



17 North Second Street
12th Floor
Harrisburg, PA 17101-1601
717-731-1970 Main
717-731-1985 Main Fax
www.postschell.com

Devin T. Ryan

dryan@postschell.com
717-612-6052 Direct
717-731-1985 Direct Fax
File #: 158814

April 27, 2015

VIA HAND DELIVERY

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: Energy Efficiency and Conservation Program
Docket No. M-2014-2424864**

Dear Secretary Chiavetta:

Enclosed for filing please find the Comments of PPL Electric Utilities Corporation on the Phase III Tentative Implementation Order in the above-referenced proceeding. A CD containing Exhibit 1 is also enclosed.

Copies will be provided as indicated on the Certificate of Service.

Respectfully submitted,

Devin T. Ryan

DTR/jl
Enclosures

cc: Certificate of Service
Megan Good (*Comments only via E-mail. Exhibit 1 on CD via First Class Mail*)
Kriss Brown (*Comments only via E-mail. Exhibit 1 on CD via First Class Mail*)

RECEIVED
2015 APR 27 PM 3:47
SECRETARY'S BUREAU

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Energy Efficiency and Conservation Program : **Docket No. M-2014-2424864**
:

**COMMENTS OF
PPL ELECTRIC UTILITIES CORPORATION**

RECEIVED
2015 APR 27 PM 3:40
PA PUC
SECRETARY'S BUREAU

TO THE PENNSYLVANIA PUBLIC UTILITY COMMISSION:

On March 11, 2015, the Pennsylvania Public Utility Commission (“PUC” or the “Commission”) entered a Tentative Implementation Order¹ in the above-captioned proceeding. In the Tentative Implementation Order, the Commission issued, for public comment, its proposals for implementing the third phase (“Phase III”) of the Energy Efficiency and Conservation (“EE&C”) Program. As explained in detail below, PPL Electric Utilities Corporation (“PPL Electric” or the “Company”) has several significant comments on the Commission’s proposals in the Tentative Implementation Order.

I. BACKGROUND

PPL Electric is a public utility and an electric distribution company (“EDC”) as defined in Sections 102 and 2803 of the Pennsylvania Public Utility Code, 66 Pa. C.S. §§ 102, 2803. PPL Electric furnishes electric distribution, transmission, and default supply services to approximately 1.4 million customers throughout its certificated service territory, which includes

¹ See *Energy Efficiency and Conservation Program*, Docket No. M-2014-2424864 (Order Entered Mar. 11, 2015) (“Tentative Implementation Order”).

all or portions of 29 counties and encompasses approximately 10,000 square miles in eastern and central Pennsylvania.

Pursuant to Act 129 of 2008, P.L. 1592, 66 Pa. C.S. §§ 2806.1 and 2806.2 (“Act 129”), PPL Electric designed and implemented Phase I and Phase II EE&C Plans.

On July 1, 2009, PPL Electric filed its Phase I EE&C Plan with the Commission in accordance with to Act 129 and various related Commission orders. The Commission approved PPL Electric’s EE&C Plan, with modifications, on October 26, 2009,² and further revisions were approved on February 17, 2010.³ On November 15, 2012, PPL Electric filed its initial Phase II EE&C Plan. The Commission approved PPL Electric’s initial Phase II EE&C Plan, with modifications, on March 14, 2013.⁴ PPL Electric’s subsequent compliance filing was approved by the Commission on July 11, 2013.⁵

PPL Electric’s Phase I and Phase II EE&C Plans have included a broad portfolio of energy efficiency and energy education programs and initiatives. PPL Electric’s portfolios of programs were designed to provide customer benefits and to meet the energy reduction goals set forth in Act 129. The Phase I and Phase II EE&C Plans have included a range of energy efficiency programs that included every customer segment in PPL Electric’s service territory. For Phase I, the Company achieved 1,642,067 MWh/yr of verified gross energy savings and 340.9 MW of verified gross peak demand reduction, well in excess of its compliance targets of

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

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

⁴ See *Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase II Energy Efficiency and Conservation Plan*, Docket No. M-2012-2334388 (Order Entered Mar. 14, 2013).

⁵ See *Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase II Energy Efficiency and Conservation Plan*, Docket No. M-2012-2334388 (Order Entered July 11, 2013).

1,146,4310 MWh/yr and 297 MW respectively. For Phase II, PPL Electric is currently on track to exceed its energy reduction target of 821,072 MWh/yr.

PPL Electric continues to support Act 129 EE&C Programs and appreciates the opportunity to provide input regarding this matter. As an EDC operating an EE&C Program, PPL Electric believes that its comments will provide the Commission with a valuable perspective in its evaluation of Phase III of the EDCs' EE&C Programs.

II. TENTATIVE IMPLEMENTATION ORDER

With the Tentative Implementation Order, the Commission begins the process of establishing the Phase III EE&C Program that requires EDCs to adopt and implement cost effective plans to reduce energy consumption and peak demand throughout the Commonwealth. Tentative Implementation Order, p. 4. The Tentative Implementation Order proposes required consumption and peak demand reductions for each EDC, as well as guidelines and requirements for implementing Phase III of the EE&C Program. *Id.* The Commission seeks comments on these proposals.

III. COMMENTS OF PPL ELECTRIC

PPL Electric generally agrees with many of the proposals in the Tentative Implementation Order but has several comments about the proposed energy consumption and peak demand reduction targets for the Commission's consideration. As explained in detail below, the Company recommends different energy consumption and peak demand reduction targets and seeks several refinements and clarifications of certain aspects of the Tentative Implementation Order. Specifically, PPL Electric recommends that the Commission make the following revisions or clarifications to improve the Phase III EE&C Program. These are explained in more detail later in these comments:

1. Eliminate PPL Electric's peak demand reduction target and reallocate the proposed demand reduction ("DR") funding (\$15.38 million) to energy efficiency programs that are more cost-effective.
 - a. PPL Electric believes DR programs for the Company (and possibly other EDCs) are likely not cost-effective because the Statewide Evaluator's ("SWE") DR Market Potential Study ("SWE's DR Study") significantly overestimates DR benefits and significantly underestimates DR costs.
 - b. Cost-effectiveness of the EE&C portfolio would increase significantly by reallocating funding from DR to energy efficiency programs.
 - c. Even if DR were to be cost-effective, PPL Electric does not believe it is possible to achieve the proposed DR target with the proposed DR funding and the proposed customer eligibility restriction that prevents PJM DR customers from participating in Act 129 DR.
 - d. Nevertheless, if the Commission determines there should be a peak demand reduction target, PPL Electric recommends changing the four yearly peak reduction targets to a single average annual peak reduction compliance target that is measured in the final year of Phase III (i.e., a single target determined from the average annual reductions in program years 9, 10, 11, and 12). PPL Electric believes the four yearly peak reduction compliance targets are overly restrictive and prevent an EDC from achieving the prescribed demand reduction in summers that have few DR events. For example, if there were a single DR event early in a program year and the EDC did not achieve all of its reductions, no opportunity would exist for an EDC to "over-comply" in subsequent events to meet its average reduction over all event hours in that program year. If there are four yearly peak reduction targets, it would likely require an EDC to significantly oversubscribe the number of participants (i.e., peak reductions) to minimize the risk of falling short in any hour or any single event. Such oversubscription will be costly and further decrease the cost-effectiveness of DR programs.

2. If the Commission eliminates PPL Electric's peak demand reduction target and reallocates the DR funding to energy efficiency (see previous bullet), increase PPL Electric's program acquisition cost from \$0.18/annual kWh saved (\$0.70 for low-income; \$0.10 for non-low-income)⁶ to \$0.31/annual kWh saved (\$0.70 for low-income; \$0.22 for non-low-income). This would revise PPL Electric's energy reduction target from 1,590,264 MWh/yr to 995,000 MWh/yr. Or, if the DR funding remains at \$15.38 million, increase PPL Electric's overall program acquisition cost from \$0.18/annual kWh saved to \$0.27/annual kWh saved (\$0.70 for low-income; \$0.20 for non-low-income). This would revise PPL Electric's energy reduction target from 1,590,264 MWh/yr to 1,059,000 MWh/yr. These revisions are consistent with PPL Electric's Energy Efficiency Market Potential Study and would:

- a. Allow sufficient funding (i.e., program acquisition cost) to provide a more effective and more comprehensive mix of energy efficiency measures and programs with a higher net-to-gross ratio for non-low-income customers, similar to Phase II program design.
- b. Provide a more realistic and accurate program acquisition cost to properly value the cost of direct-install low-income measures and to weight low-income programs/savings sufficiently to meet the Commission's proposed low-income set-aside targets.⁷ This decreases program potential by 214,724 MWh/yr for PPL Electric and provides PPL Electric with sufficient funding (i.e., program acquisition cost) to continue its highly successful and very comprehensive Act 129 WRAP low-income program with a similar mix of measures as Phases I and II and the same mix of measures as the Company's LIURP WRAP program.
- c. Revise the target to reflect cumulative annual savings as the basis for compliance, instead of the sum of incremental annual savings.⁸

⁶ The actual program acquisition costs referenced in this paragraph will be approximately 10% lower than the targets because PPL Electric expects to include an additional 10% over-compliance for risk management, as discussed later.

⁷ See item 3 on pages 6-7 for more information about low-income program acquisition costs.

⁸ See item 4 on pages 7-8.

3. Adopt the Commission's proposed low-income overall set-aside compliance target for PPL Electric but change the low-income direct-install portion from a compliance target to a non-mandatory goal.

a. PPL Electric believes the SWE's Energy Efficiency Market Potential Study ("SWE's EE Study") assumed all direct-install savings potential is served from Act 129 and failed to account for LIURP (PPL Electric's Universal Services weatherization program) and Pennsylvania's Weatherization Assistance Program ("WAP"). PPL Electric is committed to providing energy efficiency programs to *its low-income customers but does not believe it will be possible to serve enough eligible households to meet the proposed direct-install set-aside target with the Company's Act 129 WRAP measures, without jeopardizing the success of LIURP and WAP. Instead of deleting or reducing the direct-install savings, PPL Electric will strive for the proposed level of savings from low-income direct-install measures but believes it is appropriate for the Commission to change this from a compliance target to a non-mandatory goal. Stakeholder input and the approval process for EE&C Plans will ensure PPL Electric designs programs that strive to meet this non-mandatory goal (2% of the total portfolio compliance savings from direct-install measures for low-income customers).*

b. In addition, PPL Electric believes the SWE's EE Study understates the cost for the low-income program because it weights the proportion of low-income savings and costs much lower than the required for the low-income set-aside target targets.⁹ For example, the SWE's April 22, 2015 Data Request from the April 8, 2015 Stakeholder Meeting confirms the SWE's EE Study assumed 11.2% of the total portfolio costs are for low-income programs.¹⁰ For PPL Electric's portfolio, that would equate to approximately \$33 million for low-income programs.¹¹

⁹ It was not possible for the SWE's EE Study to anticipate the low-income set-aside targets.

¹⁰ Table on page 1 of the Data Request from April 8, 2015 Stakeholder Meeting.

¹¹ See Table 3b later in these comments.

However, that is approximately half of the funding that PPL Electric would need to meet the Phase III low-income set-aside targets.¹²

- c. Furthermore, PPL Electric would like clarification whether the SWE's EE Study used the full cost of measures (material and installation) to estimate the program acquisition cost for direct-install low-income measures. The SWE's April 22, 2015 Data Request from April 8, 2015 Stakeholder Meeting confirms that it used the full cost of measures, but the residential Appendix attached to the SWE's EE Study appears to be inconsistent.
 - d. If the program acquisition costs in the SWE's EE Study are adjusted for low-income measures to weight low-income programs/savings sufficiently to meet the Commission's proposed low-income set-aside targets, non-low-income funding must be reduced by \$35 million and low-income funding must be increased by \$35 million to provide sufficient low-income funding to keep the entire EE&C portfolio under the legislative cost cap. As shown in Table 7b, reducing non-low-income funding by \$35 million will, in turn, reduce the program potential savings for non-low-income (and the entire portfolio) by 214,724 MWh/yr. In other words, if the SWE had known about the low-income set-aside targets and PPL Electric's program acquisition cost for direct-install low-income measures, the program potential would have been 214,724 MWh/yr lower in the SWE's EE Study.
4. Change the savings target so it is based on cumulative annualized savings instead of the sum of incremental annual savings. PPL Electric believes cumulative annualized savings is more appropriate as a compliance target because it is consistent with the method used in Phases I and II, accounts for expired savings of short-life measures, and would encourage the EDCs to focus on measures with longer lives (more lifetime savings).
 - a. The Tentative Implementation Order is inconsistent on pages 40 (table at the bottom is based on cumulative savings and shows 5,092,433 MWh/yr of statewide

¹² See Table 3a later in these comments.

program potential) compared to Table 6 on page 42 (based on the sum of incremental savings and shows 6,123,842 MWh/yr of statewide program potential) and the wording on page 43.

- b. The Commission states, “[w]e propose to adopt the five-year consumption reduction requirements as contained in the Addendum and that appear in the table below [i.e., Table 6],” which is based on the sum of incremental annual savings and does not account for savings decay. Tentative Implementation Order, p. 42. However, the Commission also “propose[s] that, for any measures installed whose useful life expires before the end of the phase, another measure must be install or implemented during that phase which replenishes the savings from the expired measure. This means that reported savings for Phase III would take into account the useful life of measures.” *Id.* This implies that savings for short-lived measures do indeed expire and, therefore, do not count toward the compliance target. PPL Electric provides an example on pages 58 and 59.
5. Clarify whether EDCs are permitted to apply Phase II over-compliance savings to Phase III at the customer sector level for low-income and government/educational/nonprofit sector carve-outs, even if there is no over-compliance savings at the portfolio level.
6. Clarify whether the costs associated with the SWE have been considered as an “administrative cost” when determining EDCs’ budgets, program acquisition costs, and the resulting program potential (i.e., energy and DR reduction targets). The SWE costs would be on the order of \$5 million for PPL Electric if they are comparable to Phases I and II. If the SWE costs were not included in the SWE’s EE Study, then program potential (and the energy savings compliance target) should be lowered accordingly. PPL Electric also believes SWE costs should be within the legislative cost cap, not in addition to the cost cap.
7. Change the due date for the mid-year status reports from December 31 to January 15, consistent with the Phase I and Phase II schedules. The mid-year (2nd quarter) ends November 30 and PPL Electric does not “close its November books” until approximately December 15. Sixteen days would not be adequate to prepare the mid-year evaluation

report, especially given the holidays in November and December. In addition, the Final Annual Report for the prior program year is due November 15 each year. Requiring two evaluation reports (mid-year for current program year and the annual report for the previous program year) so close to each other (November 15 and December 31) is challenging, especially given the holidays in November and December.

8. Clarify that costs for Phase II evaluation (i.e., EDC evaluators and SWE) that are incurred after May 31, 2016 (and which are likely to extend until January/February 2017 when the SWE is expected to issue its Final Phase II Evaluation Report) are considered part of the “other Phase II administrative obligations” to be counted against the Phase II EE&C Plan budget.
9. Clarify that EDCs are required to solicit bids only from registered conservation service providers (“CSPs”) that are qualified for the scope of the specific contract, not from the complete list of registered CSPs. For example, for the evaluation contract, EDCs must solicit bids from registered CSPs who perform evaluation services, not from registered CSPs who deliver DR programs. PPL Electric also recommends that the Commission consider creating categories of experience on the CSP registry so EDCs and others can determine the appropriate type of work performed by each registered CSP.
10. Clarify how to classify the costs and savings for master-metered multifamily housing with a commercial rate schedule and low-income occupants. Specifically, the Company seeks clarification as to whether the costs and savings should be accounted for under the rate schedule of the building (generally “GNI- small C&I”) or as low-income (charged to the residential customer classes).
11. Adjust the proposed requirements for rebate application deadlines by including only the maximum rebate submittal deadline in the EE&C Plan and allowing the EDCs to shorten that deadline without Commission approval if the EDC determines that shorter deadlines are necessary to manage the pace of programs. Major and minor changes to the EE&C

Plan require Commission approval.¹³ As programs approach the end of a phase or their approved budgets, whichever is earlier, EDCs may need to shorten the rebate application deadline to prevent exceeding the program's budget. If this happens near the last year of Phase III, there will not be enough time for an EDC to modify its EE&C Plan to reflect a different rebate deadline, and to get Commission approval of that EE&C Plan change in time to implement the new rebate deadline.

12. Utilize the same interest rate for the Act 129 rider as the interest rate in the Commission's pending rulemaking for price-to-compare riders, which is based on the prime rate for commercial borrowing in effect on the last day of the month the over- or under-collection occurred, as reported in the Wall Street Journal.
13. Include, as part of the calculation of the Phase III rates to become effective June 1, 2016, as a clearly identified separate line item, a projection of revenues for April and May 2016, with both the revenues and expenses trued-up in the subsequent reconciliation for the period April 1, 2016, through March 31, 2017. The Commission recommends that EDCs should include, as part of the calculation of the Phase III rates, as clearly identified separate line items, projections of the: expenses to finalize any measures installed and commercially operable on or before May 31, 2016; expenses to finalize any contracts; and other Phase II administrative obligations. PPL Electric agrees with the Commission's recommendation but believes that including a projection of the April and May expenses, but not the revenues, will create an inherent over-collection, assuming all else equal.
14. Clarify the meaning and intent of "be accompanied by a full and clear explanation as to their operation and applicability to each customer class" for the proposed standard tariff reconciliation process. Tentative Implementation Order, p. 120. PPL Electric believes the wording set forth in the Tentative Implementation Order could require a tariff change in every EE&C Plan modification filing. PPL Electric also is concerned that the tariff

¹³ See *Energy Efficiency and Conservation Program*, Docket No. M-2008-2069887 (Order Entered June 10, 2011) ("Minor EE&C Plan Change Order").

would be used as a justification of EE&C Plan costs by customer class. PPL Electric believes the EE&C Plan filing should provide the justification of costs by customer class.

15. Provide a template for the reconciliation filing, rate filing, and tariff pages to ensure clarity and consistency.

In aggregate, PPL Electric believes its recommended changes will result in an energy efficiency portfolio that is more robust, diverse, cost-effective, market transforming, and acceptable to broad stakeholder consensus. Moreover, the proposed changes will have a higher net-to-gross ratio than the measure mix in the SWE's EE Study (which is the basis for compliance targets in the Tentative Implementation Order). The aggregate impact of the proposed changes is shown in Tables 1a and 1b below.

Table 1a
Summary of Recommended Changes to Compliance Targets and Funding

	Tentative Implementation Order	Recommended by PPL Electric	Notes
Cost budget (\$MM)	\$307.5 MM = \$292 MM for EE; \$15.5 MM for DR	\$307.5 MM for EE; \$0 for DR	
Estimated Portfolio Program Acquisition Cost (\$/annual kWh saved)	\$0.18 (around \$0.70 low- income; \$0.10 non- low-income)	\$0.31 (around \$0.70 low- income; \$0.22 non- low-income) ¹⁴	PPL Electric's recommended program acquisition costs are similar to Phase II
Energy reduction compliance target (MWh/yr)	1,590,264	995,000	
Low-income energy reduction compliance target (MWh/yr)	87,465 (5.5% of overall compliance)	54,725 ¹⁵ (5.5% of overall compliance)	
Low-income direct- install compliance target (MWh/yr)	31,806 (2% of overall compliance)	19,900 ¹⁶ (2% of overall compliance)	
GNI compliance target (MWh/yr)	55,660 (3.5% of overall compliance)	34,825 (3.5% of overall compliance)	
Peak demand reduction compliance target (MW)	92 MW	0 MW	

¹⁴ The actual program acquisition costs will be approximately 10% lower than those based on compliance targets because PPL Electric expects to include an additional 10% over-compliance for risk management.

¹⁵ PPL Electric recommends that this be a non-mandatory goal instead of a compliance target.

¹⁶ PPL Electric recommends that this be a non-mandatory goal instead of a compliance target.

