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January 13, 2012

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PA PUBLIC UTILITY COMMISSION  
SECRETARY'S BUREAU

**Via Federal Express**

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

**Re: PUC Docket No. M-2008-2069887  
Energy Efficiency and Conservation Program Quarterly Report for  
September 1, 2011 through November 30, 2011**

Dear Secretary Chiavetta:

In accordance with the Commission's Secretarial Letter dated May 25, 2011, enclosed are an original and eight copies of PECO's Quarterly Energy Efficiency & Conservation Report for the period September 1, 2011 through November 30, 2011.

PECO is providing a copy of the report to the Act 129 Statewide Evaluator (GDS Associates, Inc.) and is also posting the report on the PECO website.

Please acknowledge receipt of the foregoing on the enclosed copy of this letter.

If you have any further questions regarding this matter, please call me at 215-841-5777.

Sincerely,

*Richard G. Webster, Jr. / RAS*

cc: C. Walker-Davis, Director, Office of Special Assistants  
P. Diskin, Director, Bureau of Technical Utility Services  
M. C. Lesney, Director, Bureau of Audits  
J. E. Simms, Director, Bureau of Investigation & Enforcement  
Office of Consumer Advocate  
Office of Small Business Advocate  
McNees, Wallace & Nurick

enclosures

# **Quarterly Report to the Pennsylvania Public Utility Commission**

**For the Period  
September through November 2011  
Program Year Three**

For Pennsylvania Act 129 of 2008  
Energy Efficiency and Conservation Plan

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PA PUBLIC UTILITY COMMISSION  
SECRETARY'S BUREAU

Prepared by Navigant Consulting, Inc.

For

PECO Energy Company

January 13, 2012

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## Acronyms

C & I	Commercial and Industrial
CATI	Computer-Aided Telephone Interview
CFL	Compact Fluorescent Lamp
CPITD	Cumulative Program/Portfolio Inception to Date
CVR	Conservation Voltage Reduction
CVRf	Conservation Voltage Reduction factor
DLC	Direct Load Control
EDC	Electric Distribution Company
EE&C	Energy Efficiency and Conservation
EM&V	Evaluation, Measurement, and Verification
HVAC	Heating, Ventilating, and Air Conditioning
IQ	Incremental Quarter
kW	Kilowatt
kWh	Kilowatt-hour
LED	Light Emitting Diode
LEEP	Low-Income Energy Efficiency Program
LIURP	Low-Income Usage Reduction Program
M&V	Measurement and Verification
MW	Megawatt
MWh	Megawatt-hour
NTG	Net-to-Gross
PUC	Public Utility Commission
PY1	Program Year 2009
PY2	Program Year 2010
PY3	Program Year 2011
PY3TD	Program/Portfolio Year Three to Date
SEER	Seasonal Energy Efficiency Rating
SWE	Statewide Evaluator
TRC	Total Resource Cost
TRM	Technical Reference Manual

## 1 Overview of Portfolio

Pennsylvania Act 129 of 2008, signed on October 15, 2008, mandated energy savings and demand reduction goals for the largest electric distribution companies (EDCs) in Pennsylvania. Each EDC submitted energy efficiency and conservation (EE&C) plans—which were approved by the Pennsylvania Public Utility Commission (PUC)—pursuant to these goals. On July 15, 2011, PECO filed a petition for changes to our Act 129 EE&C Plan and through a Secretarial Letter dated August 18, 2011 received approval. This report documents the progress and effectiveness of the EE&C accomplishments for PECO in Program Year Two (PY2), defined as June 1, 2010 through May 31, 2011, as well as the cumulative accomplishments of the programs since inception.

PECO's EE&C performance levels have well exceeded expectations. This is attributable to customers, for the first time, having utility sponsored rebates and incentives available across a broad range of measures. Additionally, the availability of low cost measures, such as CFL's, has allowed customers to participate with a very low up-front cost. We do forecast the cost per MWh saved to increase over the remaining program years as emphasis is shifted to more expensive technologies required to achieve MWh savings. Driving performance will become increasingly more challenging for the remainder of this Act 129 plan cycle, and certainly for subsequent plan cycles given regulatory changes and available EE&C technologies in the future.

### Compliance goal progress as of the end of the reporting period<sup>1</sup>:

#### Cumulative Portfolio Energy Impacts

- The Cumulative Program/Portfolio Inception to Date (CPITD) reported gross energy savings is 992,023 megawatt-hours (MWh).
- The CPITD preliminary verified energy savings is 898,062 MWh.<sup>2</sup>

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<sup>1</sup> Percentage of the compliance target achieved, which is calculated using verified Cumulative Program/Portfolio Inception to Date values (or preliminary verified value, if not available) divided by the compliance target value.

<sup>2</sup> This amount includes verified savings exclusively from measures with approved deemed savings values or protocols that have been approved by the SWE. As of the date of publication, this includes 24,870 in PY3, 713,313 MWh in PY2 and 159,879 MWh in PY1. These values are subject to change as additional

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- Achieved 84 percent of the 1,181,550 MWh May 31, 2013 energy savings compliance target, based on reported gross energy savings.
- Achieved 76 percent of the 1,181,550 MWh May 31, 2013 energy savings compliance target, based on preliminary verified energy savings.

#### **Portfolio Demand Reduction<sup>3</sup>**

- The Program Year Three To Date (PY3TD) Total Committed demand reduction is 71 megawatts (MW).
- The CPITD reported gross demand reduction is 166.7 MW.
- The CPITD preliminary verified demand reduction is 150.6 MW.<sup>4</sup>
- Achieved 42 percent of the 355 MW May 31, 2013 demand reduction compliance target, based on preliminary verified demand reduction.
- Achieved 62 percent of the 355 MW May 31, 2013 demand reduction compliance target based on CPITD preliminary verified plus unverified, committed savings from PY3.<sup>5</sup>

#### **Low-Income Sector**

- There are 15 measures offered to the low-income sector, and another 25 measures offered by other programs in the residential sector (which are also available to low-income customers). The measures offered to the low-income sector therefore comprise 37.5 percent of the total measures offered. As required by Act 129, this exceeds the fraction of total electricity consumption in the PECO service area that is used by low-income households (8.05 percent).<sup>6</sup>

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protocols and deemed savings values for measures are approved by the SWE and as the verification process proceeds throughout PY3.

<sup>3</sup> Demand reduction includes both the demand savings from the installation of energy efficiency measures and the demand reduction associated with demand-response programs.

<sup>4</sup> This amount includes verified savings exclusively from measures with approved deemed savings values or protocols that have been approved by the SWE. As of the date of publication, this includes 1.4 MW for PY3, 136.7 MW for PY2 and 12.5 MW for PY1 (the latter value is 0.6 MW higher than reported in the PY1 Annual Report due to the subsequent approval of the savings protocol for the LEEP program and corrections to tracking system errors in the Smart Equipment Incentives program).

<sup>5</sup> Unverified, Reported Gross MW from program activity in the first two quarters of PY3 is 69.6 MW.

<sup>6</sup> Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66 Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings.

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- The CPITD reported gross energy savings for low-income sector programs is 63,817.<sup>7</sup>
- The CPITD preliminary verified energy savings for low-income sector programs is 53,580 MWh comprising savings from both weatherization audits and CFL bulbs.<sup>7</sup>

#### **Government, Nonprofit, and Institutional Sectors**

- The CPITD reported gross energy savings for government and nonprofit sector programs is 94,098 MWh.<sup>8</sup>
- The CPITD preliminary verified energy savings for government and nonprofit sector programs is 77,355 MWh.<sup>8</sup>
- Achieved 80 percent of the 118,155-MWh May 31, 2013, energy reduction compliance target for this sector, based on reported gross energy savings.

#### **Program Year (PY) Portfolio Highlights as of the End of the Reporting Period**

- The PY3TD reported gross energy savings is 103,606 MWh.
- The PY3TD preliminary verified energy savings is 24,870 MWh.
- The PY3TD reported gross demand reduction is 15.6 MW.
- The PY3TD preliminary verified demand reduction is 1.4 MW.
- The PY3TD reported participation is 97,867 participants.<sup>9</sup>

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<sup>7</sup> This value includes 25,630 MWh allocated to the low income sector from the CVR program. CVR savings are allocated to each sector on the basis of each sector's contribution to total energy consumption.

<sup>8</sup> This value includes 38,445 MWh allocated to the Government, Nonprofit, and Institutional sectors from the CVR program. CVR savings are allocated to each sector on the basis of each sector's contribution to total energy consumption.

<sup>9</sup> Participation excludes sales of compact fluorescent lamps in the Smart Lighting Discounts program and light emitting diode lamps and Energy Star lighting fixtures in the Smart Home Rebates program.

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The savings listed above reflect results from ten programs, as shown in Table 1-1.

**Table 1-1. Programs Evaluated**

Program	Launch
PECO Smart Lighting Discounts	October 2009
Low-Income Energy Efficiency Program (LEEP)	January 2010
PECO Smart Appliance Recycling	March 2010
PECO Smart Home Rebates	March 2010
PECO Smart Equipment Incentives – Commercial and Industrial (C&I)	March 2010
PECO Smart-Equipment Incentives – Government & Nonprofit	March 2010
Conservation Voltage Reduction	February 2010
Residential Direct Load Control	June 2010
C&I Direct Load Control	June 2010
PECO Smart Construction Incentives	January 2011

PECO will roll out five more programs in PY3, as shown in Table 1-2.

**Table 1-2. Forthcoming Programs**

<b>Program</b>	<b>Expected Launch</b>
Residential New Construction	TBD
Demand-Response Aggregator Contracts	October 2011
Distributed Resources	October 2011
Residential Whole Home Performance	TBD
Permanent Load Reduction	June 2011

## 1.1 Summary of Portfolio Impacts

A summary of the portfolio's reported impacts is presented in Table 1-3.

**Table 1-3. EDC Reported Portfolio Impacts Through the End of the Reporting Period**

Impact Type	Total Energy Savings (MWh)	Total Demand Reduction (MW)
Reported Gross Impact: Incremental Quarterly	39,161	6.7
Reported Gross Impact: Program Year to Date	103,606	15.6
Reported Gross Impact: Cumulative Portfolio Inception to Date	992,023	166.7
Unverified Ex Post Savings <sup>1</sup>	0	0.0
Estimated Impact: Projects in Progress	0	55.4
Estimated Impact: PYTD Total Committed	103,606	71.0
Preliminary PYTD Verified Impact <sup>2</sup>	24,870	1.4
Preliminary PYTD Net Impact <sup>3</sup>	24,870	1.4
Verified Savings: Cumulative Portfolio Inception to Date	898,062	150.6
<p><b>NOTES:</b></p> <p><sup>1</sup>Unverified Ex Post Savings are unverified savings pending approval of a TRM or Custom Measure Protocol by the Commission.</p> <p><sup>2</sup>Portfolio Verified Impact calculated by aggregating Program PYTD Verified Impacts. Program PYTD Verified Impacts are calculated by multiplying Program PYTD Reported Gross Impacts by program realization rates.</p> <p><sup>3</sup>Portfolio Net Impact calculated by aggregating Program Net Impacts. Program Net Impacts are calculated by multiplying Program PYTD Verified Impacts by program Net-to-Gross ratios.</p>		

A summary of total evaluation adjusted impacts for the portfolio is presented in Table 1-4.

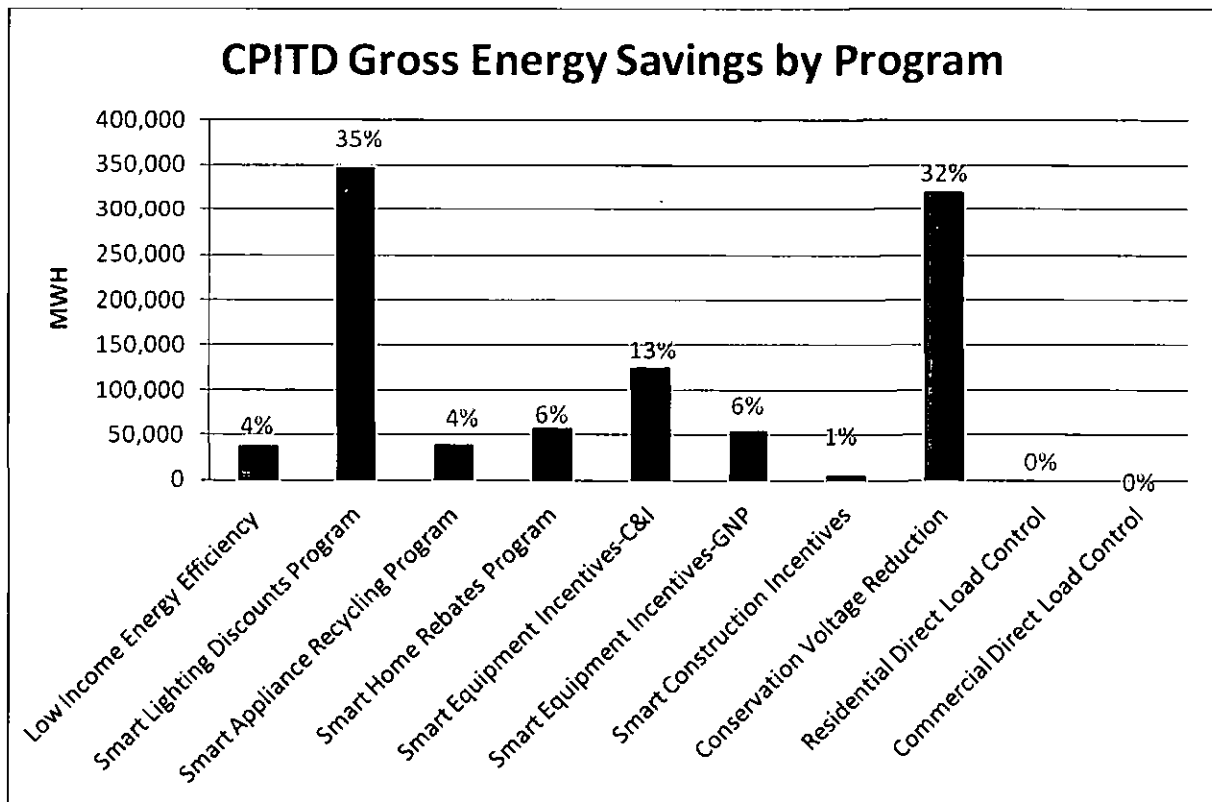
**Table 1-4. Verified Preliminary Portfolio Total Evaluation Adjusted Impacts through the End of the Reporting Period**

TRC Category	IQ	PY3TD	CPITD
TRC Benefits (\$)	n/a	n/a	n/a
TRC Costs (\$)	n/a	n/a	n/a
TRC Benefit-Cost Ratio			n/a
<p><b>NOTES:</b></p> <p>Per PUC direction, program costs, benefits, and benefit-cost ratios are not included in this report.</p>			

## 1.2 Summary of Energy Impacts by Program

A summary of the reported energy savings by program is presented in Figure 1-1.

**Figure 1-1. CPITD Reported Gross Energy Savings by Program through the End of the Reporting Period**



A summary of energy impacts by program through the second quarter of PY3 is presented in Table 1-5 and Table 1-6. Note that savings from efficiency projects at multi-tenant properties are included in the savings results for the C&I and Government / Nonprofit programs.

**Table 1-5. EDC Reported Participation and Gross Energy Savings by Program through the End of the Reporting Period**

Program	Participants			Reported Gross Impact (MWh)		
	IQ	PYTD	CPITD	IQ	PYTD	CPITD
Low-Income Energy Efficiency Program <sup>1</sup>	2,945	4,739	15,241	4,208	10,589	38,187
Smart Lighting Discounts Program <sup>2</sup>	39,820	513,201	7,338,731	2,127	24,870	347,329
Smart Appliance Recycling Program	2,466	6,151	25,974	4,112	10,012	40,458
Smart Home Rebates Program <sup>3</sup>	26,210	63,715	278,257	6,212	14,608	58,350
Smart Equipment Incentives-C&I	176	379	2,519	11,920	26,279	125,978
Smart Equipment Incentives-C&I Multi-tenant	142	292	292	44	118	118
Smart Equipment Incentives-Government / Nonprofit <sup>4</sup>	51	97	524	8,476	11,544	55,645
Smart Equipment Incentives-Government / Nonprofit Multi-tenant	30	59	59	3	8	8
Smart Construction Incentives	14	39	43	2,059	5,578	5,578
Conservation Voltage Reduction	0	0	83	0	0	320,372
Residential Direct Load Control	5,763	21,561	62,775	0	0	0
Commercial Direct Load Control	807	835	925	0	0	0
<b>TOTAL PORTFOLIO</b>	<b>38,604</b>	<b>97,867</b>	<b>386,609</b>	<b>39,161</b>	<b>103,606</b>	<b>992,023</b>

**NOTES:**

<sup>1</sup>Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66 Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings. Participation includes only those receiving the Weatherization Audit.

<sup>2</sup>Participation numbers shown are the numbers of discounted lamps sold. These are excluded from total portfolio participation numbers. The CPITD participant value reported here includes 17,856 lamps that were inadvertently removed from PY2 cumulative participation values, although their costs and savings were reported correctly in all previous reports.

<sup>3</sup>Participant values exclude sales of EnergyStar lighting fixtures and LED lamps, for which upstream rebates are provided.

<sup>4</sup>The CPITD Reported Gross Impact shown for this program reflects an increase of 5 MWh in PY1 savings from that embedded in the PY2 Q3 report and an increase of 660 MWh from the CPITD savings presented for this program in the PY1 Annual Report. These changes are due to corrections of tracking system errors identified following the publication of those reports. An appendix to the PY2 Annual Report provided complete substantiation of the necessary changes.

