding internal labor).	$0.02 - $0.10 per annual kWh saved

For Custom and CHP measures, PPL Electric may implement a minimum TRC requirement for projects if necessary to ensure the program or portfolio TRC is greater than 1.0. PPL Electric will notify customers, trade allies, and stakeholders at least 90 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. PPL Electric will contact any customer whose Phase 3 application was previously rejected because of the TRC requirement in the original EE&C Plan (> 1.25 for CHP; > 1.1 for other types of projects) to give each customer an opportunity to continue its Custom measure application.

All measures may not be available at all times. In some cases, PPL Electric may suspend a measure depending on popularity, pace of the program (savings and costs), free-ridership, evaluation requirements, complexity of the information required from customers, administrative requirements for the measure, etc. PPL Electric will review the program continually and may adjust available measures or eligibility qualifications to achieve program savings and cost budgets. PPL Electric may offer tiered incentives that encourage the installation of multiple measures or a more comprehensive whole facility approach. Program measures, eligibility requirements, and incentives may change to reflect progress, changes in the TRM, changes in market conditions, or other factors. PPL Electric 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 the Company's programs within their savings and cost budgets.

PPL has budgeted up to $3 million for pilots and new technology in the Non-residential Program (for all customer sectors). As new technology and pilots are identified, PPL Electric will provide details and budgets to stakeholders and Pa PUC staff prior to implementation.

Deadline for Rebate Applications

The program rebate application will state the deadline for its submission. The deadline will not exceed 180 days from the date the measure was installed. For some measures, PPL Electric may allow customers to request project preapproval to lock-in the stipulated incentive level and guarantee the program funding. PPL Electric may require preapproval for non-custom measures or specific customer sectors to provide early identification of budget commitments and to reduce the likelihood for exceeding budgets for the program or for customer sectors. For Custom and CHP measures, PPL Electric may require preapproval to allow time for the Company (or the Nonresidential CSP) to qualify the project, minimize free-ridership, screen for cost-effectiveness, determine the site-specific M&V plan, and conduct pre-metering if required.

Program Start Date with Key Schedule Milestones

Table 49~~Table 49~~ lists the estimated key schedule milestones for the Non-residential Energy Efficiency Program. PPL Electric program staff will lead implementation or provide management oversight of all tasks.

Table 49. Non-residential Energy Efficiency Program Schedule and Milestones

Schedule	Milestones
11/30/2015	Phase III EE&C Plan submitted to Pa PUC
06/01/2016	Launch Phase III program
Annually by 01/15	EDCs submit semi-annual program report
Annually by 07/15	EDCs submit preliminary annual program report
Annually by 11/15	EDCs submit final annual program report
05/31/2021	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electrics Evaluation Plan which will be submitted to the SWE for review. PPL Electric and its EM&V CSP will conduct annual evaluations of each program in compliance with all Pa PUC requirements and the SWE's Evaluation Framework. As part of this process, the EM&V CSP will review a sample of participant rebate applications and Nonresidential CSP records to verify the 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 demand reduction. For the Non-residential Energy Efficiency Program, PPL Electric 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 each program component for Custom and CHP measures (i.e., custom incentives, small business direct install, and behavioral changes). The EM&V CSP will also develop site-specific EM&V plans to meet Act 129 evaluation requirements.

The EM&V CSP will develop an evaluation plan and sampling protocol that fits the program prescriptive rebates and midstream incentive delivery channel. As part of this process, the EM&V CSP will review a sample of participant and Nonresidential CSP records to verify the quantity, efficiency level, and qualifying equipment. On-site assessment may be included as a verification activity.

Administrative Requirements

The Nonresidential CSP will provide overall administrative and operational management of the Non-residential Energy Efficiency Program. PPL Electric staff will provide oversight and operational support to establish effective program deployment.

Estimated Participation

PPL Electric anticipates 12,900 small C&I customers, 500 Large C&I customers, and 7,500 GNE customers will participate in the Non-residential Energy Efficiency Program during Phase III. Actual quantities will vary, and PPL Electric will manage the program to stay within budget.

Estimated Program Budget, Savings, and Cost-Effectiveness

Table 50 displays the anticipated program benefits and costs by program year for the entire Non-residential program. Table 52, Table 54, and Table 56 display anticipated program benefits and costs by program year and in total for each non-residential customer sector. Approximately ~~55%~~49% of the Nonresidential sector budget (excluding the Demand Response program costs) is attributed to the Small C&I portion of the Non-residential Energy Efficiency Program, approximately ~~32%~~29% for the Large C&I portion, and approximately ~~13%~~16% for the GNE portion.

Table 50. Total Non-Residential Energy Efficiency Program -- Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total**
Energy Savings (MWh/yr)	133,337	136,853	182,602~~180,648~~	181,209~~180,515~~	176,809~~179,457~~	810,810
Demand Reduction (MW)*	22.63~~23~~	23.17~~23~~	30.57~~30~~	30.38~~30~~	29.60~~30~~	136.34~~136~~
Total TRC Costs	$46,155	$48,974	$65,886~~$65,624~~	$65,505~~$65,417~~	$63,874~~$63,044~~	$290,394~~$289,214~~
Participant Costs	$26,327	$31,158~~$31,183~~	$41,403~~$41,768~~	$41,222~~$41,587~~	$43,102~~$44,067~~	$183,213~~$184,932~~
Direct Utility Costs	$19,828	$17,816~~$17,791~~	$24,483~~$23,856~~	$24,283~~$23,830~~	$20,772~~18,977~~	$107,181~~$104,282~~
Customer Incentives	$13,683	$11,551~~$11,526~~	$14,227~~13,862~~	$14,227~~$13,862~~	$12,374~~$11,409~~	$66,063~~$64,344~~
EDC Labor, Materials & Supplies	$450	$450	$450	$450	$450	$2,250
CSP Labor, Materials & Supplies	$4,966	$5,086	$9,077~~8,815~~	$8,878~~$8,789~~	$7,219~~6,389~~	$35,226~~$34,046~~
CSP Marketing	$728	$728	$728	$728	$728	$3,642

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

**Total of columns may not sum due to rounding.

The Total Non-residential Energy Efficiency Program is projected to be cost-effective, with a TRC test ratio of ~~1.71~~1.72. Table 51~~Table 51~~ shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 63%.

Table 51. Total Non-Residential Energy Efficiency Program -- Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$426,509~~$423,583~~

NPV Costs	$248,670~~$247,754~~
Net Benefits	$177,840~~$175,829~~
Benefit/Cost Ratio	1.72~~1.71~~

Table 52. Small C&I Portion of Non-Residential Energy Efficiency Program -- Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	72,034	73,149	56,114 ~~95,379~~	56,099 ~~96,625~~	55,414 ~~95,622~~	312,810 ~~432,810~~
Demand Reduction (MW)*	13.71~~14~~	13.92~~14~~	11.43~~18~~	11.42~~18~~	11.27~~18~~	61.75~~82~~
Total TRC Costs	$24,872	$25,187	$32,904 ~~$32,910~~	$33,191 ~~$33,285~~	$32,522 ~~$32,422~~	$148,675 ~~$148,676~~
Participant Costs	$13,825	$15,319	$20,803	$21,149	$22,162	$93,258
Direct Utility Costs	$11,046	$9,868	$12,101 ~~$12,108~~	$12,041 ~~$12,136~~	$10,360 ~~$10,260~~	$55,418 ~~$55,418~~
Customer Incentives	$8,607	$7,403	$8,252	$8,252	$7,286	$39,800
EDC Labor, Materials, Supplies	$150	$150	$150	$150	$150	$750
CSP Labor, Materials, Supplies	$1,995	$2,020	$3,405 ~~$3,411~~	$3,345 ~~$3,439~~	$2,629 ~~$2,529~~	$13,394 ~~$13,394~~
CSP Marketing	$295	$295	$295	$295	$295	$1,474

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

The Small C&I Portion of the Non-residential Energy Efficiency Program is projected to be cost-effective, with a TRC test ratio of ~~1.90~~1.40. Table 53 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 63%.

Table 53. Small C&I Portion of Non-Residential Energy Efficiency Program -- Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$177,974~~$242,742~~
NPV Costs	$127,533~~$127,539~~
Net Benefits	$50,441~~$115,202~~
Benefit/Cost Ratio	1.40~~1.90~~

Table 54. Large C&I Portion of Non-Residential Energy Efficiency Program -- Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total**
Energy Savings (MWh/year)	45,103	47,504	69,069	67,690	67,635	297,000
Demand Reduction (MW)*	6.10	6.43	9.35	9.16	9.15	40.19
Total TRC Costs	$17,036	$17,892	$25,281 ~~$25,931~~	$24,613 ~~$25,349~~	$24,613 ~~$24,727~~	$109,435 ~~$110,936~~
Participant Costs	$10,234	$11,831	$18,419 ~~$17,819~~	$17,892 ~~$17,292~~	$17,872 ~~$17,872~~	$76,248 ~~$75,048~~
Direct Utility Costs	$6,802	$6,061	$6,861 ~~$8,112~~	$6,722 ~~$8,057~~	$6,741 ~~$6,855~~	$33,187 ~~$35,887~~
Customer Incentives	$4,093	$3,257	$3,257 ~~$3,857~~	$3,257 ~~$3,857~~	$3,257	$17,121 ~~$18,321~~
EDC Labor, Materials, Supplies	$150	$150	$150	$150	$150	$750
CSP Labor, Materials, Supplies	$2,216	$2,310	$3,111 ~~$3,761~~	$2,971 ~~$3,707~~	$2,990 ~~$3,105~~	$13,599 ~~$15,099~~
CSP Marketing	$343	$343	$343	$343	$343	$1,717

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.
**Total of columns may not sum due to rounding.

The Large C&I portion of the Non-Residential Energy Efficiency Program is projected to be cost-effective, with a TRC test ratio of ~~1.45~~1.47. Table 55 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 63%.

Table 55. Large C&I Portion of Non-Residential Energy Efficiency Program --Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$137,160
NPV Costs	$93,566 ~~$94,802~~
Net Benefits	$43,594 ~~$42,358~~
Benefit/Cost Ratio	1.47~~1.45~~

Table 56. GNE Portion of the Non-Residential Energy Efficiency Program -- Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total**
Energy Savings (MWh/year)	16,200	16,200	57,420 ~~16,200~~	57,420 ~~16,200~~	53,760 ~~16,200~~	201,000 ~~81,000~~
Demand Reduction (MW)*	2.81	2.81	9.792.81	9.792.81	9.172.81	34.3914.07
Total TRC Costs	$4,247	$5,895	$7,701 ~~$6,783~~	$7,701 ~~$6,783~~	$6,739 ~~$5,895~~	$32,383 ~~$29,603~~
Participant Costs	$2,268	$4,008 ~~$4,033~~	$2,181 ~~$3,146~~	$2,181 ~~$3,146~~	$3,069 ~~$4,033~~	$13,707 ~~$16,626~~
Direct Utility Costs	$1,980	$1,887 ~~$1,862~~	$5,520 ~~$3,637~~	$5,520 ~~$3,637~~	$3,671 ~~$1,862~~	$18,577 ~~$12,977~~
Customer Incentives	$984	$891~~$866~~	$2,718 ~~$1,753~~	$2,718 ~~$1,753~~	$1,831 ~~$866~~	$9,142 ~~$6,223~~
EDC Labor, Materials, Supplies	$150	$150	$150	$150	$150	$750
CSP Labor, Materials, Supplies	$756	$756	$2,561 ~~$1,643~~	$2,561 ~~$1,643~~	$1,600 ~~$756~~	$8,233 ~~$5,553~~
CSP Marketing	$90	$90	$90	$90	$90	$451

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.
** Total of columns may not sum due to rounding

The GNE portion of the Non-Residential Energy Efficiency Program is projected to be cost-effective, with a TRC test ratio of ~~1.72~~4.04. Table 57 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 63%.

Table 57. GNE Portion of Non-Residential Energy Efficiency Program -- Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$111,375 ~~$43,681~~
NPV Costs	$27,571 ~~$25,413~~
Net Benefits	$83,804 ~~$18,268~~
Benefit/Cost Ratio	4.04 ~~1.72~~

Low-Income WRAP Master Metered Multifamily

Program Description

Through Low-Income WRAP, PPL Electric will offer services to address tenant units in low-income master-metered multifamily buildings that are under a C&I rate class. The program will offer direct installation of a broad selection of energy-saving improvements, home health and safety measures, and education to low-income customers, as described in detail in Section 3.2.1, Low-Income WRAP. Savings from low-income projects installed in master-metered multifamily buildings count toward the low-income compliance target but are accounted for under the customer sector corresponding to the rate class of the building's meter.

The provision of program services for residents in master-metered multifamily units is subject to landlord approval, availability of program funds, the program's ability to remain within the overall program acquisition cost, and a limit on cumulative spending of $2.5 million in direct costs during Phase III for Low-Income WRAP measures installed in qualifying residents' tenant units in master-metered multifamily buildings. If PPL Electric determines that it will need to spend more than $2.5 million for such measures, it will meet with stakeholders and revise its EE&C Plan to update the estimated funding for these measures, subject to Commission approval. Multifamily buildings' eligibility requirements are not affected by the number of living units in the buildings and the non-low-income residents in master-metered multifamily buildings are eligible to participate in PPL Electric's residential programs, provided that they have landlord/owner approval.

PPL Electric will deliver all aspects of the Non-residential Low-Income Mastered Metered Multifamily component of Low-Income WRAP consistent with the approach and strategy used to deliver the standard Low-Income WRAP. Section 3.2.1, Low-Income WRAP includes detailed descriptions of the target market; implementation strategy; issues, risks, and risk management strategy; anticipated customer costs; ramp-up strategy; marketing strategy; eligible measures and incentives; deadline for rebate applications; program timeline; evaluation, measurement, and verification approach; administrative requirements and estimated participation for this program.

Estimated Program Budget, Savings, and Cost-Effectiveness

Table 58 displays anticipated program benefits and costs by program year and in total.

Table 58. Total Low-Income WRAP Mastered Metered Multifamily--Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	559	840	1,200	1,200	1,200	5,000
Demand Reduction (MW)*	0.09	0.14	0.20	0.20	0.20	0.85
Total TRC Costs	$280	$420	$600	$600	$600	$2,500
Participant Costs	$0	$0	$0	$0	$0	$0
Direct Utility Costs	$280	$420	$600	$600	$600	$2,500
Customer Incentives	$0	$0	$0	$0	$0	$0
EDC Labor, Materials, Supplies	$0	$0	$0	$0	$0	$0
CSP Labor, Materials, Supplies	$280	$420	$600	$600	$600	$2,500
CSP Marketing	$0	$0	$0	$0	$0	$0

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

Table 59. Total Low-Income WRAP Master Metered Multifamily Cost-Effectiveness, TRC Test

NPV Benefits	$2,877
NPV Costs	$2,116
Net Benefits	$760
Benefit/Cost Ratio	1.36

Table 60. Small C&I Portion of Low-Income WRAP Mastered Metered Multifamily-- Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	280	420	600	600	600	2,500
Demand Reduction (MW)*	0.05	0.07	0.10	0.10	0.10	0.42
Total TRC Costs	$140	$210	$300	$300	$300	$1,250
Participant Costs	$0	$0	$0	$0	$0	$0
Direct Utility Costs	$140	$210	$300	$300	$300	$1,250
Customer Incentives	$0	$0	$0	$0	$0	$0
EDC Labor, Materials, Supplies	$0	$0	$0	$0	$0	$0
CSP Labor, Materials, Supplies	$140	$210	$300	$300	$300	$1,250
CSP Marketing	$0	$0	$0	$0	$0	$0

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

The Small C&I Low-Income Master Metered Multifamily component of Low-Income WRAP is projected to be cost-effective, with a TRC test ratio of 1.36. Table 61 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 100%.

Table 61. Small C&I Portion of Low-Income WRAP Master Metered Multifamily Cost-Effectiveness, TRC Test ($1,000)

NPV Benefits	$1,438
NPV Costs	$1,058
Net Benefits	$380
Benefit/Cost Ratio	1.36

Table 62. GNE Portion of Low-Income WRAP Master Metered Multifamily-- Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	280	420	600	600	600	2,500
Demand Reduction (MW)*	0.05	0.07	0.10	0.10	0.10	0.42
Total TRC Costs	$140	$210	$300	$300	$300	$1,250
Participant Costs	$0	$0	$0	$0	$0	$0
Direct Utility Costs	$140	$210	$300	$300	$300	$1,250
Customer Incentives	$0	$0	$0	$0	$0	$0
EDC Labor, Materials, Supplies	$0	$0	$0	$0	$0	$0
CSP Labor, Materials, Supplies	$140	$210	$300	$300	$300	$1,250
CSP Marketing	$0	$0	$0	$0	$0	$0

* Demand reductions from energy efficiency programs do not count toward PPL Electric's demand reduction compliance target, but they are used in the TRC calculation of benefits.

The GNE Low-Income Master Metered Multifamily component of Low-Income WRAP is projected to be cost-effective, with a TRC test ratio of 1.36. Table 63 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 100%.

Table 63. GNE Portion of Low-Income WRAP Master Metered Multifamily Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$1,438
NPV Costs	$1,058
Net Benefits	$380
Benefit/Cost Ratio	1.36

Plans for Achieving Compliance with the Implementation Order

PPL Electric designed its Plan to achieve its low-income targets with Phase III transactions (i.e., projects that are implemented during Phase III) through income-qualified programs only (i.e., Low-Income WRAP, including through the Small C&I and GNE Master Metered Multifamily offering, and the Energy Efficiency Kits and Education Program).

Demand Response Program

Program Description

The C&I Demand Response Program is a load curtailment program for non-residential customers. Through the program, PPL Electric offers incentives to customers who reduce their demand during specific curtailment events. Participating customers must commit to providing a minimum of 100 kW of load reduction when called upon by the Demand Response CSP.

Participants in the Demand Response Program may also be enrolled in PJM's ELRP. As required in the Pa PUC's Implementation Order, PPL Electric designed the EE&C Plan to ensure that the cost to acquire peak demand reductions from customers who participate in PJM's ELRP is no more than half the cost to acquire peak demand reductions from customers in the same rate class that are not participating in PJM's ELRP. Because customers can change their enrollment status throughout Phase III and some customers may not participate in Act 129 demand response events in every program year, PPL Electric must wait until the conclusion of PY12 to demonstrate compliance with the acquisition cost requirement. The Demand Response CSP will manage and coordinate the Demand Response Program, providing a turnkey service.

In accordance with the PA PUC's Implementation Order, PPL Electric will call curtailment events as follows.

- Curtailment events shall be limited to the months of June 1 through September 30.
- Curtailment events shall be called for the first six days that a peak hour of PJM's day-ahead forecast[24] for the PJM RTO is greater than 96% of the PJM RTO summer peak demand forecast[25] for the months of June through September each program year.
- Each curtailment event shall last four consecutive hours.
- Each curtailment event shall be called such that it will occur during the day's forecasted highest peak hour above 96% of PJM's RTO summer peak demand forecast.
- Once six curtailment events have been called in a program year, the Demand Response Program shall be suspended for that program year.
- The reductions attributable to a four consecutive hour curtailment event will be based on the average MW reduction achieved during each hour of that event.

[24] PPL Electric will use the PJM seven-day load forecast, which is available online: http://www.pjm.com/markets-and-operations/energy/real-time/7-day-load-forecast.aspx. Unless the Pa PUC or SWE establishes procedures otherwise, PPL Electric expects to use the PJM day-ahead forecast posted at approximately noon the day before each operating day.