Table 1b
Typical EE&C Portfolio with PPL Electric's Recommended Phase III Compliance Targets

Description: Typical Portfolio with PPL Electric's Recommended Compliance Targets, excluding DR

	% of Total Savings	MWh /Yr Savings Target (Phase 3)	Likely MWh/yr Savings w/ Risk Mitigation (Phase 3)	Acq Cost (\$ per annual kWh saved)	Total Cost Phase 3 (excl. DR)	% of Total Dollars
Direct Costs						
Low Income - Direct Install	2.0%	19,900	21,890	\$1.50	\$32,835,000	10.67%
Low Income Other (kits, behavior, gen'l resid)	3.5%	34,825	38,308	\$0.25	\$9,576,875	3.11%
Low Income Total (Direct Install + Other)	5.5%	54,725	60,198	\$0.70	\$42,411,875	13.78%
Direct Cost						
Residential	37.8%	376,110	413,721	\$0.200	\$82,744,200	26.89%
Sm. C&I	33.1%	329,096	362,006	\$0.200	\$72,401,175	23.53%
Lg C&I	18.9%	188,055	206,861	\$0.200	\$41,372,100	13.44%
GNI	4.7%	47,014	51,715	\$0.200	\$10,343,025	3.36%
Total Non Low Income	94.5%	940,275	1,034,303	\$0.200	\$206,860,500	67.22%
Common Costs (portfolio level costs for EM&V, technical support, SWE, tracking system, marketing, gen'l mgmt, EE&C Plan development)					\$58,455,750	19.00%
Total EE (excluding DR)	100.0%	995,000	1,094,500	\$0.28	\$307,728,125	100.00%
Ph 3 Tentative Order		995,000			\$307,500,000	
Non Low Income Programs Phase II Revised Plan Jan 2015 (direct costs)				\$0.20		
Non Low Income Programs proposed for Phase III (direct costs)				\$0.20		
Low Income Programs Phase II Revised Plan Jan 2015 (Direct Install direct costs, excluding LEAP tracking system)				\$1.54		
Low Income Programs proposed for Phase III (Direct Install direct costs, excluding LEAP tracking system)				\$1.50		
Low Income Programs Phase II Revised Plan Jan 2015 (direct costs, excluding LEAP tracking system)				\$0.79		
Low Income Programs proposed for Phase III (direct costs)				\$0.70		

In addition, on April 23, 2015, the Commission issued the SWE's Distributed Generation Potential Study for Pennsylvania highlighting the potential role that distributed generation technologies, such as solar and combined heat and power ("CHP"), can play in Pennsylvania EDCs' Act 129 Phase III EE&C Plans. Chairman Powelson issued the following statement:

I am particularly excited by the study's identification of CHP as a cost-effective measure for Pennsylvania's EDCs going forward. . . . I encourage stakeholders who plan to file comments on the Phase III EE&C Program Tentative Implementation Order to discuss how Pennsylvania EDCs can utilize CHP and the other distributed generation resources addressed in the study in their Phase III EE&C Plans. These resources can

provide tremendous value to Pennsylvania utility customers while allowing EDCs to reduce energy demand in a cost-effective manner.¹⁷

PPL Electric agrees that CHP and other distributed generation technologies should be considered by EDCs as they design their Phase III EE&C Plans, just like any other measure or program in the portfolio. EDCs and their stakeholders should evaluate the cost-effectiveness, impact on savings, impact on costs, and free-ridership issues as they design a well-balanced EE&C portfolio. PPL Electric's Phase I and Phase II EE&C programs implemented several CHP projects, although they required careful, project-specific screening to ensure cost-effectiveness before committing to a rebate. The CHP projects implemented have provided meaningful energy reductions.

Furthermore, PPL Electric believes EDCs should have the ability to develop/own emerging technologies such as distributed generation to further enhance the reliability of the electric delivery network and provide additional value to electric users. The advancement of these emerging technologies could provide significant economic benefits to Pennsylvania (in terms of reliability benefits and infrastructure investment) and could be developed within the framework of an EDC's existing regulated business, with appropriate review and approval by the Commission.

The remaining topics addressed in these comments are in the same order as the topics in the Tentative Implementation Order. The Company's comments do not address all topics.

¹⁷ April 23, 2015 Press Release, "PUC Releases Study Highlighting the Potential for Solar, Combined Heat and Power Technologies in Act 129 Phase III EE&C Plans," Pennsylvania Public Utility Commission, *available at* http://www.puc.state.pa.us/about_puc/press_releases.aspx?ShowPR=3531.

A. EVALUATION OF THE EE&C PROGRAM AND ADDITIONAL TARGETS

1. Evaluation of the EE&C Program

a. Consumption Reduction

Based on the SWE's EE Study, the Commission has determined the benefits of a Phase III Act 129 EE&C Program will exceed the costs and proposes to adopt additional required reductions in consumption for Phase III. Tentative Implementation Order, p. 12. PPL Electric has no comments on this overall conclusion to establish a Phase III but has comments on the specific consumption reductions proposed by the Commission. These are explained in Section A.4.

b. Demand Reduction

Based on the SWE's DR Study, the Commission has found that the benefits of a Phase III Act 129 EE&C Program (presumably, the Commission means peak demand reductions) will exceed the costs and proposes to adopt additional required reductions in peak demand for Phase III. Tentative Implementation Order, p. 12. However, as described in these comments, PPL Electric believes the SWE's DR Study underestimated DR program costs and overestimated DR program benefits; therefore, PPL Electric's DR programs may not be cost-effective. These comments are explained in Section A.3.

2. Length of Program

In the Tentative Implementation Order, the Commission proposes to implement a five-year term for Phase III of the Act 129 EE&C Program that would operate from June 1, 2016 through May 31, 2021. Tentative Implementation Order, p. 16.

PPL Electric agrees and believes a five-year phase with a single, cumulative energy reduction target provides the flexibility and time for EDCs to adjust measures and programs

along the way and to offer new, innovative, and more comprehensive measures that will take time to implement.

3. Proposed Additional Reductions in Peak Demand

Based on the results of the SWE's DR Study, the Commission has concluded that residential/non-residential direct load control ("DLC") is not cost-effective for PPL Electric but that non-residential load curtailment ("LC") DR programs are cost-effective for PPL Electric. As a result, the Commission proposes an average annual peak reduction target of 92 MW¹⁸ for PPL Electric in each of the last four years of Phase III (i.e., four yearly DR compliance targets). In addition, the Commission proposes a budget of \$15.38 million for PPL Electric's demand response program(s).¹⁹ Tentative Implementation Order, p. 36. This equates to a Program Acquisition Cost of \$41,622/MW/yr for PPL Electric. Tentative Implementation Order, p. 29. The Commission's Tentative Implementation Order proposes no requirements regarding to which customer classes must be offered DR programs and does not propose a specific type of DR program (such as DLC of air-conditioners or voluntary LC). Tentative Implementation Order, p. 38. The Commission also proposes a maximum of six curtailment events per year with four hours per event.

For the reasons described below, PPL Electric recommends removing the peak reduction compliance target and reallocating PPL Electric's proposed DR budget (approximately \$15.38 million) to fund additional energy efficiency because energy efficiency is more cost-effective

¹⁸ Measured at the generator level. The peak reduction as measured at the customer's meter would be lower due to transmission and distribution ("T&D") losses.

¹⁹ The Commission states that "[t]his proposed allocation is not intended to establish spending minimums or maximums for EE and DR," but the SWE's DR Study determined cost-effectiveness based on this proposed spending for PPL Electric. See Tentative Implementation Order, p. 34. If PPL Electric's planned expenditures are greater or less than \$15.38 million, it would change the cost-effectiveness for DR.

than DR,²⁰ provides “permanent” savings (since energy efficiency programs have measure lives of approximately 10-15 years as opposed to DR programs that have a one year life), and energy efficiency measures provide peak reductions as a “by product” in addition to their energy savings at no additional cost. Furthermore, PPL Electric believes it is not possible to achieve the proposed DR target (i.e., 92 MW) within the proposed DR funding (i.e., \$15.38 million) and DR would not be cost-effective if the DR funding was doubled or if the demand reductions were halved at the existing funding level.

Limitations of the SWE’s DR Study

PPL Electric believes the SWE’s DR Study significantly overestimates DR benefits from LC and significantly underestimates DR costs from LC. As a result, the LC DR program for PPL Electric (and potentially other EDCs) likely is not cost-effective, and the Commission cannot set a Phase III peak reduction compliance target.²¹

The SWE’s DR Study concluded that the only cost-effective DR program for PPL Electric is LC from non-residential customers. The SWE’s DR Study found that a DLC program is not cost-effective for PPL Electric (with a benefit-cost ratio of around 0.76 for residential and 0.72 for the small commercial and industrial sector (Small C&I”) per Tables 1-5 and 1-7).

²⁰ The table at the bottom of page 34 of the Tentative Implementation Order shows the present value of net benefits (i.e. the present value of benefits minus the present value of costs) is greatest when 100% of the funding is allocated to energy efficiency and 0% is allocated to DR. As the percentage of DR funding increases, the present value of net benefits decreases.

²¹ Additional targets for peak demand reduction should not be set by the Commission because, as the Company explains in these comments, DR likely is not cost-effective. *See* 66 Pa. C.S. § 2806.1(d)(2) (“By November 30, 2013, the commission shall compare the total costs of energy efficiency and conservation plans implemented under this section to the total savings in energy and capacity costs to retail customers in this Commonwealth or other costs determined by the commission. If the commission determines that the benefits of the plans exceed the costs, the commission shall set additional incremental requirements for reduction in peak demand for the 100 hours of greatest demand or an alternative reduction approved by the commission.”) (emphasis added). Moreover, the Commission proposes to set demand reduction targets beyond May 31, 2017, but Act 129 states that any peak demand reductions “shall be accomplished no later than May 31, 2017.” *Id.* Therefore, the Commission lacks authority to set additional targets for peak demand reduction, especially ones that go beyond May 31, 2017.

Conversely, the SWE's DR Study determined that a non-residential LC program would be cost-effective for PPL Electric (with a benefit-cost ratio of around 1.88 per Table 7-5 on page 93 of the SWE's DR Study).

However, as explained below, PPL Electric believes the SWE's DR Study significantly overestimates cost-effectiveness of LC because it: (1) fails to account for the additional cost to enroll more MWs (participants) than the DR compliance target; (2) underestimates the cost of the LC program (primarily the incentives that are necessary to enroll enough customers); and (3) overestimates the benefits of avoided capacity as explained below.

First, PPL Electric believes it must enroll more MWs (i.e., participants) than its DR compliance target to allow for uncertainties, such as customers opting out of some events, customers failing to achieve their expected reductions, customers who drop out of the program, customers deciding to participate in PJM after enrolling in Act 129 DR, and unexpected weather changes (cooler) after the event is triggered (day-ahead) that decrease the amount of weather sensitive load reductions (e.g., air conditioners are off). Based on the actual experience with its Phase I DR programs, PPL Electric believes it will need to recruit at least 135 MW of LC to meet the 92 MW DR compliance target.

The SWE's DR Study does not include this over-subscription or its additional cost of approximately \$7 million - \$14 million²² and, therefore, appears to assume that all participants will deliver their load reduction in every hour of every event. That is unlikely, especially since PPL Electric could not "penalize" customers if they failed to deliver their committed load

²² PPL Electric estimated the \$7 million additional cost by multiplying the 43 additional MW (135 - 92) by \$41,622/MW/yr (i.e., the acquisition cost) and by four years. PPL Electric believes it would need double the proposed acquisition cost of \$41,622/MW/yr to recruit enough participants, which would equate to \$14 million for the oversubscription. The SWE's DR Study assumes DR participants receive a reservation payment, regardless of how many peak reductions are delivered. Therefore, oversubscribing incurs additional cost even if some participants do not deliver peak reductions.

reductions. If PPL Electric (or the LC CSP) tried to establish firm LC commitments from customers, those customers would not likely enroll or would want substantially higher payments.

Second, PPL Electric believes the SWE's DR Study underestimated the cost of the LC program. The SWE's DR Study concluded that incentive payments for PPL Electric's LC customers should be \$24/kW/yr, which is approximately half of all other EDCs.²³ PPL Electric would like additional supporting information to confirm why a participant in PPL Electric's LC program would be willing to accept half the incentive (per kW curtailment) as an LC participant in other EDCs' territories. PPL Electric believes it will need to approximately double its LC incentives to obtain a sufficient number of participants. Doubling the incentives will add approximately \$8 million to the LC program and reduce its cost-effectiveness significantly.²⁴

Third, the Company believes the SWE's DR Study overestimates the benefits of avoided capacity. Based on Table 2-4 on page 23 of the SWE's DR Study, it appears that approximately \$16.2 million in Total Resource Cost Test ("TRC Test") benefits were included for PPL Electric's LC program.²⁵ If these include capacity reduction benefits from Phase III LC in program years 2017/18, 2018/19, 2019/20, and 2020/21, PPL Electric believes that the LC program benefits are overestimated in the TRC Test. PPL Electric believes that LC in program years 2017/18, 2018/19, 2019/20, and 2020/21 cannot provide capacity reduction benefits to customers because PJM's three-year forward capacity market for those years will have settled before Act 129 Phase III DR starts in June 2017. Therefore, Act 129 DR in those years will not result in capacity reduction benefits for retail customers through their generation supplier or

²³ See Table 6-3 on page 80 of the SWE's DR Study.

²⁴ PPL Electric estimated the \$8 million by multiplying 92 MW by the additional \$24/kW/yr and by four years.

²⁵ The Company calculated the \$16.2 million in TRC benefits by multiplying the \$44,000/MW/yr average avoided cost of capacity by 92 MW and by four years

default supply. If customers (or the wholesale market) cannot realize the capacity benefits, those benefits should not be included in the TRC cost-effectiveness calculation that was used in the SWE's DR Study.

Indeed, the Commission contemplates the revenues from PJM's Base Residual Capacity Auction ("BRA") are used to determine the TRC benefits of Act 129 Phase III DR in the Commission's 2016 TRC Tentative Order.²⁶ As the Commission explains:

Rather than perform a calculation of the avoided cost of generation capacity, an EDC could use the actual revenue received from PJM for the cleared resource as benefits in the TRC Test calculation. If an EDC allowed a CSP to bid the program into PJM as a wholesale resource on its behalf, all revenues received from the bid would still be returned to the customer sector contributing the load reduction and used as a benefit in the TRC Test in place of the estimated avoided cost of generation capacity.

2016 TRC Tentative Order, p. 34. Since the PJM BRA for 2017/18, 2018/19, 2019/20, and 2020/21 will have settled before an EDC launches its Act 129 DR program in June 2017, there are no benefits from the PJM BRA to include in the Phase III TRC Test.

The effect of these three TRC adjustments (additional costs to over-subscribe participants, additional costs for LC incentives, and reduced capacity benefits) is shown in Table 2 below and demonstrates that the LC program would not be cost-effective. In fact, the benefit-cost ratio of DR would fall in the range of 0.5 to 0.7, which is a significant drop from the 1.88 benefit-cost ratio described in the SWE's DR Study.

²⁶ See 2016 Total Resource Cost (TRC) Test, Docket No. M-2015-2468992 (Order Entered Mar. 11, 2015) ("2016 TRC Tentative Order").

Table 2

	SWE DR Market Potential Study	Adjusted by PPL Electric	Comments
NPV Costs (\$1000)	\$20,800	\$20,800 + \$7,000 or \$20,800 + \$14,000 + \$8,000 = \$36,000 to \$43,000	PPL Electric's adjustment to reflect the additional MWs for over- subscription and the additional incentives to recruit participants
NPV Benefits (\$1000)	\$39,099	\$39,099 - \$16,200 = \$22,899	PPL Electric's adjustment to reflect lower capacity benefits
TRC B/C Ratio	1.88	0.53 to 0.68	

Reallocating Funds to Energy Efficiency

In addition, the cost-effectiveness of the EE&C portfolio would increase by reallocating funding from DR to energy efficiency. The Commission acknowledges that energy efficiency is more cost-effective than DR: “We initially agree with the SWE’s assessment that EE programs provide a better return on investment than DR.” Tentative Implementation Order, p. 34. Further, the table on page 34 of the Tentative Implementation Order shows that if funding is allocated 100% to energy efficiency and 0% to DR, the present value (“PV”) net benefits is \$1.492 billion, which is more than allocating any funding to DR (90%/10% = \$1.416 billion of PV net benefits; 85%/15% = 1.416 billion; and 80%/20% = \$1.340 billion). However, the Commission concludes it is required to prescribe DR targets for Phase III because DR is cost-effective, albeit less cost-effective than energy efficiency. Tentative Implementation Order, pp. 35-36. Table 7-6 of the

SWE's DR Study shows an additional \$17 million of PV net benefits is possible for PPL Electric by allocating 100% of Phase III funding to energy efficiency instead of 10% to DR.²⁷

Energy efficiency also provides longer lasting savings because energy efficiency programs have measure lives of approximately 10 to 15 years, as opposed to DR programs, which have a one-year life. In addition, energy efficiency measures provide peak reductions as a by-product in addition to their energy savings at no additional cost.

Ability to Recruit DR Participants

Furthermore, regardless of cost-effectiveness, PPL Electric believes it will not be possible to recruit enough customers in a C&I LC program to meet the 92 MW DR target (or the 135 MW PPL Electric believes it needs to "over-subscribe") based on the average size (i.e., peak load) of non-residential customers who are likely to participate in Act 129 DR but who will not participate in PJM's DR program (a restriction proposed by the Commission for Phase III) unless the DR funding approximately doubles to provide sufficient funding to incentivize customers to leave PJM DR programs and participate in Act 129 DR instead. PPL Electric believes it will have to pay more than PJM DR to get enough customers to participate in its Phase III LC program, especially the larger customers. Further, if the budget for LC would increase from \$15.38 million (which is the DR funding proposed by the Commission) to \$31 million (which is the minimum funding PPL Electric believes it would need to convince a sufficient number of customers to participate in Act 129 Phase III DR instead of PJM DR), the benefit-cost ratio of the LC program would decrease to 1.2. This would leave little margin for uncertainties and would be much less cost-effective than reallocating the DR funding to more cost-effective energy efficiency programs as previously detailed.

²⁷ The additional \$17 million is calculated by subtracting \$330 million from \$347 million per page 94 of the SWE's DR Study.

In Phase I, PPL Electric's LC program had 325 participants/accounts that enrolled to provide approximately 150 MW but only provided 118 MW of verified peak demand reductions for one year at an actual cost of \$10 million. That equated to an actual program acquisition cost of \$84,745/MW/yr, which is more than double the program acquisition cost (i.e., \$41,622/MW/Yr) proposed by the Commission for Phase III. Moreover, PPL Electric's LC CSP could not recruit any more than the 325 participants in Phase I, regardless of the cost budget.

PPL Electric believes the Commission has underestimated the program acquisition cost and total funding needed for Phase III DR programs. The Commission has proposed that PPL Electric's DR budget should be 5% of its total portfolio budget (i.e., 5% for DR and 95% for energy efficiency). Tentative Implementation Order, p. 43. In its April 8, 2015 Stakeholder Meeting, the Commission stated that the starting point of the proposed Phase III DR budget (which dictates the DR program acquisition cost) was the actual proportion of DR funding in Phase I. However, PPL Electric believes that such a comparison is misleading because Phase I had only one year of peak reductions, whereas Phase III proposes four years. In Phase I, PPL Electric spent approximately \$20 million for its two DR programs (\$10 million for DLC and \$10 million for LC) for a single year of peak reductions. In other words, DR comprised approximately 8% of PPL Electric's total EE&C budget in Phase I. If there were four years of peak demand reductions required in Phase I, PPL Electric would have spent approximately \$62 million²⁸ for DR, which would have been 24% of the total Phase I EE&C budget. LC alone (since there is likely no DLC in Phase III) would have been 16% of PPL Electric's Phase I

²⁸ The approximate figure of \$62 million is equal to the sum of \$10 million for installing DLC switches, \$12 million for DLC incentives (i.e., \$3 million per year for four years), and \$40 million for LC (i.e., \$10 million per year for four years).

EE&C budget, whereas for Phase III, the Commission is proposing that PPL Electric spend only 5% of its EE&C budget for four years of LC.

In addition, of the 325 DR participants in Phase I, 220 participated in PJM DR and would not be eligible for Act 129 Phase III DR under the Commission's proposed rules for Phase III. The 105 customers who did not participate in PJM DR provided 45 of the total 128 MW of peak demand reductions for PPL Electric's Phase I LC program. The largest of these 105 participants provided 26 of the 45 MW, while the other 104 participants provided no more than 2 MW each, with an average of approximately 0.2 MW per participant.