**Table 1-6. EDC Reported Gross Energy Savings by Program through the End of the Reporting Period**

Program	Unverified Ex Post Savings <sup>2</sup>	Projects In Progress (MWh)	PYTD Total Committed (MWh)	EE&C Plan Estimate for Program Year (MWh)	Percent of Estimate Committed (%)
Low-Income Energy Efficiency Program <sup>1</sup>	0	0	10,589	27,240	39
Smart Lighting Discounts Program	0	0	24,870	90,140	28
Smart Appliance Recycling Program	0	0	10,012	22,483	45
Smart Home Rebates Program	0	0	14,608	40,329	36
Smart Equipment Incentives-C&I	0	0	26,279	84,078	31
Smart Equipment Incentives-C&I Multi-tenant	0	0	118	0	100
Smart Equipment Incentives-Government / Nonprofit	0	0	11,544	58,822	20
Smart Equipment Incentives-Government / Nonprofit Multi-tenant	0	0	8	0	100
Smart Construction Incentives	0	0	5,578	8,750	64
Conservation Voltage Reduction	0	0	0	0	100
Residential Direct Load Control	0	0	0	1,662	0
Commercial Direct Load Control	0	0	0	895	0
<b>TOTAL PORTFOLIO</b>	0	0	103,606	334,399	31
<b>NOTES:</b>					
<sup>1</sup> Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66 Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings.					
<sup>2</sup> Unverified Ex Post Savings are unverified savings pending approval of a TRM or Custom Measure Protocol by the Commission.					

A summary of evaluation-verified energy impacts by program is presented in Table 1-7. For most programs, there has been insufficient time following the close of the quarter to complete measurement and verification (M&V) activities or calculate realization rates.

**Table 1-7. Preliminary Verified Energy Savings by Program through the End of the Reporting Period**

Program	PYTD Reported Gross Impact (MWh)	Preliminary Realization Rate <sup>2</sup>	Preliminary PYTD Verified Impact (MWh)	Net-to-Gross Ratio	PYTD Net Impact (MWh) <sup>2</sup>	Verified Savings CPITD (MWh)
Low-Income Energy Efficiency Program <sup>1</sup>	10,589	n/a	n/a	1	n/a	53,580
Smart Lighting Discounts Program	24,870	1.00	24,870	1	24,870	347,329
Smart Appliance Recycling Program	10,012	n/a	n/a	1	n/a	30,394
Smart Home Rebates Program	14,608	n/a	n/a	1	n/a	43,680
Smart Equipment Incentives-C&I <sup>3</sup>	26,279	n/a	n/a	1	n/a	89,427
Smart Equipment Incentives-C&I Multi-tenant	118	n/a	n/a	1	n/a	0
Smart Equipment Incentives-Government / Nonprofit <sup>3</sup>	11,544	n/a	n/a	1	n/a	77,355
Smart Equipment Incentives-Government / Nonprofit Multi-tenant	8	n/a	n/a	1	n/a	0
Smart Construction Incentives	5,578	n/a	n/a	1	n/a	0
Conservation Voltage Reduction	0	n/a	n/a	1	n/a	256,298
Residential Direct Load Control	0	n/a	n/a	1	n/a	0
Commercial Direct Load Control	0	n/a	n/a	1	n/a	0
<b>TOTAL PORTFOLIO</b>	<b>103,606</b>	<b>n/a</b>	<b>24,870</b>	<b>1.00</b>	<b>24,870</b>	<b>898,062</b>

**NOTES:**

<sup>1</sup>Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66 Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings.

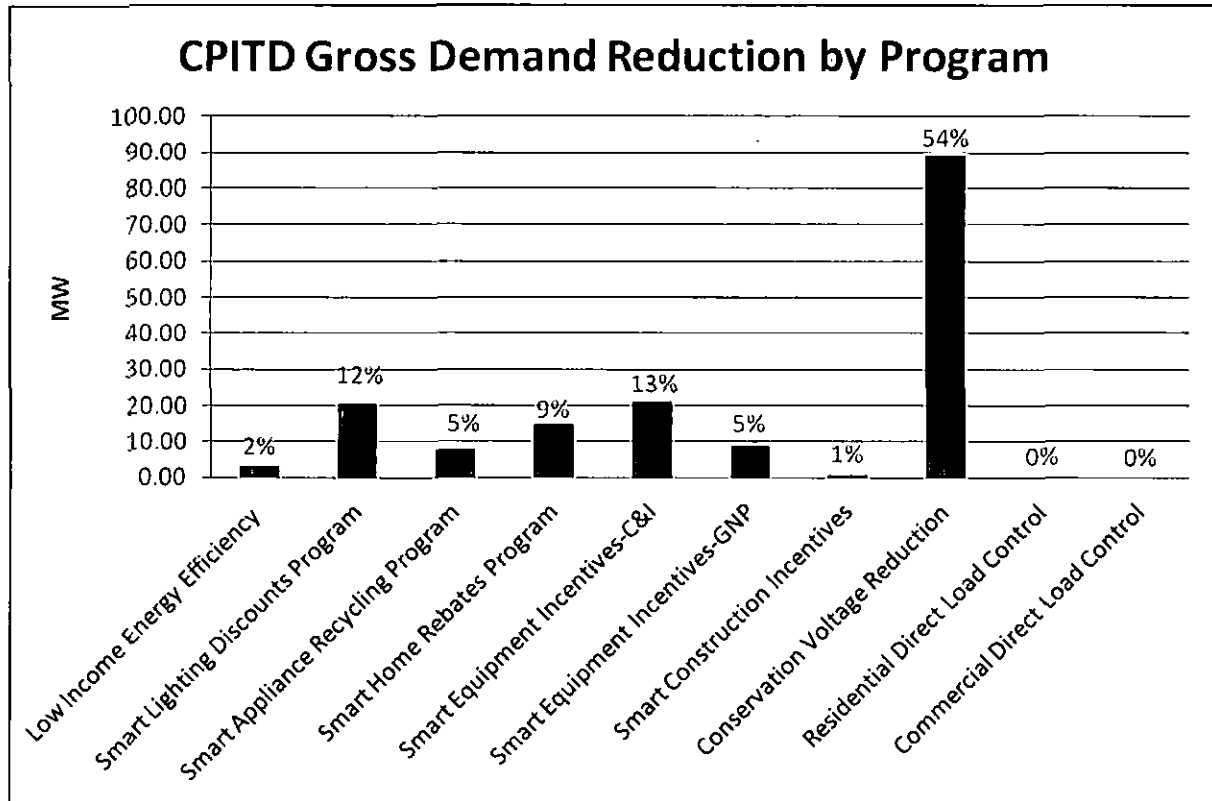
<sup>2</sup>Monitoring and verification of second quarter installations has been completed only for the Smart Lighting Discounts program. Accordingly, a realization rate and verified gross and net savings are presented only for that program.

<sup>3</sup>The values shown for CPITD Verified Savings for the C&I and Government/Nonprofit programs are higher by 1,052 MWh and 683 MWh respectively from those reported in the PY2 Third Quarter Report. Tracking system errors discovered subsequent to the publication of that report revealed higher gross savings in the Government/Nonprofit program for PY1 than previously reported. Correction of the measure-level gross savings for PY1 necessitated recalculation of realization rates for PY1. Because the C&I and Government/Nonprofit program were evaluated as a single program in PY1, the change in realization rates affects verified PY1 savings for both programs. An appendix included in the PY2 Annual Report provided complete substantiation of all changes.

### 1.3 Summary of Demand Impacts by Program

A summary of the reported demand reduction by program is presented in Figure 1-2.

**Figure 1-2. Reported Demand Reduction by Program through the End of the Reporting Period**



A summary of demand reduction impacts by program through the second quarter of PY3 is presented in Table 1-8 and Table 1-9. As in the PY2 Annual Report, all demand savings values have been adjusted to account for line losses. Note that savings from efficiency projects at multi-tenant properties are included in the savings results for the C&I and Government / Nonprofit programs.



**Table 1-8. Participation and Reported Gross Demand Reduction by Program through the End of the Reporting Period**

Program	Participants			Reported Gross Impact (MW)		
	IQ	PYTD	CPITD	IQ	PYTD	CPITD
Low-Income Energy Efficiency Program <sup>1,2</sup>	2,945	4,739	15,241	0.4	1.0	3.2
Smart Lighting Discounts Program <sup>3</sup>	39,820	513,201	7,338,731	0.1	1.4	20.4
Smart Appliance Recycling Program	2,466	6,151	25,974	0.7	1.7	7.8
Smart Home Rebates Program <sup>4</sup>	26,210	63,715	278,257	1.6	3.8	15.1
Smart Equipment Incentives-C&I	176	379	2,519	2.4	5.4	21.2
Smart Equipment Incentives-C&I Multi-tenant	142	292	292	0.0	0.0	0.0
Smart Equipment Incentives-Government / Nonprofit	51	97	524	1.1	1.5	8.8
Smart Equipment Incentives-Government / Nonprofit Multi-tenant	30	59	59	0.0	0.0	0.0
Smart Construction Incentives	14	39	43	0.3	0.9	0.9
Conservation Voltage Reduction	0	0	83	0.0	0.0	89.3
Residential Direct Load Control	5,763	21,561	62,775	0.0	0.0	0.0
Commercial Direct Load Control	807	835	925	0.0	0.0	0.0
<b>TOTAL PORTFOLIO</b>	<b>38,604</b>	<b>97,867</b>	<b>386,609</b>	<b>6.7</b>	<b>15.6</b>	<b>166.7</b>

**NOTES:**

<sup>1</sup>Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66 Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings. Participation includes only those receiving the Weatherization Audit.

<sup>2</sup>LEEP reporting through the first quarter of PY2 was based on CMC Energy Services reports of audits completed by job type and number of bulbs installed by wattage and program delivery component. As part of developing the program tracking system, PECO staff found some discrepancies with timing and reporting, and made revisions to more accurately represent the savings.

<sup>3</sup>Participation numbers shown are the numbers of discounted lamps sold. These are excluded from total portfolio participation numbers. The CPITD participant value reported here includes 17,856 lamps that were inadvertently left out of PECO's quarterly reports for PY2, although their costs and savings were reported correctly in all previous reports.

<sup>4</sup>Participant values exclude sales of EnergyStar lighting fixtures and LED lamps, for which upstream rebates are provided.

**Table 1-9. Reported Gross Demand Reduction by Program through the End of the Reporting Period**

<b>Program</b>	<b>Unverified Ex Post Savings<sup>2</sup></b>	<b>Projects In Progress (MW)</b>	<b>PYTD Total Committed (MW)</b>	<b>EE&amp;C Plan Estimate for Program Year (MW)</b>	<b>Percent of Estimate Committed (%)</b>
Low-Income Energy Efficiency Program <sup>1</sup>	0.0	0.0	1.0	1.7	57
Smart Lighting Discounts Program	0.0	0.0	1.4	4.9	28
Smart Appliance Recycling Program	0.0	0.0	1.7	4.3	39
Smart Home Rebates Program	0.0	0.0	3.8	1.9	198
Smart Equipment Incentives-C&I	0.0	0.0	5.4	19.0	29
Smart Equipment Incentives-C&I Multi-tenant	0.0	0.0	0.0	0.0	100
Smart Equipment Incentives-Government / Nonprofit	0.0	0.0	1.5	13.3	11
Smart Equipment Incentives-Government / Nonprofit Multi-tenant	0.0	0.0	0.0	0.0	100
Smart Construction Incentives	0.0	0.0	0.9	1.1	83
Conservation Voltage Reduction	0.0	0.0	0.0	0.0	100
Residential Direct Load Control	0.0	49.6	49.6	20.2	246
Commercial Direct Load Control	0.0	3.4	3.4	8.9	39
<b>TOTAL PORTFOLIO</b>	<b>0.0</b>	<b>53.0</b>	<b>68.6</b>	<b>75.3</b>	<b>91</b>
<p>NOTES:</p> <p><sup>1</sup>Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66.Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings.</p> <p><sup>2</sup>Unverified Ex Post Savings are unverified savings pending approval of a TRM or Custom Measure Protocol by the Commission.</p>					

A summary of evaluation adjusted demand impacts by program is presented in Table 1-10. For most programs, there has been insufficient time following the close of the quarter to complete M&V activities or calculate realization rates.

**Table 1-10. Verified Demand Reduction by Program through the End of the Reporting Period**

Program	PYTD Reported Gross Impact (MW)	Preliminary Realization Rate	Preliminary PYTD Verified Impact (MW)	Net-to-Gross Ratio	PYTD Net Impact (MW)	Verified Savings CPITD (MW)
Low-Income Energy Efficiency Program <sup>1</sup>	1.0	n/a	n/a	1.0	n/a	2.3
Smart Lighting Discounts Program	1.4	1	1.4	1.0	1.4	20.4
Smart Appliance Recycling Program	1.7	n/a	n/a	1.0	n/a	6.1
Smart Home Rebates Program	3.8	n/a	n/a	1.0	n/a	11.3
Smart Equipment Incentives-C&I	5.4	n/a	n/a	1.0	n/a	15.8
Smart Equipment Incentives-C&I Multi-tenant	0.0	n/a	n/a	1.0	n/a	0.0
Smart Equipment Incentives-Government / Nonprofit	1.5	n/a	n/a	1.0	n/a	5.3
Smart Equipment Incentives-Government / Nonprofit Multi-tenant	0.0	n/a	n/a	1.0	n/a	0.0
Smart Construction Incentives	0.9	n/a	n/a	1.0	n/a	0.0
Conservation Voltage Reduction	0.0	n/a	n/a	1.0	n/a	89.3
Residential Direct Load Control	0.0	n/a	n/a	1.0	n/a	0.0
Commercial Direct Load Control	0	n/a	n/a	1.0	n/a	0.0
<b>TOTAL PORTFOLIO</b>	15.6	n/a	1.4	1.0	1.4	150.6
<p>NOTES:  <sup>1</sup>Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66 Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings.</p>						

## 1.4 Summary of Evaluation

Realization rates are calculated to adjust reported savings based on statistically significant verified savings measured by independent evaluators. The realization rate is defined as the percentage of reported savings that is achieved, as determined through the independent evaluation review. A realization rate of 1 or 100 percent indicates no difference between the reported and achieved savings. Realization rates are determined by certain attributes relative to one of three protocol types. Fully deemed Technical Reference Manual (TRM) measure realization rates are driven by differences in the number of installed measures. Partially deemed TRM measure<sup>10</sup> realization rates are driven by (1) differences in the number of installed measures and (2) differences in the variables. Custom measure realization rates are driven by differences in the energy savings between the reported ex ante savings and the verified ex post savings following a site specific M&V plan (SSMVP) as developed by the evaluation contractor. The measure type and appropriate protocol or SSMVP determines the data type that is sampled.

### 1.4.1 Impact Evaluation

Impact evaluations activities for PY3 will be conducted throughout the program year. Sample sizes and realization rates for each program are presented in Table 1-11.

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<sup>10</sup> TRM measures with stipulated values and variables.

**Table 1-11: Summary of Realization Rates and Confidence Intervals (CIs) for kWh**

Program	PYTD Sample Participants	Program Year Sample Participant Target	Preliminary Realization Rate for kWh	Confidence and Precision for kWh	Preliminary Realization Rate for kWh	Confidence and Precision for kWh
Low-Income Energy Efficiency Program <sup>1</sup>	0	92	n/a	n/a	n/a	n/a
Smart Lighting Discounts Program <sup>2</sup>	513,201	2,000,000	1.00	100%/±0.00 %	1.00	100%/±0.00 %
Smart Appliance Recycling Program	0	225	n/a	n/a	n/a	n/a
Smart Home Rebates Program	0	200	n/a	n/a	n/a	n/a
Smart Equipment Incentives - C&I	0	40	n/a	n/a	n/a	n/a
Smart Equipment Incentives-C&I Multi-tenant	0	0	n/a	n/a	n/a	n/a
Smart Equipment Incentives-Government / Nonprofit	0	16	n/a	n/a	n/a	n/a
Smart Equipment Incentives-Government / Nonprofit Multi-tenant	0	0	n/a	n/a	n/a	n/a
Smart Construction Incentives	0	14	n/a	n/a	n/a	n/a
Conservation Voltage Reduction	0	0	n/a	n/a	n/a	n/a
Residential Direct Load Control Installation Verification <sup>3</sup>	100	100	n/a	n/a	n/a	n/a
Commercial Direct Load Control Installation Verification	0	100	n/a	n/a	n/a	n/a
<b>TOTAL PORTFOLIO<sup>2</sup></b>	<b>100.00</b>	<b>787.00</b>	<b>n/a</b>	<b>100%/±0.00 %</b>	<b>n/a</b>	<b>n/a</b>

**NOTES:**

<sup>1</sup> Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are “proportionate to those households’ share of the total energy usage in the service territory.” 66 Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings.

<sup>2</sup>Sample Participants and Sample Participant Targets for the Smart Lighting Discounts program are excluded from the total portfolio numbers, as these reflect numbers of CFL lamps sold.

<sup>3</sup>PYTD sample participants value represents 100 air conditioning units in 79 homes.

The following paragraphs summarize the impact evaluation methods under way to derive verified savings for each program.

- **Smart Lighting Discounts.** The M&V completed for the 2nd quarter report consisted of reviewing the 2nd quarter tracking data provided to the evaluation team by PECO lighting staff, as well as reviewing all of the manufacturer invoices received and approved by PECO and Ecos through the end of November 2011. The data used to estimate the PY3TD savings for this report was based upon the manufacturer invoices.
- **Low-Income Energy Efficiency Program.** Participant surveys provide information on installation rates, which are used to adjust savings. These surveys are conducted annually with a random sample of participants in each program component. The program has several components, including an audit component and three compact fluorescent lamp (CFL) bulb components. The Navigant team uses deemed savings for the CFL components and the approved protocol for weatherization audits, which is based on billing analyses of previous participants in PECO's Low Income Usage Reduction Program. The LEEP billing analysis is beginning in PY3 and will be completed by the fourth quarter.
- **Smart Appliance Recycling Program.** Phone surveys are being conducted quarterly or semi-annually to gather data to support the impact element of the Smart Appliance Recycling Program evaluation. Information from the phone survey will be used to calculate a part-use factor which will then be applied to a gross savings estimate. A phone survey of a sample of 125 Q1 and Q2 participants will be conducted in February 2012 and will be repeated in mid-to-late July 2012 for the remaining 100 completes in the sample. Findings will be used to inform the program part-use factors and net-to-gross ratio.
- **Smart Home Rebates Program.** As in PY2, the impact evaluation will include participant-survey-based verification.
- **Commercial and Industrial Smart Equipment Incentives Program.** The final PY2 annual report has been completed and activities are transitioning to PY3 evaluation. Currently, the PY3 evaluation is just beginning evaluation efforts for PY3. The first impact sample will be pulled in January including completed projects from Q1 and Q2. The impact evaluation plan for PY3 has been modified from the PY2 approach to use a lower level of rigor for the strata 3 projects. Verification for strata 3 projects will typically consist of file reviews only, however this will be determined on a case by case basis. Verification for strata 1 and 2 projects will continue to rely on use of on-site M&V. The SEI Program has instituted a waitlist for all applications received October 1, 2011 or later. This will not significantly affect the impact evaluation efforts for PY3, but may alter plans for PY4.
- **Government and Nonprofit Smart Equipment Incentives Program.** . As with the Commercial and Industrial (C&I) Smart Equipment Incentives Program (SEI), the PY2

Government and Nonprofit (GNP) SEI PY2 annual report was submitted and the first impact sample for Q1 and Q2 projects will be drawn in January 2012. The impact evaluation plan for PY3 has been modified from the PY2 approach to use a lower level of rigor for the strata 3 projects. Verification for strata 3 projects will typically consist of file reviews only, however this will be determined on a case by case basis. Desk review and invoice review are already used for the LED traffic lights and for the multi-tenant projects. Verification for larger strata 1 and 2 projects will continue to rely on use of on-site M&V. The waitlist for SEI C&I projects is also in effect for GNP projects.