[25] PPL Electric will use Table B-1 of the annual PJM Load Forecast Report. The January 2017 report is available online: http://www.pjm.com/~/media/library/reports-notices/load-forecast/2017-load-forecast-report.ashx

Compliance will be determined based on the average MW reductions achieved from events called in the last four years of the program. Contractor must obtain no less than 85% of the MW reduction target in every event.

- The Contractor must demonstrate that the cost to acquire MWs from customers who participate in PJM's Emergency Load Response Program ("ELRP") is no more than half the cost to acquire MWs from customers in the same rate class that are not participating in PJM's ELRP.

Based on these criteria, there could be zero to six curtailment events in each of the final four program years. There could be zero to 24 total events over the entire Phase III Demand Response Program across all of the applicable sectors (i.e., Small C&I, Large C&I and GNE).

During Program Year 8, PPL Electric will determine if it (or the Demand Response CSP) will bid peak reductions from the Demand Response Program[26] and/or peak reductions from energy efficiency programs into the PJM Capacity Market. If PPL Electric or its Demand Response CSP bids into the PJM Capacity Market, PPL Electric will allocate the revenue received from successful bidding to the customer class from which the peak load reductions were acquired.

Objectives

The objectives of the Demand Response Program are to:

- Cost-effectively deliver at least 92 MW of peak load reductions (all customer sectors combined). Peak load reductions will be determined based on the average of the MW reductions obtained from each event over the last four years of Phase III; and
- Achieve at least 85% of the peak demand reduction compliance target in every four-hour event. For PPL Electric, this requires a minimum of 78.2 MW in each event.

Target Market

The program will target non-residential customers for this program who have the ability to curtail a minimum of 100 kW. The program will be available to customers in a non-residential rate class and any building or business type.

[26] It is unclear whether PPL Electric is permitted to bid all of its peak reductions from its Act 129 Demand Response Program into PJM. Pages 143 to 144 of the Pa PUC's Phase III Implementation Order states: "We accept the Industrials' recommendation to require the EDCs to document in their EE&C Plans whether they intend to bid resources into the market. We note that as the peak demand reduction program does not permit dual participation in the Act 129 program and the PJM ELRP [PPL believes this is a typo since the Pa PUC does permit dual participation], neither the EDCs nor the customer will be permitted to bid Act 129 DR into the PJM ELRP program."

Implementation Strategy

PPL Electric staff will manage the Demand Response CSP, who will provide a turnkey service to deliver the program to customers, including marketing, customer recruitment, trade ally support, negotiating agreements with participants, providing customer care, determining when to call curtailment events and notifying participants accordingly, processing incentives, installing equipment (such as meters to measure customers' reduction in peak demand), and calculating peak load reductions. PPL Electric's energy efficiency staff will provide overall strategic direction and program management. The EM&V CSP will provide evaluation services.

Key steps in this program include:

- Educating customers on demand response and recruiting them into the program;
- Having customers complete program applications/agreements/contracts and ensuring they have the necessary documentation and methods to reduce peak load;
- Verifying that the applicant is an eligible PPL Electric customer and the customer site meets program eligibility criteria;
- Monitoring PJM load forecasts to determine the applicable hours for each demand response event;
- Notifying participants of demand response events;
- Determining the peak reductions provided by each participant and the entire program as a whole for each demand response event, and calculating the average reductions for all demand response events to date;
- Processing participant incentives;
- Manage program issues, risks, and risk management strategy

Program Issues, Risks, and Risk Management Strategy

Table 64 presents market risks associated with the Demand Response Program, as well as strategies PPL Electric will use to manage each risk.

Table 64. Demand Response Program Issues, Risks, and Risk Management Strategies

Program Issue	Risk	Risk Management Strategies
Customers do not understand or are not aware of the program	• Customers do not participate, impacting PPL Electric's ability to achieve its target	• PPL Electric awards the Demand Response CSP contract early (before PY8 starts) to provide enough lead time to recruit participants early • Demand Response CSP increases the frequency of program education and outreach to customers. • Demand Response CSP provides information to help participants understand how various end uses impact their consumption.
Customer and building owner do not commonly	• Customer are reluctant to change business practices or impact	• PPL Electric provides adequate benefits for participation (e.g., incentives,

Program Issue	Risk	Risk Management Strategies
prioritize demand response	operations	energy management support). • Demand Response CSP enters into contracts that are for firm load reductions and include adequate incentives.
Customer may not be capable or willing to participate in every event	• Customers do not provide peak reductions as expected • Evaluation uncertainty: the verification and calculation of peak reductions occur well after each event and results may differ from expected reductions. SWE's verification is more than six months after the end of each program year	• Demand Response CSP oversubscribes the number of participants and MWs in every event to provide a reasonable margin for uncertainties resulting from customers who do not provide their intended peak reductions or evaluation adjustments.
The program budget is limited	• Program budget (including incentives) is not sufficient to attract enough participation or customers drop out during Phase III	• PPL Electric awards the Demand Response CSP contract early (before PY8 starts) to provide enough lead time to recruit participants early and confirm the budget and participation levels.
PJM changes rules or the demand response market changes	• Rule changes at PJM could lead to a significant change (increase or decrease) in dual enrolled participants and/or the incentive levels required to attract Act 129 demand response participants	• Demand Response CSP monitors PJM markets. • Demand Response CSP maintains close relationships with actual and potential demand response participants. • PPL Electric revises EE&C Plan if required.
There is an unknown number of demand response events	• Uncertain demand response budget due to unknown number of demand response events	• PPL Electric designs the program and Demand Response CSP contract to accommodate zero to six events each program year for the last four program years of Phase III. • PPL Electric budgets for the highest possible number of demand response events (24).

Anticipated Costs to Participating Customers

Customers may experience impacts to business operations such as lost productivity and revenue. It is presumed that the Demand Response Program incentives will cover any such costs to participating customers.

Ramp-up Strategy

The Demand Response CSP will recruit participants from currently served markets and target current customers and other curtailment service providers, as well as recruit new customers. Recruiting will take place starting in PY8.

Marketing Strategy

PPL Electric's staff will work with the Demand Response 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:

- Promoting the program to existing PPL Electric customers that currently participate in PJM's ELRP; and
- Promote cross-functional marketing of programs with the non-residential CSP
- Publishing marketing materials, including charts, brochures, and case studies.

Eligible Measures and Incentive Strategy

There are no specific measures prescribed by this program. Customers are asked to implement their own strategies, such as shifting or shedding load or using on-site generators. Those customers who achieve the contracted kW reduction qualify for an incentive to be distributed by the Demand Response CSP. The Demand Response CSP will negotiate incentives with individual customers, and PPL Electric will not know the incentive amounts given to each participant.

Deadline for Rebate Applications

There are no rebate applications for this program. The Demand Response CSP will pay customer incentives at the conclusion of each program year, upon verification of the peak demand reductions.

Program Start Date with Key Schedule Milestones

Table 65 lists the estimated key schedule milestones for the Demand Response Program. PPL Electric program staff will lead implementation or provide management oversight of all tasks.

Table 65. Demand Response Program Schedule and Milestones

Schedule	Milestones
11/30/2015	Phase III EE&C Plan submitted to Pa PUC
08/22/2016	Start to recruit participants
06/01/2017	Launch program (curtailment events can begin)
Annually by 01/15	EDCs submit semi-annual program report
Annually by 07/15	EDCs submit preliminary annual program report
Annually by 11/15	EDCs submit final annual program report
05/31/2021	Program ends

Evaluation, Measurement, and Verification

The EM&V requirements will be detailed in PPL Electrics Evaluation Plan which will be submitted to the SWE for review. PPL Electric and its EM&V CSP will conduct annual evaluations of each program in compliance with all Pa PUC requirements and the SWE's Evaluation Framework. The EM&V CSP will follow all applicable methods in the TRM and the Evaluation Framework to calculate demand reductions. The Demand Response CSP will determine peak reductions for each participant in

accordance with one of the methods specified in the TRM. The EM&V CSP will review each method selected to confirm it is appropriate for that participant. For the Demand Response Program, PPL Electric anticipates conducting annual impact and process evaluations (activities vary by year).

The EM&V CSP will design the evaluation plan to verify demand reduction attributable to this program, and to verify the program met all regulatory requirements. The EM&V CSP will include all participants in any regression-based analysis used to confirm the reported demand reduction.

Administrative Requirements

The Demand Response CSP will provide overall administrative and operational management of the Demand Response Program. PPL Electric staff will provide oversight and operational support to facilitate effective program deployment.

Estimated Participation

PPL Electric anticipates approximately 240 customers will participate in the Demand Response Program each year (PY9 through PY12) during Phase III. Actual quantities will vary, and PPL Electric will manage the program to stay within budget.

Estimated Program Budget, Savings, and Cost-Effectiveness

Table 66 displays the anticipated program benefits and costs by program year for the entire Demand Response program. Table 66, Table 68, Table 70, and Table 85 display anticipated program benefits and costs by program year and in total for each demand response customer sector. Approximately ~~10%~~12% of the demand response sector budget is attributed to the Small C&I portion of the Demand Response Program, approximately ~~50%~~83% for the Large C&I portion, and approximately ~~40%~~4% for the GNE portion.

Table 66. Total Demand Response Program-- Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	0	0	0	0	0	0
Demand Reduction (MW)	0.00	115.00	115.00	115.00	115.00	460.00
Total TRC Costs*	$688~~$1,192~~	$1,757~~$2,943~~	$2,609~~$2,943~~	$2,609~~$2,943~~	$2,547~~$2,943~~	$10,209~~$12,964~~
Participant Costs*	$0	$1,069~~$1,751~~	$1,855~~$1,751~~	$1,855~~$1,751~~	$1,793~~$1,751~~	$6,573~~$7,005~~
Direct Utility Costs	$688~~$1,192~~	$2,113~~$3,527~~	$3,227~~$3,527~~	$3,227~~$3,527~~	$3,144~~$3,527~~	$12,400~~$15,299~~
Customer	$0	$1,425~~$2,335~~	$2,474~~$2,335~~	$2,474~~$2,335~~	$2,391~~$2,335~~	$8,764~~$9,340~~

	PY8	PY9	PY10	PY11	PY12	Total
Incentives						
EDC Labor, Materials, Supplies	$121~~$152~~	$121~~$152~~	$121~~$152~~	$121~~$152~~	$121~~$152~~	$603~~$760~~
CSP Labor, Materials, Supplies	$551~~$875~~	$551~~$875~~	$616~~$875~~	$616~~$875~~	$616~~$875~~	$2,951~~$4,375~~
CSP Marketing	$16~~$165~~	$16~~$165~~	$16~~$165~~	$16~~$165~~	$16~~$165~~	$82~~$824~~

* Per 2016 TRC Test Order guidelines, participant costs are assumed to be 75% of the participant incentive for demand response programs. Energy efficiency program tables show participant costs net of incentives. However, given the treatment of participant costs for demand response programs, the table provides gross participant costs. Therefore, for the purposes of this table, Total TRC Costs = Participant Costs + Direct Utility Costs – Customer Incentives.

Table 67 displays anticipated demand response program benefits and costs by program year and in total. The program is projected to be cost effective, with a TRC test ratio of ~~1.90~~2.01.

Table 67. Total Demand Response Program-- Cost-Effectiveness Results, TRC Test

NPV Benefits	$17,229~~$20,950~~
NPV Costs	$8,562 ~~$11,021~~
Net Benefits	$8,667~~$9,929~~
Benefit/Cost Ratio	2.01~~1.90~~

Table 68. Small C&I Portion of Demand Response Program-- Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	0	0	0	0	0	0
Demand Reduction (MW)	0.00	0.11~~11.50~~	0.11~~11.50~~	0.11~~11.50~~	0.11~~11.50~~	0.46~~46.00~~
Total TRC Costs*	$119	$294	$294	$294	$294	$1,296
Participant Costs*	$0	$175	$175	$175	$175	$701
Direct Utility Costs	$119	$353	$353	$353	$353	$1,530
Customer Incentives	$0	$234	$234	$234	$234	$934
EDC Labor, Materials, Supplies	$15	$15	$15	$15	$15	$76
CSP Labor, Materials, Supplies	$88	$88	$88	$88	$88	$438
CSP Marketing	$16	$16	$16	$16	$16	$82

* Per 2016 TRC Test Order guidelines, participant costs are assumed to be 75% of the participant incentive for demand response programs. Energy efficiency program tables show participant costs net of incentives. However, given the treatment of participant costs for demand response programs, the table provides gross participant costs. Therefore, for the purposes of this table, Total TRC Costs = Participant Costs + Direct Utility Costs – Customer Incentives.

The Small C&I portion of the Demand Response Program is projected not to be cost-effective, with a TRC test ratio of ~~2.26~~0.02. Table 69 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 100%.

Table 69. Small C&I Portion of Demand Response Program-- Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	~~$2,487~~$25
NPV Costs	$1,102
Net Benefits	($1,077)~~$1,385~~
Benefit/Cost Ratio	~~2.26~~0.02

Table 70. Large C&I Portion of Demand Response Program-- Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	0	0	0	0	0	0
Demand Reduction (MW)	0.00	112.13~~57.50~~	112.13~~57.50~~	112.13~~57.50~~	112.13~~57.50~~	448.5~~230.00~~
Total TRC Costs*	$464~~$596~~	$1,336~~$1,472~~	$2,233~~$1,472~~	$2,233~~$1,472~~	$2,171~~$1,472~~	$8,438~~$6,482~~
Participant Costs*	$0	$872~~$876~~	$1,642~~$876~~	$1,642~~$876~~	$1,580~~$876~~	$5,737~~$3,503~~
Direct Utility Costs	$464~~$596~~	$1,627~~$1,763~~	$2,781~~$1,763~~	$2,781~~$1,763~~	$2,698~~$1,763~~	$10,350~~$7,650~~
Customer Incentives	$0	$1,163~~$1,168~~	$2,190~~$1,168~~	$2,190~~$1,168~~	$2,107~~$1,168~~	$7,649~~$4,670~~
EDC Labor, Materials, Supplies	$76	$76	$76	$76	$76	$380
CSP Labor, Materials, Supplies	$388~~$438~~	$388~~$438~~	$515~~$438~~	$515~~$438~~	$515~~$438~~	$2,321~~$2,188~~
CSP Marketing	$0~~$82~~	$0~~$82~~	$0~~$82~~	$0~~$82~~	$0~~$82~~	$0~~$412~~

* Per 2016 TRC Test Order guidelines, participant costs are assumed to be 75% of the participant incentive for demand response programs. Energy efficiency program tables show participant costs net of incentives. However, given the treatment of participant costs for demand response programs, the table provides gross participant costs. Therefore, for the purposes of this table, Total TRC Costs = Participant Costs + Direct Utility Costs – Customer Incentives.

The Large C&I portion of the Demand Response Program is projected to be cost-effective, with a TRC test ratio of ~~1.55~~2.36. Table 71 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 100%.

Table 71. Large C&I Portion of Demand Response Program Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$16,608~~$8,517~~
NPV Costs	$7,042~~$5,510~~
Net Benefits	$9,565~~$3,006~~
Benefit/Cost Ratio	2.36~~1.55~~

Table 72. GNE Portion of Demand Response Program-- Costs and Benefits by Program Year ($1,000)

	PY8	PY9	PY10	PY11	PY12	Total
Energy Savings (MWh/year)	0	0	0	0	0	0
Demand Reduction (MW)	0.00	2.7646.00	2.7646.00	2.7646.00	2.7646.00	11.04184.00
Total TRC Costs*	$105$477	$126$1,177	$81$1,177	$81$1,177	$81$1,177	$475$5,186
Participant Costs*	$0$0	$21$701	$38$701	$38$701	$38$701	$135$2,802
Direct Utility Costs	$105$477	$133$1,411	$94$1,411	$94$1,411	$94$1,411	$520$6,120
Customer Incentives	$0$0	$28$934	$51$934	$51$934	$51$934	$181$3,736
EDC Labor, Materials, Supplies	$29$61	$29$61	$29$61	$29$61	$29$61	$147$304
CSP Labor, Materials, Supplies	$75$350	$75$350	$14$350	$14$350	$14$350	$193$1,750
CSP Marketing	$0$66	$0$66	$0$66	$0$66	$0$66	$0$330

*Per 2016 TRC Test Order guidelines, participant costs are assumed to be 75% of the participant incentive for demand response programs. Energy efficiency program tables show participant costs net of incentives. However, given the treatment of participant costs for demand response programs, the table provides gross participant costs. Therefore, for the purposes of this table, Total TRC Costs = Participant Costs + Direct Utility Costs – Customer Incentives.

The GNE portion of the Demand Response Program is projected to be cost-effective, with a TRC test ratio of 2.261.43. Table 73 shows net present value benefits and costs, net benefits, and the overall benefit/cost ratio. The NTG ratio for this program is estimated to be 100%.

Table 73. GNE Portion of Demand Response Program-- Cost-Effectiveness Results, TRC Test ($1,000)

NPV Benefits	$597$9,947
NPV Costs	$418$4,408
Net Benefits	$179$5,538
Benefit/Cost Ratio	1.432.26

4 Program Management and Implementation Strategies

4.1 Overview of EDC Management and Implementation Strategies

PPL Electric has a six-year history of successful EE&C Program management and implementation. The Company will utilize this knowledge and experience, lessons learned, best practices and relationships built to deliver programs that are effectively managed by its 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 relies on a broad range of CSPs, partners, trade allies, CBOs, and other entities engaged in energy efficiency to promote, deliver, and support the deployment of programs. PPL Electric's Plan identifies three primary CSPs to manage delivery of its residential, low-income, and nonresidential programs, as well as an additional CSP to manage delivery of its Demand Response Program. These program implementation CSPs will be responsible for the delivery of each program or programs defined within the relevant sector. Further, PPL Electric will use an additional CSP to provide EM&V services. PPL Electric will also implement a new energy efficiency tracking system. Figure 4 provides an overview of the activities inherent in program implementation, administration, and management and the roles and responsibilities of each program delivery participant.

In addition to CSPs, PPL Electric depends on trade allies and other market partners to engage customers, promote programs, evaluate projects, furnish and install energy efficient equipment, and provide ancillary energy efficiency services. PPL Electric 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.

PPL Electric will competitively bid all CSP contracts using the RFP procedure approved by the Pa PUC in the Secretarial Letter dated July 14, 2015, at Docket No. M-2014-2424864.

Figure 4. Program Implementation Roles and Responsibilities

	Residential					Low Income		Small C&I*		Large C&I		GNE*		All C&I
	Appliance Recycling	Efficient Lighting	Energy Efficient Home	Student EE Education	Home Energy Education	Low-Income WRAP	EE Kits and Education		Non-Residential		Non-Residential		Non-Residential	Demand Response
Program Function														
Portfolio Planning	PPL Electric													
Research & Development														
Marketing Strategy														
CSP Management & Coordination														
Trade Ally Network Management	Residential CSP					Low-Income CSP		Nonresidential CSP						Demand Response CSP
Marketing & Advertising														
Customer Intake & Routing														
Project Delivery														
Application Review & Approval														
Incentive Processing														
Customer Care														
QA/QC	Implementation CSPs, PPL Electric, and EM&V CSP													
Measurement & Verification														
Program Tracking	PPL Electric, using its Energy Efficiency Management Information System (“EEMIS”)													
Evaluation and Pa PUC Annual/Mid-Year Reports	EM&V CSP													

* Program services for the Small C&I and GNE Low-Income Master-Metered Multifamily components of WRAP will be provided under the standard Low-Income WRAP by the Low-Income CSP.

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 programs. PPL Electric anticipates that CSPs will have a major role in delivering PPL Electric's Phase III programs.