The SWE's DR Study similarly acknowledges that larger customers dominate non-residential LC programs. The SWE's DR Study states, "80% of the load reduction came from the top 10% of participating customers" and "a small number of Phase I participants provided a large share of the statewide load reductions." SWE's DR Study, p. 73. In fact, "[e]ven amongst the large accounts, a large share of the DR tends to come from the largest and most savvy customers." *Id.* However, the SWE's DR Study does not specifically state how many of those "top 10% of participating customers" also participated in PJM DR and, therefore, would be ineligible for Phase III DR.

Therefore, to achieve approximately 135 MW of LC DR in Phase III from customers who will not participate in PJM DR, PPL Electric would need approximately 675 participants at an average of 0.2 MW per participant if the one large customer with 26 MW does not participate. If the large customer with 26 MW participates in Phase III, PPL Electric would need approximately 545 participants for Phase III.

Both of those scenarios require approximately five to six times more customers than the 105 who participated in PPL Electric's Phase I LC program but did not participate in PJM DR in

Phase I. PPL Electric believes it would need to conduct outreach to more than 6,000 possible participants to obtain that increased number of participants because the “take rate” is likely less than 10%. However, PPL Electric believes that number of DR participants is not possible, especially because the Company would have approximately half the budget (i.e., cost per MW/yr) to recruit customers who do not typically participate in PJM, did not participate in Phase I DR even though they were offered a much higher price and were permitted to “double-dip” in PJM’s DR market in Phase I, and may not be interested in providing DR at any price. Moreover, if Large C&I customers are the most likely customer class to participate in PJM DR, then almost all of the PPL Electric’s Phase III DR participants will be Small C&I customers or Large C&I rate classes that do not have the capability to curtail large amounts of load, which would be similar to PPL Electric’s actual experience in Phase I (i.e., participants in Act 129 LC who did not also participate in PJM DR). Small C&I customers are very difficult to reach, and it is likely more difficult to convince them to participate in DR-type programs than energy efficiency because DR may impact their business (customer comfort, productivity, sales, product quality, branding/image, etc.) and does not likely provide any bill savings to the customer. In contrast, energy efficiency does provide bill savings and does not reduce “comfort” or adversely impact business operations. Therefore, PPL Electric believes that it would need to recruit customers away from PJM DR to meet its Phase III DR target, especially the larger customers capable of providing significant peak load reductions.

Furthermore, if PJM has a DR program during Phase III,²⁹ PPL Electric would be “competing” with that program (and PJM Curtailment Service Providers) to recruit customers

²⁹ Currently, there is much uncertainty concerning the Federal Energy Regulatory Commission’s (“FERC”) jurisdiction over Regional Transmission Organizations’ (“RTOs”) and Independent System Operators’ (“ISOs”) DR programs. In *EPSA v. FERC*, the D.C. Circuit Court of Appeals vacated FERC Order No. 745 and found that FERC

during the entire Phase III which would create a very unpredictable outcome where customers could bounce back and forth between PJM and Act 129 programs, whichever has a more favorable price, less hours of curtailment, and a more-favorable payment structure (e.g., paid to be on-call not per event). Therefore, PPL Electric believes Act 129 DR incentives will need to be much greater than PJM DR to cause customers to switch from PJM DR to Act 129 DR, especially since Act 129 participants would expect to curtail six days per year, four hours per event whereas participants in PJM's DR get paid for the "capability" to curtail and PJM typically has no more than one or two short events per year.

Recruiting customers away from PJM DR programs may help PPL Electric reach its Phase III DR target but would not create any additional peak reductions in Pennsylvania as a whole. It would merely "reallocate" existing peak reductions from PJM to Act 129, providing no real benefit to Pennsylvania's consumers or to wholesale prices for capacity or energy. In effect, a customer who leaves PJM DR and participates in Act 129 DR is a free-rider because the customer would have participated in a DR program (i.e., PJM's) without PPL Electric's DR incentive. Furthermore, customers must commit to PJM DR three years ahead of time. Therefore, it would not be possible for PPL Electric to recruit those PJM participants for Act 129 DR until June 2019 because customers are already committed to PJM for years 2015, 2016, and 2017 and will be committed for 2018 when PJM completes its 2015 BRA.³⁰ Moreover, if a

acted beyond its jurisdictional authority because it infringed states' exclusive jurisdiction over electricity market regulation. *EPSA v. FERC*, 753 F.3d 216, 224 (D.C. Cir. 2014). Thereafter, a petition for a writ of certiorari was filed, but the U.S. Supreme Court has yet to act on it. Subsequently, on March 31, 2015, FERC rejected PJM's proposed tariff revisions that would function as a "stop-gap" measure that would take effect if certiorari were denied by the Court. See *PJM Interconnection, L.L.C.*, Docket No. ER15-852-000, 150 FERC ¶ 61,251 at PP. 31-32 (2015).

³⁰ By order issued April 24, 2015, FERC granted PJM's request for a waiver of its open access transmission tariff to delay the 2015 BRA until "30-75 days after the Commission issues an order on the merits of its Capacity Procurement proposal set forth in Docket No. ER15-632-000." *PJM Interconnection, L.L.C.*, Docket No. ER15-1470-000, 151 FERC ¶ 61,067 at P. 1 (2015).

customer leaves PJM in favor of Act 129 DR, the customer would no longer be available for PJM's emergency DR events which are implemented by PJM for more than just hot weather or peak load forecasts (e.g., loss of a large generating unit, congestion, and other reasons).

PPL Electric also believes the SWE's DR Study's conclusion that there are enough customers interested in PPL Electric's Phase III LC was based on a price elasticity analysis from California's DR participants and a price analysis from PJM's DR programs without accounting for the practical program design considerations described above (i.e., over-subscription, the average MW reduction per participant, competition between PJM and Act 129 DR programs for recruiting participants, and number of participants necessary). Further, PPL Electric does not believe California DR information is relevant for Pennsylvania. Energy prices in California are much higher than in Pennsylvania, and California has time-of-use/critical peak prices that are much higher during peak hours than off-peak hours and that provide a higher financial incentive for customers to shift their usage to off-peak hours than in Pennsylvania. Additionally, California customers have significantly different viewpoints and behaviors about energy efficiency/peak load reductions than Pennsylvania customers.

Thus, if the Commission determines that peak demand reduction targets are required for PPL Electric, the Company believes it could achieve a 45 MW peak demand reduction target (average annual reduction over the final four years of Phase III) with the \$15.38 million budget recommended by the Commission.³¹ However, since 45 MW is approximately half the reduction target proposed in the Tentative Implementation Order, the TRC benefits would also reduce by

³¹ This is based on: (1) convincing approximately 100 customers (approximately the same number of Phase I DR participants who did not also participate in PJM's DR programs) to participate in Phase III; and (2) an incentive of \$62,000/MW/yr (around 30% lower price than participants in Phase I were paid), where 99 customers provide 0.2 MW each (same as Phase I) and one large participant that provides 26 MW (same as Phase I). \$62,000/MW/yr (around 30% lower price than participants in Phase I were paid).

half from \$39 million to \$19.5 million, and DR would no longer be cost-effective for PPL Electric (see Table 2).

DR Program Design

The Commission also proposes the following DR program design elements:

- a. Curtailment events shall be limited to June through September;
- b. Curtailment events shall be called for the first six days that the peak hour of PJM's day-ahead forecast for an EDC is greater than 96% of the EDC's PJM summer peak forecast. If an EDC's day-ahead forecast never reaches 96% of its summer peak demand forecast, that EDC will have no compliance requirement for that year;
- c. Each curtailment event shall last four hours;
- d. Each curtailment event shall be called such that it will occur during the day's forecasted peak hours;
- e. Once six curtailment events have been called in a program year, the peak demand reduction program shall be suspended for that program year;
- f. Compliance will be determined based on the average MW performance across all event hours in a given program year (i.e. four, yearly DR compliance targets); and
- g. Customers participating in PJM's ELRP shall not be eligible to participate.

Tentative Implementation Order, pp. 37-38.

PPL Electric generally agrees with the proposed DR program design elements but has the following comments that it believes will improve or clarify DR program design, if the Commission determines DR programs are required for PPL Electric.

PPL Electric agrees with and has no comments on items a, b, d, e, and g. For item c, PPL Electric recommends that each curtailment event shall last up to four hours instead of a mandatory four hours. If the PJM day-ahead forecast is greater than 96% of the EDC's PJM summer peak forecast for only one hour during the next day, PPL Electric does not believe the customer should have to curtail, nor should the EDC have to pay incentives to the customer, for the hours that are not in excess of the 96% of the peak forecast.

PPL Electric also recommends changing item f to “the peak reduction compliance shall be determined based on the average of the annual MW reductions across the last four program years.” Doing so provides a single, cumulative DR compliance target at the end of Phase III for the peak reduction targets, not separate DR compliance targets in each program year. This would be consistent with the cumulative energy efficiency target at the end of Phase III. In other words, an EDC could meet its DR compliance target through any combination that averages the requisite amount of annual MW reductions over the four years of Phase III. For example:

1. 100 MW in PY9 (averaged over all the event hours in that program year) + 100 MW in PY10 + 100 MW in PY11 + 100 MW in PY12. This is 400 MW divided by four years = 100 MW average per year.
2. 150 MW in PY9, 50 MW in PY10, 150 MW in PY11, and 50 MW in PY12. This is 400 MW divided by four years = 100 MW average per year.
3. Any other combination that averages 100 MW over the four years.

As currently proposed in the Tentative Implementation Order, an EDC would need to achieve 100 MW (averaged over all of the event hours in that program year) in each program year, as shown in the first example above. This would be a yearly compliance target that the EDC must attain in each of the last four program years.

PPL Electric believes the four yearly peak reduction compliance targets are overly restrictive and may prevent an EDC from complying in summers that have few DR events. For example, if there were a single DR event early in a program year and the EDC did not achieve all of its reductions, no opportunity would exist for an EDC to “over-comply” in subsequent events to meet its average reduction over all event hours in that program year. If there are four yearly peak reduction targets, it would likely require an EDC to significantly oversubscribe the number of participants (i.e., peak reductions) to minimize the risk of falling short in any hour or any single event. Oversubscription will be costly, difficult to achieve, and further decrease the cost-effectiveness of DR programs.

4. Proposed Additional Incremental Reductions in Consumption

PPL Electric addresses the Commission’s proposal concerning comprehensive programs below. However, the Company felt it was appropriate to address the remaining issues raised in Section A.4 of the Tentative Implementation Order in conjunction with its comments on Section A.5 (“Prescription of a Low-Income Carve-Out”). Therefore, please see the Company’s comments on Section A.5 below for PPL Electric’s additional comments on Section A.4.

e. Comprehensive Programs

The Commission proposes that “the EDCs should consider implementing deeper measures directed at more than simply lighting replacements.” Tentative Implementation Order, p. 49. The Commission also states that EDCs are “hesitant to define what a comprehensive program is under the Act 129 framework and to direct specific measures or targets tied to comprehensive programs” and instead “propose[s] that the EDCs include in their EE&C Plans at least one comprehensive program for residential and at least one comprehensive program for non-residential customer classes.” *Id.* at p. 49. The Commission further states that “[t]he EDCs

should work with stakeholders to determine what these programs should include based on the unique attributes of each service territory.” *Id.*

PPL Electric agrees that the definition of “comprehensive program” should be determined by each EDC and its stakeholders during the design of the EE&C Plan. PPL Electric also agrees there should be no specific targets for comprehensive programs and there should be one comprehensive program (or a collection of comprehensive measures within a program) for residential and non-residential customer classes.

However, PPL Electric has some concerns about the statement “the EDCs should consider implementing deeper measures directed at more than simply lighting replacements” for several reasons. *Id.* First, PPL Electric believes that “a kWh/yr saved is a kWh/yr saved” and provides the customer with the same cost savings regardless of the technology or end use as long as the measures have the same life (i.e., lifetime savings). PPL Electric offers measures for most end uses (lighting, water heating, plug loads, space heating, motor loads, appliances, building envelope/weatherization, etc.) and neither encourages nor discourages customers toward any end use in particular, such as lighting. PPL Electric believes that customers should be free to choose any of those measures.

Further, customers appear to prefer lighting replacements for several reasons. Lighting replacements are relatively low cost (total cost and incremental cost) to the customer, provide fast payback, are quick to implement, usually do not need landlord approval (if renting), and are usually implemented as “early replacements” because of these benefits, instead of waiting for equipment to fail. HVAC, on the other hand, has a much higher initial cost to the customer, typically requires landlord approval (if renting) and a much longer payback. Therefore, it is usually replaced when the equipment reaches the end of its useful life. For example, a standard

efficiency residential air source heat pump (“ASHP”) costs \$8,000 and a more-efficient ASHP costs \$10,000. If the customer’s existing heat pump is functioning reliably (although not efficiently), the customer views its early replacement as an \$8,000 to \$10,000 decision (i.e., there is an option to spend nothing). On the other hand, if the existing ASHP has failed beyond repair, the customer views the replacement as a \$2,000 decision because there is not option to spend nothing; the customer has to spend at least \$8,000. The key decision for the customer is whether to spend the additional \$2,000, minus the EDC’s rebate, for a more-efficient unit.

PPL Electric also notes that CFL screw-in bulbs will become the code baseline (per EISA) in 2019 and that LED screw-in bulbs will likely no longer be offered as part of EE&C programs at that time because LEDs will provide almost no savings relative to the baseline CFL. Therefore, efficient light bulbs (such as LEDs) will be naturally phased-out of EE&C programs sometime in Phase III between 2016 and 2020, especially if their net-to-gross ratio declines significantly (i.e., high free-ridership).

5. Prescription of a Low-Income Carve Out

Overview

As explained previously, PPL Electric believes it is important to collectively discuss the proposed incremental reductions in consumption and the proposed low-income carve-out because they are highly related.

As explained in more detail below, the SWE’s EE Study, cost-effectiveness evaluation, and the resulting energy reduction compliance targets and program acquisition cost in the Tentative Implementation Order are based on a mix of measures that is different than the mix PPL Electric would expect to offer in Phase III.

Although the SWE’s EE Study did not attempt to “design” programs, the mix of measures in the study and the resulting program potential and program acquisition cost

effectively constrain the EDCs' portfolios to the same mix of measures estimated in the SWE's EE Study. However, the SWE's EE Study's estimated mix of measures has a much lower program acquisition cost and, therefore, a higher program potential than PPL Electric believes is possible for Phase III.

PPL Electric believes the SWE's EE Study's mix of measures and estimate of program potential weights low-income programs and costs lower than the Commission's proposed low-income carve-outs (direct-install measures and other measures). The SWE's April 22, 2015 Data Request from the April 8, 2015 Stakeholder Meeting confirms the SWE's EE Study assumed that 11.2% of the total portfolio costs are for low-income programs.³² For PPL Electric's portfolio, that would equate to approximately \$33 million for low-income programs (see Table 3b later in these comments). However, that is approximately half³³ of the \$68 million in funding that PPL Electric would need to meet the Phase III low-income set-aside targets.

Table 3a below assumes that the low-income set-aside targets remain as proposed in the Tentative Implementation Order and that PPL Electric's program acquisition costs for low-income are the same as Phase II. Table 3b assumes that the low-income set-aside targets remain as proposed in the Tentative Implementation Order and the program acquisition costs and proportion of low-income funding (as a percent of total portfolio funding) are the same as the SWE's EE Study. In this case, PPL Electric would have to reduce the program acquisition cost of its direct-install low-income measures from \$1.50/annual kWh saved (as in Phase II) to \$0.61/annual kWh saved in Phase III to meet the low-income set-aside targets with the \$33 million low-income funding assumed in the SWE's EE Study. PPL Electric believes it will not

³² Table on page 1 of the Data Request from April 8, 2015 Stakeholder Meeting.

³³ See the yellow highlighted figures in Table 3a compared to Table 3b.

be possible to deliver its direct-install low-income programs for \$0.61/annual kWh saved and maintain the mix of measures and quality of services it currently provides for its direct-install program (i.e., WRAP) at \$1.50/annual kWh saved.

As shown in Tables 3a, 3b, and 7b, non-low-income funding must be reduced by \$35 million and low-income funding must be increased by \$35 million to provide sufficient low-income funding to meet the low-income set-aside targets and to keep the entire EE&C portfolio under the legislative cost cap. As shown in Table 7b (and consistent with PPL Electric's Energy Efficiency Market Potential Study results, Program Scenario 3), reducing non-low-income funding by \$35 million will, in turn, reduce the program potential savings for non-low-income (and the entire portfolio) by 214,724 MWh/yr. In other words, if the SWE had known about the low-income set-aside targets and PPL Electric's program acquisition cost for direct-install low-income measures, the program potential would have been 214,724 MWh/yr lower in the SWE's EE Study.

It also appears the SWE's EE Study overestimates the market potential for Act 129 low-income direct-install measures by incorrectly assuming all available potential is served by Act 129, rather than shared between Act 129, LIURP, and WAP.

Moreover, PPL Electric would like clarification as to whether the SWE's EE Study used the full cost of measures (i.e., material and installation) to estimate the program acquisition cost for direct-install low-income measures. The SWE's April 22, 2015 Data Request from the April 8, 2015 Stakeholder Meeting confirms that it used the full cost of measures, but the residential Appendix D attached to the SWE's EE Study appears to be inconsistent. For example, in Appendix D of the SWE's EE Study, measures such as CFLs, weatherization, heat pump water heaters, and HVAC have the same cost for low-income and non-low income segments. All of

these costs in the SWE's EE Study are based on the incremental cost and not full cost of these measures. The full measure cost should be the basis for the program acquisition cost and for the TRC Test because PPL Electric pays the full cost of the measure (i.e., material and labor) for low-income programs (i.e., these measures are provided at no cost to the low-income customer).

Furthermore, PPL Electric believes the SWE's EE Study's mix of measures and market potential estimates do not account for practical market conditions and prudent EDC risk management (allowance for uncertainties that will require an EDC to over-achieve its target and underspend its cost budget).

In addition, PPL Electric believes the Tentative Implementation Order incorrectly bases program potential on the sum of annualized incremental savings instead of cumulative savings. This overstates savings potential and is not on the same basis as Act 129 EE&C compliance (i.e., cumulative annualized savings).

PPL Electric also notes the increase in the low-income set-aside targets, especially the new set-aside target for direct-install measures, has a significant impact on the available funding (i.e., a low program acquisition cost) for non-low-income programs and is not a "modest increase" as described in the Tentative Implementation Order.

Collectively, these oversights result in the following:

- An understatement of program acquisition cost³⁴ for the portfolio, non-low-income sectors, and low-income direct-install measures which, in turn, overstates program potential (savings for energy reduction compliance targets) for the portfolio.

³⁴ Program acquisition cost is the EDC cost divided by annual kWh saved. The EDC costs include incentives and non-incentives.

- A failure to address free-ridership and will likely result in programs with high free-ridership.
- A significant increase to the percentage of portfolio costs used for low-income programs, which results in a program acquisition cost for non-low-income customers that is half of Phase II. That will force PPL Electric to focus on non-low-income measures with a low program acquisition cost and high free-ridership, many of which PPL Electric discontinued several years ago.

Limitations of the SWE's EE Study

First, the Commission's proposed increase (compared to Phase II) in the carve-out for low-income savings³⁵ is not "modest" as characterized by the Commission³⁶ and results in a high proportion of the total portfolio cost budget allocated to low-income. This results in a program acquisition cost that is half the actual values for non-low-income measures in Phase II. The proposed direct-install set-aside target for low-income is a 50% increase in savings³⁷ compared to PPL Electric's Phase II EE&C Plan. The proposed overall low-income set-aside target is a 25% increase in savings (4.5% to 5.5%) compared to Phase II. Therefore, although low-income savings will be 5.5% of the portfolio savings (6% with risk management "over-compliance" allowance), low-income programs will be approximately 23% of the total portfolio costs. These are clearly significant increases.

³⁵ 5.5% of total required savings must be from low-income customers and 2% of required savings must be from low-income direct-install measures. *Tentative Implementation Order*, p. 56.