- **Conservation Voltage Reduction.** PECO's CVR program was fully implemented and operational through the second quarter of PY3. PECO reported no program related issues impacting electric delivery service relating to the program over this period.
- **Direct Load Control.** PECO began calling test and system-wide load control events in PY3. Data from 100 M&V meters on residential participant homes will be used in the impact analysis of the residential direct load control program. M&V meters have yet to be installed at C&I customer sites and no impacts for the C&I DLC program will be reported in PY3. On-site verification of installations were completed during PY3 Q2.
- **Smart Construction Incentives.** In PY3, the Navigant team will perform an impact assessment to determine gross kWh and peak kW savings of the project. For prescriptive and custom measures, this assessment will include engineering review and on-site verification. For whole building projects, the analysis will leverage the computer simulation submitted with the project documents and may be supplemented through engineering algorithms and/or on-site investigation. The Navigant team will determine whole building impacts in comparison to baseline design, which is in compliance with the 2009 International Energy Conservation Code (IECC) per 34 Pa. Code Section 403.21 or the program chosen baseline, if different and more stringent than the PA code. Navigant is in the process of drawing the first wave of engineering review and on-site samples. We will also present a memo on the verification and due diligence practices of the program in late January 2012.

#### 1.4.2 Process Evaluation

The following paragraphs describe the process evaluation activities that are planned or underway for all programs.

- **Smart Lighting Discounts.** For PY3, data collection methods used in the process evaluation will include in-depth interviews conducted in March and April 2012 with program staff and program implementer staff (Ecos), and General Population telephone surveys conducted in April 2012. Due to the significant reduction in the quantity of SLD program incentives being offered in PY3, the in-store intercepts in their previous form will be less effective in PY3 (since most of the customers we speak with will be non-participants). The evaluation team is considering changing these surveys to be "stated

preference” surveys (rather than “revealed preference”), but is also considering changing the survey format to be either online or mail surveys. The SLD PY3 evaluation plan has not yet been finalized to account for the shift in the PY3 program strategy.

- **Low-Income Energy Efficiency Program.** Process evaluation activities consist primarily of in-depth interviews with utility and implementation contractor staff as well as weatherization agencies, and telephone surveys of participants. These telephone surveys will be conducted at the end of PY3.
- **Smart Appliance Recycling Program.** Phone survey data will also be used to support the process element of the Smart Appliance Recycling Program evaluation. A phone survey of a sample of 125 Q1 and Q2 participants was conducted in February 2012 and will be repeated in mid-to-late July 2011 for the remaining 125 completes in the sample. Any major findings/implications will be shared in an early feedback memo to PECO.
- **Smart Home Rebates.** As in PY2, process evaluation will include a review of program planning, design, outreach, and implementation based on review of program data and interviews with program staff, implementers, trade allies, and participating customers.
- **Commercial and Industrial Smart Equipment Incentives.** Central to the process evaluation for the PY3 program evaluation will be in-depth qualitative interviews with program managers and implementation contractors and review of relevant program-tracking databases, documents, and other materials to understand how the program works and how it is marketed. In addition, a Computer-Assisted Telephone Interviewing (CATI) survey will be used to interview participating customers to better understand customer satisfaction and perceptions related to the program, as well as gather data to support the net-to-gross analysis. With PECO’s initiation of a waitlist in PY3, additional CATI surveys will be used to interview waitlisted customers to determine the differences in customer satisfaction and perception related to the program between participating customers and waitlisted customers. The Navigant team will conduct several interviews with program trade allies to identify outreach effectiveness and barriers to participation. Additional questions will also be added to the trade ally interviews to determine the perceived effects of the waitlist on trade allies.
- **Government and Nonprofit Smart Equipment Incentives Program.** As with the Commercial and Industrial Smart Equipment Incentives Program the PY3 program evaluation will feature in-depth qualitative interviews with program managers and implementation contractors and review of relevant program-tracking databases, documents, and other materials to understand how the program works and how it is marketed. (In many cases these interviewed parties will be identical for the two SEI programs). CATI survey will be used to interview participating customers to better understand customer satisfaction and perceptions related to the program, as well as gather data to support the net-to-gross analysis. With PECO’s initiation of a waitlist in PY3, additional CATI surveys will be used to interview waitlisted customers to



determine the differences in customer satisfaction and perception related to the program between participating customers and waitlisted customers. The Navigant team will conduct several interviews with program trade allies to identify outreach effectiveness and barriers to participation.

- **Conservation Voltage Reduction (CVR) Program.** The process evaluation covering PY2 will focus on two key areas; (1) review of customer complaints related to service quality and; (2) telephone surveys with a sample of those on affected feeders. The analysis of customer complaint data and the telephone surveys will be conducted in October-November 2012.
- **Direct Load Control.** In the first quarter of PY3, the process evaluation began with a post control event survey of residential direct load participants. In the second quarter of PY3, interviews have begun with a sample of residential and commercial participants. A total of 70 residential program participants will be interviewed for this study on a number of topics including reasons for participating in the program, marketing issues, and satisfaction with the Residential A/C Saver program, program improvements, air conditioning hours of use and thermostat control, acceptance of alternative incentive structures, participation in other smart saver programs, and a firmographics description of program participants. In PY3 the surveys focus additionally on customer satisfaction with the direct load control program and satisfaction and comfort during load control events. In-depth interviews with implementers and program staff will be completed in the second quarter of PY3 as well.
- **Smart Construction Incentives.** To start the evaluation, Navigant conducted in-depth interviews with program managers from both PECO and KEMA. Navigant is drafting survey instruments for both trade allies and participants. The first wave of these surveys will begin in early 2012.

### 1.4.3 Summary of Finances

The total resource cost (TRC) test demonstrates the cost-effectiveness of a program by comparing the total economic benefits to the total costs. The PUC defined the approach to calculating the TRC.<sup>11</sup> A breakdown of the portfolio finances is presented in Table 1-12. Per PUC direction, TRC inputs and calculations have not been presented in this report.

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<sup>11</sup> Pennsylvania Public Utility Commission. June 18, 2009 "Implementation of Act 129 of 2008 – Total Resource Cost (TRC) Test, Docket No. M 2009-2108601 Order."

**Table 1-12. Summary of Portfolio Finances: TRC Test**

	Quarter 2 (\$000)	PYTD (\$000)
EDC Incentives to Participants	\$7,828	\$15,081
EDC Incentives to Trade Allies	\$278	\$1,126
<b>Subtotal EDC Incentive Costs</b>	<b>\$8,105</b>	<b>\$16,207</b>
Design & Development	\$0	\$0
Administration <sup>1</sup>	\$3,763	\$7,932
Management <sup>2</sup>	\$1,451	\$4,808
Marketing	\$951	\$1,530
Technical Assistance	\$1,056	\$1,826
<b>Subtotal EDC Implementation Costs</b>	<b>\$7,221</b>	<b>\$16,096</b>
<b>EDC Evaluation Costs</b>	<b>\$424</b>	<b>\$873</b>
<b>SWE Audit Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Participant Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Total Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Annualized Avoided Supply Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Lifetime Supply Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Total Lifetime Economic Benefits</b>	<b>n/a</b>	<b>n/a</b>
<b>Portfolio Benefit-to-Cost Ratio</b>	<b>n/a</b>	<b>n/a</b>
<b>NOTES</b>		
Per PUC direction, TRC inputs and calculations have not been provided in this report.		
<sup>1</sup> Implementation contractor costs.		
<sup>2</sup> EDC costs other than those identified explicitly.		

**Table 1-13. Summary of Portfolio Budget by Program**

<b>Program</b>	<b>TRC Benefits (\$)</b>	<b>TRC Costs (\$)</b>	<b>TRC Benefit-Cost Ratio</b>
Low-Income Energy Efficiency Program	n/a	n/a	n/a
Smart Lighting Discounts Program	n/a	n/a	n/a
Smart Appliance Recycling Program	n/a	n/a	n/a
Smart Home Rebates Program	n/a	n/a	n/a
Smart Equipment Incentives-C&I	n/a	n/a	n/a
Smart Equipment Incentives-Government / Nonprofit	n/a	n/a	n/a
Conservation Voltage Reduction	n/a	n/a	n/a
Residential Direct Load Control	n/a	n/a	n/a
Commercial Direct Load Control	n/a	n/a	n/a
<b>Portfolio</b>	n/a	n/a	n/a
NOTE: TRC benefit-cost ratios are not required to be reported for the PY2 Q4 Report.			

Per PUC direction, TRC inputs and calculations have not been provided in this report.

## 2 Portfolio Results by Sector

The EE&C Implementation Order issued on January 15, 2009, states requirements for specific sectors on page 11. In order to comply with these requirements, each program has been categorized into one of the following sectors:

1. Residential EE (excluding Low-Income)
2. Residential Low-Income EE
3. Commercial and Industrial EE
4. Government and Nonprofit EE

Summaries of portfolio gross energy savings and gross demand reduction by sector are presented in Figure 2-1 and Figure 2-2.

Figure 2-1. PY3TD Reported Gross Energy Savings by Sector

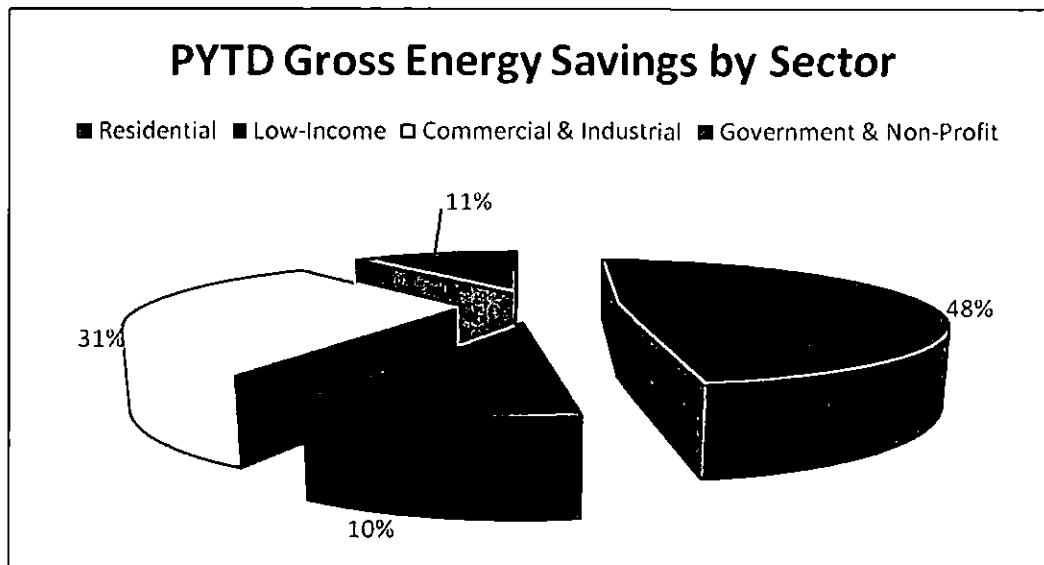


Figure 2-2. PY3TD Reported Gross Demand Reduction by Sector

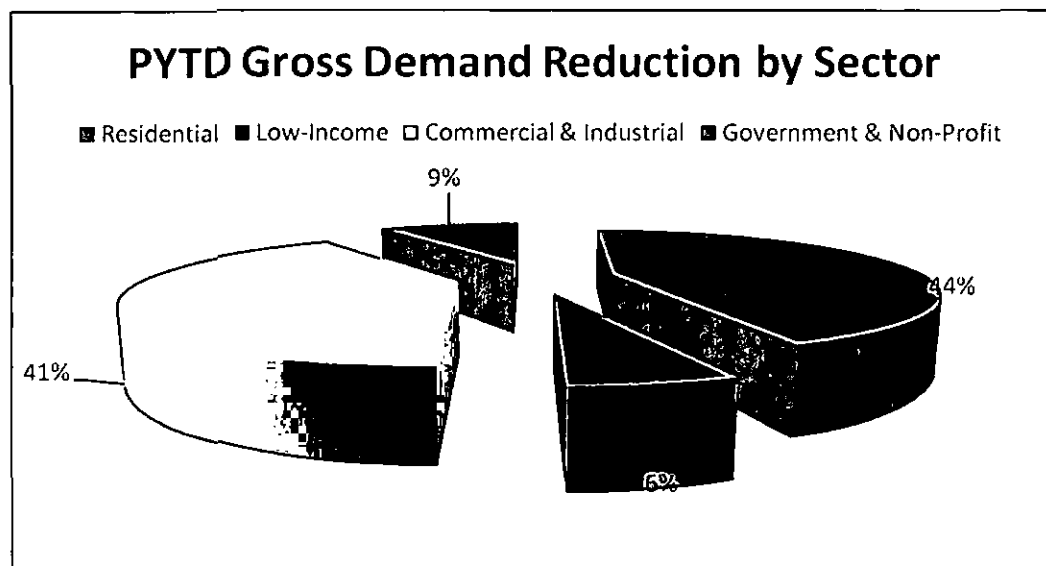


Table 2-1. Reported Gross Energy Savings by Sector through the End of the Reporting Period

Market Sector	Reported Gross Impact (MWh) <sup>1</sup>			Projects in Progress	Total Committed	Unverified Ex Post Savings <sup>3</sup>
	IQ	PYTD	CPITD			
Residential EE	12,451	49,490	551,860	-	49,490	-
Residential Low-Income EE <sup>2</sup>	4,208	10,589	63,817	-	10,589	-
Commercial & Industrial EE	14,023	31,975	282,249	-	31,975	-
Government & Nonprofit EE	8,479	11,552	94,098	-	11,552	-
<b>TOTAL PORTFOLIO<sup>2</sup></b>	<b>39,161</b>	<b>103,606</b>	<b>992,023</b>	<b>-</b>	<b>103,606</b>	<b>-</b>

**NOTES**

<sup>1</sup>The CPITD Reported Gross savings indicated for each sector includes savings allocated from the CVR program. The CVR savings allocation for each sector is based on each sector's contribution to total energy consumption. There are no incremental CVR savings beyond PY2.

<sup>2</sup>Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66 Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings.

<sup>3</sup>Unverified Ex Post Savings are unverified savings pending approval of a TRM or Custom Measure Protocol by the Commission.

**Table 2-2. Reported Gross Demand Reduction by Sector through the End of the Reporting Period**

Market Sector	Reported Gross Impact (MW)			Projects in Progress	Total Committed	Unverified Ex Post Savings <sup>1</sup>
	1Q	PYTD	CPITD			
Residential EE	2.4	6.8	43.3	0.0	6.8	0.0
Residential Low-Income EE <sup>2</sup>	0.4	1.0	3.2	0.0	1.0	0.0
Commercial & Industrial EE	2.8	6.4	22.1	0.0	6.4	0.0
Government & Nonprofit EE	1.1	1.5	8.8	0.0	1.5	0.0
<b>TOTAL PORTFOLIO</b>	<b>6.7</b>	<b>15.6</b>	<b>77.4</b>	<b>0.0</b>	<b>15.6</b>	<b>0.0</b>
NOTES						
<sup>1</sup> Unverified Ex Post Savings are unverified savings pending approval of a TRM or Custom Measure Protocol by the Commission.						
<sup>2</sup> Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66 Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings.						

## 2.1 Residential EE Sector

PECO established savings goals of 152,952 MWh and 11.1 MW for the residential sector in PY3. As demonstrated by Table 2-3 and Table 2-4, PECO's achievements in the first half of the program year are consistent with these goals.

**Table 2-3. Summary of Residential EE Sector Incremental Impacts by Program through the End of the Reporting Period**

<b>Residential EE Sector</b>	<b>IQ Participants</b>	<b>IQ Reported Gross Energy Savings (MWh)</b>	<b>IQ Reported Gross Demand Reduction (MW)</b>
Smart Lighting Discounts Program <sup>1</sup>	39,820	2,127	0.1
Smart Appliance Recycling Program	2,466	4,112	0.7
Smart Home Rebates Program <sup>2</sup>	26,210	6,212	1.6
<b>Sector Total</b>	<b>28,676</b>	<b>12,451</b>	<b>2.4</b>
<b>NOTES:</b>			
<sup>1</sup> Participation for this program reflects number of CFL lamps rebated rather than number of program participants. Participation in this program is excluded from the Sector Total.			
<sup>2</sup> Participant values exclude sales of EnergyStar lighting fixtures and LED lamps, for which upstream rebates are provided.			