As indicated in Figure 4, CSP roles involve the delivery of programs or functions within or across programs. PPL Electric will train its CSPs on reporting requirements, use of the Company's data management and tracking system (described in Section 5), customer service requirements, QA/QC standards, and protocols for addressing quality issues should they arise (described in Section 6). PPL Electric will require all 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 III EE&C portfolio, PPL Electric will engage three sector-specific CSPs: Residential, Low-Income, and Nonresidential. Each CSP will be responsible for implementation of all programs within their designated sector, including overseeing subcontractors. The Demand Response CSP will be responsible for implementing the Demand Response Program. An EM&V CSP will be responsible for independently evaluating the entire portfolio of EE&C programs and functions.

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

Trade Allies

Trade allies provide products and services directly to customers in support of PPL Electric's programs, but are not under contract to PPL Electric. Examples of the types of trade allies PPL Electric will use to deliver its programs include:

- ***Lighting and other contractors, retailers, distributors/dealers and installers*** who 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's 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's programs.
- ***Residential and commercial builders*** who are builders, developers, remodelers, contractors, architects, engineers, or other market participants that design, develop, and build residential and commercial buildings. These trade allies will provide support delivery for the Energy Efficient Home Program and applicable C&I programs.
- ***Technical engineering and energy services firms*** that install energy efficiency projects for Small C&I, Large C&I, and GNE customers.

Market Partners

Market partners are independent market participants that may provide support or services to PPL Electric 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 PPL Electric. For example, schools that engage with PPL Electric's Student Energy Efficient Education Program are considered market partners because they act as a conduit for reaching the school community with PPL Electric's program offering, but they do not receive a direct financial benefit from the program. Stakeholders and community based organizations are additional market partners.

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

As described previously, the savings compliance targets set forth in the Implementation Order are higher than the Phase II goals and must be met within the same average cost cap. This means that the Phase III program acquisition cost must be approximately 30% less than that in Phase II. The low-income set-aside target is particularly challenging. Concurrent with an increase in the low-income target by 25%, the Implementation Order no longer allows low-income participation in general residential programs to count toward the Company's low-income goals. In addition, the Implementation Order's demand reduction targets and the specific rules regarding achievement of those targets present significant compliance uncertainty.

PPL Electric has identified the following market risks.

- ***Market dynamics.*** Since implementing its Phase II EE&C programs, consumer preferences, market practices, and participation levels have evolved. Customers have many competing demands on their time and resources. Reaching key energy decision makers in Nonresidential sectors can present a special challenge to PPL Electric and its CSPs, while rental properties—both residential and commercial—entail barriers associated with split incentives.
- ***Economic conditions.*** Although economic conditions have generally improved over the past few years, consumers remain cautious about investing in capital intensive projects. Meanwhile, the cost of acquiring energy savings has increased because much of the lowest-hanging fruit (particularly lighting) has been harvested, yet the PPL Electric savings acquisition cost must decrease by approximately 30%. In addition, electric rates remain relatively low, reducing consumers' incentive to make meaningful changes in energy usage. This challenge may be particularly significant for the demand reduction targets because, unlike when implementing energy efficiency measures, customers do not generally benefit from electricity bill reductions when they implement demand response. This is because very few customers have time-of-use rates that provide meaningful price differentials between on-peak and off-peak energy consumption. Therefore, most customers will only participate in PPL Electric's Demand Response Program if the Act 129 demand response incentives are sufficient; however, the

available incentives are constrained by the demand response budget cap determined by the SWE's Demand Response Market Potential Study and the Implementation Order.[27]

- ***Technological changes.*** Changing building codes and new equipment standards tend to lower baseline energy use, thereby reducing the potential savings. This was demonstrated by measure savings in the SWE's Energy Efficiency Market Potential Study. Potential future adjustments to the TRM could further reduce or increase savings attributable to energy efficiency measures, increasing the uncertainty associated with the amount of savings from measures included in the EE&C Plan.[28] In addition, as new technologies emerge (such as smart thermostats, home/building energy management systems, and heat pump clothes dryers), it will be critical to quickly develop new TRM protocols that allow PPL Electric to claim the available energy savings.
- ***PJM regulatory changes.*** Rule changes within PJM can influence the likelihood that customers will subscribe to PPL Electric's Demand Response Program, and could change the amount of allowable incentives paid to Act 129 Demand Response participants,[29] or may result in limited or no PJM demand response programs. New regulations associated with the Clean Power Plan—or other new state or federal initiatives—could also require a greater emphasis on DSM or clean energy generation, thereby necessitating changes to the EE&C Plan.

To address these risks, PPL Electric designed its EE&C Plan to incorporate a range of mitigation measures, as outlined below.

- PPL Electric designed the Plan to exceed its regulatory energy-savings targets by a minimum of approximately 9% to allow for addressing evaluation and other uncertainties.
- The Company engaged stakeholders early and often during the Plan development process to identify key issues, solicit input, and obtain broad consensus for the Plan.
- PPL Electric issued RFPs for all CSP contracts a few months earlier than in previous phases. This helped provide earlier input for the design of programs, helped the Company confirm that savings and cost goals were realistic for each program and each customer sector (and the overall portfolio), and provided more time for detailed implementation planning so programs can

[27] The Implementation Order does not establish a funding cap for demand response. However, increasing demand response funding beyond the amount recommended increases the likelihood that demand response will not be cost-effective. It also reduces the budget for energy efficiency programs (because total funding for demand response and energy efficiency combined is capped), which makes it even more difficult to meet the energy reduction compliance targets.

[28] The TRM is likely to stay relatively constant for the entire five-year phase, although there may be mid-phase updates.

[29] The Implementation Order requires EDCs to demonstrate that the cost (including incentives) to acquire dual enrolled demand response participants (those who participate in PJM's ELRP and Act 129 demand response programs) must be half the cost to acquire single enrolled customers (those who only participate in Act 129 demand response programs). Implementation Order at page 44.

launch promptly, providing a transition from Phase II to Phase III, which is especially important because some CSPs have changed from those who implemented Phase II.

- PPL Electric will engage CSPs using performance-based contracts to ensure they have sufficient incentive to be accountable for achieving program success.
- PPL Electric identified a comprehensive range of strategies to reduce administrative and delivery costs by more than 30%, allowing it to maintain relatively high incentive levels that will continue to drive program participation.
- PPL Electric designed Phase III programs with flexible measures and incentive ranges, allowing the Company to control the pace of its EE&C programs, even if market conditions and consumer preferences change.
- PPL Electric will oversubscribe customers in its Demand Response Program to compensate for customers who do not achieve expected demand reductions in every event or who drop out of the program, and to allow the Company to address evaluation uncertainties while still meeting the requirement to achieve at least 85% of the compliance target in every demand response event.
- CSPs will emphasize comprehensive projects and measures for both residential and commercial customers through education and incentives.
- PPL Electric focused the EE&C Plan on proven and cost-effective measures with high savings, low program acquisition costs, and reasonable NTG ratios.
- PPL Electric will provide as much of the low-income savings as possible, within budget constraints, from direct install measures.
- The Company has already recognized the reduced availability of energy savings afforded by CFLs as a result of EISA and shifted its consumer lighting measure offerings to 100% LEDs in 2014.
- PPL Electric will remain focused on providing best in class EE&C programs, educating and engaging its customers in energy efficiency, and achieving high levels of customer satisfaction. This increases the likelihood of delivering the EE&C Plan within budget and achieving sufficient customer participation to meet savings targets.

4.1.3 Plans to Address Human Resource and Contractor Resource Constraints

PPL Electric's EE&C Plan balances program delivery needs and resource allocation across an experienced pool of internal staff, CSPs, trade allies, and market partners. PPL Electric's professional staff has extensive experience and a proven record of success managing program delivery CSPs and trade ally engagement. Over more than six years, PPL Electric has developed a robust network to provide the proposed services, and the EE&C Plan continues to emphasize ongoing contractor recruitment, outreach, and training to maintain continued program success. PPL Electric 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 those who meet face-to-face with customers and have provided valuable insights on gaps in contractor resources that can be quickly addressed and resolved.

The Company will assign program managers and support staff to oversee its CSPs and programs. PPL Electric frequently evaluates workloads and staffing needs and makes adjustments if necessary.

A description of PPL Electric's EE&C Plan management structure and an organizational chart (Figure 5) are provided in Section 4.2.1.

4.1.4 Early Warning System

Ongoing monitoring of program activity—enabled by PPL Electric's EEMIS, management oversight, CSPs' tracking systems, customer and trade ally feedback, and the Company's EM&V CSP—provide the means for promptly identifying programs that are not meeting their objectives. PPL Electric continually monitors program performance (such as savings and costs) and other objectives.

4.1.5 Implementation Schedule with Milestones

As of April 20, 2016, PPL Electric has issued competitive RFPs for all of its CSPs and for a new EEMIS, has selected its CSPs and the tracking system vendor, received Pa PUC approval of its Residential, Nonresidential, Low-Income, and EM&V CSP contracts, and is finalizing the CSP contract for its Demand Response programs to be submitted to the Pa PUC for approval. The majority of Phase III programs are continuing from Phase II, and implementation will continue uninterrupted to facilitate the transition for customers and trade allies. Table 74 lists the key schedule milestones for the EE&C Plan.

Table 74. PPL Electric's Phase III Implementation Schedule and Milestones

Schedule	Milestones
11/30/2015	Phase III EE&C Plan submitted to the Pa PUC
04/01/2016	Marketing can begin for EE&C programs (assuming Pa PUC approval)
06/01/2016	Launch of all Phase III energy efficiency programs
06/01/2017	Launch of Phase III demand reduction programs
Annually by 01/15	EDCs submit semi-annual program reports
Annually by 07/15	EDCs submit preliminary annual program reports
Annually by 11/15	EDCs submit final annual program reports
05/31/2021	Programs end

4.1.6 Stakeholder Engagement

PPL Electric is committed to obtaining stakeholder input and consensus, and keeping customers, stakeholders, and the general public informed about the results of the energy efficiency programs and progress toward Plan goals. During the development of the Phase III EE&C Plan, PPL Electric pursued opportunities to inform stakeholders of its progress and to solicit input. The Company held five formal stakeholder meetings and maintained ongoing communication with many parties, including other Pennsylvania EDCs; consumer and environmental advocates; chambers of commerce; state, local, and

private economic development organizations; CBOs; trade associations; government agencies; trade allies; market partners; potential CSPs; and customer groups.

In each stakeholder meeting, PPL Electric provided information on its requirements under the Commission's Implementation Order, the Company's approach to developing the Phase III programs, and the status updates on its progress with program design and development. These meetings were very well attended. PPL Electric carefully considered the feedback provided by stakeholders during program design and when establishing the savings and cost budgets for each customer sector. This collaborative process should increase the likelihood of EE&C Plan approval and success in implementing the portfolio.

Key information about stakeholder involvement, including meeting dates and topics discussed at each meeting, is summarized in Table 75.

Table 75. Stakeholder Coordination Activities and Participation

Meeting	Topics Discussed
March 16, 2015	• Summary of Phase III Tentative Implementation Order • Energy efficiency impacts of Phase III Tentative Implementation Order • Demand reduction impacts of Phase III Tentative Implementation Order • Q&A and next steps
July 9, 2015	• Summary of Phase II results through PY6 • Summary of Phase III Implementation Order • Guiding principles for Phase III EE&C Plan • Strategy and schedule for Phase III EE&C Plan • Stakeholder input • Q&A and next steps
August 18, 2015	• Phase III costs and savings by customer sector • Status update for Phase III EE&C program implementation bids • Low-income coordination with PPL Electric's LIURP personnel and other agencies • Multifamily coordination across PPL Electric program CSPs • Specific measures desired • Q&A and next steps
September 28, 2015	• Status update of Phase III EE&C programs and implementation bids • Structure, format, and schedule for EE&C Plan • Q&A and next steps
October 29, 2015	• Phase III program savings and costs by end use • Phase III program measures and incentives (by sector) • Structure, format, and schedule for EE&C Plan • Q&A and next steps
November 6, 2015	• Teleconference to discuss master-metered multifamily buildings with low income occupants

PPL Electric intends to meet with stakeholders as needed, but not less than twice annually until May 31, 2021, to discuss progress, review results, and solicit input for possible EE&C Plan changes during Phase III. PPL Electric meets regularly with its CSPs and trade allies to review the Plan progress, consider new products and services, and/or identify opportunities to improve EE&C programs. The Company also provides Act 129 information in a dedicated stakeholder section on www.pplelectric.com, including its EE&C Plan and quarterly, semi-annual, and annual reports. Additionally, PPL Electric 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 staff will design, implement, and manage programs; oversee sector and cross-functional CSPs; and support the requirements of program delivery, such as marketing, advertising and customer education.

PPL Electric's **Manager, Energy Efficiency Evaluation & Performance** (title likely to change to Manager Energy Efficiency/DSM Programs & Evaluation) has overall responsibility for the development, implementation, operation, evaluation, reporting, and compliance of PPL Electric's Act 129 energy efficiency and demand response programs.

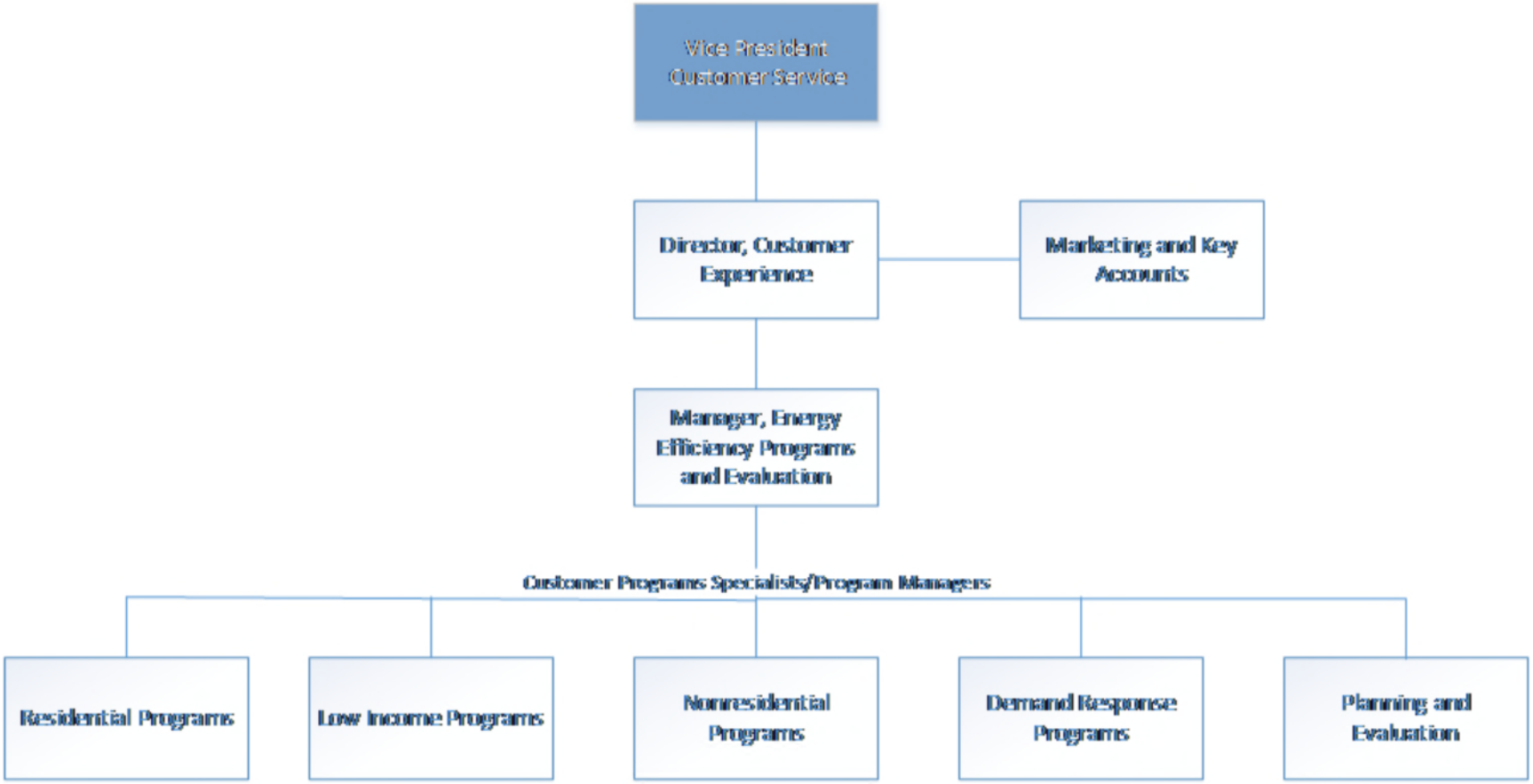
PPL Electric's **Director, Customer Experience** is responsible for marketing, advertising, market research, and the PPL Electric energy efficiency website.

PPL Electric's **Customer Program Specialist/Program Manager** staff manages each program and the respective program implementation CSPs. PPL Electric's, Key Account Managers support and help promote nonresidential programs.

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

Figure 5 summarizes PPL Electric's EE&C management structure.

Figure 5. PPL Electric EE&C Plan Management Structure



4.2.2 Approach to Overseeing the Performance of Subcontractors and Implementers

PPL Electric will implement a process to oversee its CSPs to confirm that they meet the requirements of their contracts, monitor program performance, and modify programs as needed (e.g., design, incentives, measures, marketing) to meet program objectives such as savings, costs, cost-effectiveness, and customer satisfaction. PPL Electric's oversight process includes the following elements:

- ***Sector-level CSPs.*** To reduce administrative costs and provide sufficient accountability for program objectives, PPL Electric will use three sector-level CSPs and a Demand Response CSP that will have overall responsibility for their sector and programs.
- ***PPL Electric program management staff.*** PPL Electric management and program staff are responsible for confirming that each program and sector meets its objectives. PPL Electric's management and staff will continually monitor program performance and will oversee and manage each sector-level CSP and each of their respective programs.
- ***EM&V CSP.*** PPL Electric's EM&V CSP will provide independent evaluations of programs to verify program impacts (such as savings, costs, and cost-effectiveness) and to determine if programs 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 labor and materials, CSP labor and material, marketing, QA/QC, EM&V, tracking systems, legal services, and the SWE.[30] The cost of goods and services provided to low-income and other customers at no cost is classified as administrative costs (not incentives), as directed by the Commission beginning in PY3 during Phase I.[31]

4.3 Conservation Service Providers

4.3.1 Selected CSPs and Basis for Selection

PPL Electric issued RFPs for three sector-level implementation CSPs (i.e., Residential, Nonresidential, and Low-Income), one program-specific implementation CSP (i.e., Demand Response), and one CSP to provide EM&V. PPL Electric conducted its RFP processes in accordance with the procedures approved by the Commission. At the time this EE&C Plan was prepared, PPL Electric was finalizing the CSP contracts for submittal to the Pa PUC for approval.

[30] PPL Electric's share of the SWE is not subject to the Act 129 cost cap. See Implementation Order at page 95.

[31] This is currently the practice in Phase II, and PPL Electric believes the Pa PUC will continue this practice in Phase III.

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 program description in Section 3.

4.3.3 Pending RFPs

As of April 20, 2016, PPL Electric does not expect to issue additional RFPs.

5 Reporting and Tracking Systems

5.1 Semi-annual and Annual Reports

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

5.2 Project Management Tracking System

5.2.1 Overview of Data Tracking System

PPL Electric will continue to use an EEMIS to record energy efficiency transactions and calculate reported savings. PPL Electric uses its corporate accounting system to track all energy efficiency and demand response program cost information, and uses EEMIS and its corporate business intelligence system for internal analysis and internal reporting on energy efficiency program activities. PPL Electric will modify these management and tracking systems as necessary to incorporate Phase III changes to programs and the Commission and SWE's reports, data extracts, and other requirements.