³⁶ "The Commission proposes to modestly increase the overall savings target from 4.5% to 5.5%." *Tentative Implementation Order*, p. 56. "Further, the Commission believes that the more modest increase in the overall sector [low-income] target from 4.5% in Phase II to the proposed Phase III target of 5.5% will still allow the EDCs to address critical health and safety issues while implementing the program." *Id.* at p. 57.

³⁷ PPL Electric's Phase II EE&C Plan provides approximately 1% of the savings from low-income direct-install measures (WRAP Program).

More importantly, program acquisition costs for the low-income sector are much higher than other customer sectors because the EDC pays the full cost of the measure, whereas PPL Electric pays only a portion of the incremental measure cost in programs for non-low-income customers. Therefore, if the program acquisition cost of low-income programs remains approximately the same as Phase II for PPL Electric, low-income costs will double from approximately 11%³⁸ of total portfolio cost in Phase II to 23% for PPL Electric in Phase III as shown in Table 3a below. Since low-income programs will consume 23% of the total portfolio budget, Table 3a shows that the program acquisition cost available for non-low-income programs would decrease from \$0.20/annual kWh saved (Phase II) to \$0.10/annual kWh saved (Phase III), a decrease of 50%.

³⁸ PPL Electric Phase II EE&C Plan dated April 7, 2014, Table 5a. The 11% is also consistent with the SWE's assumption in its EE Study as confirmed in the Table on page 1 of the April 22, 2015 SWE Data Request from the April 8, 2015 Stakeholder Meeting.

Table 3a
PPL Electric's Expected Portfolio with the Compliance Targets Proposed in the Tentative Implementation Order

Table 3a assumes the low-income set-aside targets remain as proposed in the Tentative Implementation Order and PPL Electric's program acquisition costs for low-income are the same as Phase II.

Description: Phase 3 Tentative Order Targets and Low Income Program Acquisition Costs = 70 cents, with DR

	% of Total Savings	MWh /Yr Savings Target (Phase 3)	Likely MWh/yr Savings w/ Risk Mitigation (Phase 3)	Acq Cost (\$ per annual kWh saved)	Total Cost Phase 3 (excl. DR)	% of Total Dollars
Direct Costs						
Low Income - Direct Install	2.0%	31,805	34,986	\$1.50	\$52,478,712	18.00%
Low Income Other (kits, behavior, gen'l resid)	3.5%	55,659	61,225	\$0.25	\$15,306,291	5.25%
Low Income Total (Direct Install + Other)	5.5%	87,465	96,211	\$0.70	\$67,785,003	23.25%
Direct Cost						
Residential	37.8%	601,120	661,232	\$0.10	\$66,123,177	22.68%
Sm. C&I	33.1%	525,980	578,578	\$0.10	\$57,857,780	19.84%
Lg C&I	18.9%	300,560	330,616	\$0.10	\$33,061,589	11.34%
GNI	4.7%	75,140	82,654	\$0.10	\$8,265,397	2.83%
Total Non Low Income	94.5%	1,502,799	1,653,079	\$0.10	\$165,307,943	56.70%
Common Costs (portfolio level costs for EM&V, technical support, SWE, tracking system, marketing, gen'l mgmt, EE&C Plan development)					\$58,455,750	20.05%
Total EE (excluding DR)	100.0%	1,590,264	1,749,290	\$0.17	\$291,548,696	100.00%
Ph 3 Tentative Order		1,590,264			\$292,100,000	
Non Low Income Programs Phase II Revised Plan Jan 2015 (direct costs)				\$0.20		
Non Low Income Programs proposed for Phase III (direct costs)				\$0.10		
Low Income Programs Phase II Revised Plan Jan 2015 (Direct Install direct costs, excluding LEAP tracking system)				\$1.54		
Low Income Programs proposed for Phase III (Direct Install direct costs, excluding LEAP tracking system)				\$1.50		

Table 3b
PPL Electric's Expected Portfolio Based on the Proportion of Low-income Funding and Savings in the SWE's EE Study

Table 3b assumes the low-income set-aside targets remain as proposed in the Tentative Implementation Order and the program acquisition costs and proportion of for low-income funding (as a percent of total portfolio funding) are the same as the SWE's EE Study. PPL Electric would have to reduce the program acquisition cost of its direct-install low-income

measures from \$1.50/annual kWh saved (Phase II) to \$0.61/annual kWh saved in Phase III. That is likely unrealistic.

See the yellow highlighted figures compared to Table 3a.

Description: Phase 3 Tentative Order Targets and Low Income Program Acquisition Costs = 37 cents per SWE Data Request, with DR

	% of Total Savings	MWh /Yr Savings Target (Phase 3)	Acq Cost (\$ per annual kWh saved)	Total Cost Phase 3 (excl. DR)	% of Total Dollars
Direct Costs					
Low Income - Direct Install	2.0%	31,805	\$0.61	\$19,401,221	6.63%
Low Income Other (kits, behavior, gen'l resid)	3.5%	55,659	\$0.24	\$13,358,218	4.57%
Low Income Total (Direct Install + Other)	5.5%	87,465	\$0.37	\$32,759,438	11.20%
Direct Cost					
Residential	37.8%	601,120	\$0.14	\$84,156,771	28.76%
Sm. C&I	33.1%	525,980	\$0.13	\$68,377,376	23.37%
Lg C&I	18.9%	300,560	\$0.13	\$39,072,786	13.35%
GNI	4.7%	75,140	\$0.13	\$9,768,197	3.34%
Total Non Low Income	94.5%	1,502,799	\$0.13	\$201,375,130	68.82%
Common Costs (portfolio level costs for EM&V, technical support, SWE, tracking system, marketing, gen'l mgmt, EE&C Plan development)				\$58,455,750	19.98%
Total EE (excluding DR)	100.0%	1,590,264	\$0.18	\$292,590,319	100.00%
Ph 3 Tentative Order		1,590,264		\$292,100,000	
Non Low Income Programs Phase II Revised Plan Jan 2015 (direct costs)			\$0.20		
Non Low Income Programs proposed for Phase III (direct costs)			\$0.13		
Low Income Programs Phase II Revised Plan Jan 2015 (Direct Install direct costs, excluding LEAP tracking)			\$1.54		
Low Income Programs proposed for Phase III (Direct Install direct costs, excluding LEAP tracking system)			\$0.61		

To reduce the program acquisition cost of low-income direct-install and non-low-income programs by 50%, PPL Electric will have to significantly change the mix of measures and how it delivers programs in Phase III (compared to Phases I and II). PPL Electric is currently investigating ways to deliver non-low-income programs at half the program acquisition cost as Phase II and has not yet determined if \$0.10/annual kWh saved is feasible for non-low-income customer sectors. If PPL Electric can reduce the program acquisition cost of direct-install

programs from \$1.50/annual kWh saved³⁹ to \$1.00/annual kWh saved, that will increase the program acquisition cost for non-low-income sectors from \$0.10 to only \$0.11/annual kWh saved as shown in Table 3c, still much lower than the \$0.23/annual kWh saved acquisition cost in Phase II.

Table 3c
PPL Electric’s Expected Portfolio with the Compliance Targets Proposed in the Tentative Implementation Order if PPL Electric Reduces the Direct-Install Low-Income Program Acquisition Costs by 33% (\$1.50 to \$1.00)

Description: Phase 3 Tentative Order Targets and Low Income Program Acquisition Costs = LI at 52 cents, with DR

	MWh /Yr Savings		Likely MWh/yr	Acq Cost	Total Cost	% of
	% of Total Savings	Target (Phase 3)	Savings w/ Risk Mitigation (Phase 3)	(\$ per annual kWh saved)	Phase 3 (excl. DR)	Total Dollars
Direct Costs						
Low Income - Direct Install	2.0%	31,805	34,986	\$1.00	\$34,985,808	12.04%
Low Income Other (kits, behavior, gen'l resid)	3.5%	55,659	61,225	\$0.25	\$15,306,291	5.27%
Low Income Total (Direct Install + Other)	5.5%	87,465	96,211	\$0.52	\$50,292,099	17.31%
Direct Cost						
Residential	37.8%	601,120	661,232	\$0.11	\$72,735,495	25.03%
Sm. C&I	33.1%	525,980	578,578	\$0.11	\$63,643,558	21.90%
Lg C&I	18.9%	300,560	330,616	\$0.11	\$36,367,747	12.52%
GNI	4.7%	75,140	82,654	\$0.11	\$9,091,937	3.13%
Total Non Low Income	94.5%	1,502,799	1,653,079	\$0.11	\$181,838,737	62.58%
Common Costs (portfolio level costs for EM&V, technical support, SWE, tracking system, marketing, gen'l mgmt, EE&C Plan development)					\$58,455,750	20.12%
Total EE (with DR)	100.0%	1,590,264	1,749,290	\$0.17	\$290,586,586	100.00%
Ph 3 Tentative Order		1,590,264			\$292,100,000	
Non Low Income Programs Phase II Revised Plan Jan 2015 (direct costs)				\$0.20		
Non Low Income Programs proposed for Phase III (direct costs)				\$0.11		
Low Income Programs Phase II Revised Plan Jan 2015 (Direct Install direct costs, excluding LEAP tracking system)				\$1.54		
Low Income Programs proposed for Phase III (Direct Install direct costs, excluding LEAP tracking system)				\$1.00		

PPL Electric notes that there are few, cost-effective, non-low-income measures with a program acquisition cost less than or equal to \$0.10/annual kWh saved. PPL Electric analyzed

³⁹ This is the actual cost for Phase II, excluding the \$750,000 one-time cost for the low-income tracking system replacement that will not be applicable in Phase III.

the list of cost-effective measures from the SWE's EE Study and determined very few residential measures have a program acquisition cost less than or equal to \$0.10/annual kWh saved.⁴⁰ The actual total program acquisition cost (including incentives and non-incentives) would be greater, but there is not enough detail in the SWE's EE Study for PPL Electric to estimate the non-incentive costs assumed by SWE for each measure.

Nevertheless, residential measures with a program acquisition cost less than or equal to \$0.10/annual kWh saved include primarily CFLs, home energy reports, low flow aerators, low flow shower heads, televisions, and office equipment. Many of the residential measures have short lives whose savings would expire during Phase III. Most importantly, CFLs, televisions, and office equipment were discontinued by PPL Electric one to two years ago because of high free-ridership and market saturation. Moreover, a standard, 60 watt equivalent LED screw-base bulb has an incentive-only acquisition cost greater than \$0.10/annual kWh saved, and most stakeholders consider it "low hanging fruit."

Further, commercial measures with a program acquisition cost less than or equal to \$0.10/annual kWh saved include CFLs, low flow aerators, metal halide lighting, T-8 lighting (appears to be standard T8s which are the baseline and have no savings after 2016), office equipment, room air conditioners, Energy Star dishwashers, and smart strips. However, like the residential measures mentioned previously, PPL Electric discontinued all of these measures one to two years ago due to high free-ridership and market saturation.

⁴⁰ A list is provided in Appendix B. The Company notes that the program acquisition costs shown in Appendix B include only the costs associated with the incentives.

The overall program acquisition cost of the SWE's EE Study's mix of measures is \$0.18/annual kWh saved⁴¹ and the program potential is 1,674,191 MWh/yr⁴² (over five years excluding DR). As previously mentioned, the mix of measures in the SWE's EE Study is not the same as the mix PPL Electric would like to include in its Phase III programs. Further, that mix of measures understates the program acquisition cost, overstates cost-effectiveness, overstates program potential (savings), fails to provide enough money for low-income programs to meet the proposed set-aside targets, and will likely result in programs with high free-ridership.

PPL Electric believes the \$0.18/annual kWh saved program acquisition cost is very low. Importantly, it is 40% lower than the program acquisition cost in PPL Electric's Phase II EE&C Plan (\$0.30/annual kWh saved) and lower than almost every EE&C program in the country except those programs that derive most of their savings from CFLs.⁴³ While a low program acquisition cost might sound favorable, it is not necessarily so. Program acquisition cost is driven heavily by the mix of measures and customer sectors. As shown in Appendix A ("Summary of Program Acquisition Costs and Low-Income Percentages"), in the SWE's EE Study, and in PPL Electric's Market Potential Study (Exhibit 1), portfolios with a low program acquisition cost rely on measures with a low acquisition cost, such as CFLs, and the portfolios have relatively little funding for low-income programs. PPL Electric could design an energy efficiency portfolio with a program acquisition cost of approximately \$0.05/annual kWh saved, but it would include only CFLs, which may no longer be of interest to consumers, would have a very low net-to-gross ratio, or both.

⁴¹ As described in these comments, the actual program acquisition cost would be approximately 10% lower since PPL Electric expects to exceed its savings compliance goal by approximately 10% for risk management purposes.

⁴² SWE's EE Study, Table ES-6, page 8.

⁴³ See Appendix A.

It also is important to note that PPL Electric could find no other EE&C program in the country with a higher portion of portfolio costs dedicated to low-income than PPL Electric's. In fact, E Source⁴⁴ data confirms that low-income EE&C costs are only 5% of total portfolio costs nationally, compared to 23% proposed for PPL Electric in Phase III.

PPL Electric commissioned The Cadmus Group to conduct an Energy Efficiency Market Potential Study (provided in Exhibit 1) that evaluated several different measure mixes. Except for the scenario that duplicates the results in the SWE's EE Study, all of the scenarios resulted in higher program acquisition cost and, hence, lower program potential than the SWE's EE Study that is the basis of compliance targets in the Tentative Implementation Order. PPL Electric commissioned this Energy Efficiency Market Potential Study because the SWE's EE Study did not provide enough information to help PPL Electric design its Phase III programs, such as determining the savings potential from individual measures, determining the savings potential for various mixes of measures, and conducting sensitivity analyses on various measure mixes.

The PPL Electric Energy Efficiency Market Potential Study examined the scenarios summarized in Tables 4a and 4b below:

⁴⁴ http://www.esource.com/public/our_company/overview.

Table 4a
PPL Electric Utilities Energy Efficiency Market Potential Study
Summary of Scenarios

Scenario Name	Acquisition Cost (\$/kWh)	5-Year Program Potential (MWh)	Total Budget (\$000s)	Low Income Potential as a % of Portfolio Savings	Lighting Potential as a % of Portfolio Savings	Weighted Average Program Potential as a Fraction of Achievable
Traditional 1	\$0.18	1,691,844	312,479	20%	34%	65%
Traditional 2	\$0.22	1,392,280	312,559	25%	32%	43%
Program 1— Low Cost A	\$0.18	1,539,137	280,370	6%	38%	91%
Program 2— Low Cost B	\$0.21	1,308,016	280,501	6%	42%	76%
Program 3— Medium Cost*	\$0.30	920,356	279,773	6%	26%	33%
Program 4— High Cost	\$0.39	712,309	275,115	6%	18%	25%

* This is the scenario and mix of measures recommended by PPL Electric.

Table 4b
PPL Electric Utilities Energy Efficiency Market Potential Study- Summary of Scenarios

Scenario Name	Acquisition Cost (\$/kWh)	Description	Benefit: Cost Threshold	Measure Mix	Low Income Treatment	Low-Income Carve Out	Lighting Treatment
Traditional 1	\$0.18	Scenario most comparable to the SWE potential study. This scenario includes all cost-effective measures, treats low-income similar to non-low-income, does not include a low-income carve out, and assumes a 30/70 distribution of CFLs and LEDs.	1.0	All cost-effective measures	Use incremental measure costs; incentives equivalent to approximately 50% of incremental costs	No	Declining LED prices; 30/70 CFL and LED share
Traditional 2	\$0.22	This scenario is identical to Scenario 1, except it assumes incentives for low-income measures are equivalent to 100% of incremental measure costs.	1.0	All cost-effective measures	Use incremental measure costs; incentives equivalent to 100% of incremental costs	No	Declining LED prices; 30/70 CFL and LED share
Program 1— Low Cost A	\$0.18	This scenario only includes PPL's preferred measures. Non-cost-effective measures are allowed and CFLs account for 100% of screw-base lighting savings.	0.75	PPL's preferred measure mix; excludes measures with high free-ridership	Use full measure costs; incentives equivalent to 100% of full costs	Yes	Exclude LEDs (CFLs only)
Program 2— Low Cost B	\$0.21	Includes PPL's preferred measures and excludes CFLs. Accounts for the low-income carve out	0.75	PPL's preferred measure mix; excludes measures with high free-ridership	Use full measure costs; incentives equivalent to 100% of full costs	Yes	LEDs only (exclude CFLs)
Program 3— Medium Cost*	\$0.30	Reflects a lower benefit-cost threshold and a more balanced mixture of measures. Lighting accounts for a low to moderate share of portfolio savings.	0.5	PPL's preferred measure mix; excludes measures with high free-ridership	Use full measure costs; incentives equivalent to 100% of full costs	Yes	LEDs only (exclude CFLs)
Program 4— High Cost	\$0.39	Reflects a lower benefit cost threshold. Lighting accounts for a relatively low share of portfolio savings.	0.45	PPL's preferred measure mix; excludes measures with high free-ridership	Use full measure costs; incentives equivalent to 100% of full costs	Yes	LEDs only (exclude CFLs)

* This is the scenario and mix of measures recommended by PPL Electric.

The results of the two traditional scenarios and the four program scenarios differ in two major ways:

1. The traditional scenarios do not account for actual low-income program costs (which are approximately \$1.50/kWh for direct-install programs and \$0.25/kWh for other programs). For Traditional 1, this means low-income customers effectively are treated akin to non-low-income customers. This approach reduces the overall acquisition cost and allows for low-income to account for a larger relative share of total portfolio savings (i.e., this large share would not be feasible upon assuming actual low-income acquisition costs); and
2. The two traditional scenarios include a broader mixture of measures, including low-cost consumer electronics measures with low acquisition costs but subject to high free-ridership levels. Including these measures in the traditional scenarios means, after accounting for Act 129 spending caps, program potential equals a moderate share of achievable potential (65% in Traditional 1 and 43% in Traditional 2).

Additionally, the four program scenarios can be summarized as follows:

1. Program 1 – Low Cost A

At \$0.18 per kWh saved, this scenario has the lowest acquisition cost of the four program scenarios and is the only program scenario with an overall acquisition cost approximately equal to the acquisition cost included in the SWE's EE Study's estimate of program potential.

However, this scenario presents significant drawbacks. After accurately accounting for low-income costs, the scenario must depend heavily on low-cost measures, including CFLs. As a result, the scenario must exclude LEDs, and all screw-base lighting savings derive from CFLs.

Furthermore, by relying heavily on CFL savings to reach an overall \$0.18 per kWh acquisition cost, one assumes the exclusion of measures with a low benefit-cost ratio and actual acquisition of a high share of achievable potential through programs. In this scenario, it is assumed that 91% of achievable potential acquired through programs and savings reflect measures with a benefit-cost ratio exceeding 0.75. While a low cost scenario, it presents higher risks because it presumes programs can capture nearly all savings estimated as achievable. Also, due to the relatively high benefit-cost threshold, this scenario reflects a less diverse mixture of measures.

2. Program 2 – Low Cost B

This scenario's \$0.21/kWh acquisition cost is the second lowest of the four scenarios. Although it is similar to the first low-cost program scenario in that it uses a minimum benefit-cost threshold of 0.75, it largely excludes CFLs and includes screw-base LEDs in the residential sector. To preserve an acquisition cost near \$0.20 per kWh and to include LED lighting, relatively low-cost lighting and behavioral measures must account for a high share of savings, while more expensive weatherization and efficient equipment measures must account for a smaller share of savings. Overall, lighting accounts for 42% of cumulative, five-year savings and for 67% of total residential savings.

Nevertheless, the scenario presents two main disadvantages: (1) it includes lower measure diversity rates; and (2) it assumes a high share of potential lighting and behavioral savings can be achieved through programs. In this scenario, it is assumed that 100% of achievable behavioral savings and 85% of achievable lighting savings can be acquired through programs. In contrast, it is assumed that approximately 25% of potential water heating equipment, HVAC equipment, weatherization, new construction, and appliances savings can be acquired through programs over the five-year planning horizon.

3. Program 3 – Medium Cost (Recommended by PPL Electric)

The third program scenario includes the second-highest acquisition cost of each of the four program scenarios (\$0.30/kWh), has a greater diversity of measures, and uses a lower benefit-cost threshold (0.5). Though this scenario depends less on residential screw-base lighting, due to the higher acquisition cost, it has a much lower five-year program potential. In this scenario, lighting accounts for 26% of five-year program potential (compared to 38% and 42% in the first and second low-cost scenarios, respectively).