**Table 2-4. Summary of Residential EE Sector PY3TD Impacts by Program through the End of the Reporting Period**

Residential EE Sector	PYTD Participants	PYTD Reported Gross Energy Savings (MWh)	PYTD Reported Gross Demand Reduction (MW)
Smart Lighting Discounts Program <sup>1</sup>	513,201	24,870	1.4
Smart Appliance Recycling Program	6,151	10,012	1.7
Smart Home Rebates Program <sup>2</sup>	63,715	14,608	3.8
<b>Sector Total</b>	<b>69,866</b>	<b>49,490</b>	<b>6.8</b>

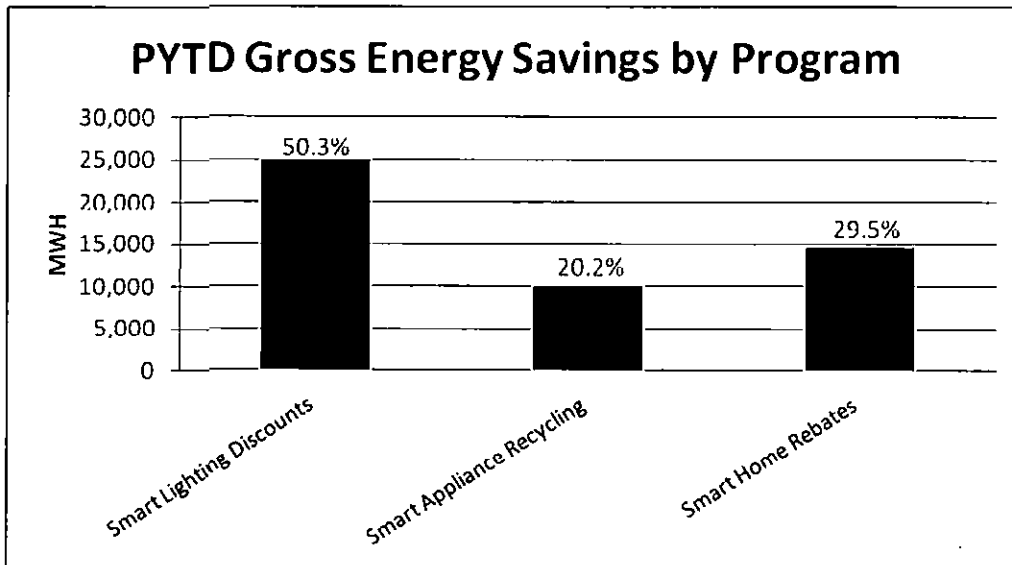
**NOTES:**

<sup>1</sup>Participation for this program reflects number of CFL lamps rebated rather than number of program participants. Participation in this program is excluded from the Sector Total.

<sup>2</sup>Participant values exclude sales of EnergyStar lighting fixtures and LED lamps, for which upstream rebates are provided.

A summary of the sector energy savings by program is presented in Figure 2-3.

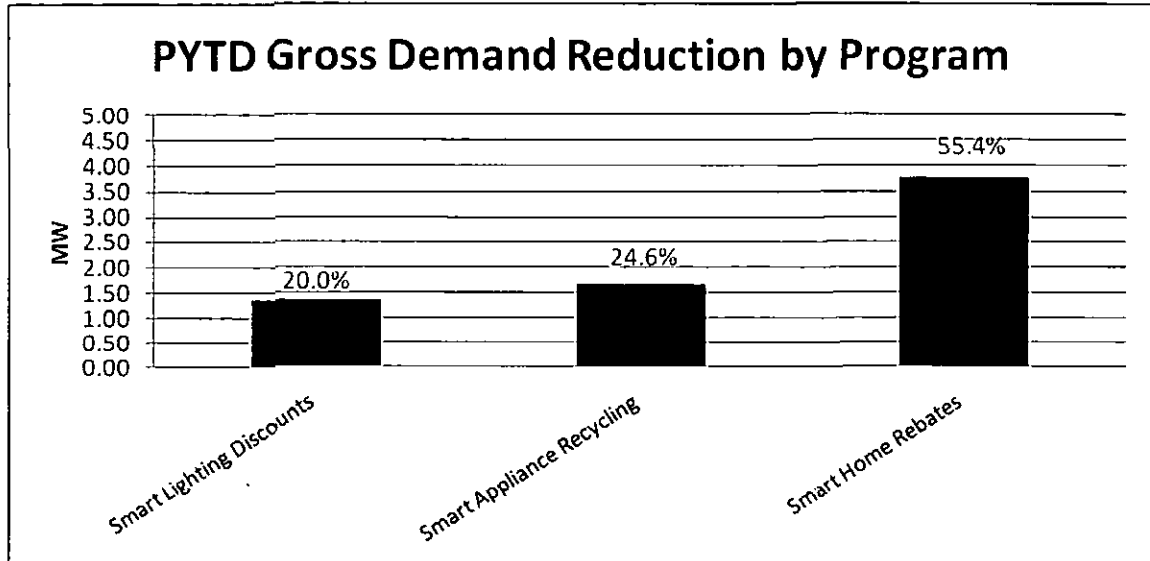
**Figure 2-3. Summary of Residential EE Sector PY3TD Reported Gross Energy Savings by Program**



A summary of the sector demand reduction by program is presented in Figure 2-4.



**Figure 2-4. Summary of Residential EE Sector PY3TD Reported Demand Reduction by Program**



## 2.2 Residential Low-Income EE Sector

PECO established savings goals of 27,240 MWh and 1.7 MW in the low-income sector for PY3. Results thus far are presented in Table 2-5 and Table 2-6.

**Table 2-5. Summary of Residential Low-Income EE Sector Incremental Impacts by Program through the End of the Reporting Period**

Residential Low-Income EE Sector	IQ Participants	IQ Reported Gross Energy Savings (MWh)	IQ Reported Gross Demand Reduction (MW)
Residential Low-Income EE <sup>1</sup>	2,945	4,208	0.4
<b>Sector Total</b>	2,945	4,208	0.4

NOTES

<sup>1</sup>Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66 Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings.

**Table 2-6 Summary of Residential Low-Income EE Sector PY3TD Impacts by Program through the End of the Reporting Period**

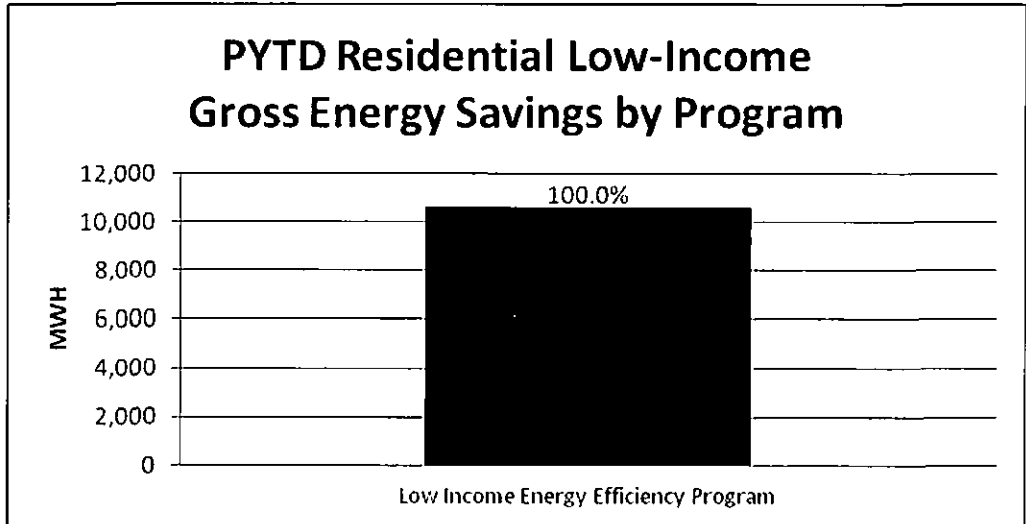
Residential Low-Income EE Sector	PYTD Participants	PYTD Reported Gross Energy Savings (MWh)	PYTD Reported Gross Demand Reduction (MW)
Residential Low-Income EE <sup>1</sup>	4,739	10,589	1.0
<b>Sector Total</b>	4,739	10,589	1.0

NOTES

<sup>1</sup>Act 129 includes a provision requiring electric distribution companies to offer a number of energy efficiency measures to low-income households that are "proportionate to those households' share of the total energy usage in the service territory." 66 Pa.C.S. §2806.1(b)(i)(G). The legislation contains no provisions regarding targets for participation, or energy or demand savings.

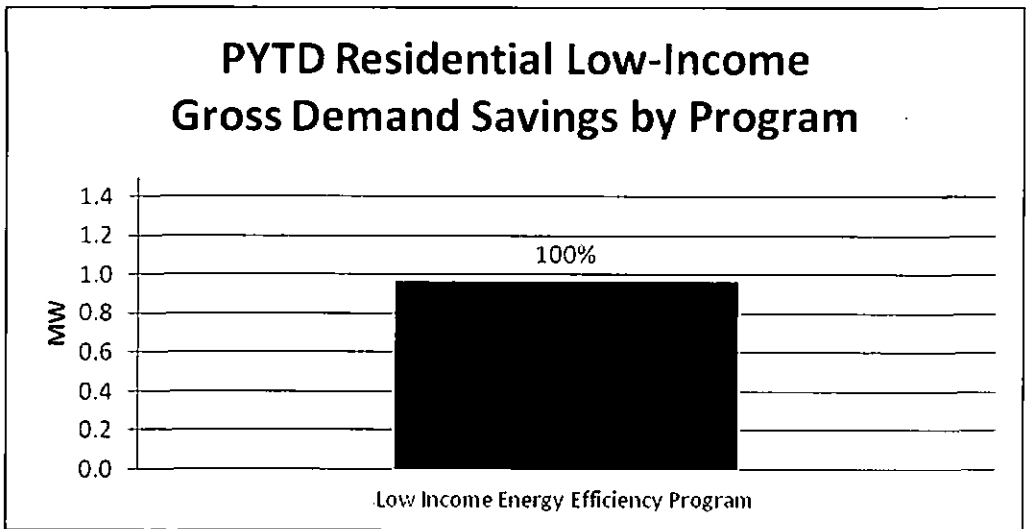
A summary of the sector energy savings by program is presented in Figure 2-5.

**Figure 2-5. Summary of Residential Low-Income EE Sector PY3TD Reported Gross Energy Savings by Program**



A summary of the sector demand reduction by program is presented in Figure 2-6.

**Figure 2-6. Summary of Residential Low-Income EE Sector PY3TD Reported Demand Reduction by Program**



### 2.3 Commercial and Industrial EE Sector

For PY3, PECO established a C&I sector target for annual energy savings of 92,828 MWh and demand reduction of 20.1 MW. Sector summaries of results thus far in PY3 are presented in Table 2-7 and Table 2-8.

**Table 2-7. Summary of Commercial & Industrial EE Sector Incremental Impacts by Program through the End of the Reporting Period**

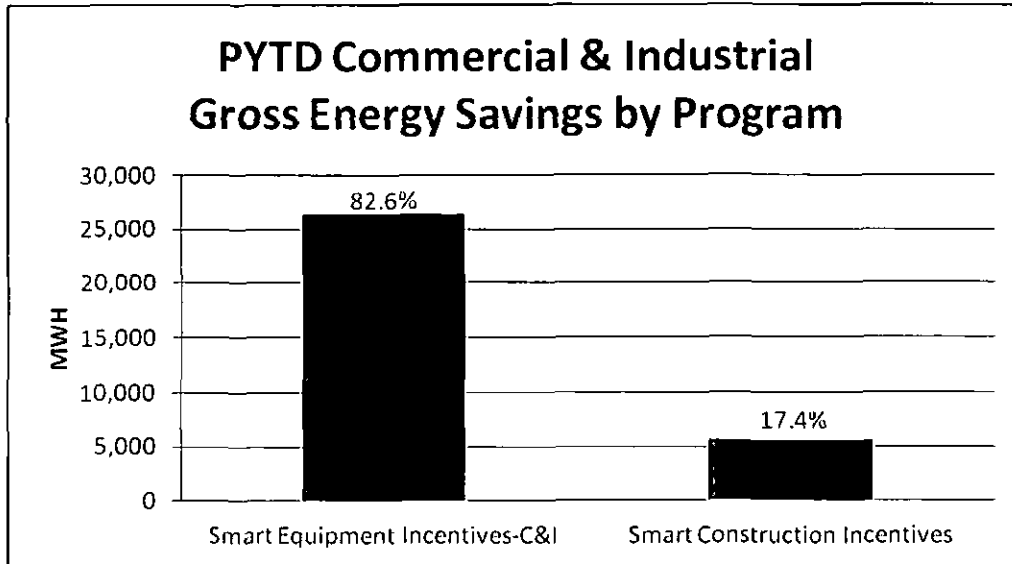
Commercial & Industrial EE Sector	IQ Participants	IQ Reported Gross Energy Savings (MWh)	IQ Reported Gross Demand Reduction (MW)
Smart Equipment Incentives-C&I	318	11,964	2.5
Smart Construction Incentives	14	2,059	0.3
<b>Sector Total</b>	<b>332</b>	<b>14,023</b>	<b>3</b>

**Table 2-8. Summary of Commercial and Industrial EE Sector PY3TD Impacts by Program through the End of the Reporting Period**

Commercial & Industrial EE Sector	PYTD Participants	PYTD Reported Gross Energy Savings (MWh)	PYTD Reported Gross Demand Reduction (MW)
Smart Equipment Incentives-C&I	671	26,397	5.5
Smart Construction Incentives	39	5,578	0.9
<b>Sector Total</b>	<b>710</b>	<b>31,975</b>	<b>6</b>

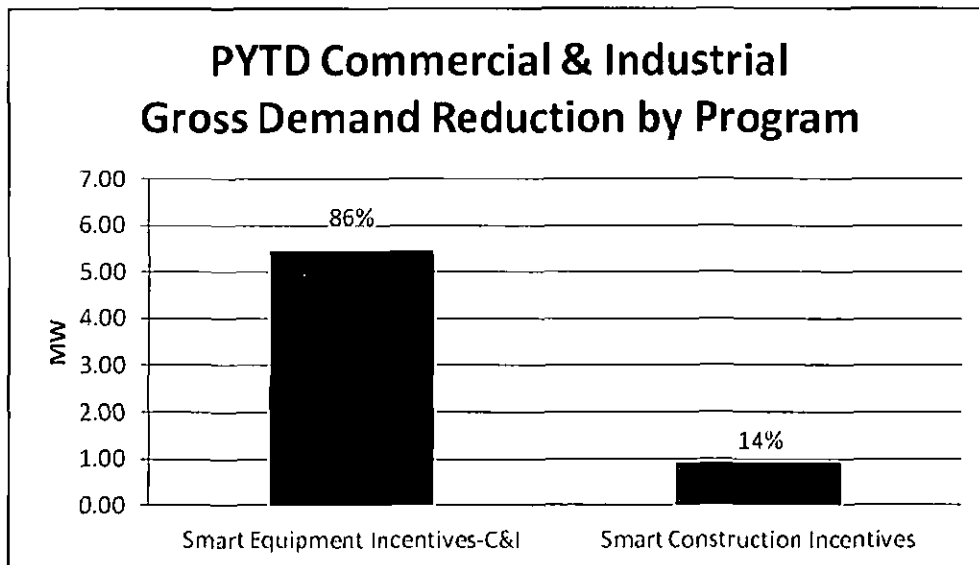
A summary of the sector energy savings by program is presented in Figure 2-7.

**Figure 2-7. Summary of Commercial & Industrial EE Sector PY3TD Reported Gross Energy Savings by Program**



A summary of the sector demand reduction by program is presented in Figure 2-8.

**Figure 2-8. Summary of Commercial & Industrial EE Sector PY3TD Reported Demand Reduction by Program**



## 2.4 Government and Nonprofit EE Sector

For PY2, PECO's internal targets for this sector are 58,822 MWh and 13.3 MW. Results through the end of the second quarter of PY3 are presented in Table 2-9 and

Government & Non-Profit EE Sector	IQ Participants	IQ Reported Gross Energy Savings (MWh)	IQ Reported Gross Demand Reduction (MW)
Smart Equipment Incentives-Government / Nonprofit	81	8,479	1.1
<b>Sector Total</b>	81	8,479	1.1

Table 2-10.

**Table 2-9 Summary of Government & Nonprofit EE Sector Incremental Impacts by Program through the End of the Reporting Period**

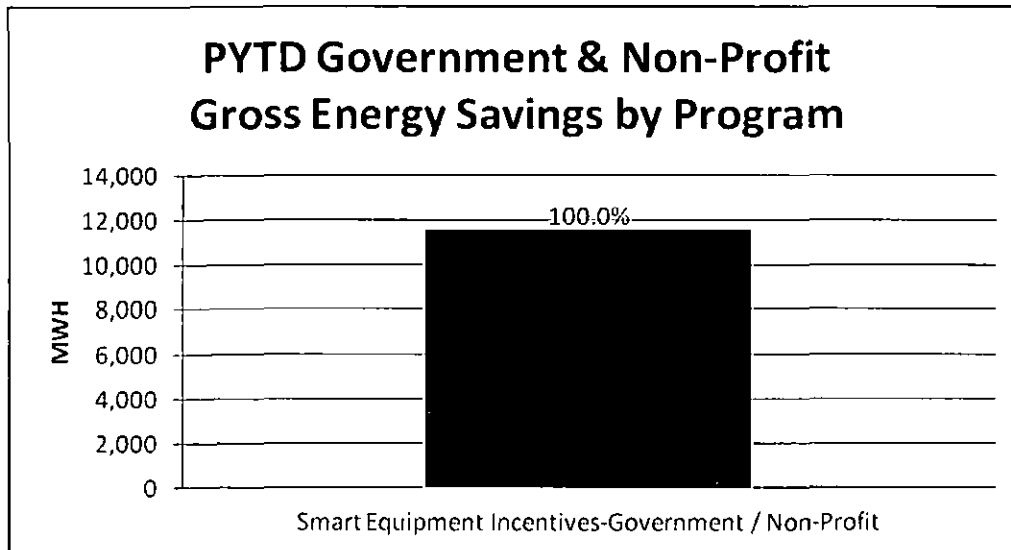
Government & Non-Profit EE Sector	IQ Participants	IQ Reported Gross Energy Savings (MWh)	IQ Reported Gross Demand Reduction (MW)
Smart Equipment Incentives-Government / Nonprofit	81	8,479	1.1
<b>Sector Total</b>	81	8,479	1.1

**Table 2-10. Summary of Government & Nonprofit EE Sector PY3TD Impacts by Program through the End of the Reporting Period**

Government & Non-Profit EE Sector	PYTD Participants	PYTD Reported Gross Energy Savings (MWh)	PYTD Reported Gross Demand Reduction (MW)
Smart Equipment Incentives-Government / Nonprofit	156	11,552	1.5
<b>Sector Total</b>	156	11,552	1.5

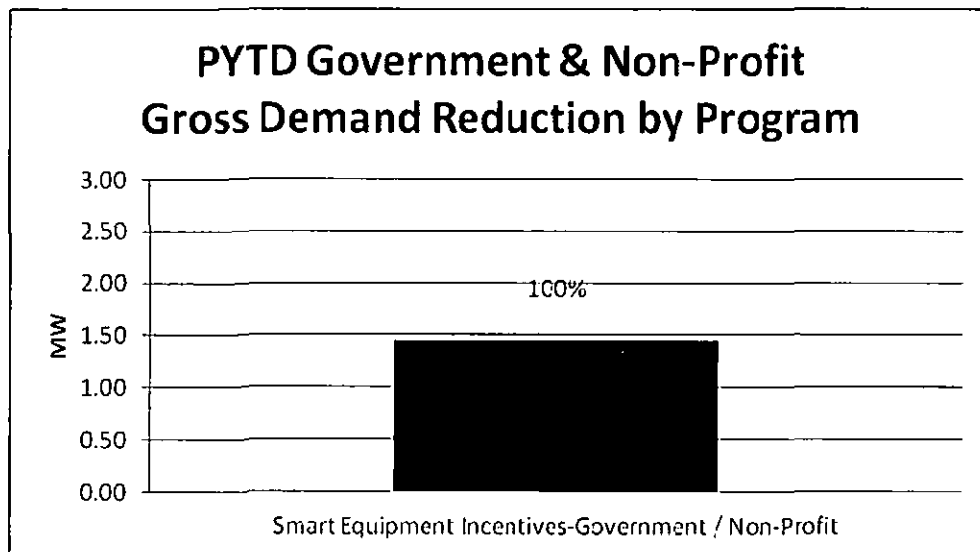
A summary of the sector energy savings by program is presented in Figure 2-9.