5.2.2 Software Format, Data Exchange Format, and Database Structure

PPL Electric's information system is based on a commercially available database platform. The system enables PPL Electric's 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:

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

The information system will include the features and capabilities outlined 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).
- Provides a place to store electronic documents related to program participants and other functions.

- Provides a straightforward interface for adding programs and program 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 name, customer, sector, and data required to calculate savings, as well as other required information about each transaction.
- Allows CSPs to file program transactions via a secure web link or other secure method.
- Calculates and allocates reported gross savings to the program, customer sector, and reporting period.
- Allows data extracts to be securely exported to external parties such as PPL Electric's EM&V CSP and the SWE.
- Is linked to PPL Electric's customer information system so that the Company can confirm participants' eligibility and track which customers participate in programs.

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's day-to-day portfolio analysis and management.

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

PPL Electric's 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, i.e., 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 staff, program CSPs, and system administrators. Direct access (i.e., read-only) is not recommended for Commission personnel, the SWE, or PPL Electric's evaluator because they would need significant training to understand the system. PPL Electric provides data extracts to those parties instead.

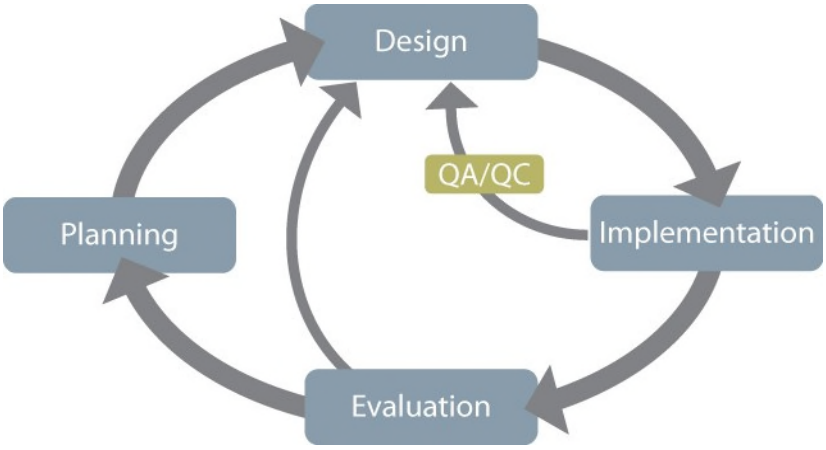
6 Quality Assurance and Evaluation, Measurement, and Verification

6.1 Quality Assurance/Quality Control

6.1.1 Approach to Quality Assurance and Quality Control

PPL Electric will use a continuous improvement process ("CIP") as the framework for managing its Phase III portfolio. The basic principles of CIP, illustrated in Figure 6, is establishing effective QA/QC and EM&V procedures to track program activities, monitoring performance and progress toward targets, and taking 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, each discussed below: (1) activity tracking; (2) QA/QC; and (3) process and impact evaluations, which are described in the following sections.

Figure 6. PPL Electric's Continuous Improvement Process



QA/QC is integral to the design and delivery of all programs in PPL Electric's 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. QA/QC procedures will improve performance. 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. QA at PPL Electric includes activities to confirm that the Company's program 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 is accurate and sufficient to allow for rigorous energy savings analysis. These activities include, but are not necessarily limited to, the following:

- Developing program logic models and process maps that document the goals, processes, and expected outcomes associated with key activities in each program;
- Implementing training protocols that describe training procedures and requirements for key program 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 program; and
- Summarizing CSPs' gross energy savings calculation methods that are reported at the measure and/or project level to support consistency and accuracy across each program.

Quality Control

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

- Ongoing tracking of program activities and costs.
- Reviewing all data and records to confirm that the proper data are collected consistently, resources are allocated appropriately, and program performance can be measured accurately. For measure-based programs, this activity including 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 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 documents and tracks all program and portfolio activity through its EEMIS, which can record and/or calculate reported gross energy savings. The Company designed the tracking system with input interfaces customized to individual programs 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 trains program implementation CSPs to use the tracking system. In cases where a turnkey CSP delivers all aspects of a program, the Company will expect that CSP to track all activity via secure Internet access or upload. Program 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 program. 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, e-mail, and in writing. PPL Electric publishes telephone numbers, addresses, and an e-mail link on its website and on program applications. PPL Electric and CSPs are responsible for following up, in a timely manner, on all comments and complaints. The Company requires program CSPs to keep a log of complaints and resolutions, which they promptly provide to PPL Electric.

PPL Electric, in conjunction with the EM&V CSP, will implement an evaluation plan for each program. 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 on a regular basis.

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

The EM&V CSP will conduct process evaluations for the Phase III portfolio of programs. These process evaluations are a principal component of PPL Electric's CIP, allowing the Company to monitor the progress of individual programs 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 program, operation, and delivery efficiency.

A primary objective of the process evaluations is to assess which program 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 program theory in terms of its goals, processes, outcomes, and metrics that enable assessment program performance relative to its objectives. The process evaluation will also involve an evaluability assessment, which includes reviewing the data collected to identify data elements required for evaluation. During the evaluability assessment, the EM&V CSP will also review data collection and tracking procedures to determine whether the CSP is collecting data necessary for verifying the program impacts on time, and to determine whether those data are in sufficient quantity and in the proper format.

PPL Electric can use the results of the process evaluation activities, benchmarking, and market effects studies to assess the programs' 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 program participation and the adoption of efficiency measures.

The main sources of data for the process evaluation will be: program documentation reviews; logic models and evaluability assessments; interviews with internal PPL Electric program staff, as well as with CSPs and key market actors; secondary research; and participant and nonparticipant surveys. Key market actors will vary from program to program and may include various trade allies, such as equipment vendors, contractors, distributors, and retailers.

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

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

PPL Electric expects that, for Phase III, 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 semi-annual and annual reports, and standard formats for data requests and data extracts. The Implementation Order provides a reporting calendar with dates the reports and data must be provided to the SWE. PPL Electric 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

and sector. The Evaluation Plan for each program outlines 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 SWE. The EM&V CSP will update Evaluation Plans annually, if needed, and provide them to the SWE for review.

The SWE and the Commission's staff may call quarterly program 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 and the EM&V CSP will attend these meetings to provide input and stay informed of the SWE's activities and decisions.

PPL Electric 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 between 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 Act 129 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's 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 III.[32] In addition, the Commission determined that certain implementation costs recoverable under Act 129 are not subject to the 2% cost cap, including PPL Electric's share of the costs for the SWE.[33]

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

PPL Electric will spend most of its $312.5 million budget[34] to implement its EE&C Plan, including administrative costs. This budget also includes costs PPL Electric 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 a plan. The Company proposes to amortize and recover those deferred costs ratably over the 60-month life of its Phase III EE&C Plan (i.e., June 1, 2016 through May 31, 2021). The amortization of those costs is included within the $312.5 million budget.

7.3 Data Tables

The tables on the following pages provide cost data for each program/sector broken out by direct program costs, administrative costs, and total costs (Pa PUC tables 6A, 6B, and 6C). Cost-effectiveness calculations by program are provided in Section 8. Each table heading includes a reference to the corresponding table numbers provided in the EE&C Plan Template.

Tables in this section include:

- **Table 76: Pa PUC Table 6A** – Portfolio-Specific Assignment of EE&C Costs
- **Table 77: Pa PUC Table 6B** – Allocation of Common Costs to Applicable Customer Sector
- **Table 78: Pa PUC Table 6C** – Summary of Portfolio EE&C Costs

[32] Implementation Order at page 135.

[33] Implementation Order at page 95.

[34] $307.5 million is the allowable budget under PPL Electric's Act 129 cost cap. In addition to this cost, PPL Electric expects to incur approximately $5 million for its share of the SWE's cost, which are not subject to the cost cap.

Table 76. Pa PUC Table 6A - Portfolio-Specific Assignment of EE&C Costs

Residential and Low Income Portfolio**					
	Direct Cost Element ($)				
EE&C Program	**Incentives***	**CSP Labor Materials & Supplies**	**CSP Marketing**	**EDC Labor and Materials**	**Total Costs*** **
Appliance Recycling	$2,361,919	$8,116,488	$1,027,175	$296,400	$11,801,982
Efficient Lighting	$26,033,775	$4,900,849	$1,036,161	$600,400	$32,571,185
Energy Efficient Home	$16,966,860	$15,789,889	$1,384,399	$592,800	$34,733,949
Student Energy Efficient Education	$0	$4,520,481~~$54,870,481~~	$943,931	$197,600	$5,662,012~~7,012,012~~
Home Energy Education	$0	$8,569,858~~$8,636,358~~	$1,275,167	$296,400	$10,141,425~~$10,207,925~~
Low-Income WRAP	$0	$38,145,195~~$36,728,697~~	$1,560,000	$2,017,500	$41,722,695~~$40,306,197~~
Energy Efficiency Kits and Education	$0	$5,911,831	$762,000	$225,000	$6,898,831
Total* **	**$45,362,554**	**$85,954,593**	**$7,988,833**	**$4,226,100**	**$143,532,081**

***** Excludes $47 million for low-income measures provided to customers at no cost that are not categorized as "incentives" per the PaPUC**.**

** There could be up to $2.5 M reallocated from other sectors to the residential sector for a residential direct load control measure if enacted.

*** The sum of "Total" columns may not equal the "Total Costs" due to rounding.

Small C&I Portfolio					
	Direct Cost Element ($)				
EE&C Program	**Incentives**	**CSP Labor Materials & Supplies**	**CSP Marketing**	**EDC Labor and Materials**	**Total Costs**
Small C&I – Non-Residential Energy Efficiency	$39,799,587	$13,394,291	$1,474,182	$750,000	$55,418,059
Small C&I Demand Response	$934,000	$437,535	$82,400	$76,000	$1,529,935
Small C&I Efficient Lighting[1]	$3,560,666	$205,173	$0	$0	$3,765,839
Small C&I Low-Income WRAP Master Metered Multifamily	$0	$1,250,000	$0	$0	$1,250,000
Total	**$44,294,252**	**$15,286,999**	**$1,556,582**	**$826,000**	**$61,963,833**

[1] To account for cross-sector sales, PPL Electric allocates a portion of costs and savings from the Efficient Lighting (Residential) program to the small commercial sector.

Large C&I Portfolio					
	Direct Cost Element ($)				
EE&C Program	**Incentives**	**CSP Labor Materials & Supplies**	**CSP Marketing**	**EDC Labor and Materials**	**Total Costs**
Large C&I – Non-Residential Energy Efficiency	$17,121,465~~$18,321,465~~	$13,598,724~~$15,099,055~~	$1,716,643	$750,000	$33,186,840~~$35,887,163~~
Large C&I Demand Response	$7,649,170~~4,670,000~~	$2,320,839~~$2,187,685~~	$0~~412,000~~	$380,000	$10,350,009~~7,649,685~~
Total*	**$24,770,643~~22,991,465~~**	**$15,919,563~~$17,286,740~~**	**$1,716,643~~$2,128,643~~**	**$1,130,000**	**$43,536,848**

*Sum in rows may not match total due to rounding.

GNE Portfolio					
	Direct Cost Element ($)				
EE&C Program	**Incentives**	**CSP Labor Materials & Supplies**	**CSP Marketing**	**EDC Labor and Materials**	**Total Costs**
GNE – Non-Residential Energy Efficiency	$9,141,907 ~~$6,222,637~~	$8,233,353~~5,552,902~~	$451,175	$750,000	$18,576,436~~$12,976,714~~
GNE Demand Response	$180,512~~3,736,000~~	$192,515~~$1,750,150~~	$0~~329,600~~	$147,000~~304,000~~	$520,027~~6,119,750~~
GNE Low-Income WRAP Master Metered Multifamily	$0	$1,250,000	$0	$0	$1,250,000
Total*	**$9,322,420~~$9,958,637~~**	**$9,675,868~~8,553,052~~**	**$451,175~~780,775~~**	**$897,000~~1,054,000~~**	**$20,346,464**

*Sum in rows may not match total due to rounding.

Total All Sectors							
	Direct Cost Element ($)						
Total Portfolio	**Incentives**	**CSP Labor Materials & Supplies**	**Marketing**	**EDC Labor, Materials & Supplies**	**Total EDC Costs[5]**	**Total Participant Costs[2]**	**Total TRC Costs (EDC + Participant)[5]**
Direct Costs	$123,749,869~~$122,606,909~~	$126,837,023~~$127,081,384~~	$11,713,233~~12,454,833~~	$7,079,100~~$7,236,100~~	$269,379,226	$261,603,336~~$265,540,404~~	$530,982,562~~$534,919,630~~

Common Costs[1]		$23,354,924[3]	$10,600,000[4]	$9,145,000	$43,099,924		$43,099,924
Total EDC Costs	$123,749,869~~$122,606,909~~	$150,191,947 ~~$150,436,308~~	$22,313,233 ~~$23,054,833~~	$16,224,100 ~~$16,381,100~~	**$312,479,150**	$261,603,336~~$265,540,404~~	$574,082,486~~578,019,554~~

[1] Common costs are not allocated to individual programs and, thus, not included in the Direct Costs.
[2] Participant costs are net of incentives.
[3] Includes SWE and some contractors who are not CSPs.
[4] Includes EDC labor and materials for advertising, marketing, market research, and website.
[5] Total may not sum due to rounding.

Table 77. Pa PUC Table 6B - Allocation of Common Costs to Applicable Customer Sector

Common Cost Element	Total Cost ($)	Basis for Cost Allocation	Class Cost Allocation ($)			
			Residential and Low-Income	Small C&I	Large C&I	GNE
Plan Development	~~$2,054,924~~ $1,554,924	% of direct program cost	~~$1,094,914~~ $828,502	~~$472,683~~ $357,671	~~$332,115~~ $251,305	~~$155,212~~ $117,446
EM&V	~~$13,500,000~~ $15,000,000	% of direct program cost	~~$7,193,131~~ $7,992,368	~~$3,105,329~~ $3,450,366	~~$2,181,866~~ $2,424,295	~~$1,019,674~~ $1,132,971
Marketing	$10,600,000	% of direct program cost	$5,647,940	$2,438,258	$1,713,169	$800,633
Technical Support/ Tracking System	$7,450,000	% of direct program cost	$3,969,543	$1,713,682	$1,204,067	$562,709
Plan Management	~~$3,100,000~~ $2,100,000	% of direct program cost	~~$1,651,756~~ $1,118,931	~~$713,076~~ $483,052	~~$501,021~~ $339,401	~~$234,147~~ $158,616
KAMs	$1,395,000	Estimated based on the proportion of KAM time with customer sectors	-	$69,750	$1,116,000	$209,250
SWE	$5,000,000	% of direct program cost	$2,664,123	$1,150,122	$808,099	$377,657
Totals	**$43,099,924**		**$22,221,406**	**$9,662,899**	**$7,856,337**	**$3,359,282**

Table 78. Pa PUC Table 6C - Summary of Portfolio EE&C Costs[2]

Portfolio	Total Direct Costs($)	Total Common Costs ($)[1]	Total of All Costs ($)[3]
Residential and Low-Income	$143,532,081	$22,221,406	$165,753,487
Small C&I	$61,963,833	$9,662,899	$71,626,731
Large C&I	$43,536,848	$7,856,337	$51,393,186
GNE	$20,346,464	$3,359,282	$23,705,746

Total	**$269,379,226**	**$43,099,924**	**$312,479,150**

[1] Due to rounding ratios used to allocate total common costs to sectors in the analysis, the total common cost for the phase varies from the actual estimate by less than $10.

[2] There could be up to $2.5 M reallocated from other sectors to the residential sector for a residential direct load control measure if enacted.

[3] Sum in rows may not match total due to rounding.

7.4 Tariffs and Cost Recovery Mechanism

Section 2806.1(k)(1) of Act 129 authorizes EDCs to recover the costs of their EE&C Plan through a reconcilable adjustment clause under Section 1307 of the Public Utility Code. In Appendix E of this EE&C Plan filing, PPL Electric has included its proposed *pro forma* tariff supplement to implement such a cost recovery mechanism—the ACR-III. Because all of PPL Electric's proposed EE&C Plan programs will benefit both shopping and non-shopping customers, the Company designed its cost recovery mechanism to be non-bypassable. The ACR-III will be separately calculated for each of PPL Electric's three major customer classes – Residential, Small C&I, and Large C&I. For residential customers, PPL Electric 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 will apply the cost recovery mechanism as a dollars per kW charge, as a separate line item on the customers' bill, where the demand (i.e., kW) is a customer's PJM peak load contribution (which may change yearly).

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

In addition to the annual reconciliation, upon determination that a customer class' Act 129 rate, if left unchanged, would result in a material over- or under-collection of Phase III 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 rate.

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

Section 2806.1(a)(11) of Act 129 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 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/portfolio-level costs, relate to EE&C measures that are applicable to more than one customer class or that provide system-wide benefits. In Phases I and II, the Commission directed PPL Electric 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. As in Phases I and II, PPL Electric 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.

PPL Electric's EE&C Plan provides estimated costs and savings for five customer sectors: Residential, Low-Income, Small C&I, Large C&I, and GNE. The GNE programs and measures are available to customers in more than one rate class (i.e., Residential, Small C&I, or Large C&I) who meet GNE

eligibility requirements (i.e., government, non-profit, or educational). The EE&C Plan does not have separate savings and cost budgets for each rate class within GNE. For cost recovery, the Company's ACR-III will assume that 60% of the estimated GNE costs will come from Small C&I participants and 40% from Large C&I participants, based on the actual results from Phases I and II. PPL Electric will assign actual GNE costs to the specific rate class of each GNE participant. The Company's reconciliation process will account for any differences between the estimated and actual GNE costs by customer class.

7.6 Phase III Cost Accounting

PPL Electric will account for Phase III 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 III from those used in prior phases. Any costs associated with energy efficiency measures installed and operable on or before May 31, 2016 will be accounted for as Phase II costs. Any costs associated with energy efficiency measures installed and operable after May 31, 2016 will be accounted for as Phase III costs.

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 Tables 7A through 7F in Section 8. For each program in the Plan, PPL Electric determined cost-effectiveness in accordance with the Commission's 2016 TRC Test Order.

PPL Electric began assessing the cost-effectiveness of each program in the Plan by creating a valuation of the net total resource benefits ("B_{TRC}") over the life of each conservation measure, for a maximum of 15 years as directed in the 2016 TRC Test Order. The Company also determined each measure's total incremental installed costs ("C_{TRC}"). PPL Electric deemed a measure (or program) as cost-effective if its B_{TRC} was positive or the benefit/cost ratio was at least 1.0, as shown by the following equations:

$$B_{TRC} - C_{TRC} \geq 0$$

or

$$B_{TRC} / C_{TRC} \geq 1$$

The B_{TRC} 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.

Calculation of Avoided Costs of Supplying Electricity

PPL Electric calculated the avoided costs of delivered electricity for a 15-year planning horizon in three segments, in accordance with the procedure prescribed in the Commission's 2016 TRC Test Order, as follows:

- ***Years 1-5 (June 2016-May 2021):*** The Company will use PJM New York Mercantile Exchange ("NYMEX") PPL Zone Off-Peak and On-Peak Locational Marginal Price ("LMP") Swap futures as of August 27, 2015 through December 2016. PJM Western Hub Off-Peak and On-Peak LMP Swap futures are used from January 2017 through December 2018. PPL Electric adjusted the Western Hub values by assessing the 2016 ratio between PJM PPL Zone LMP Swap futures and Western Hub futures, and applying this ratio to the Western Hub values for 2017 and 2018. The Company used NYMEX Henry Hub Natural Gas Futures from 2019 through 2021, converted to electric prices using an on-peak and off-peak heat rate, and included basis adjustments and on-peak and off-peak spark price spreads.
- ***Years 6-10 (June 2021-May 2026):*** PPL Electric used NYMEX Henry Hub Natural Gas Futures as of August 27, 2015, converted to electric prices using an on-peak and off-peak heat rate. The Company included basis adjustments and on-peak and off-peak spark price spreads.
- ***Years 11-15 (June 2026-May 2031):*** PPL Electric 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 through 2017 and 2018. After 2018, PPL Electric escalated prices using the Consumer Price Index from the Bureau of Labor Statistics ("BLS"). Avoided transmission and distribution costs are from the SWE Demand Response Potential study,[35] with the 2016 dollar escalated yearly using the BLS escalator. The assumptions used to calculate avoided costs are summarized by sector in Table 79.