The scenario includes a much more balanced mixture of measures—it assumes approximately 33% of achievable potential acquired through programs. The residential sector still accounts for roughly one-half of the total five-year program potential; however, a smaller share of residential savings comes from lighting measures.

4. Program 4 – High Cost

The final program scenario reflects a diverse mixture measures, relatively low lighting savings, and a high overall acquisition cost (\$0.39/kWh saved). This scenario includes the greatest diversity of measures and reflects a minimum benefit-cost ratio threshold of 0.45. Program potential in this scenario is equivalent to roughly 25% of five-year achievable potential.

After analyzing these four scenarios, the mix of measures recommended by PPL Electric for Phase III is Program 3, which would have a program acquisition cost of approximately \$0.30/annual kWh saved and a program potential of 920,000 MWh/yr (over five years) assuming the same low-income set-aside targets proposed by the Commission.

In the SWE's EE Study, the mix of measures and the resulting proportion of savings and costs from each measure (i.e., how they are weighted in the overall portfolio) are based on the mix of all cost-effective measures, which are subsequently used to estimate achievable potential.

The SWE's EE Study's approach for estimating program potential involves equally "scaling down" estimates of achievable potential for all measures so that overall program budgets meet legislatively mandated spending caps. This approach assumes the distribution of savings from measures that contribute to program potential equals the distribution observed in achievable potential. An alternate approach involves estimating program potential using only measures that a utility expects to offer through programs. Measures with high free-ridership levels or market barriers are excluded from such estimates of program potential. For example, a measure with a very low incremental cost (such as consumer electronics or office equipment that has a \$1 incremental cost, or an Energy Star refrigerator with an incremental cost of \$25) would have a low program acquisition cost because the EDC's cost (such as the incentive) would likely be very low, such as 50% of the incremental cost. Any customer getting a rebate for a \$1,000 Energy Star refrigerator with an incremental cost of only \$25 is a free-rider because the rebate likely had no influence of the purchasing decision.

The SWE's EE Study also included many measures PPL Electric would exclude from its Phase III programs and has already discontinued in Phases I or II due to lack of interest by consumers, high free-ridership, or high market saturation. Examples of such measures include CFLs, office equipment, and televisions. If CFLs are 25% of the cost-effective market potential for the residential sector in the SWE's EE Study's mix of measures, the program potential and program acquisition cost includes that proportion of CFLs.

In addition, the SWE's EE Study excluded individual measures that are not cost-effective but that PPL Electric believes are important to include within a cost-effective energy efficiency program (and within the cost-effective energy efficiency portfolio) to help raise consumer awareness about energy efficiency, to encourage a "more-comprehensive" approach to energy

efficiency within a home or building, or to help transform markets for costly energy efficient measures. PPL Electric has included some of these non-cost-effective measures in Phases I and II such as air source heat pumps, heat pump water heaters, ceiling/wall insulation, air sealing, duct sealing, duct insulation, ground source heat pumps, ductless mini-split heat pumps, Energy Star room air conditioners, Energy Star refrigerators, residential new home construction, and variable speed pool pumps.

Moreover, although PPL Electric is committed to providing significant energy efficiency programs to low-income customers and will strive to meet the low-income set-aside target proposed by the Commission, PPL Electric believes there may not be sufficient eligible housing to meet its direct-install set-aside target within five years, without jeopardizing the success of LIURP and WAP (see Table 5 below). As explained below, PPL Electric recommends adopting the low-income overall set-aside compliance target as proposed but recommends changing the low-income direct-install portion from a compliance target to a non-mandatory goal.

There is insufficient detail in the SWE's EE Study for PPL Electric to determine how the market potential for the low-income sector was estimated. However, it appears that the SWE's EE Study did not weight low-income savings potential in anticipation of a future low-income set-aside target. It also appears that the proportion of low-income savings potential in the SWE's EE Study's mix of measures (direct-install and non-direct-install) is lower than the 2% established in the Tentative Implementation Order. *See Tentative Implementation Order, p. 56.* Further, the Tentative Implementation Order suggests it was difficult to estimate low-income potential: "The Commission proposes to modestly increase the overall savings target from 4.5% to 5.5% due to the inability (emphasis added) to accurately capture the specific sector [low-income] savings

potential, and in part, to acknowledge the increasing acquisition costs of providing certain measures to this sector [low-income].” *Id.*

PPL Electric will strive to meet the direct-install set-aside target for low-income but believes it may not be possible given the existing population of low-income customers and the number of homes that are eligible for direct-install measures. PPL Electric estimated its low-income direct-install potential, and the results are summarized below in Table 5.

Table 5

**Act 129 WRAP
Potential Households for Phase III Participation**

313,000	Total low-income customers at or below 150% of poverty ⁴⁵
- 82,000	Customers who have already received WRAP services ⁴⁶
- 22,000	Customers who have already received Act 129 WRAP services
- 31,000	Low-income individuals who live in master-metered apartments ⁴⁷
- 63,000	No approval from landlords to conduct weatherization work ⁴⁸
- 78,000	Customers who simply refuse to participate in PPL's programs ⁴⁹
- 15,000	WRAP applicants who walk-away from the job, move, etc.
22,000	Subtotal- Number of homes
+7,000	Premises receiving more WRAP services after 7 years ⁵⁰
+25,000	Renters receiving limited measures after landlord refusal ⁵¹
54,000	Total Potential Pool of homes to be shared between LIURP WRAP, Phase III Act 129 WRAP, and PA Weatherization programs
67,000 MWh/yr	Total potential savings at 100% penetration rate over 5 years.⁵² Based on around 1,250 kWh/yr savings per average WRAP project (most recent actual savings for PPL Electric's LIURP and Act 129 WRAP programs. The proposed target for Phase III Act 129 alone is 31,805 MWh/yr.

As seen in Table 5, the Company estimates there are 54,000 homes available for direct-install measures, such as PPL Electric's existing WRAP (i.e., Act 129 and LIURP) program. WRAP provides measures such as weatherization, heat pump water heaters, efficient air

⁴⁵ 2010 U.S. Census.

⁴⁶ Projected numbers for both WRAP and Act 129 WRAP through 2015.

⁴⁷ Assumes 10% of low-income customers live in master-metered apartments that have a commercial rate schedule and, therefore, are not eligible for WRAP or low-income programs.

⁴⁸ Assumes a 20% rejection rate from landlords.

⁴⁹ Assumes 25% of households choose not to participate for a variety of reasons. This is based on PPL Electric's actual experience.

⁵⁰ Assumes the ability to serve 10% of premises that previously received WRAP measures.

⁵¹ Assumes 40% participation by low-income households. The Company also notes that very little savings are achieved for these premises.

⁵² PPL Electric does not believe it is possible to achieve a 100% penetration rate in five years. This is shown for reference only, if a 100% penetration rate were possible.

conditioning, efficient central heat, efficient appliances, efficient lighting (i.e., LEDs), low-flow aerators and shower heads, life-safety measures, and energy efficiency education.

For several reasons, PPL Electric believes that based upon this number of homes and the Company's low-income direct-install compliance target, it is not possible to meet that target. First, PPL Electric's low-income direct-install compliance target is 31,805 MWh/yr.⁵³ To provide a sufficient margin for uncertainty (such as evaluation results that differ from reported results), PPL Electric likely would have to exceed that target by approximately 10%. This margin is warranted because low-income WRAP savings are determined from a pre and post billing analysis and vary significantly from year to year as shown in Table 6 below. Therefore, PPL Electric would strive for approximately 35,000 MWh/yr from low-income direct-install measures, not 31,805 MWh/yr. However, it appears that the SWE's EE Study did not attempt to weight low-income savings potential in anticipation of a future low-income set-aside target and did not account for this risk management margin.

**Table 6
Act 129 WRAP Verified Savings per Job Type and Program Year**

Job Type/Measure	Program Year (kWh/year)				
	2013	2012	2011	2010	2009
Baseload	911	1,035	1,445	1,042	1,042
Low Cost	*	1,204	1,797	1,588	1,588
Full Cost	*	2,092	2,276	1,306	1,306

*Measure not offered

Second, the number of participating homes also would have to increase because PPL Electric would need to achieve this higher level of savings from direct-install measures.

⁵³ This figure is calculated by multiplying 2% by 1,590,264 MWh/yr (per Table 6 on page 42 of the Tentative Implementation Order).

Specifically, each of PPL Electric's WRAP projects averages approximately 1,000 to 1,500 kWh/yr energy savings. Consequently, to achieve 35,000 MWh/yr from direct-install measures, PPL Electric would need to implement at least 30,000 WRAP projects for Act 129⁵⁴ (an average of 6,000 Act 129 WRAP projects per program year), which is approximately 70% greater than Act 129 WRAP projects Phases I and II (approximately 3,500 per year). LIURP WRAP would complete approximately 17,500 projects (3,500 per year which is the current five-year average). Therefore, between Act 129 Phase III WRAP and LIURP WRAP, PPL Electric would need to complete WRAP projects for approximately 47,000 of the 54,000 possible homes (per Table 5) within five years. The Company believes that an 87% penetration rate is highly unlikely, although PPL Electric will strive for it nonetheless.

Additionally, to achieve this penetration rate of WRAP 6,000 homes per year for Act 129 and to lower the program acquisition cost for Act 129 WRAP, PPL Electric will likely have to significantly change its current program delivery method, such as using a large national CSP to deliver its low-income WRAP program instead of several, small, local community-based organizations and contractors, and may have to change the eligible measures to focus on those measures with lower program acquisition costs. PPL Electric is currently investigating the feasibility of changing its Act 129 low-income program delivery method, determining how to ensure that Act 129 WRAP and LIURP WRAP are coordinated and do not "compete" with each other.

For these reasons, PPL Electric recommends adopting the low-income overall set-aside compliance target as proposed but changing the low-income direct-install portion from a compliance target to a non-mandatory goal. PPL Electric believes the SWE's EE Study assumes

⁵⁴ This figure is calculated by dividing 35,000 MWh/yr by an average of 1,250 MWh/yr per WRAP project.

all direct-install savings potential is served from Act 129 and fails to account for LIURP (PPL Electric's Universal Services weatherization program) and WAP. PPL Electric is committed to providing energy efficiency programs to its low-income customers but does not believe it will be possible to reach enough households to reach the direct-install set-aside target with the Company's Act 129 WRAP measures without jeopardizing the success of LIURP and WAP. Instead of deleting or reducing the direct-install savings, PPL Electric will strive for the proposed level of savings from low-income direct-install measures. However, the Company believes it is appropriate for the Commission to change this from a compliance target to a non-mandatory goal. The approval process for EE&C Plans and revisions will ensure PPL Electric designs programs to meet this goal.

In addition, PPL Electric believes the SWE's EE Study should have used the full measure cost, instead of the incremental measure cost, in the cost-effectiveness calculation and to estimate the program acquisition cost for low-income direct-install measures.⁵⁵ PPL Electric believes the SWE's EE Study should have used the total cost of the measure (i.e., material and labor) for direct-install measures because that is the actual program delivery cost incurred by PPL Electric for purposes of calculating program acquisition. The total cost of the measure should also be used as the "cost" in the TRC Test because the "baseline" for low-income customers is "do nothing" (i.e., low-income customers cannot be expected to implement energy efficiency measures on their own). Using the incremental measure cost overstates cost-effectiveness of the portfolio and understates the program acquisition cost which, in turn,

⁵⁵ The SWE's Data Request from the April 8, 2015 Stakeholder Meeting states the SWE did use the full measure cost. However, see the appendices in the SWE's EE Study. Every low income and non-low income measure permutation has the same incremental cost. The SWE considered a low income weatherization package, so it is difficult to compare this permutation to discrete non-low income weatherization measures. Examples include heat pumps, central air conditioners, water heaters, and lighting.

overstates program potential savings. PPL Electric's Market Potential Study (Exhibit 1) confirms the program acquisition cost of the portfolio would increase from \$0.18/annual kWh saved (as determined in the SWE's EE Study) to \$0.22/annual kWh saved if the SWE's EE Study had used 100% of the incremental measure cost (not around 50% of incremental measure cost) for the PPL Electric's cost of low-income measures. Exhibit 1, p. 12.

The SWE's EE Study and the Tentative Implementation Order also have not addressed risk management practices that will require the EDC to exceed the savings targets and stay under budget. This means the actual program acquisition cost will be lower than established in the Tentative Implementation Order (and lower than estimated in the EE&C Plan). If the Commission believes an actual program acquisition cost of \$0.18/annual kWh saved is appropriate for PPL Electric, then it should establish compliance targets based on a program acquisition cost of \$0.22/annual kWh saved as explained below. PPL Electric would design its Phase III EE&C Plan to meet those targets and program acquisition cost.

PPL Electric believes it would need to achieve approximately 6.0% of its savings from low-income to meet the 5.5% compliance target and will need approximately 2.2% from direct-install measures to meet its 2.0% direct-install requirement. This excess is required for prudent risk management to address realistic program delivery and evaluation uncertainties. Actual savings (i.e., verified savings) are determined during the annual impact evaluation and results are not available until November, five months after the end of each program year. PPL Electric needs to strive for savings in excess of its target (and incur the additional cost) to address the risk that actual savings are less than the reported savings PPL Electric is monitoring in real-time. Therefore, PPL Electric believes the SWE's EE Study and estimated cost for low-income measures should reflect these higher costs. As described previously, as low-income program

costs increase, it will raise the program acquisition cost of the portfolio significantly and will reduce the available funding (i.e., program acquisition cost) for non-low-income programs.

Similarly, PPL Electric would strive to exceed its overall portfolio compliance target by approximately 10% to allow for uncertainties such as evaluation adjustments. PPL Electric also would strive to be under its budget cap by 5 to 10% because it is not possible to perfectly predict the pace of expenditures and PPL Electric does not want to exceed its spending cap. If PPL Electric's actual spending is 10% under its cap and verified savings are 10% greater than the compliance target, PPL Electric's actual program acquisition cost will be approximately 20% less than the basis of the compliance target (i.e., full funding and hitting the savings target exactly) because *program acquisition cost equals EDC spending divided by annual energy savings*. Therefore, if the Commission believes \$0.18/annual kWh saved is the appropriate program acquisition cost, it should establish PPL Electric's reduction targets based on a \$0.22/annual kWh saved program acquisition cost (i.e., 20% higher to allow for risk management uncertainties).

Determining Compliance Savings

Furthermore, the Commission should clarify whether program potential should be based on cumulative annualized energy savings, as recommended by PPL Electric, or the sum of incremental annualized energy savings as currently proposed in the Tentative Implementation Order. PPL Electric believes the latter overstates program potential because it includes savings from short-lived measures that expire during Phase III and, therefore, do not count toward the cumulative savings target. The Company believes it is not consistent to establish a compliance target based on the market potential equal to the sum of incremental annual savings and then to prohibit EDCs from counting some of those savings toward compliance. Therefore, consistent

with Phases I and II, the Phase III energy reduction compliance target should be based on cumulative annualized energy savings.

However, certain portions of the Tentative Implementation Order appear to be inconsistent and do not provide clarity as to which method of determining compliance savings the Commission proposes to adopt. On page 40, the table at the bottom is based on cumulative annual savings, whereas Table 6 on page 42 is based on the sum of incremental annual savings. *See* Tentative Implementation Order, pp. 40, 42.

Further, the Commission “propose[s] to adopt the five-year consumption reduction requirements as contained in the Addendum and that appear in [Table 6],” which are based on the sum of incremental annual savings and do not account for savings decay. *Id.* at p. 42. However, the Commission also states the following:

Therefore, we propose that, for any measures installed whose useful life expires before the end of the phase, another measure must be installed or implemented during that phase which replenishes the savings from the expired measure. This means that reported savings for Phase III would take into account the useful life of measures.

Id. at p. 43. This passage implies that savings for short-lived measures do indeed expire and, therefore, do not count toward the compliance target.

To better illustrate these passages, assume there is a behavior program with a one-year measure life that provides 25,000 MWh/yr of savings and is repeated in two consecutive program years. There are three alternative interpretations of the Tentative Implementation Order:

1. Cumulative annual savings that account for expired savings (which is the method used by the SWE in Table ES-3 of the SWE’s EE Study and in the Table on page 40 of the Tentative Implementation Order):

$$25,000 \text{ in PY1} + 25,000 \text{ in PY2} - 25,000 \text{ PY1 expired} = 25,000 \text{ MWh/yr total}$$

2. Sum of incremental annual savings that does not account for expired savings (which is the method suggested in Table 6 of the Tentative Implementation Order):

$$25,000 \text{ in PY1} + 25,000 \text{ in PY2} = 50,000 \text{ MWh/yr total}$$

3. Sum of incremental annual savings that accounts for expired savings (which is the method suggested by the wording on page 43 of the Tentative Implementation Order):

$$25,000 \text{ in PY1} + 25,000 \text{ in PY2} - 25,000 \text{ PY1 expired} = 25,000 \text{ MWh/yr total}$$

The Tentative Implementation Order appears to suggest on page 43 that Alternative 3 is the expected method because it uses the sum of incremental annual savings and directs EDCs account for expired savings. *See id.* However, Table 6 on page 42 of the Tentative Implementation Order and Table ES-6 in the SWE's EE Study use Alternative 2 to determine the potential energy savings. *See id.* at p. 42; SWE's EE Study, p. 8. Therefore, the SWE's EE Study would estimate 50,000 MWh/yr of potential, but the Tentative Implementation Order would allow EDCs to claim only 25,000 MWh/yr in savings toward compliance.

PPL Electric believes Alternative 1 should be used for compliance and is consistent with SWE's EE Study's Table ES-3 and the table on page 40 of the Tentative Implementation Order. This method (i.e., cumulative annual savings that account for expired savings) also is consistent with the method used for Phases I and II, thereby allowing a direct comparison of savings, program acquisition cost, and cost-effectiveness across Act 129 Phases. In contrast, a target based on the sum of incremental annual savings would encourage EDCs to focus on programs with short-lived measures and a low program acquisition cost (such as behavior programs) and to repeat those programs in all years.

For these reasons, the Company believes that cumulative annual savings that account for expired savings should be utilized in deriving PPL Electric's compliance target. Doing so would

change PPL Electric's Phase III overall compliance target from 1,590,264 MWh/yr⁵⁶ to 1,222,314 MWh/yr.⁵⁷

Treatment of SWE's Costs

Finally, PPL Electric requests clarification as to whether the SWE's costs are included as an "administrative cost" when determining EDCs' budgets, program acquisition costs, and the resulting program potential (i.e., savings targets for energy and DR reductions). PPL Electric's share of the SWE costs would be approximately \$5 million (i.e., \$1 million per year) if they are comparable to Phases I and II. If the SWE costs were not included, adding them would reduce PPL Electric's program potential and compliance target by approximately 28,000 MWh/yr.⁵⁸

PPL Electric believes SWE costs should be within the legislative cost cap, not in addition to the cost cap (as they were treated in Phases I and II) because these costs are no different than any other "administrative" costs in the EE&C Plan (such as EDC evaluators, tracking systems, program management, etc.). In Phases I and II, they were treated in addition to the cost cap because the need for the SWE (and its cost) was unknown at the time EDCs prepared their EE&C Plans. However, that is no longer true for Phase III. EDCs know that there will be a SWE in Phase III and that the cost is likely to be consistent with the actual costs in Phases I and II.

In aggregate, the proposed changes recommended by PPL Electric would have the impact on the energy reduction target summarized in Tables 7a, 7b, and 7c below.

⁵⁶ See Tentative Implementation Order, p. 42 (Table 6).

⁵⁷ See Table ES-3 on page 7 of the SWE's EE Study. This figure has been scaled to 95% to reflect the Commission's proposed budget of 95% EE/5% DR.

⁵⁸ This figure was calculated by dividing \$5,000,000 by a program acquisition cost of \$0.18/annual kWh saved.