**Figure 2-9. Summary of Government & Nonprofit EE Sector PY3TD Reported Gross Energy Savings by Program**



A summary of the sector demand reduction by program is presented in Figure 2-10.

**Figure 2-10. Summary of Government & Nonprofit EE Sector PY3TD Reported Demand Reduction by Program**



### 3 Demand Response

Demand-response programs specifically target the reduction of peak demand through various demand-side management strategies. Three PECO demand-response programs were operated in the second quarter of PY3: the CVR program, the Residential Direct Load Control (DLC) program, and the Commercial DLC program.

Table 3-1 and Table 3-2 summarize second quarter and program year-to-date results for the Demand Response programs respectively.

**Table 3-1. Summary of Demand Response Program Quarterly Impacts through the End of the Reporting Period**

	<b>IQ Participants</b>	<b>IQ Reported Gross Energy Savings (MWh)</b>	<b>IQ Reported Gross Demand Reduction (MW)</b>
Conservation Voltage Reduction	0	0	0
Residential Direct Load Control	5,763	0	0
Commercial Direct Load Control	807	0	0
<b>Sector Total</b>	<b>6,570</b>	<b>0</b>	<b>0</b>

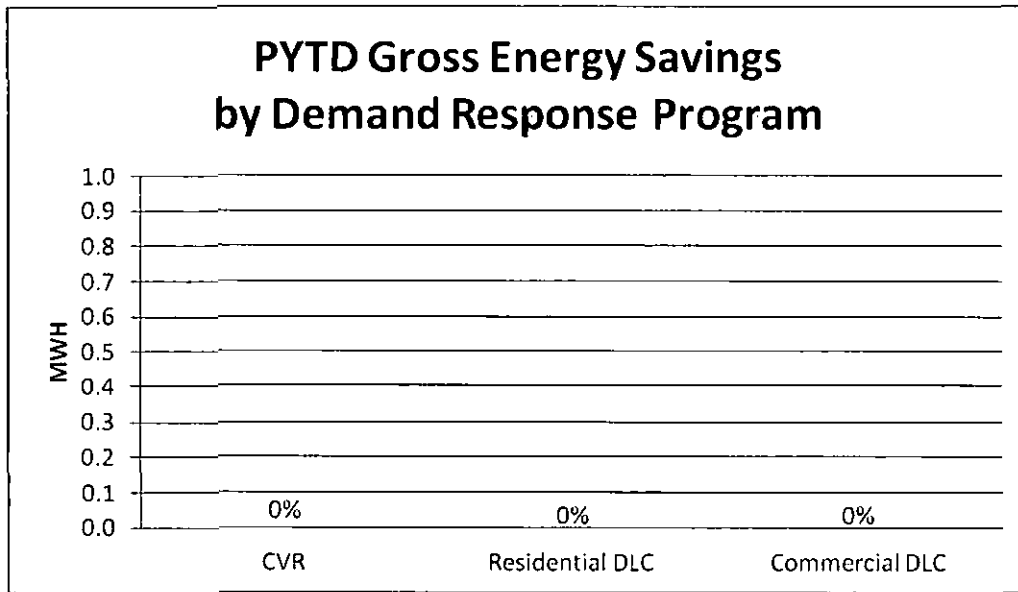
**Table 3-2: Summary of Demand Response Program PY3TD Impacts through the End of the Reporting Period**

	<b>PYTD Participants</b>	<b>PYTD Reported Gross Energy Savings (MWh)</b>	<b>PYTD Reported Gross Demand Reduction (MW)</b>
Conservation Voltage Reduction <sup>1</sup>	0	0	0
Residential Direct Load Control	21,561	0	0
Commercial Direct Load Control	835	0	0
<b>Sector Total</b>	<b>22,396</b>	<b>0</b>	<b>0</b>

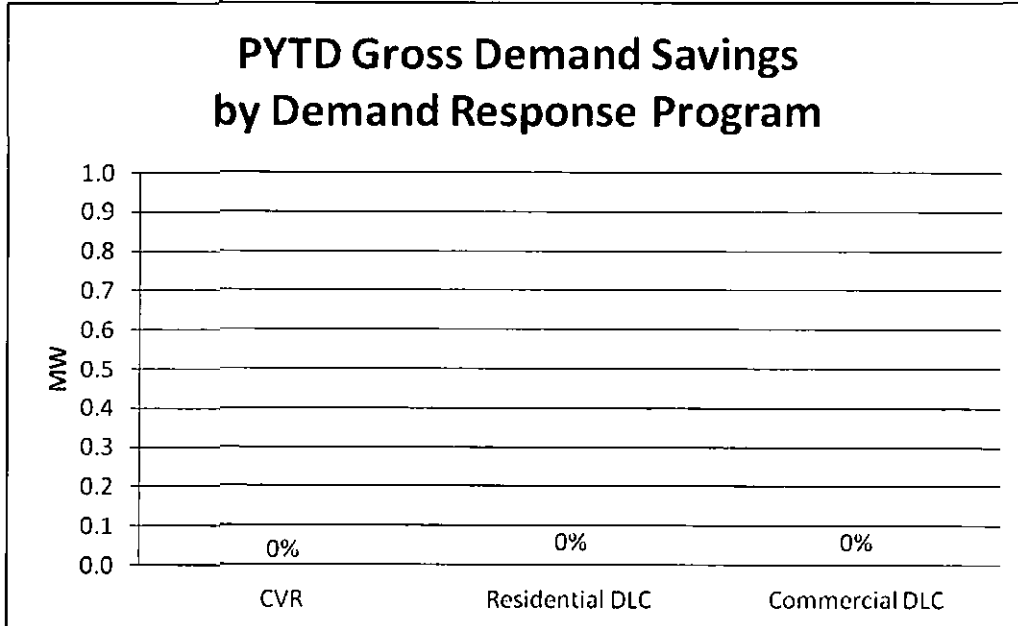
Figure 3-1 and Figure 3-2 present the gross energy and demand savings reported for these programs through the second quarter of PY3.



**Figure 3-1 PY3TD Reported Gross Energy Savings by Demand Response Program**



**Figure 3-2 PY3TD Reported Gross Demand Savings by Demand Response Program**



## **4 Portfolio Results by Program**

### **4.1 Smart Lighting Discounts Program**

The PECO Smart Lighting Discounts Program helps PECO residential customers become consumers who are conscious about their energy use by encouraging and facilitating their adoption of CFLs. The program achieves this goal by providing incentives to increase the market share of ENERGY STAR-qualified CFLs sold through retail sales channels, as well as by distributing educational materials that will increase customer awareness, acceptance, and proper disposal of energy-efficient lighting technology. PECO launched the program in October 2009.

#### **4.1.1 Program Logic**

The primary activities that had to be developed before launching the PECO Smart Lighting Discounts Program included establishing manufacturer and retailer partnerships, creating program marketing materials, and training the implementer's (Ecos) field representatives. These activities resulted in the creation of point-of-purchase materials, in-store events, and retailer partners that were educated about the PECO program and the benefits of high-efficiency lighting products. These actions enabled PECO customers to learn about the benefits of CFLs and the related discounts being offered from PECO to encourage them to purchase and install CFLs in their homes (including both program and non-program bulbs), all of which leads to PECO energy savings.

#### **4.1.2 Program M&V Methodology**

The PY3 impact evaluation will continue several of the methodological elements from PY1 and PY2. Similar to both PY1 and PY2, the evaluation will include verification of the quantity of bulbs sold based on the PECO tracking database, a general population survey, and in-depth interviews with program implementers and staff. Elements in the PY2 evaluation that will not be in the PY3 evaluation include shelf stocking surveys, and in-depth interviews with lighting manufacturers and high-level retail buyers. These elements are expected to be included in the PY4 evaluation.

Due to the significant reduction in the quantity of SLD program incentives being offered in PY3, the in-store intercepts in their previous form will be less effective in PY3 (since most of the customers we speak with will be non-participants). The evaluation team is considering changing these surveys to be "stated preference" surveys (rather than "revealed preference"),

but is also considering changing the survey format to be either online or mail surveys. The SLD PY3 evaluation plan has not yet been finalized to account for the shift in the PY3 program strategy.

The M&V completed for this report consisted of reviewing the tracking database provided to the evaluation team by PECO personnel and verifying it against the manufacturer invoices Ecos packaged and sent to PECO for payment. All gross and net savings parameters, other than quantity of bulbs sold, are deemed for PY3.<sup>12</sup> The estimated gross energy savings (kWh) are estimated as follows:

$$\text{Total kWh Savings} = \# \text{ bulbs sold} * ((\text{CFL}_{\text{watts}} \times (\text{CFL}_{\text{hours}} \times 365))/1,000 \times \text{ISR}_{\text{CFL}}$$

Where:

- The deemed installation rate is 84 percent ( $\text{ISR}_{\text{CFL}}$ ), the deemed hours of use-per-day is three hours ( $\text{CFL}_{\text{hours}}$ ), and
- The deemed displaced watts is bulb-specific based on the program bulb wattage and equivalent incandescent wattage ( $\text{CFL}_{\text{watts}}$ ).

The estimated gross demand savings (kW) are estimated as follows:

$$\text{Total kW Savings} = \# \text{ bulbs sold} * (\text{CFL}_{\text{watts}}) \times \text{Light CF} \times \text{ISR}_{\text{CFL}}$$

Where:

- The deemed peak coincidence factor is 5 percent (Light CF) and all other savings parameter estimates are the same as for the gross energy savings (kWh).

The net and gross savings for the residential lighting program are equal, as the deemed net-to-gross (NTG) ratio is 1.

#### 4.1.3 Program Sampling

For impact evaluation, no sampling was necessary for this report. All available tracking data was summarized for this report. For process evaluation, the evaluation team will utilize a 750-point general population phone survey in PY3, which is estimated to identify 250 self-reported upstream program participants. This survey may also be stratified across other customer dispositions: those unaware of CFLs, aware non-purchasers, and CFL user non-program purchasers. The sample for this phone survey will be a random sample of PECO customers. The batched sampling method is not appropriate for the general population survey as the

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<sup>12</sup> Pennsylvania Public Utility Commission. "Technical Reference Manual (TRM) for Pennsylvania Act 129 Energy Efficiency and Conservation Program and Act 213 Alternative Energy Portfolio Standards", 2011.

sample will be pulled from the residential customer information system database. The survey sample sizes were based on an assumption that one-third of the PECO residential customers surveyed will have bought program bulbs (based on the PY1 and PY2 evaluations). In all cases, we will be able to use overlapping samples for the gross, process, and NTG analysis.

We will interview key lighting program staff at PECO and Ecos. We anticipate conducting four interviews; however, we realize this will be driven by input from PECO staff. For PY3, we plan to conduct in-depth interviews with all key PECO and Ecos staff that have been instrumental in the rollout of this lighting program.

#### **4.1.4 Process Evaluation**

As with the impact evaluation, the PY3 process evaluation will continue several of the methodological elements from PY1 and PY2. Similar to both PY1 and PY2, the evaluation will include a general population survey and in-depth interviews with program implementers and staff. Elements in the PY2 evaluation that will not be in the PY3 evaluation include shelf stocking surveys, and in-depth interviews with lighting manufacturers and high-level retail buyers. These elements are expected to be included in the PY4 evaluation.

Due to the significant reduction in the quantity of SLD program incentives being offered in PY3, the in-store intercepts in their previous form will be less effective in PY3 (since most of the customers we speak with will be non-participants). The evaluation team is considering changing these surveys to be “stated preference” surveys (rather than “revealed preference”), but is also considering changing the survey format to be either online or mail surveys. The SLD PY3 evaluation plan has not yet been finalized to account for the shift in the PY3 program strategy.

#### **4.1.5 Program Partners and Trade Allies**

The PECO Smart Lighting Discounts Program is delivered upstream using a markdown/buy-down approach, which allows for customers to purchase discounted products. Program partners include CFL manufacturers and retailers and currently there are approximately six manufacturers and approximately 90 retail stores (representing 5 unique retailers) participating in the program.<sup>13</sup>

#### **4.1.6 Program Finances**

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<sup>13</sup> This data is based on tracking data review.

A summary of the project finances is presented in Table 4-1.

**Table 4-1: Summary of Program Finances: TRC Test<sup>14</sup>**

	Quarter 2 (\$000)	PYTD (\$000)
EDC Incentives to Participants	\$0	\$0
EDC Incentives to Trade Allies	\$55	\$559
<b>Subtotal EDC Incentive Costs</b>	<b>\$55</b>	<b>\$559</b>
Design & Development	\$0	\$0
Administration <sup>1</sup>	\$100	\$287
Management <sup>2</sup>	\$86	\$155
Marketing	\$202	\$366
Technical Assistance	\$0	\$0
<b>Subtotal EDC Implementation Costs</b>	<b>\$388</b>	<b>\$808</b>
EDC Evaluation Costs	\$55	\$106
SWE Audit Costs	n/a	n/a
Participant Costs	n/a	n/a
<b>Total Costs</b>	<b>n/a</b>	<b>n/a</b>
Annualized Avoided Supply Costs	n/a	n/a
Lifetime Supply Costs	n/a	n/a
<b>Total Lifetime Economic Benefits</b>	<b>n/a</b>	<b>n/a</b>
<b>Portfolio Benefit-to-Cost Ratio</b>	<b>n/a</b>	<b>n/a</b>
<b>NOTES</b>		
Per PUC direction, TRC inputs and calculations have not been provided in this report.		
<sup>1</sup> Implementation contractor costs.		
<sup>2</sup> EDC costs other than those identified explicitly.		

## 4.2 Low-Income Energy Efficiency Program

The purpose of LEEP is to educate and assist eligible residential customers with making their homes more energy efficient. The program builds upon the Low Income Usage Reduction

<sup>14</sup> Definitions for terms in the table are subject to the TRC Order.

Program (LIURP) objective: to make low-income customers' energy bills more affordable by helping to reduce energy usage. LEEP was built on the existing LIURP infrastructure for outreach and delivery of services. The same contractor (CMC Energy Services) delivers both LIURP and LEEP.

There are three program components aimed at distinct groups:

1. Double the number of participants over the 2008 LIURP level by 2013, providing in-home audits and education and direct installation of measures for customers, primarily with household incomes below 150 percent of the Federal Poverty Level (FPL). There is no inherent difference between LEEP and LIURP. (C1)
2. Increase by up to ten the number of CFLs installed for LIURP participants. (C2)
3. Include electric efficiency improvements (up to ten CFLs) with weatherization improvements provided through weatherization programs other than LIURP. (C3)

Other measures may also be included in LEEP Act 129 results; for example, additional default service provider funding was used in PY2 to increase the number of refrigerators replaced for low-income customers.

#### **4.2.1 Program Logic**

The program is delivered by CMC. As part of the PY1 program evaluation, an extensive logic model was created to identify program flow. This logic model will be reviewed and updated as needed as part of the overall PY3 evaluation activities.

LEEP allows PECO to offer energy savings assistance to more low-income customers; LIURP participation is limited by available funding. A goal of LEEP is to double the number of participants over the 2008 LIURP level by 2013. The eligible customer population consists of low-income residents in existing residential units that are provided with electricity by PECO and who are financially responsible for the electric bill payment.

There are several program components:

1. In-home audits, education, and direct installation of measures for customers with household incomes below 200 percent of the federal poverty level (with a focus on those below 150 percent of the poverty level), and energy consumption of 500 kWh or more monthly for non-electric heating customers and 1,400 kWh monthly for electric heating customers.
2. Increase by the maximum possible level, the number of CFLs installed for LIURP participants.

3. Include up to ten additional CFLs, with weatherization improvements provided through weatherization programs other than LIURP.
4. Replace refrigerators in homes weatherized by DCED, PHA and other agencies.<sup>15</sup>
5. In addition, as opportunity allows, LEEP will provide funding for the implementation of other measures using other contractors or agencies.

Customers must meet usage and income eligibility criteria for program participation. These vary a bit by program component, as described in Table 4-2, which also shows measures associated with each component.

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<sup>15</sup> As part of the DSP settlement agreement, PECO was required to spend \$1M in usage reduction/weatherization efforts in calendar year 2010 and \$1.5M in calendar year 2011. Although the budget for DSP falls under the LIURP program, the energy usage savings will be counted towards Act 129 LEEP.

**Table 4-2 LEEP Target Markets and Measures**

Component	Target Market	Measures
1	PECO residential customers with a household income at or below 200% of the federal poverty level with a focus on customers at or below 150%, plus household usage levels exceeding 600 kWh per month for electric baseload (500 kWh for Customer Assistance Program rate customers) for non-electric heating customers, and 1,400 kWh per month for electric heating customers.	Audits conducted. Extra CFL bulbs installed
2	PECO customers who participate in LIURP during PY1- PY4.	Extra CFL bulbs installed
3	PECO residential electric customers eligible to participate in other assistance or weatherization programs for low-income residents.	Extra CFL bulbs installed or distributed.
4	PECO residential customers eligible to participate in other energy efficiency programs.	Refrigerator replacements*
5	Opportunities with other agencies such as Project H.O.M.E.	Custom*

\*Funded by the Default Service Plan (DSP) settlement.

#### 4.2.2 Program M&V Methodology

The major objectives of the evaluation are to: 1) quantify savings impacts from each program year, 2) determine program strengths and weaknesses and identify ways PECO can improve the program, and 3) assess customer satisfaction with the program. Evaluation will seek to answer the following key questions.