Table 79. Main Assumptions Used in Avoided Costs and TRC Calculations

Discount Rates	Utility Discount Rate	7.63%
	Participant Discount Rate	10.00%
	Societal Discount Rate	7.63%
	TRC Discount Rate	7.63%
Line Losses[1]	**Energy**	
	Residential	8.75%
	Commercial (Small C&I)	8.75%
	Industrial (Large C&I)	4.20%
	GNE	8.75%
	Demand	
	Residential	8.75%
	Commercial (Small C&I)	8.75%
	Industrial (Large C&I)	4.20%
	GNE	8.75%
T&D Prices[2]	Average BLS Escalator	0.77%
	Transmission & Distribution ($/kW-year 2016)	$20.10
	Transmission Only ($/kW-year 2016)	$0.00

[1] Line losses are consistent with those provided in the 2016 TRM Order, at Docket No. M-2015-2469311 (Order Entered July 8, 2015).
[2] T&D prices are consistent with those provided on page 34 of the 2016 TRM Order. Avoided costs are provided in the SWE's 2015 Demand Response Market Potential Study.

Table 80 shows PPL Electric's calculated avoided costs of delivered electricity for a 15-year planning horizon.

[35] Table 2-13.

Table 80. Overall Avoided Costs (All Sectors)[1]

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			
2017	$0.0428	$0.0300	$0.0396	$0.0213	$0.0340	$21.67	$20.26	$0.00
2018	$0.0407	$0.0291	$0.0381	$0.0206	$0.0326	$43.80	$20.14	$0.00
2019	$0.0600	$0.0380	$0.0325	$0.0203	$0.0408	$44.23	$20.34	$0.00
2020	$0.0608	$0.0428	$0.0330	$0.0207	$0.0429	$44.58	$20.50	$0.00
2021	$0.0619	$0.0437	$0.0340	$0.0214	$0.0439	$44.93	$20.66	$0.00
2022	$0.0635	$0.0450	$0.0353	$0.0225	$0.0452	$45.29	$20.83	$0.00
2023	$0.0650	$0.0462	$0.0369	$0.0238	$0.0466	$45.64	$20.99	$0.00
2024	$0.0667	$0.0475	$0.0384	$0.0250	$0.0480	$46.00	$21.16	$0.00
2025	$0.0681	$0.0487	$0.0399	$0.0262	$0.0494	$46.37	$21.32	$0.00
2026	$0.0698	$0.0499	$0.0413	$0.0273	$0.0507	$46.73	$21.49	$0.00
2027	$0.0839	$0.0613	$0.0843	$0.0617	$0.0720	$47.10	$21.66	$0.00
2028	$0.0826	$0.0603	$0.0836	$0.0611	$0.0711	$47.47	$21.83	$0.00
2029	$0.0816	$0.0595	$0.0820	$0.0598	$0.0700	$47.85	$22.00	$0.00
2030	$0.0810	$0.0590	$0.0814	$0.0593	$0.0694	$48.23	$22.18	$0.00
2031	$0.0818	$0.0597	$0.0808	$0.0589	$0.0697	$48.61	$22.35	$0.00
2032	$0.0841	$0.0615	$0.0824	$0.0602	$0.0716	$48.99	$22.53	$0.00
2033	$0.0870	$0.0639	$0.0851	$0.0623	$0.0741	$49.38	$22.71	$0.00
2034	$0.0899	$0.0661	$0.0882	$0.0648	$0.0767	$49.77	$22.89	$0.00
2035	$0.0936	$0.0691	$0.0909	$0.0669	$0.0798	$50.16	$23.07	$0.00
2036	$0.0974	$0.0722	$0.0953	$0.0705	$0.0833	$50.55	$23.25	$0.00
2037	$0.1024	$0.0762	$0.0987	$0.0732	$0.0873	$50.95	$23.43	$0.00
2038	$0.1092	$0.0816	$0.1047	$0.0780	$0.0932	$51.35	$23.62	$0.00
2039	$0.1173	$0.0881	$0.1120	$0.0838	$0.1001	$51.76	$23.80	$0.00

[1] In Phase II, T&D ($/kWh) was included in the avoided energy cost; however, in Phase III, T&D ($/kW) was included in the avoided capacity cost. Thus, relative to Phase II, Phase III avoided energy costs were lower and offset by higher avoided capacity costs. Additionally, given that the avoided generation capacity costs are pegged to PJM Reliability Pricing Model Base Residual Auction results, those costs are subject to volatility. As such, 2017 avoided generation capacity costs are less than subsequent years as provided in the 2017-2018 Base Residual Auction Report.

Measure Data

PPL Electric 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").

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 adjusted hourly (8,760) system-avoided costs by the hourly load shape of the end user affected by the measure. The Company did not factor non-energy benefits, such as water savings, into the calculation because

these benefits were not readily quantifiable and assumed to be relatively minor.[36] These non-energy benefits would increase the benefit-cost ratio.

Program 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 program development, delivery, and ongoing operation, and fit into the four categories outlined below.

1) EDC Labor, Material, and Supplies

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

2) Customer Incentives

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

3) CSP Labor, Materials, and Supplies

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

4) Marketing

- EDC and CSP expenditures related to promotion of energy efficiency programs include, but are not limited to, the production of energy efficiency program 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 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.

[36] 2016 TRC Test Order at page 15

PPL Electric also categorizes costs as follows:

- **Direct Costs:** These costs are directly related and charged to a specific program. PPL Electric will assign costs directly to programs 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 program, or provide portfolio-wide benefits.
- **EDC Costs:** These costs (i.e., the four categories described above) are incurred by PPL Electric 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 only uses participant costs in the TRC evaluation.

8.2 Data Tables

The tables on the following pages provide TRC benefits data for each program 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 heading includes a reference to the corresponding table number provided in the EE&C Plan Template.

Tables in this section include:

- Table 81: **Pa PUC Table 7A** – Gross TRC Benefits, Portfolio
- Table 82: **Pa PUC Table 7B** – Net Benefits, Portfolio
- Table 83: **Pa PUC Table 7C** – TRC Benefits, Residential and Low-Income Portfolio
- Table 84: **Pa PUC Table 7D** – TRC Benefits, Small C&I Portfolio
- Table 85: **Pa PUC Table 7E** – TRC Benefits, Large C&I Portfolio
- Table 86: **Pa PUC Table 7F** – TRC Benefits, GNE Portfolio

Table 81. Pa PUC Table 7A – Gross TRC Benefits, Portfolio

Portfolio			Gross TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1], [2]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
Appliance Recycling	PY8		$2,113	$4,497	$38	$36	$351	$147	1,775	14,056	13,120	105,351
	PY9		$2,108	$4,595	$76	$35	$327	$137	1,725	13,654	12,734	102,261
	PY10		$2,345	$4,693	$74	$34	$404	$169	1,676	13,263	12,358	99,257
	PY11		$2,431	$4,822	$73	$33	$411	$172	1,629	12,884	11,994	96,339
	PY12		$2,806	$6,423	$93	$43	$536	$225	2,073	16,167	15,316	121,822
Program Total [2]		**2.12**	**$10,136**	**$21,471**	**$354**	**$181**	**$2,030**	**$850**	**8,880**	**70,024**	**65,522**	**525,031**
Efficient Lighting	PY8		$39,189	$56,539	$383	$357	$2,809	$850	17,643	247,001	95,752	1,340,530
	PY9		$23,101	$56,804	$738	$340	$2,575	$778	16,859	236,021	91,454	1,280,353
	PY10		$11,909	$41,964	$526	$242	$2,280	$683	11,894	166,513	64,245	899,432
	PY11		$6,238	$28,131	$344	$158	$1,543	$454	7,726	108,159	41,402	579,632
	PY12		$120	$0	$0	$0	$0	$0	0	0	0	0
Program Total [2]		**2.21**	**$76,025**	**$168,104**	**$1,991**	**$1,097**	**$9,207**	**$2,764**	**54,121**	**757,694**	**292,853**	**4,099,948**
Energy Efficient Home	PY8		$8,651	$3,615	$14	$13	$189	$102	656	7,434	7,357	88,348
	PY9		$9,773	$5,152	$37	$17	$244	$134	848	9,391	9,941	119,029
	PY10		$14,371	$8,061	$47	$22	$478	$279	1,065	11,624	14,408	176,217
	PY11		$18,804	$11,503	$54	$25	$688	$425	1,220	13,241	19,454	244,650
	PY12		$21,859	$13,794	$56	$26	$815	$523	1,253	13,312	22,561	286,445
Program Total [2]		**0.57**	**$61,507**	**$34,865**	**$209**	**$103**	**$2,414**	**$1,463**	**5,043**	**55,003**	**73,721**	**914,689**
Student Energy Efficient Education	PY8		$1,243	$2,348	$15	$14	$138	$59	673	7,407	5,180	56,977
	PY9		$1,271	$2,502	$29	$14	$133	$56	673	7,407	5,180	56,977
	PY10		$854 ~~$1,390~~	$1,444 ~~$2,657~~	$16 ~~$30~~	$7 ~~$14~~	$92 ~~$169~~	$39 ~~$72~~	366~~673~~	4,027~~7,407~~	2,816~~5,180~~	30,974~~56,977~~
	PY11		$876 ~~$1,419~~	$1,504 ~~$2,766~~	$16 ~~$30~~	$8 ~~$14~~	$97 ~~$178~~	$41 ~~$75~~	366~~673~~	4,027~~7,407~~	2,816~~5,180~~	30,974~~56,977~~
	PY12		$1,419 ~~$1,689~~	$1,071 ~~$1,815~~	$11 ~~$19~~	$5 ~~$9~~	$68 ~~$115~~	$29 ~~$49~~	251~~426~~	2,764~~4,682~~	1,933~~3,274~~	21,259~~36,014~~
Program Total [2]		**1.61 ~~1.75~~**	**$4,920~~$6,020~~**	**$7,923~~$10,537~~**	**$88~~$123~~**	**$47 ~~$64~~**	**$527 ~~$732~~**	**$224 ~~$311~~**	**2,330~~3,119~~**	**25,633~~34,312~~**	**17,924~~23,993~~**	**197,162~~263,922~~**
Home Energy Education	PY8		$1,845	$1,743	$113	$106	$1,070	$454	5,219	5,219	40,144	40,144
	PY9		$1,759	$1,839	$234	$108	$1,051	$446	5,341	5,341	41,080	41,080
	PY10		$1,930 ~~$1,952~~	$2,252 ~~$2,284~~	$236 ~~$239~~	$108 ~~$110~~	$1,339 ~~$1,358~~	$569 ~~$576~~	5,334~~5,408~~	5,334~~5,408~~	41,026~~41,600~~	41,026~~41,600~~
	PY11		$2,230 ~~$2,253~~	$2,670 ~~$2,702~~	$270 ~~$273~~	$124 ~~$126~~	$1,598 ~~$1,617~~	$678 ~~$686~~	6,060~~6,132~~	6,060~~6,132~~	46,611~~47,168~~	46,611~~47,168~~
	PY12		$2,376~~$2,3~~	$3,354	$335 ~~$339~~	$154 ~~$156~~	$2,011~~$~~	$854~~$86~~	7,463~~7,5~~	7,463~~7,53~~	57,406~~57,~~	57,406~~57,94~~

Portfolio			Gross TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1], [2]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
			~~98~~	~~$3,386~~			~~2,030~~	~~2~~	~~33~~	~~3~~	~~946~~	~~6~~
Program Total [2]		**1.15**	**$8,706 ~~$8,759~~**	**$10,037 ~~$10,113~~**	**$1,189 ~~$1,198~~**	**$600 ~~$605~~**	**$7,069 ~~$7,125~~**	**$3,001 ~~$3,025~~**	**29,417~~2~~ ~~9,634~~**	**29,417~~29,~~ ~~634~~**	**226,268~~22~~ ~~7,938~~**	**226,268~~227,~~ ~~938~~**
Low-Income WRAP (all sectors)	PY8		$7,504	$5,391	$34	$31	$298	$124	1,547	18,532	11,060	131,490
	PY9		$7,367	$5,908	$70	$32	$295	$123	1,602	~~19,354~~19,355	11,404	136,594
	PY10		$10,955~~$10,396~~	$7,733~~$6,489~~	$91~~$74~~	$42~~$34~~	$484~~$388~~	$203~~$163~~	2,047~~1,664~~	23,750~~20,295~~	14,716~~11,778~~	168,755~~142,179~~
	PY11		$11,132~~$10,566~~	$8,067~~$6,773~~	$91~~$75~~	$42~~$34~~	$509~~$409~~	$214~~$171~~	2,052~~1,672~~	23,844~~20,391~~	14,755~~11,835~~	169,532~~142,973~~
	PY12		$7,265~~$6,973~~	$6,144~~$5,369~~	$67~~$56~~	$31~~$26~~	$395~~$329~~	$176~~$148~~	1,489~~1,245~~	16,400~~14,412~~	11,349~~9,468~~	125,139~~109,845~~
Program Total [2]		**0.75 ~~0.70~~**	**$38,148~~$36,994~~**	**$28,604~~$25,915~~**	**$353~~$308~~**	**$178~~$157~~**	**$1,979~~$1,718~~**	**$840~~$729~~**	**8,737~~7,730~~**	**101,880~~92,983~~**	**63,285~~55,546~~**	**731,510~~663,080~~**
Energy Efficiency Kits and Education	PY8		$1,262	$2,538	$21	$20	$190	$77	988	8,857	7,074	60,368
	PY9		$1,408	$2,918	$47	$22	$198	$81	1,075	9,637	7,696	65,681
	PY10		$1,500	$3,225	$49	$23	$261	$107	1,119	10,026	8,007	68,333
	PY11		$1,596	$3,481	$52	$24	$284	$116	1,162	10,416	8,318	70,989
	PY12		$1,133	$2,341	$37	$17	$223	$98	832	5,795	6,506	45,620
Program Total [2]		**2.10**	**$5,989**	**$12,569**	**$207**	**$105**	**$1,157**	**$479**	**5,177**	**44,731**	**37,601**	**310,990**
Non-Residential Energy Efficiency (all C&I sectors)	PY8		$46,155	$74,637	$491	$335	$3,599~~$3,601~~	$1,442~~$1,440~~	22,628	318,401	133,337	1,865,637
	PY9		$48,974	$80,107	$1,015	$337	$3,541~~$3,544~~	$1,427~~$1,425~~	23,165	324,861	136,853	1,908,289
	PY10		$65,886~~$65,624~~	$112,598~~$110,144~~	$1,352~~$1,337~~	$432~~$425~~	$5,853~~$5,791~~	$2,413~~$2,384~~	30,567~~30,236~~	432,376~~42,935~~	182,602~~180,648~~	2,572,748~~2,516,984~~
	PY11		$65,505~~$65,417~~	$115,954~~$114,291~~	$1,354~~$1,349~~	$435~~$433~~	$6,034~~$6,011~~	$2,477~~$2,466~~	30,376~~30,259~~	429,426~~43,184~~	181,209~~180,515~~	2,551,103~~2,514,240~~
	PY12		$63,874~~$63,044~~	$117,077~~$117,782~~	$1,330~~$1,350~~	$422~~$432~~	$6,011~~$6,101~~	$2,471~~$2,512~~	29,600~~30,049~~	417,730~~419,976~~	176,809~~179,457~~	2,484,782~~2,498,051~~
Program Total [2]		**1.72 ~~1.71~~**	**$248,670~~$247,754~~**	**$426,509~~$423,583~~**	**$5,541~~$5,542~~**	**$1,961~~$1,961~~**	**$25,038 ~~$25,049~~**	**$10,230 ~~$10,227~~**	**136,337 ~~136,337~~**	**1,922,795 ~~1,909,358~~**	**810,810~~810,810~~**	**11,382,559~~11,303,201~~**
Demand Response (all C&I sectors)	PY8		$688~~$1,192~~	$0	$0	$0	$0	$0	0	0	0	0
	PY9		$1,757~~$2,943~~	$5,095~~$6,195~~	$5,037	$58~~$1,158~~	$0	$0	115,000	115,000	0	0
	PY10		$2,609~~$2,943~~	$5,145~~$6,256~~	$5,087	$~~1,170~~58	$0	$0	115,000	115,000	0	0
	PY11		$2,609~~$2,9~~	$5,186~~$6,~~	$5,127	$~~1,179~~59	$0	$0	115,000	115,000	0	0

Portfolio			Gross TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1], [2]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
			~~43~~	~~306~~								
	PY12		$2,547~~$2,943~~	$5,227~~$6,355~~	$5,167	$~~1,188~~59	$0	$0	115,000	115,000	0	0
Program Total [2]		**2.01 ~~1.90~~**	**$8,562~~$11,021~~**	**$17,229~~$20,950~~**	**$20,418~~$20,418~~**	**$235~~$4,695~~**	**$0**	**$0**	**460,000**	**460,000**	**0**	**0**
Portfolio Total [2]		**1.57**	**$462,663~~$464,206~~**	**$727,313 ~~$728,107~~**	**$30,350~~$30,351~~**	**$4,508~~$8,968~~**	**$49,421 ~~$49,431~~**	**$19,850 ~~$19,847~~**	**710,041**	**3,467,176 ~~3,453,739~~**	**1,587,984**	**18,388,158 ~~18,308,800~~**

[1]Annual TRC costs reported in this table are different from those reported in Table 3 (Pa PUC Table 1a, energy efficiency) and Table 3 (Pa PUC Table 1b, demand). The annual costs in this table are nominal annual values and do not include common, portfolio-level costs.

[2] The TRC ratio will reflect the lifetime TRC, not an annual TRC ratio, and does not include common costs. Total program costs and benefits are discounted back to PY8. Yearly cost and benefits are valued in their respective program years.