Table 7a

**PPL Electric's Recommended Compliance Target
With No DR, Using Cumulative Savings Instead of the Sum of Incremental Savings, and Implementing PPL Electric's
Recommended Mix of Measures for Non-Low-Income Customers.**

Energy Savings Target (MWh/yr)	Projected Energy Savings with 10% Over-compliance⁵⁹	Description	Comments
1,590,264	1,749,000	Energy reduction target for PPL Electric in the Tentative Implementation Order	\$0.17/kWh prog acq cost (\$0.7 low-income; \$0.10 non-low-income)
- 388,000		Use cumulative annual savings instead of the sum of incremental savings.	The reduction is based on 95% of Table ES-3 in the SWE's DR Study (95/5 split of funding between EE & DR)
1,202,000	1,322,490	Subtotal	\$0.24/kWh prog. acq. cost. based on \$292MM EE budget. \$0.7/kWh for low-income; 0.14/kWh for non-low-income.
+ 64,083		Reallocate \$15.38 MM from DR to EE @ \$0.24/kWh prog. acq. cost.	
1,266,347	1,393,000	Subtotal	\$0.22 prog. acq. cost. based on \$307.5 budget w/o DR. \$0.15/kWh prog acq cost for non-low-income; \$0.7 for low-income
-143,000		Implement PPL Electric's desired measure mix for non-low-income. Change the prog acq cost for non-low-income from \$0.15 (the line above) to \$0.20/kWh similar to PPL Ph 2. Also provides enough funding for low-income, direct-install measures.	
995,000	1,094,500	RECOMMENDED TARGET	Portfolio program acquisition cost is \$0.28/kWh with 10% over-compliance (\$0.70/kWh low-income; \$0.20/kWh non-low-income. Similar to PPL Electric's Phase II EE&C Plan

⁵⁹ This is for PPL Electric's risk management to address uncertainties such as adjustments to savings during the evaluation.

Table 7b

**PPL Electric's Recommended Compliance Target
With the Adjustment to Reflect Adequate Low-Income Funding to Meet Set-Aside Targets
(with none of the other changes recommended by PPL Electric)**

Energy Savings Target (MWh/yr)	Projected Energy Savings with 10% Over-compliance ⁶⁰	Description	Comments
1,590,264	1,749,000	Energy reduction target for PPL Electric in the Tentative Implementation Order	\$0.17/kWh prog acq cost (\$0.7 low-income; \$0.10 non-low-income). Adequate funding (prog. acq. cost) for direct-install low-income measures.
- 214,724		Add around \$35 million for low-income programs per the difference between Tables 3a and 3b. \$35MM divided by the SWE's \$163/MWh prog. acq. cost for non-low-income = 214,724 MWh/yr reduction in program potential.	To remain under the budget cap, non-low-income must reduce \$35MM, which, in turn, reduces the program potential savings of non-low-income and the portfolio if the low-income savings target is unchanged
1,375,540	1,513,094	RECOMMENDED TARGET	Portfolio program acquisition cost is \$0.18/kWh with 10% over-compliance (\$0.70/kWh low-income; \$0.13/kWh non-low-income.

⁶⁰ For PPL Electric's risk management to address uncertainties such as adjustments to savings during the evaluation

Table 7c

**PPL Electric's Recommended Compliance Target
With No DR and Implementing PPL Electric's Recommended Mix of Measures for Non-Low-Income Customers.
(This table would apply if the Commission continues to use the sum of incremental annual savings instead of cumulative annual savings as the Company recommends)**

Energy Savings Target (MWh/yr)	Projected Energy Savings with 10% Over-compliance ⁶¹	Description	Comments
1,590,264	1,749,000	Energy reduction target for PPL Electric in the Tentative Implementation Order	
+ 64,083		Reallocate \$15.38 MM from DR to EE @ \$0.24/kWh prog. acq. cost.	
1,654,800	1,820,000	Subtotal	\$0.17/kWh prog. acq. cost. based on \$307.5 budget. \$0.10/kWh prog acq cost for non-low-income; \$0.7 for low-income (adequate funding for direct-install measures)
-660,000		Implement PPL Electric's desired measure mix for non-low-income. Change the prog acq cost for non-low-income from \$0.10 (the line above) to \$0.20/kWh similar to PPL Ph II.	
995,000	1,094,500	RECOMMENDED TARGET	Portfolio program acquisition cost is \$0.28/kWh with 10% over-compliance (\$0.70/kWh low-income; \$0.20/kWh non-low-income. Similar to PPL Electric's Phase II EE&C Plan

⁶¹ For PPL Electric's risk management to address uncertainties such as adjustments to savings during the evaluation

6. Carve-Out for Government, Educational and Nonprofit Entities

a. Prescription of a Government/Educational/Nonprofit Carve-Out

PPL Electric agrees with the proposed government/education/nonprofit (“GNI”) carve-out.

b. Inclusion of Multifamily Housing

PPL Electric agrees with the Commission that there should not be any Phase III savings or budgetary carve-outs for multifamily housing. *See* Tentative Implementation Order, p. 66. PPL Electric also generally agrees with maintaining the same qualifying provisions from Phase II with regard to counting multifamily savings from the low-income or the GNI sectors. *See id.* at p. 67. However, PPL Electric requests clarification on how to classify the costs and savings for master-metered multifamily housing with a commercial rate schedule and low-income occupants. Specifically, the Company seeks clarification as to whether the costs and savings should be accounted for under the rate schedule of the building (generally “GNI- small C&I”) or as low-income (charged to the residential customer classes). Act 129 requires the customer class that receives the benefit (i.e., the energy savings) to pay the costs associated with those savings. 66 Pa. C.S. § 2806.1(a)(11). Therefore, PPL Electric believes the savings and costs for a master-metered multifamily building with a Small C&I rate schedule and low-income occupants would be assigned to Small C&I customers.

7. Accumulating Savings in Excess of Reduction Requirements

PPL Electric agrees with the proposed savings carryover provisions but requests clarification on whether EDCs are permitted to apply Phase II over-compliance savings to Phase III at the customer sector level for low-income and government/educational/nonprofit sector

carve-outs, even if there is no over-compliance at the portfolio level. *See id.* at pp. 69-70. For example:

Assume the total overall savings (all sectors) from an EDC's Phase II transactions is 615,000 MWh/yr compared to the Phase II compliance target of 821,000 MWh/yr. The EDC uses some of its carryover from Phase I to meet its Phase II overall compliance target.

Assume further that the total savings from low-income Phase II transactions is 56,000 MWh/yr compared to the Phase II low-income compliance target of 36,000 MWh/yr. Can the EDC carryover the excess 20,000 low-income savings from Phase II to Phase III even though there is no carryover at the portfolio level (all sectors)?

8. Process to Challenge Reduction Requirements

PPL Electric has no comments on this section of the Tentative Implementation Order.

B. PLAN APPROVAL PROCESS

PPL Electric has no comments on this section of the Tentative Implementation Order.

C. PLAN EFFECTIVENESS EVALUATION PROCESS

1. Statewide Evaluator

PPL Electric has no comments on this section of the Tentative Implementation Order.

2. Technical Reference Manual

PPL Electric agrees with the proposed updating frequency for the Technical Reference Manual (i.e., the 2016 TRM would apply to the entire period of Phase III unless a mid-phase update is deemed necessary). *See* Tentative Implementation Order, pp. 80-81.

3. EDC Annual and Quarterly Reporting

The Commission proposes semiannual reporting instead of quarterly reporting. *Id.* at pp. 83-84. PPL Electric agrees but recommends changing the due date for the mid-year report from December 31 to January 15, consistent with the Phase I and Phase II schedules. The mid-year (2nd quarter) ends November 30 and PPL Electric does not "close its November books" until approximately December 15. Sixteen days would not be adequate to prepare the mid-year

evaluation report, especially given the holidays in November and December. In addition, the Final Annual Report for the prior program year is due November 15 each year. Requiring two evaluation reports (mid-year for current program year and the annual report for the previous program year) so close to each other (November 15 and December 31) is challenging, especially given the holidays in November and December.

D. COST – BENEFIT ANALYSIS APPROVAL PROCESS

1. 2016 TRC Test

Please see PPL Electric’s comments addressing the 2016 TRC Tentative Order, which were filed at Docket No. M-2015-2468992.

2. Net-to-Gross Adjustment

In the Tentative Implementation Order, the Commission has proposed to “maintain [] the practice used in Phases I and II where NTG is used for making modifications to existing programs in the current phase, as well as for planning purposes for future phases” and to “continue determining EDC compliance with targets through the use of gross savings.” Tentative Implementation Order, p. 89. PPL Electric agrees with the Commission’s proposed approach.

The Commission also proposes “that the EDCs include in their EE&C Plans net TRC ratios, as well as gross TRC ratios” because it “believe[s] the inclusion of NTG-based TRC ratios will provide all stakeholders with additional information regarding the effectiveness of EE&C measures and programs.” *Id.*

PPL Electric agrees but notes that the net-to-gross ratios included in the EE&C Plan for each program will be order of magnitude estimates with undeterminable accuracies. An EDC cannot determine the actual net savings (net-to-gross ratio) when developing its EE&C Plan. The actual net-to-gross ratio is determined based on actual information as part of the annual

impact evaluation conducted by the EDC's independent evaluator. If net savings must be included in the EE&C Plan, the net-to-gross ratio will merely be an estimate that is based on the EDC's judgment and the performance of a similar program in previous years (even though the programs and measures may be significantly different in Phase III), well before programs launch and actual performance is evaluated. Moreover, the EDC's independent evaluator may not be under contract when the EDC creates its Phase III EE&C Plan.

E. PROCESS TO ANALYZE HOW THE PROGRAM AND EACH PLAN WILL ENABLE EDCS TO MEET REDUCTION REQUIREMENTS

1. Measuring Annual Consumption Reductions

PPL Electric has no comments on this section of the Tentative Implementation Order.

2. Measuring Peak Demand Reductions

The Commission proposes "that, for DLC programs where advanced metering infrastructure (AMI) data is not available for all participants, estimates based on a sample of metered homes be permissible." Tentative Implementation Order, p. 91. PPL Electric recommends deleting this proposal. PPL Electric believes savings from DLC programs should be determined based on any of PJM's protocols, consistent with Phases I and II. Even if an EDC has AMI, DLC savings cannot be determined from AMI data because AMI does not isolate the air conditioner's usage (kW or kWh) from other usage elsewhere in the home or business. If an EDC elects to use PJM's protocol for metering the peak reductions for DLC, the meter is installed on a statistically valid sample of air conditioners that includes DLC participants and non-participants. This meter is separate from the EDC's billing meter (AMI). The DLC meter measures the kW and kWh of the air conditioner only.

F. STANDARDS TO ENSURE THAT A VARIETY OF MEASURES ARE APPLIED EQUITABLY TO ALL CUSTOMER CLASSES

PPL Electric has no comments on this section of the Tentative Implementation Order.

G. PROCESS TO MAKE RECOMMENDATIONS FOR ADDITIONAL MEASURES

PPL Electric has no comments on this section of the Tentative Implementation Order.

H. PROCEDURES TO REQUIRE COMPETITIVE BIDDING AND APPROVAL OF CONTRACTS WITH CSPS

1. Competitive Bidding

The Commission proposes “that EDCs will issue RFPs to all qualified registered CSPs using the current posting of the CSP register on the Commission’s website.” Tentative Implementation Order, p. 97.

PPL Electric requests clarification as to whether EDCs are required to solicit bids only from registered CSPs that are qualified for the scope of the specific contract, not from the complete list of registered CSPs. For example, for the evaluation CSP contract, EDCs would be required to solicit bids from registered CSPs who perform evaluation services, not from registered CSPs who deliver DR programs.

PPL Electric also suggests that the Commission consider creating categories of experience on the CSP registry so EDCs and others can determine the appropriate type of work performed by the CSP. The existing CSP registry contains hundreds of CSPs but PPL Electric cannot determine their field of expertise to establish a meaningful RFP. Example categories that could be selected by each CSP (on their CSP application) include: Residential Program Implementation, Non-residential Program Implementation, Evaluation, Demand Response Program Implementation, Low-income program implementation, Technical Support/EE&C Plan Development, residential energy audits, etc.

2. Approval of Contracts

PPL Electric has no comments on this section of the Tentative Implementation Order.

I. PARTICIPATION OF CONSERVATION SERVICE PROVIDERS

PPL Electric has no comments on this section of the Tentative Implementation Order.

J. PROCEDURES TO ENSURE COMPLIANCE WITH CONSUMPTION AND PEAK DEMAND REDUCTION REQUIREMENTS

PPL Electric has no comments on this section of the Tentative Implementation Order.

K. EDC COST RECOVERY

1. Determination of Allowable Costs

a. Phase III Allowable Costs

PPL Electric has no comments on this section of the Tentative Implementation Order.

b. Application of Excess Phase II Budget

The Commission proposes “that on June 1, 2016, the EDCs would only use Phase II budgets to finalize any measures installed and commercially operable on or before May 31, 2016, and to finalize any contract and other Phase II administrative obligations.” Tentative Implementation Order, p. 110.

PPL Electric requests clarification that the costs for Phase II evaluation (EDC evaluators and SWE), program implementers, and EDC staff that are incurred after May 31, 2016 (likely will extend until January/February 2017 when the SWE is expected to issue its Final Phase II Evaluation Report) are considered part of the “other Phase II administrative obligations” to be counted against the Phase II EE&C Plan budget.

c. Rebate Application Deadlines

The Commission proposes “that the EDCs be required to develop deadlines for [submitting rebate applications] for their programs within their Phase III EE&C Plans . . . but that all deadlines (both within the phase and at the end) must be outlined in the EE&C Plans.” *Id.* at p. 113.

PPL Electric recommends changing the proposed requirements for rebate application deadlines. Instead of including all rebate application deadlines in the EE&C Plan, PPL Electric recommends including only the maximum rebate submittal deadline in the EE&C Plan and allowing the EDCs to shorten that deadline without Commission approval if required to manage the pace of programs. Major and minor changes to the EE&C Plan require Commission approval. *See Minor EE&C Plan Change Order, supra* note 13. As programs approach the end of a phase or their approved budgets, whichever is earlier, EDCs may need to shorten the rebate application deadline to prevent exceeding the program's budget. If this happens near the last year of Phase III, there will not be enough time for an EDC to modify its EE&C Plan to reflect a different rebate deadline and to get Commission approval of that EE&C Plan change to implement the new rebate deadline.

2. Allocation of Costs to Customer Classes

a. Bidding Energy Efficiency and Peak Demand Resources into the PJM Capacity Market

PPL Electric agrees with the Commission's proposal not to require EDCs to bid qualified energy efficiency or DR resources into the PJM capacity market, but allow the EDCs to voluntarily do so. *See Tentative Implementation Order, p. 114.*

b. Other Allocation of Cost Issues

PPL Electric has no comments on this section of the Tentative Implementation Order.

3. Cost Recovery Tariff Mechanism

The Commission proposes several changes to the Act 129 cost recovery tariff and reconciliation. Generally, PPL Electric agrees with the proposed changes but recommends the following changes or clarifications.

The Commission proposes to require EDCs to apply a 6% interest rate on over- or under-recoveries. *Id.* at p. 118. In Phases I and II, no interest applied. PPL Electric notes the Commission has a pending proposed rulemaking to change the interest rate for price-to-compare riders. PPL Electric recommends that the same interest rate should be used for the Act 129 rider as the price-to-compare riders, which is based on the prime rate for commercial borrowing in effect on the last day of the month the over- or under-collection occurred, as reported in the Wall Street Journal.

The Commission also proposes that “the Phase II and Phase III surcharges should be combined into a single surcharge and tariff with the implementation of Phase III.” *Id.* at p. 119. The Commission explains further:

In order to transition from the cost recovery methodology utilized during Phase II, ending May 31, 2016, to the cost recovery methodology to be utilized during Phase III, beginning on June 1, 2016, we propose that each EDC reconcile its total actual recoverable EE&C Plan expenditures incurred through March 31, 2016, with its actual EE&C Plan revenues received through March 31, 2016. The net over-recovered or under-recovered amount shall be reflected, with interest, as a separate line item of the E-factor calculation of the Phase III rates to become effective June 1, 2016. In addition, each EDC should include, as part of the calculation of the Phase III rates to become effective June 1, 2016, as clearly identified separate line items, projections of the: expenses to finalize any measures installed and commercially operable on or before May 31, 2016; expenses to finalize any contracts; and other Phase II administrative obligations. The Phase II rate that becomes effective June 1, 2015 will remain effective through May 31, 2016.

Id. (footnote omitted).

PPL Electric agrees but recommends that the calculation of Phase III rates should include a separate line item for a projection of revenues for April and May of 2016, with both the revenues and expenses trued-up in the reconciliation for the period April 1, 2016 through March 31, 2017. Including a projection of the April and May expenses, but not the revenues, will create an inherent over-collection, assuming all else equal.

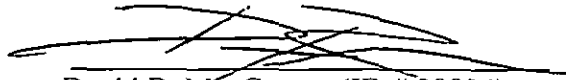
The Commission also proposes “that the standardized reconciliation process, the inclusion of interest on over- or under-recoveries and the calculation of the annual surcharge will be set forth by each EDC in a supplement or supplements to the EDC’s tariff to become effective June 1, 2016, be accompanied by a full and clear explanation as to their operation and applicability to each customer class.” *Id.* at p 120. PPL Electric requests clarification about the meaning and intent of “be accompanied by a full and clear explanation as to their operation and applicability to each customer class.” PPL Electric is concerned this could require a tariff change in every EE&C Plan modification filing. PPL Electric also is concerned that the tariff would be used as a justification of EE&C Plan costs by customer class. PPL Electric believes the EE&C Plan filing should provide the justification of costs by customer class.

PPL Electric also recommends that the Commission provide a template for the reconciliation filing, rate filing, and tariff pages to ensure clarity and consistency.

IV. CONCLUSION

For the reasons set forth above, PPL Electric Utilities Corporation respectfully requests that the Commission take these comments into consideration in preparing its Final Implementation Order.

Respectfully submitted,



Paul E. Russell (ID #21643)
Kimberly A. Klock (ID # 89716)
PPL Services Corporation
Office of General Counsel
Two North Ninth Street
Allentown, PA 18106
Phone: 610-774-4254
Fax: 610-774-6726
E-mail: perussell@pplweb.com
kklock@pplweb.com

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

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

Date: April 27, 2015

Attorneys for PPL Electric Utilities Corporation

Appendix A Summary of Program Acquisition Costs and Low-Income Percentages

This summary of acquisition costs was provided by The Cadmus Group and is calculated from EIA 861 data, as well as a more detailed look at the portfolios of eight utilities from high, medium, and low cost states.

Cadmus identified utilities in states where the average acquisition cost is low (below \$0.15/kWh), medium (\$0.16-\$0.25/kWh), and high (above \$0.25/kWh). This table summarizes the overall acquisition cost for these utilities, the low income acquisition cost, low income program's share of total portfolio savings, and residential lighting's share of total portfolio savings.

Lighting accounts for a larger share of total portfolio savings for low cost utilities. The mixture of measures within low income programs vary-- lower cost low income programs tend to primarily offer kit-type measures (CFLs, aerators, showerheads, and weather-stripping). CFLs are included in every portfolio (note: data were only available for 2010-2013 for most utilities).

First, Cadmus pulled EIA 861 data from 2011-2013 on EE savings and expenditures to summarize the average acquisition cost (\$/kWh) in each state. Cadmus identified low cost states (OH, IL, MI), medium cost states (Utah, WA, ID), and high cost states (CA, MA) and looked at the portfolios from utilities in these states in more depth. Generally, Cadmus found:

- Low cost utilities such as DP&L and DTE acquire high savings from residential CFL programs. Lighting for low cost utilities accounts for around 33% to 45% of portfolio savings, while for medium and high cost utilities lighting typically accounts for around 20% to 30% of portfolio savings.
- For low and medium cost utilities, low income either makes up a lower share of portfolio savings or low income programs provide primarily low cost measures (refrigerator removal, CFLs, aerators, showerheads, etc.). DTE for example has a low income program that contributed to between 3.6% and 8.1% of portfolio savings in 2012 and 2013, however, the average acquisition cost for these programs ranged from \$0.15/kWh to \$0.33/kWh. In contrast, utilities with higher acquisition costs either have a low income program that accounts for a very small share of total savings (such as PacifiCorp Idaho), or a higher overall acquisition cost (such as National Grid)
- There is no indication that acquisition costs decreased over the 2011 to 2013 period. Average acquisition costs increased in nearly every state—with more data, it is expected that one could test the hypothesis that acquisition costs increase, not decrease, over time. This increase is suspected because any cost savings from running a program over multiple years is negated by the increased difficulty in getting savings (due to the depletion of easy-to-acquire savings).