- What are the levels of gross annual energy (MWh [megawatt-hours) and peak demand (MW) savings achieved by the program?
- Did the participant change their behavior as a result of education for participants?
- Is the participation rate for Component 1 similar to that of the participants in LIURP?
- Are the type and number of measures installed for PY 1, PY2, PY3 (etc.) similar to that of the participants in LIURP?
- Are the participants included in Component 1 satisfied with the program? Are customers satisfied with the education received?



- How effective has the program been in extending the reach of LIURP to low-income customers at or below 200 percent of the FPL?
- Is the energy education material clear and informative?
- Has the program effectively leveraged sources of other available rebates for qualified customers?
- Is the process to select potential participants for Component 1 operating as expected?
- Is the coordination with LIURP and other weatherization programs operating smoothly?
- Are there changes that could be made to improve participation?

#### 4.2.3 Program Sampling

The Navigant team will use the following data collection approaches:

- In-depth interviews
  - PECO staff
  - CMC Energy Services
  - Weatherization agencies
- Tracking system review
- Research with participants to verify installation
  - Telephone surveys
  - Field research
- Program Benchmarking

The Navigant team will conduct 92 telephone surveys annually to assess installation and retention of measures, participant satisfaction, and other process questions. This sample size achieves a precision of +/- 10% at a 90% confidence level (90/10) for the program. The team will also conduct field visits for a sample of 51 participants in LEEP audits. The sample size provides 90/10 precision (using a coefficient of variation of 0.25); the variance for installation rates of measures is expected to be small since this is a direct install program.

Navigant will also benchmark the program against peer and “best practices” utility performance to develop a comparative performance view and identify potential opportunities for improvement in the program’s performance. Peer utilities will include utilities that have also fielded energy efficiency program portfolios relatively recently and so are subject to somewhat similar energy efficiency market conditions. “Best practice” utilities will be selected based on their historical EE program performance at the two sector levels, C&I and residential. Comparisons will include sector savings as a percent of sector consumption and cost per kWh

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saved. Comparative savings and cost data will also be provided at the program level where it is so reported. Interviews will be conducted with best practice utilities to discuss their program design and delivery features that are contributing to their strong performance.

#### **4.2.4 Process Evaluation**

Program Partner Process evaluation data from the in-depth interviews and program material review will be combined and analyzed to identify the most defensible conclusions and recommendations. For PY3, the team will again conduct these in-depth interviews to determine changes in implementation and to get an update on what is working with the program and changes that might need to be made. Interviews provide insight into program design and delivery and are one of the main elements for the assessment.

In particular, the Navigant team will focus on Component 3, which was not delivered in PY1.

PECO staff to be interviewed would be the Program Manager responsible for overseeing overall LEEP production, quality assurance, and the annual program evaluation. For CMC Energy Services, interviews would be conducted with the Manager, Office Manager, and Quality Control Manager at CMC. The Navigant team will also interview some of the staff of the weatherization agencies involved in Component 3. The final number of interviews of PECO and CMC staff will be driven by PECO.

These interviews will begin in PY3 Quarters 2 and 3.

### LEEP PY3 Evaluation Plan Activity Schedule

Task	Activity	Deliverable	Plan Start	Plan End
Tracking System, Communications	Review Tracking System	Yes	10/15/2011	1/31/2012
Process Evaluation	Revise in-depth interview guides.	Y	2/1/2011	2/28/2012
Process Evaluation	Conduct in-depth interviews.		4/1/2011	5/30/2011
Process & Impact Evaluation	Select samples of participants for survey of process and installation.		7/16/2012	7/31/2012
Process & Impact Evaluation	Conduct annual phone surveys of participants.	Y	8/1/2012	8/31/2012
Impact Evaluation	Conduct field data research	Y	8/1/2012	8/31/2012
Impact Evaluation	Cost-Effectiveness	Y	6/1/2012	6/30/2012
Impact Evaluation	Billing Analysis of PY2	Y	7/1/2012	9/30/2012
Impact Evaluation	Calibrated Simulation	Y	9/15/2012	11/15/2012

#### 4.2.5 Program Partners and Trade Allies

PECO works with several partners and trade allies to deliver LEEP savings.

CMC Energy Services implement Components 1 and 2. CMC conducts the LEEP audit and develops a work order for additional measures to be installed on subsequent visit(s) by the program subcontractors. CMC also does a follow-up inspection for a sample of the audits and all of the subcontractor installations. CMC also tracks and reports results to PECO. CMC implements Component 2 by installing additional CFL bulbs as part of LIURP audits.

For Component 3, PECO works through other weatherization agencies such as the Philadelphia Housing Authority (PHA) and the Bucks County Opportunity Council to install CFL bulbs as part of their weatherization services. Also, PECO mails CFL bulbs to CAP rate customers and distributes them at low-income community events.

Component 4 is delivered through a partnership with the PHA and the Pennsylvania Department of Community and Economic Development (DCED), a state weatherization provider, to replace older, inefficient refrigerators as part of their weatherization services in Philadelphia and the surrounding counties in PECO's service territory.

Component 5 is delivered through Project H.O.M.E., a non-profit organization that provides housing to enable chronically homeless and low-income persons to break the cycle of homelessness and poverty. The project included the replacement of boilers, water heaters, central air conditioning systems and refrigerators at two multi-family dwellings.

**4.2.6 Program Finances**

A summary of the project costs by quarter and year is presented in Table 4-3.

**Table 4-3 Summary of LEEP Program Finances**

	Quarter 2 (\$000)	PYTD (\$000)
EDC Incentives to Participants	\$0	\$0
EDC Incentives to Trade Allies	\$0	\$0
<b>Subtotal EDC Incentive Costs</b>	<b>\$0</b>	<b>\$0</b>
Design & Development	\$0	\$0
Administration <sup>1</sup>	\$229	\$454
Management <sup>2</sup>	\$107	\$192
Marketing	\$10	\$77
Technical Assistance	\$1,056	\$1,826
<b>Subtotal EDC Implementation Costs</b>	<b>\$1,402</b>	<b>\$2,549</b>
EDC Evaluation Costs	\$29	\$57
SWE Audit Costs	n/a	n/a
Participant Costs	n/a	n/a
<b>Total Costs</b>	<b>n/a</b>	<b>n/a</b>
Annualized Avoided Supply Costs	n/a	n/a
Lifetime Supply Costs	n/a	n/a
<b>Total Lifetime Economic Benefits</b>	<b>n/a</b>	<b>n/a</b>
<b>Portfolio Benefit-to-Cost Ratio</b>	<b>n/a</b>	<b>n/a</b>
<b>NOTES</b> Per PUC direction, TRC inputs and calculations have not been provided in this report. <sup>1</sup> Implementation contractor costs. <sup>2</sup> EDC costs other than those identified explicitly.		

### **4.3 Residential Smart Appliance Recycling Program**

The PECO Residential Smart Appliance Recycling program removes old, inefficient refrigerators, freezers, and room air conditioners from operation as secondary units in homes. It prevents existing primary refrigerators, freezers, and room air conditioners from being retained and used as secondary units when customers purchase new units. Through the program, units are removed to a collection facility and disassembled for environmentally responsible disposal and recycling. PECO rolled out the program in Q4 of PY1 (specifically, on March 1, 2010).

#### **4.3.1 Program Logic**

The primary activities put in place prior to launching the PECO Smart Appliance Recycling Program included creating program marketing materials and building a recycling facility. The marketing materials include content for PECO bill stuffers and program brochures. These serve to build customer awareness of PECO's program and participation procedures and requirements, and to educate customers on the program benefits, namely the availability of the recycling and pickup service, and the associated program rebate for turning in a program-qualifying, unwanted appliance. These, in turn, lead program-aware customers with qualifying appliances to contact the program and to schedule an appliance pick-up. Once picked up, the units are taken to the recycling facility, where they are dismantled and component parts and chemicals are recycled and/or resold.

#### **4.3.2 Program M&V Methodology**

The impact evaluation of the Appliance Recycling program is based on an in-depth review and analysis of tracking data, application of the deemed savings factors approved by the SWE and published in the TRM or a related work paper, and a separate verification of units being picked up by the program via telephone survey.

#### **4.3.3 Program Sampling**

The impact evaluation utilizes all available tracking data. In addition, a quarterly telephone survey is conducted of a statistically valid random sample of participants. The sample is drawn to achieve 90/10 confidence/precision levels on an annual basis. For the first two quarters of PY3 the target sample size is approximately 100 participants.

#### **4.3.4 Process Evaluation**

The process evaluation of the Appliance Recycling program is based on a telephone survey of a random sample of program participants. A phone survey of a sample of 100 Q1 and Q2 participants will be conducted in February 2012 and will be repeated in late July 2012 for the

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remaining 100 completes in the sample. Any major findings/implications will be shared in an early feedback memo to PECO.

#### **4.3.5 Program Partners and Trade Allies**

The program partner is the implementation contractor, JACO. The program also works with big-box retailers that sell new units and can collect the old units when they are being turned over.

### 4.3.6 Program Finances

A summary of the project finances is presented in Table 4-4 below.

**Table 4-4 Smart Appliance Recycling Program Finances**

	Quarter 2 (\$000)	PYTD (\$000)
EDC Incentives to Participants	\$87	\$224
EDC Incentives to Trade Allies	\$0	\$0
<b>Subtotal EDC Incentive Costs</b>	<b>\$87</b>	<b>\$224</b>
Design & Development	\$0	\$0
Administration <sup>1</sup>	\$227	\$563
Management <sup>2</sup>	\$93	\$156
Marketing	\$10	\$33
Technical Assistance	\$0	\$0
<b>Subtotal EDC Implementation Costs</b>	<b>\$329</b>	<b>\$752</b>
EDC Evaluation Costs	\$16	\$32
SWE Audit Costs	n/a	n/a
Participant Costs	n/a	n/a
<b>Total Costs</b>	<b>n/a</b>	<b>n/a</b>
Annualized Avoided Supply Costs	n/a	n/a
Lifetime Supply Costs	n/a	n/a
<b>Total Lifetime Economic Benefits</b>	<b>n/a</b>	<b>n/a</b>
<b>Portfolio Benefit-to-Cost Ratio</b>	<b>n/a</b>	<b>n/a</b>
<b>NOTES</b>		
Per PUC direction, TRC inputs and calculations have not been provided in this report.		
<sup>1</sup> Implementation contractor costs.		
<sup>2</sup> EDC costs other than those identified explicitly.		

## 4.4 Smart Home Rebates Program

The Smart Home Rebates Program offers PECO residential customers rebates for the purchase of qualifying energy-efficient appliances, heating and cooling equipment, and LED lamps and lighting fixtures. The program provides promotional and marketing materials and support to participating retailers and contractors to encourage their promotion of rebated products. For non-lighting measures, customers submit applications via web or mail. Each application includes accompanying proof-of-purchase receipts or invoices. For qualifying lighting

measures, PECO provides manufacturers with a cost buy-down, which is passed on to the customer as a discounted price.

Consumer electronics measures were added in February 2011 and discontinued September 30, 2011. For PY3Q2 up until November 1, 2011, program measures included the following: attic/roof insulation; high-efficiency electric water heaters; LED lamps and ENERGY STAR fixtures; whole-house fans; white roofs; ground-source heat pumps; ENERGY STAR windows and room air conditioners; dehumidifiers; central air conditioning (14.5, 15, and 16 seasonal energy efficiency ratio [SEER]); refrigerators: freezers; clothes washers; dishwashers; lighting fixtures; heat pump water heaters; high-efficiency gas water heaters (fuel switching); and high-efficiency gas furnaces (fuel switching from baseboard or heat pump).

On November 1, 2011, the eligible measures changed to:

- ENERGY STAR Most Efficient 2011 refrigerators -- \$25 rebate
- ENERGY STAR Most Efficient 2011 clothes washers - - \$25 rebate
- ENERGY STAR room air conditioners - - \$25 rebate
- Air-source Heat Pump (16+ SEER or higher, 12 EER, 8.2 HSPF) - \$400 rebate - PECO Electric Customers
- Air-source Heat Pump (15 SEER, 12 EER, 8.2 HSPF) - \$325 rebate - PECO Electric Customers
- Central Air Conditioner (16+ SEER or higher, 12 EER) - \$300 rebate- PECO Electric Customers
- LED lamps (upstream \$10/bulb)

These measures remain unchanged<sup>16</sup>:

ENERGY STAR GEOTHERMAL HEAT PUMP	\$217 per ton	PECO Electric Customers
ENERGY STAR HIGH-EFFICIENCY GAS FURNACE - 90% AFUE or higher (replacing Electric Base Board or Electric Furnace)	\$1,000 per unit	PECO Electric Heating Customers
ENERGY STAR HIGH-EFFICIENCY GAS FURNACE - 90% AFUE or higher (replacing Electric Heat Pump)	\$550 per unit	PECO Electric Heating Customers

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<sup>16</sup> PECO Smart Home Rebates Web site. Accessed: December 19, 2011.



ENERGY STAR HIGH-EFFICIENCY GAS WATER HEATER - .67 EF or higher (replacing Electric Hot Water Heater)	\$250 per unit	PECO Electric Customers
ENERGY STAR HEAT PUMP WATER HEATER 2.0 EF or higher	\$300 per unit	PECO Electric Customers
HIGH-EFFICIENCY ELECTRIC WATER HEATER - .93 EF or higher	\$25 per unit	PECO Electric Customers
ENERGY STAR NATURAL GAS FURNACE 90% AFUE or higher	\$300 per unit	PECO Natural Gas Customers
ENERGY STAR NATURAL GAS BOILER 85% AFUE or higher	\$300 per unit	PECO Natural Gas Customers
ENERGY STAR NATURAL GAS STORAGE TANK WATER HEATER .67 EF or higher	\$50 per unit	PECO Natural Gas Customers

The Smart Home Rebates Program is a retrofit and renovation program designed to upgrade existing equipment to higher levels of efficiency. It is designed to encourage and assist residential customers in improving the energy efficiency of their homes through a broad range of energy efficiency options that address all major end uses. This program offers cash rebates to residential customers who install high-efficiency electric equipment and engages equipment suppliers and contractors to promote the rebate-eligible equipment. The program also encourages customers to make energy-efficient choices when purchasing new products. Unlike an appliance-recycling program, the Smart Home Rebates Program does not focus on persuading customers to get rid of inefficient equipment with significant useful life remaining.

A conservation service provider, Ecova, implements the program on PECO's behalf, providing assistance with PECO's direct marketing, working with upstream suppliers to stock qualifying measures, promoting the program, assisting with rebate applications, providing fulfillment services, and tracking and reporting program activities and achievements toward goals.

#### 4.4.1 M&V Methodology

The three major objectives of the evaluation are to: (1) quantify gross savings impacts from the program; (2) determine key process-related program strengths and weaknesses and identify ways in which the program can be improved; and (3) assess the program's effectiveness in

demonstrating PECO's commitment to and confidence in the measures' performance and their ability to reduce home energy use.

The M&V completed on a quarterly basis includes reviewing program data and documentation to track and verify savings. In addition the M&V also includes 1) conducting participant surveys to obtain customer experience and insight information and to confirm measure installation; and 2) interviewing staff and market actors for insights into program structure and implementation.

For non-lighting measures, gross savings impacts are based on program-reported activity by measure and deemed savings values from the TRM. Savings are adjusted based on results of a participant survey, in which participants are asked to verify the installation and performance of rebated measures.

For lighting measures, M&V consists of reviewing the tracking database and verifying it against the manufacturer invoices sent to PECO for payment. The tracking data is used to estimate the annual program savings. In addition, in-store customer intercept surveys of LED lamps and fixtures purchasers will be conducted to establish intended uses and estimate in-service rates.

#### **4.4.2 Program Sampling**

The PECO Smart Home Rebates program features four distinct delivery channels -- the downstream retailer channel which generally delivers eligible appliances; the downstream contractor channel which generally delivers HVAC, insulation, whole house fans and white roofs through contractors, the midstream consumer electronics channel which incentivized retailers to promote ENERGY STAR televisions and other consumer electronics, and the upstream lighting program. For the downstream program, at current and expected program participation levels, and based on the high incidence of verified installation (over 99%) for the previous program year, a sample size of 200 annually will be sufficient to derive program level realization rates and free-ridership exceeding 85/15 confidence at both the retailer and contractor channel level, as well as provide information representative of customer opinion regarding the program.

#### **4.4.3 Process Evaluation**

Process evaluation activities include reviewing program plans and documentation, and conducting CATI telephone surveys with Smart Home Rebates Program participants, survey interviews with participant and non-participant retailers and contractors, and in-depth interviews with PECO program staff and Ecova program implementers. In addition, the program databases were reviewed as part of the Verification and Due Diligence completed during the fourth quarter of PY2.

#### **4.4.4 Program Partners and Trade Allies**

Under the Smart Home Rebates Program, customers purchase and install qualified products from retailers and/or contractors. The customers or their contractors submit the rebate form to Ecova with information that documents the qualifying sale or installation, with the form allowing customers to see the exact rebate they can receive. Ecova mails the rebate checks to the customer.

Under the implementation strategy, the program is delivered mainly through direct contact between PECO and its customers but offers opportunities for working with trade allies and other upstream suppliers. Retailers and equipment contractors and installers are engaged to promote awareness and use rebate offers to help sell qualifying equipment and may also provide or pre-fill rebate forms to help customers obtain rebates. These allies include residential air-conditioning and heating equipment dealers and installers, high-efficiency clothes washer and dishwasher dealers, and electrical equipment dealers.

#### **4.4.5 Program Finances**

A summary of the project finances is presented in Table 4-5.