Table 82. Pa PUC Table 7B - Net Benefits, Portfolio

Portfolio			Net TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1], [2]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
Appliance Recycling	PY8		$2,113	$2,698	$23	$22	$211	$88	1,065	8,433	7,872	63,210
	PY9		$2,108	$2,757	$45	$21	$196	$82	1,035	8,192	7,640	61,357
	PY10		$2,345	$2,816	$44	$20	$242	$101	1,006	7,958	7,415	59,554
	PY11		$2,431	$2,893	$44	$20	$247	$103	977	7,730	7,196	57,803
	PY12		$2,806	$3,854	$56	$26	$322	$135	1,244	9,700	9,189	73,093
Program Total [2]		**1.27**	**$10,136**	**$12,883**	**$212**	**$109**	**$1,218**	**$510**	**5,328**	**42,014**	**39,313**	**315,018**
Efficient Lighting	PY8		$29,799	$42,404	$287	$268	$2,107	$637	13,232	185,251	71,814	1,005,398
	PY9		$17,697	$42,603	$554	$255	$1,931	$584	12,644	177,015	68,590	960,265
	PY10		$9,385	$31,473	$395	$181	$1,710	$512	8,920	124,885	48,184	674,574
	PY11		$5,101	$21,099	$258	$119	$1,157	$340	5,794	81,119	31,052	434,724
	PY12		$120	$0	$0	$0	$0	$0	0	0	0	0
Program Total [2]		**2.15**	**$58,524**	**$126,078**	**$1,494**	**$823**	**$6,906**	**$2,073**	**40,591**	**568,271**	**219,640**	**3,074,961**
Energy Efficient Home	PY8		$6,814	$2,350	$9	$9	$123	$66	426	4,832	4,782	57,426
	PY9		$7,439	$3,349	$24	$11	$159	$87	551	6,104	6,461	77,369
	PY10		$10,586	$5,240	$31	$14	$311	$182	693	7,556	9,365	114,541
	PY11		$13,651	$7,477	$35	$16	$447	$277	793	8,607	12,645	159,023
	PY12		$15,475	$8,966	$37	$17	$530	$340	815	8,653	14,665	186,189
Program Total [2]		**0.50**	**$45,345**	**$22,662**	**$136**	**$67**	**$1,569**	**$951**	**3,278**	**35,752**	**47,919**	**594,548**
Student Energy Efficient Education (NET Single Year)	PY8		$1,243	$2,348	$15	$14	$138	$59	673	7,407	5,180	56,977
	PY9		$1,271	$2,502	$29	$14	$133	$56	673	7,407	5,180	56,977
	PY10		$854 ~~$1,390~~	$1,444 ~~$2,657~~	$16 ~~$30~~	$7 ~~$14~~	$92 ~~$169~~	$39 ~~$72~~	366 ~~673~~	4,027 ~~7,407~~	2,816 ~~5,180~~	30,974 ~~56,977~~
	PY11		$876 ~~$1,419~~	$1,504 ~~$2,766~~	$16 ~~$30~~	$8 ~~$14~~	$97 ~~$178~~	$41 ~~$75~~	366 ~~673~~	4,027 ~~7,407~~	2,816 ~~5,180~~	30,974 ~~56,977~~
	PY12		$1,419 ~~$1,689~~	$1,071 ~~$1,815~~	$11 ~~$19~~	$5 ~~$9~~	$68 ~~$115~~	$29 ~~$49~~	251 ~~426~~	2,764 ~~4,682~~	1,933 ~~3,274~~	21,259 ~~36,014~~
Program Total [2]		**1.61** ~~**1.75**~~	**$4,920** ~~**$6,020**~~	**$7,923** ~~**$10,537**~~	**$88** ~~**$123**~~	**$47** ~~**$64**~~	**$527** ~~**$732**~~	**$224** ~~**$311**~~	**2,330** ~~**3,119**~~	**25,633** ~~**34,312**~~	**17,924** ~~**23,993**~~	**197,162** ~~**263,922**~~
Home Energy Education (NET Single Year)	PY8		$1,845	$1,743	$113	$106	$1,070	$454	5,219	5,219	40,144	40,144
	PY9		$1,759	$1,839	$234	$108	$1,051	$446	5,341	5,341	41,080	41,080
	PY10		$1,930 ~~$1,952~~	$2,252 ~~$2,284~~	$236 ~~$239~~	$108 ~~$110~~	$1,339 ~~$1,358~~	$569 ~~$576~~	5,334 ~~5,408~~	5,334 ~~5,408~~	41,026 ~~41,600~~	41,026 ~~41,600~~
	PY11		$2,230 ~~$2,253~~	$2,670 ~~$2,702~~	$270 ~~$273~~	$124 ~~$126~~	$1,598 ~~$1,617~~	$678 ~~$686~~	6,060 ~~6,132~~	6,060~~6,132~~	46,611 ~~47,168~~	46,611 ~~47,168~~
	PY12		$2,376 ~~$2,398~~	$3,354~~$~~ ~~3,386~~	$335	$154 ~~$156~~	$2,011 ~~$2,030~~	$854 ~~$862~~	7,463 ~~7,533~~	7,463 ~~7,533~~	57,406 ~~57,946~~	57,406 ~~57,946~~

Portfolio			Net TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1], [2]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
					~~$339~~							
Program Total [2]		**1.15**	**$8,706 ~~$8,759~~**	**$10,037 ~~$10,113~~**	**$1,189 ~~$1,198~~**	**$600 ~~$605~~**	**$7,069 ~~$7,125~~**	**$3,001 ~~$3,025~~**	**29,417 ~~29,634~~**	**29,417 ~~29,634~~**	**226,268 ~~227,938~~**	**226,268 ~~227,938~~**
Low-Income WRAP (all sectors)	PY8		$7,504	$5,391	$34	$31	$298	$124	1,547	18,532	11,060	131,490
	PY9		$7,367	$5,908	$70	$32	$295	$123	1,602	19,355	11,404	136,594
	PY10		$10,955 ~~$10,396~~	$7,733 ~~$6,489~~	$91 ~~$74~~	$42 ~~$34~~	$484 ~~$388~~	$203 ~~$163~~	2,047 ~~1,665~~	23,7450 ~~20,295~~	14,716 ~~11,778~~	168,755 ~~142,179~~
	PY11		$11,132 ~~$10,566~~	$8,067 ~~$6,773~~	$91 ~~$75~~	$42 ~~$34~~	$509 ~~$409~~	$214 ~~$171~~	2,052 ~~1,672~~	23,844 ~~20,391~~	14,755 ~~11,835~~	169,532 ~~142,973~~
	PY12		$7,265 ~~$6,973~~	$6,144 ~~$5,369~~	$67 ~~$56~~	$31 ~~$26~~	$395 ~~$329~~	$176 ~~$148~~	1,489 ~~1,245~~	16,400 ~~14,412~~	11,349 ~~9,468~~	125,139 ~~109,845~~
Program Total [2]		**0.75 ~~0.70~~**	**$38,148 ~~$36,994~~**	**$28,604 ~~$25,915~~**	**$353 ~~$308~~**	**$178 ~~$157~~**	**$1,979 ~~$1,718~~**	**$840 ~~$729~~**	**8,737 ~~7,730~~**	**101,880 ~~92,984~~**	**63,285 ~~55,546~~**	**731,510 ~~663,080~~**
Energy Efficiency Kits and Education	PY8		$1,262	$2,538	$21	$20	$190	$77	988	8,857	7,074	60,368
	PY9		$1,408	$2,918	$47	$22	$198	$81	1,075	9,637	7,696	65,681
	PY10		$1,500	$3,225	$49	$23	$261	$107	1,119	10,026	8,007	68,333
	PY11		$1,596	$3,481	$52	$24	$284	$116	1,162	10,416	8,318	70,989
	PY12		$1,133	$2,341	$37	$17	$223	$98	832	5,795	6,506	45,620
Program Total [2]		**2.10**	**$5,989**	**$12,569**	**$207**	**$105**	**$1,157**	**$479**	**5,177**	**44,731**	**37,601**	**310,990**
Non-Residential Energy Efficiency (all C&I sectors)	PY8		$31,837	$47,780	$317	$218	$2,329	$893	14,621.35	205,787.55	85,075	1,189,922
	PY9		$33,802	$51,145	$654	$219	$2,283	$880	14,920.50	209,471.72	86,982	1,213,434
	PY10		$45,570~~$45,309~~	$70,464~~$69,237~~	$857~~$849~~	$279~~$275~~	$3,708~~$3,677~~	$1,460~~$1,446~~	19,367~~19,201.48~~	273,520~~268,798.95~~	113,952~~112,975~~	1,601,759~~1,573,877~~
	PY11		$45,141~~$45,053~~	$72,440~~$71,609~~	$857~~$854~~	$281~~$280~~	$3,817~~$3,805~~	$1,495~~$1,489~~	19,220~~19,161.03~~	271,266~~268,145.24~~	112,873~~112,526~~	1,585,222~~1,566,790~~
	PY12		$43,503~~$42,673~~	$73,341~~$73,694~~	$844~~$854~~	$274~~$279~~	$3,812~~$3,857~~	$1,496~~$1,516~~	18,779~~19,003.33~~	264,616~~265,739.29~~	110,409~~111,733~~	1,548,015~~1,554,649~~
Program Total [2]		**1.57**	**$171,205 ~~$170,290~~**	**$268,880 ~~$267,417~~**	**$3,528**	**$1,270**	**$15,949 ~~$15,952~~**	**$6,224~~$6,225~~**	**86,908 ~~86,907.69~~**	**1,224,661 ~~1,217,942.75~~**	**509,290**	**7,138,352 ~~7,098,672~~**
Demand Response (all C&I sectors)	PY8		$688 ~~$1,192~~	$0	$0	$0	$0	$0	0	0	0	0
	PY9		$1,757 ~~$2,943~~	$5,095 ~~$6,195~~	$5,037	$58 ~~$1,158~~	$0	$0	115,000	115,000	0	0
	PY10		$2,609 ~~$2,943~~	$5,145 ~~$6,256~~	$5,087	$58 ~~$1,170~~	$0	$0	115,000	115,000	0	0
	PY11		$2,609	$5,186	$5,127	$59	$0	$0	115,000	115,000	0	0

Portfolio			Net TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1], [2]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
			~~$2,943~~	~~$6,306~~		~~$1,179~~						
	PY12		$2,547 ~~$2,943~~	$5,227 ~~$6,355~~	$5,167	$59 ~~$1,188~~	$0	$0	115,000	115,000	0	0
Program Total [2]		**2.01 ~~1.90~~**	**$8,562 ~~$11,021~~**	**$17,229 ~~$20,950~~**	**$20,418 ~~$20,418~~**	**$235 ~~$4,695~~**	**$0**	**$0**	**460,000**	**460,000**	**0**	**0**
Portfolio Total [2]		**1.44**	**$351,536 ~~$353,079~~**	**$506,867 ~~$509,124~~**	**$27,624~~$2 7,624~~**	**$3,435~~$7, 895~~**	**$36,373 ~~$36,376~~**	**$14,301 ~~$14,302~~**	**641,765**	**2,532,359~~2,5 25,640~~**	**1,161,240**	**12,588,810 ~~12,549,130~~**

[1] Annual TRC costs reported in this table are different from those reported in Table 3 (Pa PUC Table 1a, energy efficiency) and Table 3 (Pa PUC Table 1b, demand). The annual costs in this table are nominal annual values and do not include common, portfolio-level costs.

[2] The TRC ratio will reflect the lifetime TRC, not an annual TRC ratio, and does not included common costs. Total program costs and benefits are discounted back to PY8. Yearly cost and benefits are valued in their respective program years. The Portfolio Total is discounted back to PY8 and excludes common costs.

Table 83. Pa PUC Table 7C - TRC Benefits, Residential and Low-Income Portfolio

Residential and Low-Income			Gross TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
Appliance Recycling	PY8	2.13	$2,113	$4,497	$38	$36	$351	$147	1,775	14,056	13,120	105,351
	PY9	2.18	$2,108	$4,595	$76	$35	$327	$137	1,725	13,654	12,734	102,261
	PY10	2.00	$2,345	$4,693	$74	$34	$404	$169	1,676	13,263	12,358	99,257
	PY11	1.98	$2,431	$4,822	$73	$33	$411	$172	1,629	12,884	11,994	96,339
	PY12	2.29	$2,806	$6,423	$93	$43	$536	$225	2,073	16,167	15,316	121,822
Efficient Lighting	PY8	1.43	$36,579	$52,270	$352	$328	$2,586	$799	16,215	227,012	88,864	1,244,102
	PY9	2.45	$21,383	$52,316	$676	$311	$2,361	$730	15,431	216,032	84,566	1,183,925
	PY10	3.49	$10,689	$37,258	$463	$213	$2,012	$622	10,466	146,525	57,357	803,004
	PY11	4.38	$5,307	$23,256	$281	$129	$1,264	$391	6,298	88,171	34,515	483,204
	PY12	0.00	$120	$0	$0	$0	$0	$0	0	0	0	0
Energy Efficient Home	PY8	0.42	$8,651	$3,615	$14	$13	$189	$102	656	7,434	7,357	88,348
	PY9	0.53	$9,773	$5,152	$37	$17	$244	$134	848	9,391	9,941	119,029
	PY10	0.56	$14,371	$8,061	$47	$22	$478	$279	1,065	11,624	14,408	176,217
	PY11	0.61	$18,804	$11,503	$54	$25	$688	$425	1,220	13,241	19,454	244,650
	PY12	0.63	$21,859	$13,794	$56	$26	$815	$523	1,253	13,312	22,561	286,445
Student Energy Efficient Education	PY8	1.89	$1,243	$2,348	$15	$14	$138	$59	673	7,407	5,180	56,977
	PY9	1.97	$1,271	$2,502	$29	$14	$133	$56	673	7,407	5,180	56,977
	PY10	1.69~~1.91~~	$8541~~,390~~	$1,444~~2,657~~	$1630	$~~714~~	$92~~169~~	$39~~72~~	366~~673~~	4,027~~7,407~~	2,816~~5,180~~	30,974~~56,977~~
	PY11	1.72~~1.95~~	876$~~1,419~~	$1,504~~2,766~~	$1630	$8~~14~~	$97~~178~~	$41~~75~~	366~~673~~	4,027~~7,407~~	2,816~~5,180~~	30,974~~56,977~~
	PY12	.76~~1.07~~	$1,419$~~1,689~~	$1,071$~~1,815~~	11~~19~~	5~~9~~	$68~~115~~	$29~~49~~	251~~426~~	2,764~~4,682~~	1,933~~3,274~~	21,259~~36,014~~
Home Energy Education	PY8	0.94	$1,845	$1,743	$113	$106	$1,070	$454	5,219	5,219	40,144	40,144
	PY9	1.05	$1,759	$1,839	$234	$108	$1,051	$446	5,341	5,341	41,080	41,080
	PY10	1.17	~~$1,952~~$1,930	$2,252$~~2,284~~	236~~239~~	108~~110~~	$1,339$~~1,358~~	569~~576~~	5,334~~5,408~~	5,334~~5,408~~	41,026~~41,600~~	41,026~~41,600~~
	PY11	1.20	$2,230$~~2,253~~	$2,670$~~2,702~~	270~~273~~	124~~126~~	$1,598$~~1,617~~	678~~686~~	6,060~~6,132~~	6,060~~6,132~~	46,611~~47,168~~	46,611~~47,168~~
	PY12	1.41	$2,376$~~2,398~~	$3,354$~~3,386~~	335~~339~~	154~~156~~	$2,011$~~2,030~~	854~~862~~	7,463~~7,533~~	7,463~~7,533~~	57,406~~57,946~~	57,406~~57,946~~
Low-Income WRAP	PY8	0.70	$7,225	$5,047	$31	$29	$283	$117	1,452	17,111	10,501	123,102
	PY9	0.77	$6,947	$5,365	$64	$29	$273	$113	1,460	17,221	10,564	123,994
	PY10	0.67~~0.58~~	$10,355~~9,796~~	$6,920~~5,676~~	$82~~65~~	38~~30~~	$445~~350~~	186~~145~~	1,844~~1,462~~	20,702~~17,247~~	13,516~~10,578~~	150,755~~124,179~~
	PY11	0.69~~0.60~~	$10,531~~9,966~~	$7,224~~5,930~~	$82~~65~~	38~~30~~	$469~~369~~	$196~~153~~	1,848~~1,469~~	20,795~~17,342~~	13,555~~10,635~~	151,526~~124,967~~

	PY12	0.790.71	$6,664$6,372	$5,2704,495	$5847	$27$22	$3542888	$157$129	1,2861,041	13,35111,363	10,1498,268	107,13391,839
Energy Efficiency Kits and Education	PY8	2.01	$1,262	$2,538	$21	$20	$190	$77	988	8,857	7,074	60,368
	PY9	2.07	$1,408	$2,918	$47	$22	$198	$81	1,075	9,637	7,696	65,681
	PY10	2.15	$1,500	$3,225	$49	$23	$261	$107	1,119	10,026	8,007	68,333
	PY11	2.18	$1,596	$3,481	$52	$24	$284	$116	1,162	10,416	8,318	70,989
	PY12	2.07	$1,133	$2,341	$37	$17	$223	$98	832	5,795	6,506	45,620

[1]Annual TRC costs reported in this table are different from those reported in Table 3 (Pa PUC Table 1a, energy efficiency) and Table 4 (Pa PUC Table 1b, demand). The annual costs in this table are nominal annual values and do not include common, portfolio-level costs.

Residential and Low-Income			**Net TRC Benefits by Program Per Year ($1000)**									
Program	**Program Year**	**TRC**	**TRC Costs ($1,000)[1]**	**TRC Benefits ($1,000)**	**Capacity (Annual)**		**Energy (Annual)**		**Load Reduction in kW**		**MWh Saved**	
					Generation	**Trans/Dist**	**Peak**	**Off Peak**	**Annual**	**Lifetime**	**Annual**	**Lifetime**
Appliance Recycling	PY8	1.28	$2,113	$2,698	$23	$22	$211	$88	1,065	8,433	7,872	63,210
	PY9	1.31	$2,108	$2,757	$45	$21	$196	$82	1,035	8,192	7,640	61,357
	PY10	1.20	$2,345	$2,816	$44	$20	$242	$101	1,006	7,958	7,415	59,554
	PY11	1.19	$2,431	$2,893	$44	$20	$247	$103	977	7,730	7,196	57,803
	PY12	1.37	$2,806	$3,854	$56	$26	$322	$135	1,244	9,700	9,189	73,093
Efficient Lighting	PY8	1.41	$27,831	$39,202	$264	$246	$1,939	$599	12,161	170,259	66,648	933,076
	PY9	2.39	$16,400	$39,237	$507	$233	$1,771	$547	11,573	162,024	63,425	887,944
	PY10	3.30	$8,457	$27,943	$347	$160	$1,509	$466	7,850	109,894	43,018	602,253
	PY11	3.98	$4,385	$17,442	$211	$97	$948	$293	4,723	66,128	25,886	362,403
	PY12	0.00	$120	$0	$0	$0	$0	$0	0	0	0	0
Energy Efficient Home	PY8	0.34	$6,814	$2,350	$9	$9	$123	$66	426	4,832	4,782	57,426
	PY9	0.45	$7,439	$3,349	$24	$11	$159	$87	551	6,104	6,461	77,369
	PY10	0.49	$10,586	$5,240	$31	$14	$311	$182	693	7,556	9,365	114,541
	PY11	0.55	$13,651	$7,477	$35	$16	$447	$277	793	8,607	12,645	159,023
	PY12	0.58	$15,475	$8,966	$37	$17	$530	$340	815	8,653	14,665	186,189
Student Energy Efficient Education	PY8	1.89	$1,243	$2,348	$15	$14	$138	$59	673	7,407	5,180	56,977
	PY9	1.97	$1,271	$2,502	$29	$14	$133	$56	673	7,407	5,180	56,977
	PY10	1.691.91	$854$1,390	$1,444$2,657	$16$30	$7$14	$92$169	$39$72	$366673	$4,0277,407	2,8165,180	30,97456,977
	PY11	1.721.95	$876$1,419	$1,504$2,766	$16$30	$8$14	$97$178	$41$75	$366673	4,0277,407	2,8165,180	30,97456,977
	PY12	0.761.07	$1,419$1,689	$1,071$1,815	$11$19	$5$9	$68$115	$29$49	251426	2,7644,682	1,9333,274	21,25936,014
Home Energy Education	PY8	0.94	$1,845	$1,743	$113	$106	$1,070	$454	5,219	5,219	40,144	40,144
	PY9	1.05	$1,759	$1,839	$234	$108	$1,051	$446	5,341	5,341	41,080	41,080
	PY10	1.17	$1,930$1,952	$2,252$2,284	$236$239	$108$110	$1,339$1,358	$569$576	5,3345,408	5,3345,408	41,02641,600	41,02641,600
	PY11	1.20	$2,230$2,253	$2,670$2,702	$270$273	$124$126	$1,598$1,617	$678$686	6,0606,132	6,0606,132	46,61147,168	46,611147,168

	PY12	1.41	$2,376$2,398	$3,354$3,386	$335$339	$154$156	$2,011$2,030	$854$862	7,4637,533	7,4637,533	57,40657,946	57,40657,946
Low-Income WRAP	PY8	0.70	$7,225	$5,047	$31	$29	$283	$117	1,452	17,111	10,501	123,102
	PY9	0.77	$6,947	$5,365	$64	$29	$273	$113	1,460	17,221	10,564	123,994
	PY10	0.670.58	$10,355$9,796	$6,920$5,676	$82$65	$38$30	$445$350	$186$145	1,8441,462	20,70217,247	13,51610,578	150,75512,4,179
	PY11	0.690.60	$10,531$9,966	$7,224$5,930	$82$65	$38$30	$469$369	$196$153	1,8481,469	20,79517,342	13,55510,635	151,52612,4,967
	PY12	0.790.71	$6,664$6,372	$5,270$4,495	$58$47	$27$22	$354$288	$157$129	1,2861,041	13,35111,363	10,1498,268	107,13391,839
Energy Efficiency Kits and Education	PY8	2.01	$1,262	$2,538	$21	$20	$190	$77	988	8,857	7,074	60,368
	PY9	2.07	$1,408	$2,918	$47	$22	$198	$81	1,075	9,637	7,696	65,681
	PY10	2.15	$1,500	$3,225	$49	$23	$261	$107	1,119	10,026	8,007	68,333
	PY11	2.18	$1,596	$3,481	$52	$24	$284	$116	1,162	10,416	8,318	70,989
	PY12	2.07	$1,133	$2,341	$37	$17	$223	$98	832	5,795	6,506	45,620

[1]Annual TRC costs reported in this table are different from those reported in Table 3 (Pa PUC Table 1a, energy efficiency) and Table 3 (Pa PUC Table 1b, demand). The annual costs in this table are nominal annual values and do not include common, portfolio-level costs. Yearly cost and benefits are valued in their respective program years.