Cost Group	State	Utility	Year	Acquisition Cost (\$/kWh)	Low Income Acquisition Cost (\$/kWh)	Low Income as % of Portfolio	Lighting as % of Portfolio	Notes	Source
Low Cost (below \$0.15/kWh)	Ohio	DP&L	2012	\$0.08	\$1.03	0.5%	45%		Source: Table 86 & 87; 2012 DPL Portfolio EMV Evaluation Report
	Ohio	DP&L	2013	\$0.07	\$0.86	0.7%	41%		Source: Table 92 & 93; 2013 DPL Portfolio EMV Evaluation Report
	Ohio	DP&L	2014	\$0.09	\$0.68	0.8%	38%		Source: Table 7 & 8; 2014 DPL Cost Effectiveness Evaluation Report
	Michigan	DTE	2012	\$0.11	\$0.15	8.1%	36%	Low income savings primarily kits (CFLs, aerators, showerheads, and wstripping)	Source: Chart 10 & Chart 34; http://www.nickconfintl.com/wp-content/uploads/2013/08/DTE-EO-annual-report-2012.pdf
	Michigan	DTE	2013	\$0.11	\$0.33	3.6%	33%	Low income savings primarily kits (CFLs, aerators, showerheads, and wstripping)	Source: Chart 10 & Chart 44; http://viewer.zmags.com/publication/7ba0812d#f7ba0812d/18
Medium Cost (\$0.16-0.25/kWh)	Utah	PacifiCorp	2013	\$0.17	\$0.27	0.2%	37%	Lighting savings embedded in Home Energy Savings (HES) program. Lighting as a % of portfolio is likely overstated. High C&I savings in Utah. Low income primarily CFLs	Source: Table 3; http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2014/2013-UT-Annual-Report-FINAL-Report-051614.pdf
	California	SCE	2010-2012	\$0.20	\$0.51	1.9%	22%		Source: Program Costs and Impacts Tab http://eestats.cpuc.ca.gov/EEGA2010Files/SCE/monthlyReport/SCE.MN.201212.2.xls
	Idaho	PacifiCorp	2013	\$0.21	\$2.00	0.6%	14%	Lighting savings embedded in Home Energy Savings (HES) program. Lighting as a % of portfolio is likely overstated. Agriculture savings accounts for most of PC Idaho's portfolio. Low income primarily weatherization	Source: Table 3; http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2014/2013-Idaho-Annual-Report-FINAL.pdf
	Illinois	Ameren	2011	\$0.26	N/A	N/A	20%	Low Income not included in portfolio summary	Source: Table 2 & Table 3; http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIU%20Evaluation%20Reports%20EPYS/AIC_PYS_Integrated_Report_FINAL_2014-09-18.pdf
	Illinois	Ameren	2012	\$0.23	N/A	N/A	25%	Low Income not included in portfolio summary	Source: Table 2 & Table 3; http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIU%20Evaluation%20Reports%20EPYS/AIC_PYS_Integrated_Report_FINAL_2014-09-18.pdf
	Illinois	Ameren	2013	\$0.20	N/A	N/A	30%	Low Income not included in portfolio summary	Source: Table 2 & Table 3; http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIU%20Evaluation%20Reports%20EPYS/AIC_PYS_Integrated_Report_FINAL_2014-09-18.pdf
	Washington	PacifiCorp	2014	\$0.23	\$4.47	0.4%	29%		Source: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Demand_Side_Management/2015/WA_AnnualReport_FINAL-Report_033115.pdf
High Cost (Above \$0.25/kWh)	California	PG&E	2010-2012	\$0.26	\$3.11	2.4%	22%		Source: Program Costs and Impacts Tab http://eestats.cpuc.ca.gov/EEGA2010Files/PGE/monthlyReport/PGE.MN.201212.1.xlsx
	Massachusetts	National Grid	2012	\$0.36	\$1.87	2.3%	18%		2012 Electric Statewide Master Summary on NGRID Tab http://ma-eeac.org/results-reporting/
	Massachusetts	National Grid	2013	\$0.35	\$1.63	2.8%	22%		2013 Electric Statewide Report on Master Data Tab http://ma-eeac.org/results-reporting/
	Massachusetts	Cape Light	2012	\$0.85	\$1.23	8.4%	33%		2012 Electric Statewide Master Summary on CLC Tab http://ma-eeac.org/results-reporting/
	Massachusetts	Cape Light	2013	\$0.85	\$1.45	6.4%	19%		2013 Electric Statewide Report on Master Data Tab http://ma-eeac.org/results-reporting/

Appendix B

Measures in the SWE's Energy Efficiency Market Potential Study with a Low Program Acquisition Cost

Residential Measures in the SWE's Energy Efficiency Market Potential Study with a Program Acquisition Cost about less than or equal to \$0.10/annual kWh saved. Please note that the costs shown below include only the incentives so the actual program acquisition cost will be higher to reflect program delivery and administrative costs.

Measure Name	Home Type (SFA, SFD, MF)	Income Target	Annual Elec. Savings (kWh)	Useful Life	Incremental / Full Cost	Incentives as % of Incremental Cost	Calculated Incentive	Program Acquisition Cost of the Incentive Only (Incentive / Savings)
Indirect Feedback (Home Energy Reports) - homes with non-ASHP electric heating	SFD	All	337.0	1	\$0.00	50%	\$ -	\$0.00
Indirect Feedback (Home Energy Reports) - homes with gas heating	SFD	All	122.3	1	\$0.00	50%	\$ -	\$0.00
Indirect Feedback (Home Energy Reports) - homes with ASHP	SFD	All	251.4	1	\$0.00	50%	\$ -	\$0.00
Low Flow Faucet Aerators - Kitchen	SFD	NLI	195.9	12	\$1.61	50%	\$ 0.81	\$0.00
ENERGY STAR Televisions > 50"	MF	ALL	98.6	6	\$1.00	50%	\$ 0.50	\$0.01
Low Flow Showerheads	SFD	ALL	361.3	9	\$6.00	50%	\$ 3.00	\$0.01
Furnace Whistle - electric heating and central AC	MF	NLI	58.8	14	\$1.00	50%	\$ 0.50	\$0.01
ENERGY STAR Televisions < 50"	SFA	ALL	48.4	6	\$1.00	50%	\$ 0.50	\$0.01
ENERGY STAR Copier	SFD	ALL	46.9	6	\$1.00	50%	\$ 0.50	\$0.01
ENERGY STAR Multifunction	SFD	ALL	46.4	6	\$1.00	50%	\$ 0.50	\$0.01

Measure Name	Home Type (SFA, SFD, MF)	Income Target	Annual Elec. Savings (kWh)	Useful Life	Incremental / Full Cost	Incentives as % of Incremental Cost	Calculated Incentive	Program Acquisition Cost of the Incentive Only (Incentive / Savings)
Standard CFL Replacing Standard Halogen/Incandescent Bulb (≤ 75W Equiv.)	SFD	NLI	22.9	5	\$0.61	50%	\$ 0.30	\$0.01
Water Heater Temperature Setback	SFD	NLI	151.3	4	\$5.00	50%	\$ 2.50	\$0.02
Standard CFL Replacing Standard Halogen/Incandescent Bulb (≥ 100W Equiv.)	SFD	NLI	44.0	5	\$1.64	50%	\$ 0.82	\$0.02
Exterior CFL Bulb Replacing Exterior Incandescent/Halogen bulb	SFD	NLI	33.5	5	\$1.35	50%	\$ 0.68	\$0.02
ENERGY STAR Printer	SFD	ALL	24.1	5	\$1.00	50%	\$ 0.50	\$0.02
Low Flow Faucet Aerators - Bathroom	MF	NLI	38.5	12	\$1.61	50%	\$ 0.81	\$0.02
ENERGY STAR Computer - Laptop	SFD	ALL	21.5	4	\$1.00	50%	\$ 0.50	\$0.02
Furnace Whistle - non-electric heating and central AC	SFD	NLI	19.6	14	\$1.00	50%	\$ 0.50	\$0.03
Direct (Real Time) Feedback - homes with non-ASHP electric heating	SFD	All	2,067.1	3	\$109.00	50%	\$ 54.50	\$0.03
CFL Reflector Replacing 65W/75W Reflector	SFD	NLI	40.3	5	\$2.15	50%	\$ 1.07	\$0.03
ENERGY STAR Fax Machine	SFD	ALL	15.6	4	\$1.00	50%	\$ 0.50	\$0.03
Electroluminescent Nightlight	SFD	NLI	29.5	8	\$1.92	50%	\$ 0.96	\$0.03

Measure Name	Home Type (SFA, SFD, MF)	Income Target	Annual Elec. Savings (kWh)	Useful Life	Incremental / Full Cost	Incentives as % of Incremental Cost	Calculated Incentive	Program Acquisition Cost of the Incentive Only (Incentive / Savings)
Direct (Real Time) Feedback - homes with ASHP	SFD	All	1,542.0	3	\$109.00	50%	\$ 54.50	\$0.04
ENERGY STAR Monitors	SFD	ALL	23.8	4	\$1.80	50%	\$ 0.90	\$0.04
LED Nightlight	SFD	NLI	25.5	8	\$2.51	50%	\$ 1.26	\$0.05
ENERGY STAR Water Coolers	SFD	ALL	481.8	10	\$50.00	50%	\$ 25.00	\$0.05
Specialty CFL Replacing Specialty Halogen/Incandescent Bulb (\leq 75W Equiv.)	SFD	NLI	24.1	5	\$2.71	50%	\$ 1.36	\$0.06
Specialty CFL Replacing Specialty Halogen/Incandescent Bulb (\geq 100W Equiv.)	MF	NLI	41.2	5	\$5.26	50%	\$ 2.63	\$0.06
ENERGY STAR Dehumidifiers	SFD	ALL	149.9	12	\$20.21	50%	\$ 10.10	\$0.07
Direct (Real Time) Feedback - homes with gas heating	SFD	All	750.2	3	\$109.00	50%	\$ 54.50	\$0.07
ENERGY STAR Freezers (Upright)	SFD	NLI	44.0	12	\$6.75	50%	\$ 3.38	\$0.08
ENERGY STAR Air Purifier/Cleaner	SFA	ALL	391.0	9	\$70.00	50%	\$ 35.00	\$0.09
ENERGY STAR Freezers (Chest)	SFD	NLI	29.0	12	\$5.23	50%	\$ 2.62	\$0.09

Commercial Measures in the SWE's Energy Efficiency Market Potential Study with a Program Acquisition Cost about less than or equal to \$0.10/annual kWh saved. Please note that the costs shown below include only the incentives so the actual program acquisition cost will be higher to reflect program delivery and administrative costs.

Commercial Measure Name	Commercial Baseline Description	Segment	Unit	Baseline Energy (kWh)	Energy Savings %	EUL (years)	Incr. Cost (\$)	Incentives as % of Incr Cost	Calculated Incentive	Program Acq Cost of the Incentive Only (Incentive / Savings)
320 - 400W Pulse Start Metal Halide	One 1000W Mercury Vapor Fixture	Grocery	Fixture	7,791	65%	13	\$18	50%	\$ 9.20	\$ 0.00
Insulating Tank Wrap on Water Heater (R-11)	Water heater w/out tank wrap (R-8.3)	Retail	building	5,837	2.1%	7	\$0.5	50%	\$ 0.25	\$ 0.00
Heat Trap	No Heat Trap	Warehouse	building	2,362	22%	11	\$2.4	50%	\$ 1.20	\$ 0.00
Economizer for Walk-in Coolers	No Economizer	Grocery	measure	213,168	12%	10	\$176	50%	\$ 87.82	\$ 0.00
Compact Fluorescent Lamp - Screw In (13W)	One 43W Incandescent Bulb	Grocery	lamp	274	65%	2	\$1.8	50%	\$ 0.89	\$ 0.00
Central Lighting Control System	Lighting w/ No Controls	Healthcare	building	282,550	38%	8	\$1,106	50%	\$ 553.05	\$ 0.01
Faucet Aerators	Low Flow Aerator (2.0 GPM)	Retail	building	6,351	5.9%	12	\$4.0	50%	\$ 2.00	\$ 0.01
Low-Flow Showerhead	Low-Flow Showerhead (2.0 GPM)	Gov't	building	8,381	6.5%	9	\$6.0	50%	\$ 3.00	\$ 0.01
Time Clock Control	Lighting w/ No Controls	Healthcare	building	282,550	28%	8	\$1,106	50%	\$ 553.05	\$ 0.01
175 - 320W Pulse Start Metal Halide	One 1000W Mercury Vapor Fixture	Grocery	Fixture	7,791	74%	13	\$86	50%	\$ 42.88	\$ 0.01
Auto Off Time Switch	Lighting w/ No Controls	Healthcare	building	282,550	24%	8	\$1,106	50%	\$ 553.05	\$ 0.01

Commercial Measure Name	Commercial Baseline Description	Segment	Unit	Baseline Energy (kWh)	Energy Savings %	EUL (years)	Incr. Cost (\$)	Incentives as % of Incr Cost	Calculated Incentive	Program Acq Cost of the Incentive Only (Incentive / Savings)
Fan Motor - correct sizing	Incorrect Fan Motor Sizing	Healthcare	measure	106,370	2.9%	15	\$50	50%	\$ 25.00	\$ 0.01
350W+ Ceramic Metal Halide	One 1000W Mercury Vapor Fixture	Grocery	Fixture	7,791	57%	13	\$88	50%	\$ 44.13	\$ 0.01
Occupancy Sensor	Lighting w/ No Controls	Healthcare	building	282,550	24%	8	\$1,666	50%	\$ 833.15	\$ 0.01
High Efficiency small Instantaneous Water Heater (30% above the minimum)	Existing std. Water Heater (50 Gallon)	Education	water heater	96,871	27%	15	\$646	50%	\$ 323.08	\$ 0.01
LED Task Lighting/Screw-In	1 60W Incandescent Bulb	Grocery	lamp	460	83%	3	\$9.6	50%	\$ 4.80	\$ 0.01
HVAC Diagnostic/Air Conditioner Tune Up	<65000 BTU Std. Efficiency AC w/out Tune Up	Healthcare	building	174,597	5.0%	5	\$225	50%	\$ 112.50	\$ 0.01
Downsizing motor during retrofit	Larger hp standard motor	Office	building	186,404	0.9%	15	\$50	50%	\$ 25.00	\$ 0.01
Cooling Tower Optimization	No Cooling Tower Optimization	Warehouse	building	2,353	20%	10	\$14	50%	\$ 7.22	\$ 0.02
Water Heater Thermostat Setback	Water Heater w/ constant Setpoint Thermostat	Education	building	29,380	2.3%	4	\$28	50%	\$ 13.75	\$ 0.02
Variable Speed Drive Control, 40HP	Code minimum Motor w/out VSD Drive	Grocery	motor	159,546	72%	15	\$4,666	50%	\$ 2,333.15	\$ 0.02

Commercial Measure Name	Commercial Baseline Description	Segment	Unit	Baseline Energy (kWh)	Energy Savings %	EUL (years)	Incr. Cost (\$)	Incentives as % of Incr Cost	Calculated Incentive	Program Acq Cost of the Incentive Only (Incentive / Savings)
Chiller Tune Up	No Chiller Tune Up	Office	building	1,246	2.3%	10	\$1.2	50%	\$ 0.62	\$ 0.02
Diagnostics										
Variable Speed Drives on Process Equipment	Constant speed control	Office	building	196,176	49%	10	\$4,300	50%	\$ 2,150.00	\$ 0.02
Premium Efficiency T8 Lighting Replacements (28W w/ LBF)	One 4' 28W T5 w/ Normal Ballast Factor	Grocery	Lamp	200	28%	7	\$2.5	50%	\$ 1.26	\$ 0.02
Programmable Thermostat (7 Day, 2 Stage Setback)	HVAC system w/ Manual Thermostat (Code Min Eff)	Healthcare	building	174,597	1.7%	11	\$146	50%	\$ 73.00	\$ 0.02
Variable Speed Drive Control, 15HP	Code minimum Motor w/out VFD Drive	Grocery	motor	20,968	72%	15	\$731	50%	\$ 365.44	\$ 0.02
eCube	Refrigeration unit w/out eCube	Warehouse	building	18,920	15%	15	\$144	50%	\$ 72.10	\$ 0.03
Anti-sweat heat (ASH) controls - Freezer	System w/out ASH Controls	Grocery	building	90,283	1.5%	12	\$70	50%	\$ 35.00	\$ 0.03
Variable Speed Drive Control, 5HP	Code minimum Motor w/out VSD Drive	Grocery	motor	60,537	72%	15	\$2,243	50%	\$ 1,121.56	\$ 0.03
400 - 750W Pulse Start Metal Halide	One 1000W High Pressure Sodium Fixture	Grocery	Fixture	7,972	23%	13	\$96	50%	\$ 48.20	\$ 0.03
Strip Curtains	Walk in Unit Door w/ no Strip Curtain	Other Inst'l	building	2,526	59%	4	\$80	50%	\$ 39.90	\$ 0.03

Commercial Measure Name	Commercial Baseline Description	Segment	Unit	Baseline Energy (kWh)	Energy Savings %	EUL (years)	Incr. Cost (\$)	Incentives as % of Incr Cost	Calculated Incentive	Program Acq Cost of the Incentive Only (Incentive / Savings)
Heat Pump Water Heater (50 Gallon)	Std. Electric Water heater (50 Gallon)	Healthcare	water heater	96,871	66%	10	\$3,562	50%	\$ 1,781.12	\$ 0.03
Air curtain technology	Strip plastic curtain	Grocery	building	75,236	3.1%	8	\$132	50%	\$ 65.92	\$ 0.03
4' T5 HO 2 Lamp Fixture	Equipment 4: One 175W Mercury Vapor Fixture	Grocery	Fixture	1,778	43%	13	\$51	50%	\$ 25.75	\$ 0.03
120 - 320W Ceramic Metal Halide Photocell Dimming Control (Interior)	One 1000W Mercury Vapor Fixture	Grocery	Fixture	7,791	73%	13	\$383	50%	\$ 191.38	\$ 0.03
Indoor Daylight Sensors	Lighting w/ No Controls	Healthcare	building	282,550	28%	8	\$5,444	50%	\$ 2,721.80	\$ 0.03
High Efficiency T8 Lighting Replacement (32W)	Lighting w/ No Controls	Healthcare	building	282,550	28%	8	\$5,444	50%	\$ 2,721.80	\$ 0.03
LED Overhead High Bay Lighting Fixture	One 4' 40W T12 w/ Magnetic Ballast	Grocery	Lamp	312	38%	7	\$8.3	50%	\$ 4.14	\$ 0.03
VFD on HVAC Fan	One 1075 W Mercury Vapor Fixture	Grocery	Fixture	7,791	89%	13	\$491	50%	\$ 245.63	\$ 0.04
VFD on Cooling Tower Fan	Motor w/out VFD	Lodging	motor	52,737	72%	15	\$2,843	50%	\$ 1,421.56	\$ 0.04
VFD on Hot Water Pump	Motor w/out VFD	Lodging	motor	52,737	72%	15	\$2,843	50%	\$ 1,421.56	\$ 0.04
Hot Water Circulation Pump Time-Clock	Code minimum Motor w/out VFD Drive	Healthcare	motor	66,301	57%	15	\$2,843	50%	\$ 1,421.56	\$ 0.04
	Constant circulation system	Education	building	29,380	5.3%	10	\$119	50%	\$ 59.33	\$ 0.04