**Table 4-5 Summary of PECO Smart Home Rebates Program Finances:**

	Quarter 2 (\$000)	PYTD (\$000)
EDC Incentives to Participants	\$1,514	\$3,517
EDC Incentives to Trade Allies	\$0	\$0
<b>Subtotal EDC Incentive Costs</b>	<b>\$1,514</b>	<b>\$3,517</b>
Design & Development	\$0	\$0
Administration <sup>1</sup>	\$634	\$1,265
Management <sup>2</sup>	\$251	\$425
Marketing	\$403	\$598
Technical Assistance	\$0	\$0
<b>Subtotal EDC Implementation Costs</b>	<b>\$1,288</b>	<b>\$2,289</b>
EDC Evaluation Costs	\$62	\$119
SWE Audit Costs	n/a	n/a
Participant Costs	n/a	n/a
<b>Total Costs</b>	<b>n/a</b>	<b>n/a</b>
Annualized Avoided Supply Costs	n/a	n/a
Lifetime Supply Costs	n/a	n/a
<b>Total Lifetime Economic Benefits</b>	<b>n/a</b>	<b>n/a</b>
<b>Portfolio Benefit-to-Cost Ratio</b>	<b>n/a</b>	<b>n/a</b>
<b>NOTES</b> Per PUC direction, TRC inputs and calculations have not been provided in this report. <sup>1</sup> Implementation contractor costs. <sup>2</sup> EDC costs other than those identified explicitly.		

#### **4.5 Smart Equipment Incentives Program for Commercial and Industrial Customers**

The purpose of the C&I Smart Equipment Incentives program is to increase awareness of energy savings opportunities and assist customers in acting on those opportunities to decrease energy usage in commercial and industrial facilities and in master-metered multifamily residential buildings. This program offers incentives to customers who install high-efficiency electric equipment and engages equipment suppliers and contractors to promote the incentive-eligible equipment. The program launched March 1, 2010, although incentives were also offered for projects completed between July 1, 2009, and February 28, 2010. A waitlist was initiated

effective October 1, 2011 for all project applications received on or after this date. Projects will be taken off the waitlist only as necessary to meet the Act 129 portfolio compliance targets.

PECO's three-year efficiency plan separates the program efforts targeting private C&I businesses from the program efforts targeting the government and nonprofit sectors. For the limited post-launch period of PY1, the marketing and implementation of the Smart Equipment Incentives program was not differentiated between C&I and Government/Nonprofit to a degree that made it necessary to conduct separate evaluations. PY2 and thereafter, C&I and government programs are sufficiently differentiated that the two programs are now being evaluated separately.

#### **4.5.1 Program Logic**

The Smart Equipment Incentives program is designed to make it as easy as possible for C&I customers and their contractors to obtain rebates for prescriptive measures, while also providing flexibility in accommodating custom energy-savings measures. The program leverages the involvement of trade allies to promote the program and identifies energy-savings opportunities. Measure incentives are expected to cover part of the installation costs and drive the market. PECO administers the Smart Equipment Incentives program through an implementation contractor, KEMA. The implementation contractor works with trade allies and contractors, and directly with customers, to achieve program participation. Information flows from customers and contractors to KEMA, is aggregated for PECO, and then flows as needed to the SWE and to the program evaluators.

#### **4.5.2 Program M&V Methodology**

The impact evaluation plan for PY3 is substantially similar to that for PY2. The sample plan for PY3 will use stratified ratio estimation as in PY2; there will continue to be three tiers stratified on size of energy savings (kWh). In PY3, dynamic sampling will be employed to incorporate sample points from each quarter or period. Quarter 1 and Quarter 2 will be combined for one sample to enable a more cost effective evaluation. Additional sample waves will also be completed after Quarters 3 and 4. Measurement and verification in PY3 will include data collection and on-site M&V for most sampled sites, however, the PY3 evaluation will use file reviews only for the strata 3, low impact / low rigor measures. High rigor on-site evaluations will primarily be reserved for strata 1 and 2 sampled projects, but may be applied to strata 3 projects as necessary.

Similar to PY2, for sample design purposes, Multi-tenant projects will be aggregated to one project based on the common site utility account ID. The sampled Multi-tenant aggregated projects will receive a file review only to verify invoices. Key impact findings from the residential appliance rebate program will be applied to the Multi-tenant projects while still

considering the Multi-tenant file review results. This prevents duplicative evaluation efforts among similar programs for which there is no reason to expect dissimilar results.

A maximum of up to 48 sample points is planned with an expectation of 40 sample points selected at an 80/10 confidence and precision. This sample design is sufficient to meet or exceed the precision and confidence targets of 85/15 at the program level and 90/10 at the (non-residential) sector level. Extra sample points may be added to ensure the C/P targets are met, or to meet the requirements of the SWE for large Custom projects.

Gross impacts for demand and energy are verified through different approaches for the three categories of measures in this program: 1) deemed, 2) partially deemed, and 3) custom measures. The measures in these categories are defined by the TRM<sup>17</sup> plus interim protocols approved by the PA PUC through the Statewide Evaluator.

If a measure is deemed, the impacts for the measure are provided in the TRM or in an approved Interim TRM Measure protocol. The evaluation approach for deemed measures is to verify both quantity and that the measure installed matches TRM-required specifications. If a measure is partially deemed, the TRM or approved work paper provides the algorithms and default assumptions for calculating impacts and the variables to be verified through an approved protocol (Basic or Enhanced level of rigor) that includes application review and site-specific M&V. Projects that contain custom measures as defined by the TRM are evaluated through application review and implementing site-specific M&V plans.

#### **4.5.3 Program Sampling**

The sample plan for PY3 will use stratified ratio estimation as in previous program years. Based on an estimated combined paid annual population of 900 non-multi-tenant projects and 400 multi-tenant projects (per sampling count as described above, not reporting counts), we anticipate the sample size will be 40 sites for the program year, with sample allocated by participation from each quarter. The sample may be allocated to larger projects or projects in underrepresented (primarily non-lighting) measures, based on the tiered sampling strategy.

#### **4.5.4 Process Evaluation**

As in previous program years, process evaluation in PY3 will include in-depth interviews with program staff and trade allies, and participant CATI phone interviews. The participant CATI

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<sup>17</sup> Pennsylvania Public Utility Commission, *Technical Reference Manual (TRM) for Pennsylvania Act 129 Energy Efficiency and Conservation Program and Act 213 Alternative Energy Portfolio Standards*, May 2009. Updated version released June 2011.

interviews will assess standard process topics, focusing on satisfaction and program delivery issues. In PY3 particular focus will be the impact of the waitlist on participant and trade ally satisfaction.

#### **4.5.5 Program Partners and Trade Allies**

PECO and PECO's program managers use a contracted program conservation service provider (CSP) to deliver the program. The CSP conducts outreach through trade allies, architects, engineers, energy consultants, energy service companies, equipment providers, and contractors. Customers may also implement measures on their own.

#### **4.5.6 Program Finances**

Summaries of program finances are presented in Table 4-6.

**Table 4-6 Summary of PECO Smart Equipment Incentives – C&I Program Finances:**

	Quarter 2 (\$000)	PYTD (\$000)
EDC Incentives to Participants	\$1,013	\$2,268
EDC Incentives to Trade Allies	\$0	\$0
<b>Subtotal EDC Incentive Costs</b>	<b>\$1,013</b>	<b>\$2,268</b>
Design & Development	\$0	\$0
Administration <sup>1</sup>	\$634	\$1,307
Management <sup>2</sup>	\$124	\$301
Marketing	\$166	\$241
Technical Assistance	\$0	\$0
<b>Subtotal EDC Implementation Costs</b>	<b>\$924</b>	<b>\$1,849</b>
EDC Evaluation Costs	\$136	\$262
SWE Audit Costs	n/a	n/a
Participant Costs	n/a	n/a
<b>Total Costs</b>	<b>n/a</b>	<b>n/a</b>
Annualized Avoided Supply Costs	n/a	n/a
Lifetime Supply Costs	n/a	n/a
<b>Total Lifetime Economic Benefits</b>	<b>n/a</b>	<b>n/a</b>
<b>Portfolio Benefit-to-Cost Ratio</b>	<b>n/a</b>	<b>n/a</b>
<b>NOTES</b>		
Per PUC direction, TRC inputs and calculations have not been provided in this report.		
<sup>1</sup> Implementation contractor costs.		
<sup>2</sup> EDC costs other than those identified explicitly.		

#### **4.6 Smart Equipment Incentives Program for Government and Nonprofit Customers**

The purpose of the Smart Equipment Incentives program is to increase awareness of energy savings opportunities and assist customers in acting on those opportunities to decrease energy usage in government, nonprofit, and institutional facilities. These efforts also presently include



multitenant buildings; savings from this component are now being reported separately. This program offers incentives to customers who install high-efficiency electric equipment and engages equipment suppliers and contractors to promote the incentive-eligible equipment. The program launched March 1, 2010, although incentives were also offered for projects completed between July 1, 2009, and February 28, 2010. A waitlist was initiated effective October 1, 2011 for all project applications received on or after this date. Projects will be taken off the waitlist only as necessary to meet the Act 129 portfolio compliance targets.

PECO's three-year efficiency plan separates the program efforts targeting private C&I businesses from the program efforts targeting the government and nonprofit sectors. For the limited post-launch period of PY1, the marketing and implementation of the Smart Equipment Incentives program was not differentiated between C&I and government/nonprofit to a degree that made it necessary to conduct separate evaluations. Since the close of PY1, the C&I and government programs have been sufficiently differentiated that the two programs are now being evaluated separately. One of the key differences between the programs is the LED traffic light installations.

#### **4.6.1 Program Logic**

The Smart Equipment Incentives program is designed to make it as easy as possible for government, nonprofit, and institutional customers and their contractors to obtain rebates for prescriptive measures, while also providing flexibility in accommodating custom energy-savings measures. The program leverages the involvement of trade allies to promote the program and identifies energy-savings opportunities. Measure incentives are expected to cover part of the installation costs and drive the market. PECO administers the Smart Equipment Incentives program through an implementation contractor, KEMA. The implementation contractor works with trade allies and contractors, and directly with customers, to achieve program participation. Information flows from customers and contractors to KEMA, is aggregated for PECO, and then flows as needed to the SWE and to the program evaluators.

#### **4.6.2 Program M&V Methodology**

The impact evaluation plan for PY3 is substantially similar to that for PY2. The sample plan for PY3 will use stratified ratio estimation as in PY2; there will continue to be three tiers stratified on size of energy savings (kWh), with a fourth strata added specifically for fully deemed traffic signals. In PY3, dynamic sampling will be employed to incorporate sample points from each quarter or period. Quarter 1 and Quarter 2 will be combined for one sample to enable a more cost effective evaluation. Additional sample waves will also be completed after Quarters 3 and 4. Measurement and verification in PY3 will include data collection and on-site M&V for most sampled sites; however, the PY3 evaluation will predominantly use file / invoice reviews only for the strata 3, low impact / low rigor measures. Strata 4 (LED traffic lights) will continue to be

evaluated using a combination of file and invoice reviews for each site. High rigor on-site evaluations will primarily be reserved for strata 1 and 2 sampled projects, but may be applied to strata 3 projects as necessary.

Similar to PY2, for sample design purposes, multi-tenant projects will be aggregated to one project based on the common site utility account ID. The sampled multi-tenant aggregated projects will receive a file review only to verify invoices. Key impact findings from the residential appliance rebate program will be applied to the multi-tenant projects while still considering the multi-tenant file review results. This prevents duplicative evaluation efforts among similar programs for which there is no reason to expect dissimilar results. This evaluation approach may change for the SEI programs in future quarters.

A maximum of up to 20 sample points is planned with an expectation of 16 sample points selected at an 80/10 confidence and precision. This sample design is sufficient to meet or exceed the precision and confidence targets of 85/15 at the program level and 90/10 at the (non-residential) sector level. Extra sample points may be added to ensure the C/P targets are met, or to meet the requirements of the SWE for large Custom projects.

Gross impacts for demand and energy are verified through different approaches for the three categories of measures in this program: 1) deemed, 2) partially deemed, and 3) custom measures. The measures in these categories are defined by the TRM<sup>18</sup> plus interim protocols approved by the PA PUC through the Statewide Evaluator.

If a measure is deemed, the impacts for the measure are provided in the TRM or in an approved Interim TRM Measure protocol. The evaluation approach for deemed measures is to verify both quantity and that the measure installed matches TRM-required specifications. If a measure is partially deemed, the TRM or approved work paper provides the algorithms and default assumptions for calculating impacts and the variables to be verified through an approved protocol (Basic or Enhanced level of rigor) that includes application review and site-specific M&V. Projects that contain custom measures as defined by the TRM are evaluated through application review and implementing site-specific M&V plans.

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<sup>18</sup> Pennsylvania Public Utility Commission, *Technical Reference Manual (TRM) for Pennsylvania Act 129 Energy Efficiency and Conservation Program and Act 213 Alternative Energy Portfolio Standards*, May 2009. Updated version released June 2011.

#### **4.6.3 Program Sampling**

The sample plan for PY3 will use stratified ratio estimation as in previous program years. Based on an estimated paid annual population of 300 non-multi-tenant projects and 100 multi-tenant projects, we anticipate the sample size for the larger non-multi-tenant projects will be 16 sites for the program year, with sample allocated by participation from quarters 1 and 2 combined, quarter 3 and quarter 4. The sample size may be adjusted if the paid project population differs significantly from the projections, in order to achieve an 85/15 confidence / precision target. The on-site sample size will be designed to meet the confidence and precision targets for the portfolio. The sample may be allocated to larger projects or projects in underrepresented (primarily non-lighting) measures, based on the tiered sampling strategy and the likelihood of those sample points being represented in future random samples as the population changes in the course of PY3. Additional samples will be pulled from the fully deemed traffic lights projects for file review of invoices only. As these are fully deemed measures, a lower level of rigor is justified.

#### **4.6.4 Process Evaluation**

As in PY2, process evaluation in PY3 will include in-depth interviews with program staff and trade allies, and participant and trade ally CATI phone interviews. The participant CATI interviews will assess standard process topics, focusing on satisfaction and program delivery issues. In PY3 particular focus will be the impact of the waitlist on participant and trade ally satisfaction.

#### **4.6.5 Program Partners and Trade Allies**

PECO and PECO's program managers use a contracted program conservation service provider to deliver the program. The CSP conducts outreach through trade allies, architects, engineers, energy consultants, energy service companies, equipment providers, and contractors. Customers may also implement measures on their own.

#### **4.6.6 Program Finances**

Summaries of program finances are presented in Table 4-7.

**Table 4-7 Summary of PECO Smart Equipment Incentives – Government and Nonprofit Program Finances:**

	Quarter 2 (\$000)	PYTD (\$000)
EDC Incentives to Participants	\$942	\$1,136
EDC Incentives to Trade Allies	\$0	\$0
<b>Subtotal EDC Incentive Costs</b>	<b>\$942</b>	<b>\$1,136</b>
Design & Development	\$0	\$0
Administration <sup>1</sup>	\$362	\$637
Management <sup>2</sup>	\$69	\$165
Marketing	\$39	\$50
Technical Assistance	\$0	\$0
<b>Subtotal EDC Implementation Costs</b>	<b>\$470</b>	<b>\$852</b>
EDC Evaluation Costs	\$66	\$126
SWE Audit Costs	n/a	n/a
Participant Costs	n/a	n/a
<b>Total Costs</b>	<b>n/a</b>	<b>n/a</b>
Annualized Avoided Supply Costs	n/a	n/a
Lifetime Supply Costs	n/a	n/a
<b>Total Lifetime Economic Benefits</b>	<b>n/a</b>	<b>n/a</b>
<b>Portfolio Benefit-to-Cost Ratio</b>	<b>n/a</b>	<b>n/a</b>
<b>NOTES</b>		
Per PUC direction, TRC inputs and calculations have not been provided in this report.		
<sup>1</sup> Implementation contractor costs.		
<sup>2</sup> EDC costs other than those identified explicitly.		

#### 4.7 Conservation Voltage Reduction Program

The Conservation Voltage Reduction program achieves load reductions through changes in voltage regulation parameters at the substation/transformer level. This change involves a *physical adjustment* in transformer settings governing voltage at the substation. By adjusting

substation voltage, the program impacts hourly energy flows and capacity, including demand coincident with the system peak period(s), included within the top 100 (peak demand) hours on the system load duration curve. Changes to voltage settings at substation/feeder locations were completed during a four-month period from February through May 2010 in PECO's CVR program.

PECO's CVR program was fully implemented and operational through the fourth quarter of PY2. PECO reported no program related issues impacting electric delivery service relating to the program over this period. PECO anticipates continued operation of CVR through PY3 and beyond.

#### 4.7.1 Program Logic

Changes in voltage translate into demand and energy savings through the basic physical relationships governing power. The change in voltage targeted by this program is a 1 percent change in voltage within the tolerance bandwidths required to ensure power quality and equipment performance by end-use customers. In most instances, customers will not notice, nor experience, any changes in equipment performance(s) (e.g., air-conditioning, electric space heating, and motor performance and use), resulting from the change in voltage. However, there is a small possibility that power quality and equipment performance could be impacted under the program, requiring adjustments consisting of equipment changes or enhancements (e.g., adding capacitors to feeders), and/or dialing voltage settings back to their pretreatment level(s).

Part of the role of the EM&V protocol for the CVR program will be to assess these potential impacts, and how effective PECO is in the following areas:

- 1) Identifying adverse outcomes resulting from the program as opposed to common voltage complaints;
- 2) Implementing a remediation plan to restore electric service and power quality to prior levels

#### 4.7.2 Program M&V Methodology

As a custom EE/DR program concept, CVR required the development of a custom EM&V protocol to calculate verified program energy and demand savings. (A detailed description of this protocol can be found in the approved custom protocol filed with the SWE.)

The EM&V protocol for CVR includes the following parameter values and equations to be used in calculating and reporting program-induced energy impacts from CVR:

##### Energy Savings:

- A CVR factor (CVRf) of 1.08 will be used in estimating energy savings for CVR.

- A delta voltage estimate of 0.76 percent will be used in estimating energy savings for CVR.

The calculation of energy and peak demand savings will continue to rely on system-level data from PECO (e.g., monthly system MWh loads) and/or parameter values (e.g., system loss factors) in calculating program impacts.

#### **4.7.3 Program Sampling**

The analysis of CVR savings makes use of census-level data encompassing all substation/feeder locations treated in the program, for which data are available.

#### **4.7.4 Process Evaluation**

The process evaluation of the CVR program is centered on whether there are significant CVR-related customer complaints. Complaints are considered CVR related if they meet all of the following criteria:

- They are classified as low-voltage-related by PECO.
- They occur on distribution feeders that are included in the CVR program.
- They are registered after the CVR cut-over date.
- The nature of the complaint appears to be related to CVR, rather than an equipment-related problem (such as a transformer replacement), or one that involves downed wires, tree branches, or a problem with the wiring inside the customer's facility.