Table 84. Pa PUC Table 7D - TRC Benefits, Small C&I Portfolio

Small C&I			Gross TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
Small C&I – Non-Residential Energy Efficiency	PY8	1.75	$24,872	$43,570	$297	$278	$2,149~~$2,151~~	$652~~654~~	13,710	196,151	72,034	1,026,162
	PY9	1.84	$25,187	$46,228	$610	$280	$2,093~~$2,095~~	$637~~$635~~	13,922	198,208	73,149	1,036,274
	PY10	1.12~~1.89~~	$32,904~~$32,910~~	$36,825~~62,290~~	$505~~799~~	$232~~368~~	$2,160~~3,407~~	$484~~1,053~~	11,425~~18,074~~	158,590~~253,838~~	56,114~~95,379~~	768,813~~1,331,350~~
	PY11	1.15~~1.97~~	$33,191~~$33,285~~	$38,157~~65,442~~	$509~~815~~	$234~~375~~	$2,244~~3,590~~	$503~~1,116~~	11,422~~18,284~~	158,544~~256,993~~	56,099~~96,625~~	768,633~~1,350,070~~
	PY12	1.20~~2.07~~	$32,522~~$32,422~~	$38,997~~67,046~~	$507~~812~~	$233~~374~~	$2,262~~3,627~~	$511~~1,133~~	11,273~~18,081~~	156,256~~253,896~~	55,414~~95,622~~	758,038~~1,334,702~~
Small C&I Demand Response	PY8	0.00	$119	$0	$0	$0	$0	$0	0	0	0	0
	PY9	0.02~~2.50~~	$294	$7~~$735~~	$5~~$504~~	$2~~$232~~	$0	$0	115~~11,500~~	115~~11,500~~	0	0
	PY10	0.03~~2.52~~	$294	$7~~$743~~	$5~~$509~~	$2~~$234~~	$0	$0	115~~11,500~~	115~~11,500~~	0	0
	PY11	0.03~~2.54~~	$294	$7~~$748~~	$5~~$513~~	$2~~$236~~	$0	$0	115~~11,500~~	115~~11,500~~	0	0
	PY12	0.03~~2.56~~	$294	$~~8754~~	$5~~$517~~	$2~~$238~~	$0	$0	115~~11,500~~	115~~11,500~~	0	0
Small C&I Low-Income WRAP Master Metered Multifamily	PY8	1.23	$140	$172	$1	$1	$7	$3	47	710	280	4,194
	PY9	1.29	$210	$271	$3	$1	$11	$5	71	1,067	420	6,300
	PY10	1.35	$300	$406	$4	$2	$19	$9	102	1,524	600	9,000
	PY11	1.40	$300	$422	$5	$2	$20	$9	102	1,524	600	9,003
	PY12	1.46	$300	$437	$5	$2	$20	$9	102	1,524	600	9,003
Small C&I Efficient Lighting[2]	PY8	1.64	$2,610	$4,269	$31	$29	$223	$51	1,428	19,989	6,888	96,428
	PY9	2.61	$1,718	$4,487	$63	$29	$214	$48	1,428	19,989	6,888	96,428
	PY10	3.86	$1,220	$4,706	$63	$29	$269	$61	1,428	19,989	6,888	96,428
	PY11	5.24	$930	$4,876	$64	$29	$279	$63	1,428	19,989	6,888	96,428
	PY12	N/A	$0	$0	$0	$0	$0	$0	0	0	0	0

[1]Annual TRC costs reported in this table are different from those reported in Table 3 (Pa PUC Table 1a, energy efficiency) and Table 4 (Pa PUC Table 1b, demand). The annual costs in this table are nominal annual values and do not include common, portfolio-level costs.

[2] To account for cross-sector sales, PPL Electric allocates a portion of costs and savings from the Efficient Lighting (Residential) program to the small commercial sector.

Small C&I			Net TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/ Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
Small C&I – Non-Residential Energy Efficiency	PY8	1.66	$17,032	$28,313	$196	$183	$1,423	$402	9,054	129,119	46,773	663,348
	PY9	1.74	$17,273	$30,068	$403	$185	$1,385	$391	9,190	130,592	47,471	670,519
	PY10	1.21~~1.77~~	$22,669~~$22,675~~	$27,511~~$40,244~~	$376~~$523~~	$173~~$241~~	$1,609~~$2,232~~	$358~~$642~~	8,510~~11,834~~	118,587~~166,211~~	41,735~~61,368~~	574,511~~855,779~~
	PY11	1.25~~1.84~~	$22,782~~$22,876~~	$28,507~~$42,150~~	$379~~$532~~	$174~~$245~~	$1,672~~$2,344~~	$372~~$679~~	8,507~~11,938~~	118,553~~167,777~~	41,725~~61,987~~	574,376~~865,094~~
	PY12	1.32~~1.96~~	$22,101~~$22,001~~	$29,077~~$43,101~~	$377~~$530~~	$173~~$244~~	$1,682~~$2,365~~	$377~~$688~~	8,382~~11,786~~	116,634~~165,454~~	41,131~~61,235~~	565,236~~853,568~~
Small C&I Demand Response	PY8	0.00	$119	$0	$0	$0	$0	$0	0	0	0	0
	PY9	0.02~~2.50~~	$294	$7~~$735~~	$5~~$504~~	$2~~$232~~	$0	$0	115~~11,500~~	115~~11,500~~	0	0
	PY10	0.03~~2.52~~	$294	$7~~$743~~	$5~~$509~~	$2~~$234~~	$0	$0	115~~11,500~~	115~~11,500~~	0	0
	PY11	0.03~~2.54~~	$294	$7~~$748~~	$5~~$513~~	$2~~$236~~	$0	$0	115~~11,500~~	115~~11,500~~	0	0
	PY12	0.03~~2.56~~	$294	$8~~$754~~	$5~~$517~~	$2~~$238~~	$0	$0	115~~11,500~~	115~~11,500~~	0	0
Small C&I Low-Income WRAP Master Metered Multifamily	PY8	1.23~~1.23~~	$140	$172	$1	$1	$7	$3	47	710	280	4,194
	PY9	1.29	$210	$271	$3	$1	$11	$5	71	1,067	420	6,300
	PY10	1.35	$300	$406	$4	$2	$19	$9	102	1,524	600	9,000
	PY11	1.40	$300	$422	$5	$2	$20	$9	102	1,524	600	9,003
	PY12	1.46	$300	$437	$5	$2	$20	$9	102	1,524	600	9,003
Small C&I Efficient Lighting[2]	PY8	1.63	$1,968	$3,202	$23	$22	$167	$38	1,071	14,991	5,166	72,321
	PY9	2.59	$1,297	$3,365	$47	$22	$160	$36	1,071	14,991	5,166	72,321
	PY10	3.80	$928	$3,530	$47	$22	$202	$46	1,071	14,991	5,166	72,321
	PY11	5.11	$716	$3,657	$48	$22	$209	$47	1,071	14,991	5,166	72,321
	PY12	N/A	$0	$0	$0	$0	$0	$0	0	0	0	0

[1]Annual TRC costs reported in this table are different from those reported in Table 3 (Pa PUC Table 1a, energy efficiency) and Table 3 (Pa PUC Table 1b, demand). The annual costs in this table are nominal annual values and do not include common, portfolio-level costs.

[2] To account for cross-sector sales, PPL Electric allocates a portion of costs from the Efficient Lighting (Residential) program to the small commercial sector.

Table 85. Pa PUC Table 7E - TRC Benefits, Large C&I Portfolio

Large C&I			Gross TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
Large C&I – Non-Residential Energy Efficiency	PY8	1.28	$17,036	$21,829	$132	$0	$1,009	$606	6,104	83,481	45,103	616,858
	PY9	1.35	$17,892	$24,170	$282	$0	$1,025	$615	6,429	87,885	47,504	649,399
	PY10	1.491.45	$25,281$25,931	$37,664	$413	$0	$1,852	$1,112	9,347	130,328	69,069	963,018
	PY11	1.561.51	$24,613$25,349	$38,287	$408	$0	$1,865	$1,120	9,161	127,423	67,690	941,553
	PY12	1.621.61	$24,613$24,727	$39,793	$411	$0	$1,906	$1,144	9,153	127,312	67,635	940,732
Large C&I Demand Response	PY8	0.00	$464596	$0	$0	$0	$0	$0	0	0	0	0
	PY9	3.681.71	$1,336$1,472	$4,9112,518	$4,9112,518	$0	$0	$0	112,12557,500	112,12557,500	0	0
	PY10	2.221.73	$2,2331,472	$4,9602,543	$4,9602,543	$0	$0	$0	112,12557,500	112,12557,500	0	0
	PY11	2.241.74	$2,2331,472	$4,9992,563	$4,9992,563	$0	$0	$0	112,12557,500	112,12557,500	0	0
	PY12	2.321.76	$2,1711,472	$5,0382,584	$5,0382,584	$0	$0	$0	112,12557,500	112,12557,500	0	0

[1]Annual TRC costs reported in this table are different from those reported in Table 3 (Pa PUC Table 1a, energy efficiency) and Table 3 (Pa PUC Table 1b, demand). The annual costs in this table are nominal annual values and do not include common, portfolio-level costs.

Large C&I			Net TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
Large C&I – Non-Residential Energy Efficiency	PY8	1.16	$11,948	$13,845	$84	$0	$640	$384	3,871	52,949	28,601	391,251
	PY9	1.22	$12,436	$15,171	$177	$0	$643	$386	4,034	55,161	29,810	407,593
	PY10	1.34~~1.29~~	$17,003~~$17,653~~	$22,794	$251	$0	$1,123	$674	5,671	78,869	41,906	582,776
	PY11	1.40~~1.34~~	$16,461~~$17,196~~	$23,034	$246	$0	$1,125	$676	5,527	76,649	40,838	566,374
	PY12	1.45 ~~1.44~~	$16,465~~$16,579~~	$23,935	$248	$0	$1,150	$690	5,521	76,566	40,797	565,759
Large C&I Demand Response	PY8	0.00	$464~~$596~~	$0	$0	$0	$0	$0	0	0	0	0
	PY9	3.68 ~~1.71~~	$1,336 ~~$1,472~~	$4,911 ~~$2,518~~	$4,911 ~~$2,518~~	$0	$0	$0	112,125 ~~57,500~~	112,125 ~~57,500~~	0	0
	PY10	2.22 ~~1.73~~	$2,233 ~~$1,472~~	$4,960 ~~$2,543~~	$4,960 ~~$2,543~~	$0	$0	$0	112,125 ~~57,500~~	112,125 ~~57,500~~	0	0
	PY11	2.24 ~~1.74~~	$2,233 ~~$1,472~~	$4,999 ~~$2,563~~	$4,999 ~~$2,563~~	$0	$0	$0	112,125 ~~57,500~~	112,125 ~~57,500~~	0	0
	PY12	2.32 ~~1.76~~	$2,171 ~~$1,472~~	$5,038 ~~$2,584~~	$5,038 ~~$2,584~~	$0	$0	$0	112,125 ~~57,500~~	112,125 ~~57,500~~	0	0

[1]Annual TRC costs reported in this table are different from those reported in Table 3 (Pa PUC Table 1a, energy efficiency) and Table 3 (Pa PUC Table 1b, demand). The annual costs in this table are nominal annual values and do not include common, portfolio-level costs.

Table 86. Pa PUC Table 7F - TRC Benefits, GNE Portfolio

GNE			Gross TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/ Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
GNE – Non-Residential Energy Efficiency	PY8	2.18	$4,247	$9,238	$61	$57	$441	$182	2,815	38,769	16,200	222,617
	PY9	1.65	$5,895	$9,708	$123	$57	$4234	$175	2,815	38,769	16,200	222,617
	PY10	4.951.50	$7,7016,783	$38,11010,191	$433125	$19957	$1,841532	$817220	9,7942,815	143,45938,769	57,42016,200	840,91722,617
	PY11	5.131.56	$7,7016,783	$39,51010,562	$437$125	$20158	$1,924556	$853230	9,7942,815	143,45938,769	57,42016,200	840,91722,617
	PY12	5.681.86	$6,7395,895	$38,28810,943	$412126	$19058	$1,843568	$816235	9,1742,815	134,16238,769	53,76016,200	786,01222,617
GNE Demand Response	PY8	0.00	$105477	$0	$0	$0	$0	$0	0	0	0	0
	PY9	1.402.50	$126$1,177	$1762,941	$1212,015	$56927	$0	$0	2,76046,000	2,76046,000	0	0
	PY10	2.192.52	$8111,177	$1782,970	$1222,035	$56936	$0	$0	2,76046,000	2,76046,000	0	0
	PY11	2.212.54	$8111,177	$1802,994	$1232,051	$57943	$0	$0	2,76046,000	2,76046,000	0	0
	PY12	2.232.56	$8111,177	$1813,017	$1242,067	$57950	$0	$0	2,76046,000	2,76046,000	0	0
GNE Low-Income WRAP Master Metered Multifamily	PY8	1.23	$140	$172	$1	$1	$7	$3	47	710	280	4,194
	PY9	1.29	$210	$271	$3	$1	$11	$5	71	1,067	420	6,300
	PY10	1.35	$300	$406	$4	$2	$19	$9	102	1,524	600	9,000
	PY11	1.40	$300	$422	$5	$2	$20	$9	102	1,524	600	9,003
	PY12	1.46	$300	$437	$5	$2	$20	$9	102	1,524	600	9,003

[1]Annual TRC costs reported in this table are different from those reported in Table 3 (Pa PUC Table 1a, energy efficiency) and Table 3 (Pa PUC Table 1b, demand). The annual costs in this table are nominal annual values and do not include common, portfolio-level costs.

GNE			Net TRC Benefits by Program Per Year ($1000)									
Program	Program Year	TRC	TRC Costs ($1,000)[1]	TRC Benefits ($1,000)	Capacity (Annual)		Energy (Annual)		Load Reduction in kW		MWh Saved	
					Generation	Trans/Dist	Peak	Off Peak	Annual	Lifetime	Annual	Lifetime
GNE – Non-Residential Energy Efficiency	PY8	1.97	$2,857	$5,621	$37	$34	$266	$107	1,696	23,719	9,701	135,322
	PY9	1.44	$4,093	$5,906	$74	$34	$256	$103	1,696	23,719	9,701	135,322
	PY10	3.42 ~~1.24~~	$5,899 ~~$4,981~~	$20,159 ~~$6,199~~	$229 ~~$75~~	$105 ~~$35~~	$976 ~~$321~~	$428 ~~$129~~	5,186 ~~1,696~~	76,064 ~~23,719~~	30,311 ~~9,701~~	444,472 ~~135,322~~
	PY11	3.54 ~~1.29~~	$5,899 ~~$4,981~~	$20,899 ~~$6,425~~	$231 ~~$76~~	$106 ~~$35~~	$1,020 ~~$336~~	$447 ~~$135~~	5,186 ~~1,696~~	76,064 ~~23,719~~	30,311 ~~9,701~~	444,472 ~~135,322~~
	PY12	4.12 ~~1.63~~	$4,937 ~~$4,093~~	$20,330 ~~$6,658~~	$219 ~~$76~~	$101 ~~$35~~	$980 ~~$343~~	$429 ~~$138~~	4,876 ~~1,696~~	71,416 ~~23,719~~	28,481 ~~9,701~~	417,020 ~~135,322~~
GNE Demand Response	PY8	0.00	$105 ~~$477~~	$0	$0	$0	$0	$0	0	0	0	0
	PY9	1.40 ~~2.50~~	$126 ~~$1,177~~	$176 ~~$2,941~~	$121 ~~$2,015~~	$56 ~~$927~~	$0	$0	2,760 ~~46,000~~	2,760 ~~46,000~~	0	0
	PY10	2.19 ~~2.52~~	$81 ~~$1,177~~	$178 ~~$2,970~~	$122 ~~$2,035~~	$56 ~~$936~~	$0	$0	2,760 ~~46,000~~	2,760 ~~46,000~~	0	0
	PY11	2.21 ~~2.54~~	$81 ~~$1,177~~	$180 ~~$2,994~~	$123 ~~$2,051~~	$57 ~~$943~~	$0	$0	2,760 ~~46,000~~	2,760 ~~46,000~~	0	0
	PY12	2.23 ~~2.56~~	$81 ~~$1,177~~	$181 ~~$3,017~~	$124 ~~$2,067~~	$57 ~~$950~~	$0	$0	2,760 ~~46,000~~	2,760 ~~46,000~~	0	0
GNE	PY8	1.2	$140	$172	$1	$1	$7	$3	47	710	280	4,194

Low-Income WRAP Master Metered Multifamily		3										
	PY9	1.29	$210	$271	$3	$1	$11	$5	71	1,067	420	6,300
	PY10	1.35	$300	$406	$4	$2	$19	$9	102	1,524	600	9,000
	PY11	1.40	$300	$422	$5	$2	$20	$9	102	1,524	600	9,003
	PY12	1.46	$300	$437	$5	$2	$20	$9	102	1,524	600	9,003

[1]Annual TRC costs reported in this table are different from those reported in Table 3 (Pa PUC Table 1a, energy efficiency) and Table 3 (Pa PUC Table 1b, demand). The annual costs in this table are nominal annual values and do not include common, portfolio-level 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's 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 ensure compliance with the Implementation Order, is outlined in Figure 1 of Section 1. Figure 3 in Section 3.1.2 shows that PPL Electric will offer each customer class a range of energy efficiency and conservation measure and program choices. PPL Electric included education, which is fundamental to understanding and making informed choices about energy efficiency, as a component of all programs.