Commercial Measure Name	Commercial Baseline Description	Segment	Unit	Baseline Energy (kWh)	Energy Savings %	EUL (years)	Incr. Cost (\$)	Incentives as % of Incr Cost	Calculated Incentive	Program Acq Cost of the Incentive Only (Incentive / Savings)
Induction High Bay Lighting	One 1000W Mercury Vapor Fixture	Grocery	Fixture	15,582	96%	13	\$1,149	50%	\$ 574.48	\$ 0.04
Compact Fluorescent Lamp - Hardwire (13W)	Two 43W Bulbs (EISA Halogen code minimum)	Grocery	lamp	547	65%	13	\$29	50%	\$ 14.33	\$ 0.04
LED exterior lighting	250 Watt Incandescent	Grocery	measure	1,456	83%	15	\$104	50%	\$ 51.92	\$ 0.04
Elevators	Std. Eff Elevator	Gov't	measure	89,016	1.5%	15	\$116	50%	\$ 58.15	\$ 0.04
4' HPT8 High Bay lamp (28 watt)	32W T8 lamp	Grocery	lamp	149	13%	7	\$1.6	50%	\$ 0.81	\$ 0.04
ENERGY STAR® desktop	Standard computer	Lodging	Computer	411	32%	4	\$12	50%	\$ 6.00	\$ 0.05
Efficient compressor motor	Base Refrigeration System - Grocery	Healthcare	measure	15,825	4.0%	5	\$60	50%	\$ 30.00	\$ 0.05
T8 Lamp (any length)	Standard T12 lamp (any length)	Grocery	Lamp	367	42%	7	\$15	50%	\$ 7.39	\$ 0.05
Electronic Ballast	Motor w/out VFD Drive	Lodging	motor	52,746	55%	15	\$2,843	50%	\$ 1,421.56	\$ 0.05
VFD on Chilled Water Pump	VFD Drive	Lodging	motor	52,746	55%	15	\$2,843	50%	\$ 1,421.56	\$ 0.05
Cold Cathode Screw-In Bulb	40W Incandescent Bulb	Grocery	lamp	382	87%	4	\$33	50%	\$ 16.31	\$ 0.05
Facility Commissioning	No Facility Commissioning	Restaurant	building	25,983	16%	10	\$422	50%	\$ 210.88	\$ 0.05
Escalator Motor Controller	Constant power control	Healthcare	escalator	53,261	34%	15	\$1,875	50%	\$ 937.50	\$ 0.05
Anti-sweat heat (ASH) controls - Cooler	System w/out ASH Controls	Grocery	building	90,283	0.7%	12	\$70	50%	\$ 35.00	\$ 0.05

Commercial Measure Name	Commercial Baseline Description	Segment	Unit measure	Baseline Energy (kWh)	Energy Savings %	EUL (years)	Incr. Cost (\$)	Incentives as % of Incr Cost	Calculated Incentive	Program Acq Cost of the Incentive Only (Incentive / Savings)	
										\$	\$
High Efficiency Ice Making Head	Standard Ice Making Head	Warehouse	measure	11,815	10%	10	\$140	50%	\$ 70.00	\$	0.06
Door Gasket-Freezer	Door w/out Gasket	Lodging	building	7,273	9.3%	4	\$82	50%	\$ 41.15	\$	0.06
Chilled Water Reset, Optimizer System for Chiller(s)	No Chilled Water Reset	Gov't	building	2,992	3.7%	10	\$14	50%	\$ 6.82	\$	0.06
Solid-state temperature controls	No Solid State Controls	Grocery	building	4,550	3.6%	12	\$20	50%	\$ 10.20	\$	0.06
High Efficiency Commercial Freezer	Std. Commercial Freezer	Lodging	freezer	6,169	26%	12	\$204	50%	\$ 101.79	\$	0.06
Hot Water (DHW) Pipe Insulation (Add 3/4" Foam)	N/A - Retrofit Only	Education	building	29,380	0.4%	13	\$16	50%	\$ 8.15	\$	0.07
Energy Star Dishwasher	Standard Dishwasher unit	Education	dishwasher	25,250	32%	10	\$1,073	50%	\$ 536.25	\$	0.07
Snack Machine Controls (Non-Refrigerated)	Non-refrigerated Snack Vending Machine w/out Controls	Warehouse	building	2,913	46%	5	\$180	50%	\$ 90.00	\$	0.07
Beverage Machine Control	Existing std refrigerated beverage vending machine w/o control systems	Street Lighting	building	2,913	46%	5	\$189	50%	\$ 94.50	\$	0.07
Walk-in Shaded Pole to ECM	Shaded Pole Evaporator Fan Motor	Education	evap fan motor	1,627	62%	15	\$151	50%	\$ 75.60	\$	0.08

Commercial Measure Name	Commercial Baseline Description	Segment	Unit	Baseline Energy (kWh)	Energy Savings %	EUL (years)	Incr. Cost (\$)	Incentives as % of Incr Cost	Calculated Incentive	Program Acq Cost of the Incentive Only (Incentive / Savings)
Hand/Man LED	Hand/Man Inc. Fixture w/out countdown	Misc.	Fixture	1,016	94%	10	\$145	50%	\$ 72.50	\$ 0.08
LED Retrofit Linear Fluorescent Lamp	One 40W T12 Lamp, Magnetic Ballast	Grocery	Lamp	363	63%	8	\$36	50%	\$ 17.97	\$ 0.08
Reach-in Shaded Pole to PSC Evaporator Fan Motor	Shaded Pole Evaporator Fan Motor	Street Lighting	evap fan motor	587	53%	15	\$50	50%	\$ 25.00	\$ 0.08
Smart Strip Plug Outlets	Standard plug strip/outlet	Education	Smart Strip	378	33%	5	\$21	50%	\$ 10.50	\$ 0.08
VFD on Condenser Water Pump	Motor w/out VFD Drive	Lodging	motor	50,030	33%	15	\$2,843	50%	\$ 1,421.56	\$ 0.09
Room AC (w/ louvered sides)	Std Room AC (Code Min. Fedral Standards)	Warehouse	ton	2,161	4.5%	9	\$17	50%	\$ 8.65	\$ 0.09
Efficient Unit Heating System	Existing Unit Heaters in PA	Lodging	heater	78,299	23%	15	\$3,289	50%	\$ 1,644.45	\$ 0.09
Duct Insulation, Add R8	No Insulation	Restaurant	building	2,003	4.0%	15	\$16	50%	\$ 7.95	\$ 0.10

Industrial Measures in the SWE's Energy Efficiency Market Potential Study with a Program Acquisition Cost about less than or equal to \$0.10/annual kWh saved. Please note that the costs shown below include only the incentives so the actual program acquisition cost will be higher to reflect program delivery and administrative costs.

Industrial Measure Name	Segment	End Use	Baseline Energy (kWh)	Energy Savings %	EUL (years)	Incr. Cost (\$)	TRC Ratio	Incentives as % of Incr Cost	Calculated Incentive	Program Acq Cost of the Incentive Only (Incentive / Savings)
Elec Chip Fab: Reduce Gas Pressure	Mfg: Comp & Elec	Process Other	40,740	10%	10	\$0.0	5.96	50%	\$0.00	\$0.00
Wood: Replace Pneumatic Conveyor	Other Non-Mfg	Motors	2,018	29%	10	\$8.5	5.10	50%	\$4.24	\$0.01
Motors Other	Mfg: Chemicals	Motors	419,472	1.4%	15	\$106	6.81	50%	\$53.04	\$0.01
Heat Lamps	Other Non-Mfg	Process Heating	8,988	3.4%	10	\$5.7	4.68	50%	\$2.87	\$0.01
Facility Energy Management	Mfg: Other	Motors	27,370	2.0%	2	\$11	1.10	50%	\$5.27	\$0.01
Plant Energy Management	Mfg: Paper	Other	98,664	12%	10	\$248	4.47	50%	\$123.90	\$0.01
Recommissioning	Mfg: Other	HVAC	174,975	5.0%	10	\$240	4.31	50%	\$119.96	\$0.01
Cooling Tower Optimization	Other Non-Mfg	Process Refrigeration	1,140	20%	10	\$7.0	5.25	50%	\$3.49	\$0.02
Block Heater Timer	Other Non-Mfg	Other	3,878	2.5%	10	\$3.8	3.73	50%	\$1.89	\$0.02
Food: Refrig Storage Tuneup	Mfg: Food	Process Cooling	521,888	14%	3	\$3,256	1.39	50%	\$1,628.04	\$0.02
Fruit Storage Tuneup	Mfg: Food	Process Cooling	521,888	16%	3	\$3,539	1.39	50%	\$1,769.74	\$0.02
Improved Controls - Air Compressor	Other Non-Mfg	Process Air Compressor	167	41%	10	\$3.0	3.62	50%	\$1.49	\$0.02
Greenhouse Heat Curtain	Other Non-Mfg	Other	3,878	17%	5	\$30	1.96	50%	\$14.81	\$0.02
Air Compressor Equipment	Other Non-Mfg	Process Air Compressor	167	39%	10	\$3.0	3.53	50%	\$1.52	\$0.02
Improved Controls - HVAC	Other Non-Mfg	HVAC	21,827	21%	10	\$229	3.49	50%	\$114.74	\$0.03
Improved Controls - Fans	Mfg: Food	Fans	440,724	7.1%	10	\$1,709	3.27	50%	\$854.35	\$0.03
Cold Storage Tuneup	Mfg: Food	Process Refrigeration	268,089	13%	3	\$2,045	1.15	50%	\$1,022.38	\$0.03
Air Compressor Demand Reduction	Mfg: Other	Process Air Compressor	1,548	26%	10	\$23	3.22	50%	\$11.60	\$0.03

Industrial Measure Name	Segment	End Use	Baseline Energy (kWh)	Energy Savings %	EUL (years)	Incr. Cost (\$)	TRC Ratio	Incentives as % of Incr Cost	Calculated Incentive	Program Acq Cost of the Incentive Only (Incentive / Savings)
Optimization of operating parameters	Mfg: Paper	Process Refrigeration	31,162	13%	3	\$252	1.11	50%	\$125.80	\$0.03
Improved Controls - Process Heating	Other Non-Mfg	Process Heating	8,988	17%	10	\$103	3.04	50%	\$51.64	\$0.03
Motor Management Plan	Mfg: Plastics	Motors	230,958	2.9%	10	\$471	2.99	50%	\$235.46	\$0.04
Kraft: Effluent Treatment System	Mfg: Paper	Process Other	128,283	15%	10	\$1,428	2.90	50%	\$713.76	\$0.04
Clean Room: Chiller Optimize	Mfg: Comp & Elec	Process Cooling	43,393	15%	10	\$524	2.99	50%	\$261.90	\$0.04
Kraft: Efficient Agitator	Mfg: Paper	Process Other	128,283	50%	10	\$5,375	2.72	50%	\$2,687.49	\$0.04
Fan Equipment Upgrade	Other Non-Mfg	Fans	6,392	35%	10	\$192	2.80	50%	\$95.88	\$0.04
Metal: New Arc Furnace	Mfg: Metals	Process Heating	911,351	45%	10	\$37,864	2.56	50%	\$18,932.14	\$0.05
Screw Base LED	Other Non-Mfg	Lighting	12,328	77%	9	\$909	2.12	50%	\$454.48	\$0.05
T8 High Performance Linear Florescent	Other Non-Mfg	Lighting	12,328	26%	14	\$321	3.03	50%	\$160.39	\$0.05
Motors: Rewind 500+ HP	Mfg: Other	Motors	27,370	0.6%	8	\$16	2.05	50%	\$7.76	\$0.05
Heat Lamp/Heating Pad Controller	Other Non-Mfg	Process Heating	8,988	1.8%	15	\$16	3.42	50%	\$8.22	\$0.05
Improved Controls - Motors	Mfg: Comp & Elec	Motors	21,287	4.0%	10	\$93	2.33	50%	\$46.26	\$0.05
Air Compressor Optimization	Other Non-Mfg	Process Air Compressor	167	39%	10	\$7.3	2.28	50%	\$3.65	\$0.06
Programmable Ventilation Controller	Other Non-Mfg	HVAC	21,827	0.1%	10	\$2.5	2.31	50%	\$1.23	\$0.06
Mech Pulp: Premium Process	Mfg: Paper	Process Other	128,283	0.2%	5	\$24	1.27	50%	\$12.21	\$0.06
Circulating Fans	Mfg: Metals	Fans	245,967	5.0%	10	\$1,497	2.28	50%	\$748.67	\$0.06
Energy Project Management	Mfg: Chemicals	Other	142,840	29%	11	\$5,099	2.30	50%	\$2,549.38	\$0.06
Pump Equipment Upgrade	Mfg: Paper	Pumps	3,007,473	20%	12	\$75,187	2.57	50%	\$37,593.41	\$0.06

Industrial Measure Name	Segment	End Use	Baseline Energy (kWh)	Energy Savings %	EUL (years)	Incr. Cost (\$)	TRC Ratio	Incentives as % of Incr Cost	Calculated Incentive	Program Acq Cost of the Incentive Only (Incentive / Savings)
Synchronous Belts	Other Non-Mfg	Process Refrigeration	1,140	1.2%	10	\$1.7	2.29	50%	\$0.84	\$0.06
Grain bin aeration control systems	Other Non-Mfg	Other	3,878	2.3%	15	\$12	2.88	50%	\$5.81	\$0.07
Bldg Improvements	Other Non-Mfg	Other	3,878	16%	15	\$85	2.86	50%	\$42.28	\$0.07
Variable Speed Drives for Dairy Vacuum Pumps	Other Non-Mfg	Motors	2,018	37%	15	\$101	3.00	50%	\$50.52	\$0.07
Refrigerated Cycling Dryers	Other Non-Mfg	Process Air Compressor	167	1.7%	10	\$0.4	2.00	50%	\$0.19	\$0.07
Heat Reclaimer	Other Non-Mfg	HVAC	21,827	42%	15	\$1,249	2.92	50%	\$624.26	\$0.07
Motors: Rewind 201-500 HP	Mfg: Food	Motors	139,143	0.6%	8	\$110	1.64	50%	\$55.24	\$0.07
Crate Heating Pads	Other Non-Mfg	Process Heating	8,988	18%	15	\$228	2.77	50%	\$114.20	\$0.07
Properly Sized Fans	Other Non-Mfg	Fans	6,392	13%	10	\$131	1.93	50%	\$65.46	\$0.08
Adjustable speed drive on compressors	Other Non-Mfg	Process Refrigeration	1,140	12%	10	\$21	1.97	50%	\$10.54	\$0.08
Clean Room: Clean Room HVAC	Mfg: Plastics	Process Cooling	295,258	9.0%	15	\$4,302	2.78	50%	\$2,151.08	\$0.08
Room AC (with louvered sides)	Other Non-Mfg	HVAC	21,827	2.6%	9	\$94	1.77	50%	\$46.83	\$0.08
Fruit Storage Refer Retrofit	Mfg: Food	Process Cooling	521,888	38%	10	\$33,743	1.90	50%	\$16,871.41	\$0.08
Heat Lamp Setback (Microzone)	Other Non-Mfg	Process Heating	8,988	0.5%	15	\$6.9	2.49	50%	\$3.44	\$0.08
Cold Storage Retrofit	Mfg: Food	Process Refrigeration	268,089	18%	10	\$8,360	1.75	50%	\$4,179.99	\$0.09
Metal Halide (High Bay)	Other Non-Mfg	Lighting	12,328	73%	13	\$1,540	1.97	50%	\$769.93	\$0.09
Linear Fluorescent (High Bay)	Mfg: Plastics	Lighting	366,954	13%	14	\$8,525	2.07	50%	\$4,262.41	\$0.09
Paper: Efficient Pulp Screen	Mfg: Paper	Process Other	128,283	15%	10	\$3,482	1.67	50%	\$1,740.98	\$0.09
Efficient Centrifugal Fan	Mfg: Paper	Fans	1,699,371	20%	10	\$61,795	1.73	50%	\$30,897.65	\$0.09
Paper: Premium Fan	Mfg: Paper	Fans	1,699,371	20%	10	\$61,795	1.73	50%	\$30,897.65	\$0.09
Fan System Optimization	Other Non-Mfg	Fans	6,392	7.3%	10	\$87	1.59	50%	\$43.59	\$0.09

Industrial Measure Name	Segment	End Use	Baseline Energy (kWh)	Energy Savings %	EUL (years)	Incr. Cost (\$)	TRC Ratio	Incentives as % of Incr Cost	Calculated Incentive	Program Acq Cost of the Incentive Only (Incentive / Savings)
<i>Elec Chip Fab: Eliminate Exhaust</i>	<i>Mfg: Comp & Elec</i>	<i>Process Other</i>	40,740	5.0%	10	\$380	1.63	50%	\$190.16	\$0.09
<i>Enhanced (Ultra-PE) Motor 50-100 HP Transformers</i>	<i>Mfg: Comp & Elec</i>	<i>Motors</i>	21,287	0.9%	15	\$37	2.39	50%	\$18.72	\$0.09
<i>Integrated Plant Energy Management</i>	<i>Mfg: Plastics</i>	<i>Other</i>	113,315	1.6%	15	\$362	2.19	50%	\$181.01	\$0.10
	<i>Mfg: Chemicals</i>	<i>Other</i>	142,840	50%	11	\$14,079	1.67	50%	\$7,039.56	\$0.10

CERTIFICATE OF SERVICE
(Docket No. M-2014-2424864)

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

VIA FIRST CLASS MAIL

Bureau of Investigation & Enforcement
PO Box 3265
Commonwealth Keystone Building
400 North Street, 2nd Floor West
Harrisburg, PA 17105-3265

Office of Small Business Advocate
Commerce Building
300 North Second Street, Suite 202
Harrisburg, PA 17101

Christopher M. Arfaa
Thomas J. Sniscak
Hawke McKeon & Sniscak LLP
100 North Tenth Street
Harrisburg, PA 17101
Pennsylvania State University

Aron J. Beatty
Office of Consumer Advocate
555 Walnut Street
Forum Place, 5th Floor
Harrisburg, PA 17101-1923
Office of Consumer Advocate

Robin LeBaron
Sr. Analyst
2107 Wilson Blvd., Suite 850
Arlington, VA 22201
Home Performance Coalition

Elizabeth P. Trinkle
McNees Wallace & Nurick LLC
100 Pine Street
P.O. Box 1166
Harrisburg, PA 17108-1166
Industrial Customer Groups

Mark C. Morrow
Chief Regulatory Counsel
UGI Corporation
460 North Gulph Road
King of Prussia, PA 19406
UGI Distribution Companies

Jocelyn Grabrynowicz Hill
City of Philadelphia
1515 Arch Street
16th Floor
Philadelphia, PA 19102
City of Philadelphia

Robert Altenburg
610 North Third Street
Harrisburg, PA 17101
Citizens for Pennsylvania's Future

John L. Munsch
First Energy Corp.
800 Cabin Hill Drive
Greensburg, PA 15601-1689
MetEd, Penelec, PennPower & West Penn Power

Harry S. Geller
Elizabeth R. Marx
Pennsylvania Utility Law Project
118 Locust Street
Harrisburg, PA 17101-1414
CAUSE-PA

RECEIVED
2015 APR 27 PM 3:48
PA PUC
SECRETARY'S BUREAU

Logan Welde
135 S. 19th Street
Suite 300
Philadelphia, PA 19103
Clean Air Council

Brian Kauffman
Executive Director
1501 Cherry Street
Philadelphia, PA 19102
Keystone Energy Efficiency Alliance

Terrence J. Fitzpatrick
President and CEO
Energy Association of PA
800 North Third Street
Suite 205
Harrisburg, PA 17102
Energy Association of PA

Jack R. Garfinkle
Assistant General Counsel
Exelon Business Services Company
2301 Market Street
Philadelphia, PA 19103
PECO Energy Company

Jackson Morris
Director Regional Affairs
100 Center Road
Danville, PA 17821
Energy Efficiency for All

Thomas Schuster
PO Box 51
Winber, PA 15963
Sierra Club

Rachel Blake
Mark Schwartz
2 S. Easton road
Glenside, PA 19038
RHLS & PWCC

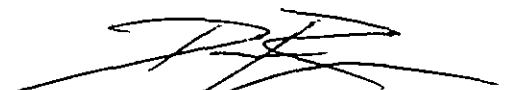
John Manz
1 College Avenue
Williamsport, PA 17701
National Sustainable Structures Center

Joseph L. Vullo
Burke Vullo Reilly Roberts
1460 Wyoming Avenue
Forty Fort, PA 18704
Pennsylvania Weatherization Task Force

Tishckia E. Williams
Duquesne Light Company
411 Seventh Avenue, 16th Fl.
Pittsburgh, PA 15219
Duquesne Light Company

RECEIVED
2015 APR 27 PM 3:48
PA PUC
SECRETARY'S BUREAU

Date: April 27, 2015


Devin T. Ryan