The process evaluation will consist of two key activities, (1) review of customer complaints related to service quality, and (2) telephone surveys with a sample of those on affected feeders. The analysis of customer complaint data will be completed annually following the completion of each program year, while the telephone surveys will be implemented twice annually. Neither of these was completed for this reporting period. A telephone survey will be conducted in January-February 2012, and any significant findings will be shared with PECO in an early feedback memo.

#### **4.7.5 Program Partners and Trade Allies**

The CVR program involves no program partners or trade allies.

#### **4.7.6 Program Finances**

A summary of the project finances is presented in Table 4-8.

**Table 4-8 Summary of CVR Program Finances**

	Quarter 2 (\$000)	PYTD (\$000)
EDC Incentives to Participants	\$0	\$0
EDC Incentives to Trade Allies	\$0	\$0
<b>Subtotal EDC Incentive Costs</b>	<b>\$0</b>	<b>\$0</b>
Design & Development	\$0	\$0
Administration <sup>1</sup>	\$86	\$224
Management <sup>2</sup>	\$6	\$25
Marketing	\$0	-\$1
Technical Assistance	\$0	\$0
<b>Subtotal EDC Implementation Costs</b>	<b>\$91</b>	<b>\$248</b>
EDC Evaluation Costs	\$12	\$24
SWE Audit Costs	n/a	n/a
Participant Costs	n/a	n/a
<b>Total Costs</b>	<b>n/a</b>	<b>n/a</b>
Annualized Avoided Supply Costs	n/a	n/a
Lifetime Supply Costs	n/a	n/a
<b>Total Lifetime Economic Benefits</b>	<b>n/a</b>	<b>n/a</b>
<b>Portfolio Benefit-to-Cost Ratio</b>	<b>n/a</b>	<b>n/a</b>
<b>NOTES</b>		
Per PUC direction, TRC inputs and calculations have not been provided in this report.		
<sup>1</sup> Implementation contractor costs.		
<sup>2</sup> EDC costs other than those identified explicitly.		

## 4.8 Residential Direct Load Control

The Smart A/C Saver Program is a direct load control program for residential customers. During peak summer hours, control signals can be sent to reduce air-conditioning load by cycling the compressor 50 percent within each home. The program is designed to provide

demand response during PECO's top 100 hours of system peak loads. Switches have been installed in participant homes, and control events were called during the summer of 2011.

#### 4.8.1 Program Logic

The Smart A/C Saver Program is based on the installation of digital control units (switches) on qualified residential air conditioners. Participants are incented at the rate of \$120/year (\$30 in each of the four summer months per installed device). These switches will initially be controlled via public VHF paging networks, but as AMI is implemented, these units may migrate to a ZigBee control protocol (switches are dual mode, i.e., both VHF paging and ZigBee).

#### 4.8.2 Program M&V Methodology

The two major objectives of the PY2 evaluation are to:

- (1) Verify installations
- (2) Determine key process-related program strengths and weaknesses and identify ways in which the program can be improved.

In PY3 and PY4, the additional objective of quantifying gross energy and demand savings impacts will be added.

Installations were verified by on-site visits to a sample of participant homes in February and March 2011. Another round of installation verification was completed in December 2011. The first process evaluation was completed in PY2 Q3 and relied on stakeholder interviews and phone surveys with a sample of participants. The process evaluation is being repeated in fall and winter 2011. Impacts will be estimated from a metered data sample after the completion of control events for summer 2011 and again after the summer 2012.

#### 4.8.3 Program Sampling

**Installation Verification:** Each year a sample of sites will be randomly selected for on-site inspection. They will be selected from all installations completed over the previous year. Quotas will be set to ensure there is coverage across geographic areas and different installers. The quotas will minimize potential sampling bias related to these parameters.

**Participant Survey:** Similarly, a sample of participants is randomly selected each summer or fall for telephone interviews. They are selected from all participants at the time of the survey. In program years when control events will be called, the survey is designed to be delivered immediately after the events to get reliable customer recall of conditions in their home while their air-conditioning was being controlled.



**Metered Data:** A random sample of 79 participants was selected in the early months of 2011 to have 100 interval recording meters installed (some participants have multiple air conditioners). This sample will be used to measure impacts from events over all program years due to the high cost of installing interval meters and data communication equipment. Annual monitoring will be done to verify that the selected sample remains representative of the participant customer base, particularly related to average customer size, geography, and number of air-conditioners per home. Corrections will be made to the selected metered sample if needed to keep it representative over time.

#### **4.8.4 Process Evaluation**

The primary objective of the process evaluation is ensure the programs are structured to achieve cost-effective savings, while maintaining high levels of market penetration, customer satisfaction, and program efficiency. In-depth interviews and review of program and marketing materials were used to answer the process-related research questions regarding program design, implementation processes, and marketing.

Participant surveys are used to understand customer demographics, how customers learn of the program, satisfaction with the installation process, and how customers handle their air conditioner on a typical summer day and during heat waves. In PY3 process evaluations, customers will also be asked if they noticed load control events after the fact, and how they and their homes or businesses responded to these events.

#### **4.8.5 Program Partners and Trade Allies**

Comverge is the third-party implementer for this program.

#### 4.8.6 Program Finances

A summary of the project finances is presented in Table 4-9.

**Table 4-9 Summary of Residential DLC Program Finances**

	Quarter 2 (\$000)	PYTD (\$000)
EDC Incentives to Participants	\$4,197	\$7,803
EDC Incentives to Trade Allies	\$0	\$0
<b>Subtotal EDC Incentive Costs</b>	<b>\$4,197</b>	<b>\$7,803</b>
Design & Development	\$0	\$0
Administration <sup>1</sup>	\$893	\$2,172
Management <sup>2</sup>	\$683	\$3,011
Marketing	\$2	\$21
Technical Assistance	\$0	\$0
<b>Subtotal EDC Implementation Costs</b>	<b>\$1,578</b>	<b>\$5,205</b>
EDC Evaluation Costs	\$34	\$65
SWE Audit Costs	n/a	n/a
Participant Costs	n/a	n/a
<b>Total Costs</b>	<b>n/a</b>	<b>n/a</b>
Annualized Avoided Supply Costs	n/a	n/a
Lifetime Supply Costs	n/a	n/a
<b>Total Lifetime Economic Benefits</b>	<b>n/a</b>	<b>n/a</b>
<b>Portfolio Benefit-to-Cost Ratio</b>	<b>n/a</b>	<b>n/a</b>
<b>NOTES</b> Per PUC direction, TRC inputs and calculations have not been provided in this report. <sup>1</sup> Implementation contractor costs. <sup>2</sup> EDC costs other than those identified explicitly.		

#### 4.9 Commercial Direct Load Control

The Smart A/C Saver Program is a direct load control program available to small commercial customers. During peak summer hours, control signals can be sent to reduce air-conditioning

load within a business. The program is designed to provide demand response during PECO's top 100 hours of system peak loads. Thermostats have been installed in participant businesses, and control events were called during the summer of 2011.

#### 4.9.1 Program Logic

The Smart A/C Saver Program is based on the installation of programmable thermostats on qualified small commercial air conditioners. Participants are incented at the rate of \$120/year (\$30 per four summer months per installed device). These thermostats are controlled via a public VHF paging network.

#### 4.9.2 Program M&V Methodology

The two major objectives of the PY2 evaluation are to:

- (1) Verify installations
- (2) Determine key process-related program strengths and weaknesses and identify ways in which the program can be improved

In PY3 and PY4, the additional objective of quantifying gross energy and demand savings impacts were added.

Installations were verified by on-site visits to a sample of participant businesses in February and March 2011. Another round of installation verification was completed in December 2011. The first process evaluation was completed in the third quarter of PY2 and relied on stakeholder interviews and phone surveys with a sample of participants. The process evaluation will be repeated in fall and winter 2011. Impacts will be estimated from a metered data sample after the completion of control events for summer 2012.

#### 4.9.3 Program Sampling

**Installation Verification:** Each fall a sample of sites will be randomly selected for on-site inspection. They will be selected from all installations completed over the previous year. Quotas will be set to ensure there is coverage across geographic areas and different installers. The quotas will minimize potential sampling bias related to these parameters.

**Participant Survey:** Similarly, a sample of participants will be randomly selected each summer or fall for telephone interviews. They will be selected from all participants at the time of the survey. In program years when control events are called, the survey will be designed to be delivered immediately after the events to get reliable customer recall of conditions in their business while their air-conditioning was being controlled.

**Metered Data:** A random sample of 100 thermostats will be selected in the early months of 2012 to have interval recording meters installed. This sample will be used to measure impacts from

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events over all program years due to the high cost of installing interval meters and data communication equipment. Annual monitoring will be done to verify that the selected sample remains representative of the participant customer base, particularly related to average customer size, geography, and number of air conditioners per business. Corrections will be made to the selected metered sample if needed to keep it representative over time.

#### **4.9.4 Process Evaluation**

Participant surveys and stakeholder interviews will be conducted during the second quarter. They will focus on participant satisfaction during control events.

#### **4.9.5 Program Partners and Trade Allies**

Comverge is the third-party implementer for this program.

#### **4.9.6 Program Finances**

A summary of the project finances is presented in Table 4-10.

**Table 4-10 Summary of Commercial DLC Program Finances**

	Quarter 2 (\$000)	PYTD (\$000)
EDC Incentives to Participants	\$75	\$132
EDC Incentives to Trade Allies	\$0	\$0
<b>Subtotal EDC Incentive Costs</b>	<b>\$75</b>	<b>\$132</b>
Design & Development	\$0	\$0
Administration <sup>1</sup>	\$533	\$832
Management <sup>2</sup>	\$40	\$82
Marketing	\$103	\$132
Technical Assistance	\$0	\$0
<b>Subtotal EDC Implementation Costs</b>	<b>\$676</b>	<b>\$1,046</b>
<b>EDC Evaluation Costs</b>	<b>\$12</b>	<b>\$22</b>
<b>SWE Audit Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Participant Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Total Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Annualized Avoided Supply Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Lifetime Supply Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Total Lifetime Economic Benefits</b>	<b>n/a</b>	<b>n/a</b>
<b>Portfolio Benefit-to-Cost Ratio</b>	<b>n/a</b>	<b>n/a</b>
<b>NOTES</b> Per PUC direction, TRC inputs and calculations have not been provided in this report. <sup>1</sup> Implementation contractor costs. <sup>2</sup> EDC costs other than those identified explicitly.		

#### 4.10 Smart Construction Incentives Program

The purpose of the Smart Construction Incentives program is to greatly improve the energy efficiency of all newly constructed facilities and facilities that are completely renovated or re-constructed in the PECO service territory. Customers can participate through a custom, whole building performance approach or a prescriptive equipment efficiency approach. The Smart

Construction Incentives program provides facility designers and builders with training, design assistance and custom incentives (based on kWh saved) to incorporate energy efficient systems and construction practices in facilities.

The program launched officially in February 2011 with some pipeline participants who were in the Smart Ideas tracking system anticipating the launch of this new construction program. 39 projects have been completed so far in PY3.

#### **4.10.1 Program Logic**

The Smart Construction Incentives program is designed to make it as easy as possible for C&I and government/nonprofit customers and their contractors to obtain rebates for energy efficiency in new construction that exceeds minimum standard required by state and local building codes. The program intends to leverage the involvement of the design and engineering community to promote the program and identify energy-savings opportunities.

PECO administers the Smart Construction Incentives program through an implementation contractor, KEMA. The implementation contractor works with design professionals and contractors, and directly with customers, to achieve program participation. Information flows from customers and contractors to KEMA, is aggregated for PECO, and then flows as needed to the SWE and to the program evaluators.

#### **4.10.2 Program M&V Methodology**

Semi-annual sampling and visits will be conducted beginning in the second month following the end of the quarter (e.g., M&V begins in October for quarter ending in August). This analysis will verify that measures recorded in the program tracking system have been installed and remain in place following approved protocols. Inventory and customer interviews will be conducted at all sites. Spot measurement, data logging, and metering will be implemented at sites as required by approved protocols. The sample frame for the first wave of site visits will span participants from the first two quarters of PY3 as well as the four participants from the fourth quarter of PY2. These visits will take place in February 2012.

#### **4.10.3 Program Sampling**

Participant sampling will follow a dynamic sampling methodology executed on a batch-wise basis to achieve the required relative precision targets for defined sampling groups on an annual basis. Sampling of installed measures for verification will be designed to achieve an 85/15 or better level of confidence and relative precision.

Samples for participant phone surveys of process and net-to-gross questions will follow the Sampling and Uncertainty Protocol for simple random sampling. Sample sizes for planning assume a coefficient of variation of 0.5.

#### **4.10.4 Process Evaluation**

The process evaluation will include the following:

- In-Depth interviews with management staff and implementers to provide insight into program design and delivery
- Participant customer telephone survey to gather impact and process-related data, including program experience, free-ridership, and spillover
- Participating vendor and contractor interviews to provide additional insight into program design and delivery

Navigant has conducted in-depth interviews with program managers from both PECO and KEMA. The remainder of these activities will be conducted from January through June 2012.

#### **4.10.5 Program Partners and Trade Allies**

PECO and PECO's program managers use a contracted program conservation service provider (CSP) to deliver the program. The CSP conducts outreach through architects, engineers, energy service companies, equipment providers, and contractors. Customers may also implement measures on their own. Due to the limited participation and waitlist protocol for PY3, additional outreach to architects and other design professionals is on hold and the bulk of current trade allies are contractors who also participate in the Smart Equipment Incentives program.

#### **4.10.6 Program Finances**

A summary of the project finances is presented in Table 4-11.

**Table 4-11. Summary of Smart Construction Incentives Program Finances**

	Quarter 2 (\$000)	PYTD (\$000)
EDC Incentives to Participants	\$0	\$0
EDC Incentives to Trade Allies	\$223	\$567
<b>Subtotal EDC Incentive Costs</b>	<b>\$223</b>	<b>\$567</b>
Design & Development	\$0	\$0
Administration <sup>1</sup>	\$67	\$157
Management <sup>2</sup>	\$5	\$11
Marketing	\$16	\$27
Technical Assistance	\$0	\$0
<b>Subtotal EDC Implementation Costs</b>	<b>\$88</b>	<b>\$195</b>
<b>EDC Evaluation Costs</b>	<b>\$2</b>	<b>\$5</b>
<b>SWE Audit Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Participant Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Total Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Annualized Avoided Supply Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Lifetime Supply Costs</b>	<b>n/a</b>	<b>n/a</b>
<b>Total Lifetime Economic Benefits</b>	<b>n/a</b>	<b>n/a</b>
<b>Portfolio Benefit-to-Cost Ratio</b>	<b>n/a</b>	<b>n/a</b>
<p><b>NOTES</b>                      Per PUC direction, TRC inputs and calculations have not been provided in this report.  <sup>1</sup>Implementation contractor costs.  <sup>2</sup>EDC costs other than those identified explicitly.</p>		



## Summary

Compliance goal progress as of the end of the second quarter of PY3<sup>19</sup> is as follows:

### Cumulative Portfolio Energy Impacts

- The Cumulative Program/Portfolio Inception to Date (CPITD) reported gross energy savings is 992,023 megawatt-hours (MWh).
- The CPITD preliminary verified energy savings is 898,062 MWh.<sup>20</sup>
- Achieved 84 percent of the 1,181,550 MWh May 31, 2013 energy savings compliance target, based on reported gross energy savings.
- Achieved 76 percent of the 1,181,550 MWh May 31, 2013 energy savings compliance target, based on preliminary verified energy savings.

### Portfolio Demand Reduction<sup>21</sup>

- The Program Year Three To Date (PY3TD) Total Committed demand reduction is 71 megawatts (MW).
- The CPITD reported gross demand reduction is 166.7 MW.
- The CPITD preliminary verified demand reduction is 150.6 MW.<sup>22</sup>
- Achieved 42 percent of the 355 MW May 31, 2013 demand reduction compliance target, based on preliminary verified demand reduction.

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<sup>19</sup> Percentage of the compliance target achieved, which is calculated using verified Cumulative Program/Portfolio Inception to Date values (or preliminary verified value, if not available) divided by the compliance target value.

<sup>20</sup> This amount includes verified savings exclusively from measures with approved deemed savings values or protocols that have been approved by the SWE. As of the date of publication, this includes 24,870 in PY3, 713,313 MWh in PY2 and 159,879 MWh in PY1 (note that verified savings of 156,813 MWh from the PY1 Annual Report were supplemented by PY1 savings from the LEEP and CVR programs, once protocols for their savings were approved). These values are subject to change as additional protocols and deemed savings values for measures are approved by the SWE and as the verification process proceeds throughout PY3.

<sup>21</sup> Demand reduction includes both the demand savings from the installation of energy efficiency measures and the demand reduction associated with demand-response programs.

<sup>22</sup> This amount includes verified savings exclusively from measures with approved deemed savings values or protocols that have been approved by the SWE. As of the date of publication, this includes 1.4 MW for PY3, 136.7 MW for PY2 and 12.5 MW for PY1 (the latter value is 0.6 MW higher than reported in the PY1 Annual Report due to the subsequent approval of the savings protocol for the LEEP program and corrections to tracking system errors in the Smart Equipment Incentives program).

- Achieved 62 percent of the 355 MW May 31, 2013 demand reduction compliance target based on CPITD preliminary verified plus unverified, committed savings from PY3.<sup>23</sup>

The progress reported here reflects results of the ten programs in operation in the second quarter of PY3. Additional programs will be launched in PY3. PECO is making excellent progress toward meeting its savings targets.

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<sup>23</sup> Unverified, Reported Gross MW from program activity in the first two quarters of PY3 is 69.6 MW.

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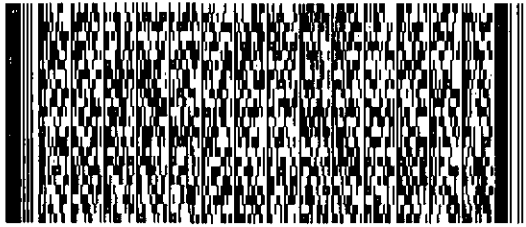
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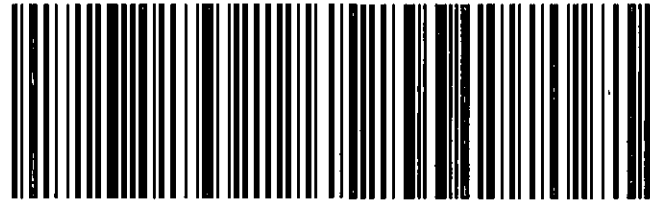
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