Programs for residential customers (including low-income) comprise approximately 53% of the total cost and 47% of the total savings projected in this Plan. Programs for nonresidential customers comprise approximately 47% of the total cost and 53% 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 revenue attributable to each sector. The percentage of residential (including low-income) cost is greater than the percentage of residential savings (and vise-versa for nonresidential) because the program acquisition cost is higher for residential (including low-income) than for nonresidential, primarily because the program acquisition cost of low-income is much higher than for non-low-income programs.

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

By its Implementation Order, the Commission requires PPL Electric to achieve 3.8% energy savings by May 31, 2021, which equates to 1,433,035 MWh/year. The Commission also requires PPL Electric to achieve 92 MW of peak demand reduction over the last four Phase III program years; 79,367 MWh/year of energy savings from the low-income sector; and 50,507 MWh/year from the GNE sector. PPL Electric designed its Plan to achieve all of these objectives. As previously described, the Company designed the Plan to exceed each of those targets by at least approximately 10% 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 5.5% (79,367 MWh/year) of the total required reductions come from the Low-Income customer sector. Savings may not accrue from low-income participation in general residential programs.

Twenty-three measures are available at no cost to low-income customers. While low income customers can participate in residential programs, these 23 measures are offered exclusively to the low-income sector. These measures comprise 35% 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 87. Low-Income Sector Compliance (Number of Measures)[1]

	Low-Income Sector	All Sectors	% Low-Income	Goal: Low-Income Measures as % of All Measures Offered
Number of measures offered	23	65	35.38%	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 designed its Low-Income sector portfolio to exceed the Commission's low-income set-aside target through Phase III programs alone. The Company will offer targeted programs to income-qualified customers residing in multiple housing types (i.e., single family, multifamily individual metered units, master-metered multifamily buildings, and manufactured homes). PPL Electric will achieve this objective primarily by delivering direct installation measures coupled with distributing energy efficiency education and kits throughout its territory. See Section 3.2.1 for detailed descriptions of low-income program offerings.

9.1.4 Manner in which the EE&C Plan will Achieve GNE Requirements

The Implementation Order requires that a minimum of 3.5% (50,507 MWh/year) of the total required reductions come from the GNE customer sector. To achieve its GNE set-aside target, the Company will offer a wide range of energy efficiency measures to schools, government facilities, and nonprofits.

PPL Electric designed its EE&C Plan to exceed its GNE compliance target through Phase III programs alone. The Company will offer a comprehensive range of energy efficiency measures for GNE customers in both existing buildings and new construction through the Non-Residential Energy Efficiency program. This program offers GNE sector customers the full range of commercial measures. See Section 3.3 for detailed descriptions of Non-Residential program offerings.

9.1.5 Funds Allocated to Experimental Equipment or Devices

All of the measures included 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 described in Section 3, PPL Electric included funding for pilots, new technology,

and experimental equipment. As was done in Phase II, the Company will submit descriptions of any pilot programs or proposed technology additions to the Pa PUC and stakeholders prior to implementation. Table 88 shows the funds PPL Electric allocated to pilots, new technology and experimental equipment by customer sector.

Table 88. PPL Electric Funds Allocated to Pilots, New Technology, and Experimental Equipment

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

PPL Electric will track and limit expenditures on measures deemed experimental to ensure that no more than 2% of Act 129 funds (a maximum of $6.2 million) are allocated for this purpose.

9.1.6 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 and measures. All of the programs are available to customers regardless of whether they receive default generation service from PPL Electric 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's programs.

9.2 Other Key Issues

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

PPL Electric 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 programs will continue to perform and produce savings well beyond the term of the Plan. In addition, as described throughout the Plan, PPL Electric will encourage customers to take a comprehensive approach to energy efficiency by offering education and incentives designed to implement multiple measures and to take a whole-home/building approach. Furthermore, PPL Electric programs have and will continue to stimulate demand for energy efficient products and encourage distributors and retailers to stock such equipment. For example, when the Company's EE&C Plan launched, LED lighting was new to the market and too costly to achieve widespread market adoption. In PY6, PPL Electric's programs began offering LED bulbs exclusively. As a result, retailers throughout PPL Electric's territory began to stock and promote LEDs. PPL Electric will continue to encourage the wide availability of program-eligible energy efficiency measures and stimulate increased demand for energy efficient products and equipment, thereby transforming local and regional markets.

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

PPL Electric 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 program materials.

Additionally, as mentioned in the program descriptions for low-income and GNE, PPL Electric and the Nonresidential and Low-Income CSPs will work with stakeholders, trade allies, and various market partners (e.g., CBOs) to create partnerships that can leverage additional incentives for GNE and low-income customers. Examples could include a nonprofit makeover, in which agencies, trade allies, equipment manufacturers, and others provide incentives (or donate/discount products or services) that could be combined with PPL Electric's incentives to help customers install energy efficiency measures in an applicable building, especially if the joint venture could result in more comprehensive savings. PPL Electric will develop case studies to share the benefits of these efforts and encourage additional joint ventures.

9.2.3 How PPL Electric Will Address Consumer Education

PPL Electric understands that educating customers about the value of energy efficiency is critical to achieving its goals, and includes education as a component of all its Phase III programs. PPL Electric has significantly expanded and improved its Home Energy Education Program (called the Behavior Program in Phase II), including offering a new energy efficiency hub with resources for customers to learn more about energy efficiency actions they can take. PPL Electric 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 Will Provide Information on Federal and State Funding Programs

PPL Electric 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 Will Provide the Public with Information about Program Results

PPL Electric is committed to keeping customers, stakeholders, and the general public informed about the results of the energy efficiency programs and progress toward Plan goals. PPL Electric hosts a dedicated section on www.pplelectric.com that provides Act 129 information, including quarterly, semi-annual, and annual evaluation reports. The Company will periodically meet with stakeholders to review results, provide semi-annual and annual reports to stakeholders, and post those reports on its website. Additionally, PPL Electric shares customer success stories with customers, trade allies, and the public by publishing and distributing case studies.

Appendix A: Commission approved electricity consumption forecast for the period of June 1, 2009-May 31, 2010[37]

PPL Electric Utilities Corporation
Consumption Forecast and Peak Load Data
For the period June 1, 2009 through May 31, 2010
Docket Nos. M-2012-2289411 and M-2008-2069887

Introduction

In its order entered on January 16, 2009 at Docket No. M-2008-2069887, the Public Utility Commission ("PUC" or the "Commission") established procedures for the implementation of Act 129 of 2008 ("Act 129" of the "Act"). In that order, the PUC directed each Electric Distribution Company ("EDC") subject to Act 129 to submit a consumption forecast for the period June 1, 2009 through May 31, 2010. In its August 3, 2012 Implementation Order at Docket No. M-2012-2289411, the Commission again adopted the June 1, 2009 through May 31, 2010 expected load forecast as the baseline from which to measure incremental savings in Phase II of the Act 129 Energy Efficiency and Conservation Plans.

In this filing, PPL Electric Utilities Corporation ("PPL Electric" or "the Company") is submitting the required data.

Consumption Forecast

Set forth below are PPL Electric's consumption forecast for the period June 1, 2009, through May 31, 2010, as well as a full description of its forecasting methodology, weather normalization methodology, supporting data and the major assumptions reflected in the forecast. The result of the forecast is summarized in Table 89-.

Table 89. June 1, 2009 to May 31, 2010, Forecasted

Customer Class	Billed Sales (MWh)
Residential	14,560,303
Commercial	14,093,904
Industrial	9,275,530
Other	172,435
Company Use	36,762
GenCo	75,434
Total	**38,214,368**

[37] Duplicated but reformatted from the referenced filing to match the format of this Phase III EE&C Plan.

Consumption Forecast Methodology

PPL Electric uses an econometric model to forecast monthly sales by customer class (residential, commercial, industrial, and other). Each customer class model is comprised of linear regression or trend models. Historical and forecast economic data used in the models are obtained from Moody's Economy.com. Energy efficiency and end-use data is obtained from the Energy Forecaster's Group of Itron (the forecasting software vendor). These data are based on Energy Information Administration (EIA) historical and forecasted end-use and efficiency data. The methodology is identical to the methodology used by the Company and accepted by the Commission in PPL Electric's previous distribution service base rate proceedings. A summary of each model and methodology are as follows:

Residential

The residential forecast is comprised of four models.

Average monthly usage for premises coded as General Residential Service (GRS) customers is modeled using a linear regression model. Historical monthly average use per customer is regressed against variables for cooling, heating, and other uses (lighting, cooking, water heating, etc.). Forecast drivers include weather, billing days, household size, household income, price, and energy efficiency indexes.

Average monthly usage for premises coded as Electrically Heated Homes (EHH) customers is also modeled using a linear regression model. Historical monthly average use per customer is regressed against variables for cooling, heating, and other uses. Forecast drivers include weather, billing days, household size, household income, price, and energy efficiency indexes.

The Residential Customer Forecast is a regression model of PPL Electric's customer counts as a function of the population in its service territory.

Electrically Heated Homes Share is a trend model used to allocate the forecast of residential customers to GRS and EHH.

Commercial

The commercial customer class is forecasted as a whole using a linear regression model. Historical commercial usage is regressed against variables for heating, cooling, and a base usage. Forecast drivers include weather, billing days, population, non-manufacturing output, and energy efficiency indexes.

Industrial

The industrial forecast is segmented into four major sub-categories: food, steel, chemical, and other. All four sub-categories are modeled using a linear regression model.

1) Historical Industrial-Food usage is regressed against variables for weather, price, and GOP-Manufacturing-Food.

2) Historical Industrial-Steel usage is regressed against variables for price and GOP-Manufacturing-Primary Metal Industries.

3) Historical Industrial-Chemical usage is regressed against variables for weather, price, and GOP-Manufacturing-Chemical & Allied Products.

4) Historical Industrial-Other usage is regressed against variables for weather, price, billing days, and GOP- Manufacturing.

Other

The other forecast is comprised of three models: Public Authority, Railroad, and Borderline.

1) Public Authority is modeled using a linear regression model. Historical usage is regressed against a variable for population.

2) Railroad and Borderline are modeled using exponential smoothing models.

3) GENCO/Company Use- The GENCO and Company Use forecasts are both modeled using seasonal exponential smoothing models. The GENCO forecast is for station net-metered usage at affiliated generating stations owned by PPL Generation. The Company Use forecast is for PPL Electric's facilities, such as service centers.

Institutional Consumption

Act 129 specifies that a minimum of 10% of the required reductions in consumption shall be obtained from units of federal, state and local government, including municipalities, school districts, institutions of higher education and non-profit entities. For PPL Electric, the 2008 consumption for customers in this group totaled 3.4 million kWh, which is just under 9% of total consumption.

Major Assumptions

Economic Conditions- The forecast is based on a continuation of the recession through the middle of 2009, with a slow recovery beginning during the second half of the year. More normal GDP growth is expected to return in the second half of 2010.

Weather- Normal weather is assumed for the forecast period. PPL Electric uses a 10-year normal Heating Degree Days (HDDs) and Cooling Degree Days (CDDs) to reflect the trend toward warmer winter weather over the past decade. Prior to 2008, PPL Electric used a 20-year normal, but was consistently over-forecasting sales during the winter months and under-forecasting during the summer months. In order to provide the most accurate monthly forecast, PPL Electric changed to a 10-year normal for the 2008-2012 planning period. A rolling normal is used, and there currently is little difference between the 10- and 20-year rolling normal HDDs, as high HDD years in the 1980s fall out of the rolling 20-year period. However, the rolling normal for CDDs continues to climb. The differences between the 10-year, 20-year, and 30-year normals are shown in Table 90.

Table 90. 10-Year, 20-Year, and 30-Year Normal Degree Days

	10-year Normal	20-year Normal	% Change	30-year Normal	% Change
HDD	5,603	5,596	+0.1%	5,700	-1.7%
CDD	828	813	+1.8%	798	+3.8%

The use of a 10-year normal reduces monthly forecast variances and, on an annual basis, reduces the consumption forecast by less than 0.2% compared to the 30-year normal.

Rate Cap Expiration

The forecast assumes that rate caps for PPL Electric's retail customers expire at the end of 2009, which will result in decreased consumption in 2010.

Energy Efficiency and Conservation (EE&C) Measures- EE&C measures resulting from Act 129 are not included in the forecast.

Consumption Forecast Accuracy

Since 2000, PPL Electric's billed sales forecast accuracy has had a Mean Average Percentage Error (MAPE) of 0.9% on a weather-normalized basis. Table 91 shows the actual and weather-adjusted billed sales variance vs. forecast over this time period.

Table 91. Actual Billed Sales and Weather-Adjusted Billed Sales, Variance vs. Forecast

Year	Forecasted Billed Sales (MWh)	Actual Billed Sales (MWh)	Actual Billed Sales vs. Forecast	Weather-Adjusted Billed Sales (MWh)	Weather Adjusted Billed Sales vs. Forecast
2000	33,806,574	33,844,469	0.1%	34,123,298	0.9%
2001	33,817,831	34,576,695	2.2%	34,749,744	2.8%
2002	35,241,722	34,779,292	-1.3%	34,397,979	-2.4%
2003	35,598,244	35,291,594	-0.9%	35,215,173	-1.1%
2004	36,689,129	35,791,611	-2.4%	36,056,721	-1.7%
2005	36,835,033	37,262,218	1.2%	36,458,105	-1.0%
2006	37,295,451	36,715,684	-1.6%	37,192,547	-0.3%
2007	37,497,311	37,839,168	0.9%	37,665,070	0.4%
2008	38,029,900	38,135,600	0.3%	38,328,200	0.8%

Appendix B: Approved CSP Contracts

As of the date of this filing, April 20, 2016, PPL Electric has received Pa PUC approval of its Residential, Nonresidential, Low-Income, and EM&V CSP contracts. Copies of these contracts were filed with the Pa PUC on a confidential basis.

Appendix C: Calculation of Annual Savings and Costs

The Phase III Plan includes tables showing program by program calculation of savings and costs for each program and plan year (see Section 7.3). Please refer to Table 76 (Pa PUC Table 6A) in the plan for portfolio specific assignment of EE&C costs. Table 77 (Pa PUC Table 6B) provides detail on the allocation of common costs to applicable customer sectors. Table 78 (Pa PUC Table 6c) 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 81 through Table 86 (Pa PUC Tables 7A through 7F) show TRC benefits by program and plan year for each sector.

Appendix D: Calculation Methods and Assumptions

PPL Electric based its savings and cost estimates on experience from Phase I and Phase II, the TRM, input from stakeholders and trade allies, and measure cost data generated by the sector-level CSPs using a variety of sources, including the SWE incremental cost database, DEER, and actual measure acquisition costs for direct installations. Many variables can impact the cost and effectiveness of a measure or program, and these variables led to numerous TRM changes during Phase I and Phase II that influenced program savings, acquisition cost, and TRC test results. In Phase III, PPL Electric will use the experience and knowledge gained from prior phases to monitor and adjust measures and programs that ensure the optimum balance of cost and benefits.

In most instances, the sector-level CSPs based their Phase III savings calculations on the current TRM algorithms and industry practices. For measures that were not in the TRM, PPL Electric 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 a percentage of incremental cost 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 III consist of two components:

- Sector-level CSPs calculated costs required for individual program and cross-sector marketing to generate sufficient participation to meet PPL Electric's Act 129 targets, based on their implementation experience and knowledge of PPL Electric's market.
- PPL Electric's allocated portion of common costs for overarching marketing and advertising campaign. 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 labor and materials, CSP labor and material, marketing, QA/QC and EM&V, tracking systems, legal, and the SWE costs.[38] These Phase III costs were based on PPL Electric wage rates; tracking system cost from prior phases; and EM&V costs from prior phases with downward adjustments to reflect efficiencies, lessons learned, and revisions to prior phase systems and processes to increase Phase III operational efficiency.

[38] PPL Electric's share of the SWE costs is not subject to the Act 129 cost cap.

Appendix E: ACT 129 COMPLIANCE RIDER – PHASE 3

A Phase 3 Act 129 Compliance Rider (ACR 3) 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 Rider will be implemented beginning June 1, 2016

The ACR 3 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, LPEP, and L5S.

The ACR 3 will be computed for each customer receiving distribution service from the Company using the formulae described below. For residential customers, the ACR 3 charge shall be included in the distribution charges 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 3.

The ACR 3 for the Residential class and the Small C&I class shall be computed using the following formula:

ACR 3 = [ACc/S - E/S] X 1 / (1-T)

The ACR 2 for the Large C&I class shall be computed using the following formula:

ACR 3 = [ACc/D - E/D] X 1 / (1-T)

Where:

ACc = An annual budget of all costs required for the Company to implement its Commission-approved Phase 3 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 budget amount is the sum of all direct and indirect costs (including all 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 compliance 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.

ACT 129 COMPLIANCE RIDER – PHASE 3 (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 year of the PJM Planning Year.

E = Net over or undercollection of the ACR 3 charges as of the end of the 12-month period ending March 31 immediately preceding the next compliance year. Reconciliation of the ACR 3 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 2017-2018 ACR 3 application year to reflect actual data for the months of April and May 2015, as well as any expenses incurred prior to May 31, 2016, 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 3 shall be filed with the Pennsylvania Public Utility Commission (Commission) by May 1 of each year. The ACR 2 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 3, if left unchanged, would result in a material over or undercollection of Phase 3 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 3 to become effective ten (10) days from the date of filing, unless otherwise ordered by the Commission.

At the conclusion of the Phase 2 EE&C Plan on May 31, 2016, collections under the ACR 2 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 in the E factor, defined above, and will be refunded or recovered through application of the ACR 3 rate through March 31, 2017. If any over/under collection balance is expected to remain after May 31, 2017, the collection will be included in the ACR 3 rate going forward.

Minimum bills shall not be reduced by reason of the ACR 3 nor shall charges hereunder be a part of the monthly rate schedule minimum. The ACR 3 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 1, and ACR 2, and ACR 3 will be combined for billing purposes only.

The Company shall file a report of collections under the ACR 3 within thirty (30) days following the conclusion of each compliance-year.

Application of the ACR 3 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 3 and the costs included therein.

PPL Electric Utilities Corporation

ACT 129 COMPLIANCE RIDER – PHASE 3 (CONTINUED)

ACT 129 COMPLIANCE RIDER – PHASE 3 CHARGE

Charges under the ACR 3 for the period June 1, 2016 through May 31, 2017, as set forth in the applicable Rate Schedules.

Customer Class	**Large I&C - Transmission**	**Large I&C - Primary**	**Small I&C**	**Residential**
Rate Schedule / Charge	L5S, LP-5, and LPEP	LP-4	GS-1, GS-3, IS-1 (R), BL, and GH-2 (R)	RS and RTS (R)
	$X.XXX /KW	$X.XXX /KW	$X.XXXXX /KWH	$X.XXXXX /KWH

Small C&I – Street Lights										
	SA		SM (R)		SHS		SLE		SE	TS (R)
	Nominal Lumens	Charge	Nominal Lumens	$/Lamp	Nominal Lumens	$/Lamp	Nominal Lumens	$/Fixture	$/KWH	$/Watt
Rate Schedule/ Charge	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		

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of PPL Electric Utilities	:	
Corporation for Approval of its Act 129	:	Docket No. M-2015-2515642
Phase III Energy Efficiency and	:	
Conservation Plan	:	

VERIFICATION

I, Dirk S. Chiles, being the Manager-Energy Efficiency at PPL Electric Utilities Corporation, hereby state that the facts set forth above are true and correct to the best of my knowledge, information and belief, and that if asked orally at a hearing in this matter, my answers would be as set forth therein.

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: July 20, 2018

Dirk S. Chiles