Act 129 Statewide Evaluator Quarterly Report

1st Quarter, Program Year 4

Presented to:

Pennsylvania Public Utility Commission

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Table of Contents

List of Tables

List of Acronyms

ASHRAE:	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
C&I:	Commercial and Industrial
C/P:	Confidence and Precision
CF:	Coincidence Factor
CFL:	Compact Fluorescent Light bulb
CPITD:	Cumulative Program Inception To Date
CPITD-Q:	Cumulative Program Inception To Date-Quarter
CVR:	Conservation Voltage Reduction
DER:	Distributed Energy Resources
DOE:	Department of Energy
DR:	Demand Response
DRA:	Demand Response Aggregator
EDC:	Electric Distribution Company
EE&C:	Energy Efficiency and Conservation
EEMIS:	Energy Efficiency Management Information System
EFLH:	Equivalent Full Load Hours
EISA:	Energy Independence and Security Act
EM&V:	Evaluation, Measurement and Verification
GNP:	Government/Non-Profit
HOU:	Hours of Usage
HVAC:	Heating, Ventilation and Air Conditioning
JUUMP:	Joint Utility Usage Management Program
kW:	Kilowatt
kWh:	Kilowatt Hour
LED:	Light-Emitting Diode
LEEP:	Low-Income Energy Efficiency Program
LIEEP:	Limited Income Energy Efficiency Program
LIURP:	Low Income Usage Reduction Program
M&V:	Measurement and Verification
MW:	Megawatts
MWh:	Megawatt Hours
NTG:	Net-to-Gross
PEG:	Program Evaluation Group
PUC:	Public Utility Commission
PY3:	Program Year Three
PY4Q1:	Program Year Four Quarter One
PYTD:	Program Year To Date
QA:	Quality Assurance
QC:	Quality Control

SEI:	Smart Equipment Incentives
SWE:	Statewide Evaluator
T&D:	Transmission and Distribution
TRC:	Total Resource Cost
TRM:	Technical Resource Manual
TUS:	Technical Utility Services
UMP:	Uniform Methods Protocol
VFD:	Variable Frequency Drive
WARM:	Winter Relief Assistance Program

1 Introduction

As part of the *Audit Plan* the Statewide Evaluation team (SWE or SWE team) is required to submit quarterly reports to the Pennsylvania Public Utility Commission (PUC or Commission) with updates on energy (MWh) and demand (MW) savings, impact evaluations, cost-effectiveness, and process evaluations related to the programs implemented under PA Act 129 and detailed in the following Electric Distribution Company's (EDC) respective Energy Efficiency and Conservation (EE&C) Plan[1]:

- West Penn Power Company formerly Allegheny Power (West Penn or West Penn Power);[2]
- Duquesne Light Company (Duquesne);
- The FirstEnergy companies –
    - Metropolitan Edison Company (Met-Ed),
    - Pennsylvania Electric Company (Penelec), and
    - Pennsylvania Power Company (Penn Power);
- PECO Energy Company (PECO), and
- PPL Electric Utilities (PPL).

This report covers the first quarter of Program Year 4 (PY4Q1) and details the Act 129 program activities occurring in both the current program year and since the implementation of energy savings programs per the EDC EE&C plans. Thus, impacts reported as Program Year to Date (PYTD) include impacts occurring between June 1, 2012 and August 31, 2012. Impacts reported as Cumulative Program Inception to Date (CPITD) include savings since the implementation of Act 129 programs (June 1, 2009) through August 31, 2012.

The findings, conclusions, and recommendations contained in the Statewide Evaluator's Quarterly Report are the findings, conclusions, and recommendations of the Statewide Evaluator only and, as such, are not necessarily agreed to by the EDCs or the Commission. The Commission, while not adopting the findings, conclusions, and recommendations contained in the Statewide Evaluator's Quarterly Report, may consider and adopt some or all of them at a later date in appropriate proceedings, such as the annual Technical Reference Manual update, Total Resource Cost Test update, and individual EDC Energy Efficiency and Conservation Plan revision proceedings.

[1] See Statewide Evaluation Team, *Audit Plan and Evaluation Framework for Pennsylvania Energy Efficiency and Conservation Programs,* November 4, 2011.

[2] While West Penn Power has since merged with the FirstEnergy Companies, it will be referred to as a separate company for purposes of this report.

2 Quarterly Report Summary

The following sections present a summary of the EDC program impacts and SWE activities completed to date.

2.1 Aggregated EDC Portfolio Impact Summary

Table 2-1 presents the seven EDCs' aggregated cumulative program inception to date (CPITD[3]) reported gross MWh and MW impacts and cumulative program inception to date – quarter (CPITD-Q[4]) gross MWh and MW impacts based on verified savings through Program Year Three (PY3) and gross savings from PY4. The following table also includes estimates in the reduction of CO2 emissions through the end of the first quarter for PY4 (P4Q1) based on CPITD-Q MWh savings. This quarter ended on August 31, 2012.

Table 2-1: Summary of EDC Quarterly Report Impacts – Program Year 4, 1st Quarter

	CPITD Reported Gross Impact	CPITD-Q Reported Impact [a]
Total Energy Savings (MWh)	3,919,872	3,383,465
Total Demand Reduction (MW)	598	582
TRC Benefits ($) [a]	Not Reported	Not Reported
TRC Costs ($) [b]	Not Reported	Not Reported
TRC Benefit-Cost Ratio[c]	Not Reported	Not Reported
CO_2 Emissions Reduction[d] (Tons)	3,175,096	3,113,207

NOTES:
[a] Avoided supply costs, including the reduction in costs of electric energy, generation, transmission, and distribution capacity, and natural gas valued at marginal cost for periods when there is a load reduction. Subject to TRC Order. TRC Benefits reporting requirement is waived for quarterly reports.
[b] Costs paid by the program administrator and participants plus the increase in supply costs for any period when load is increased. Subject to TRC Order. TRC Costs reporting requirement is waived for quarterly reports.
[c] Subject to TRC Order. TRC Benefit-Cost Ratio reporting requirement is required in annual reports only.
[d] 8.1x10-4 metric tons of CO_2 per kWh (EPC's eGRID2007 Version 1.1, RFCE Region annual non-baseload CO_2 output emissions rate, year 2005 data).

[3] CPITD Reported Gross = CPITD Reported Gross Savings through PY3 + PYTD Reported Gross Savings. All savings reported as CPITD are reported this way.
[4] CPITD-Q Gross = CPITD Verified Gross Savings through PY3 + PYTD Reported Gross Savings. All savings reported as CPITD –Q gross savings are computed this way. CPITD-Q savings provide the best available estimate of savings achieved through the current quarter. CPITD Verified Gross savings will be reported in the Annual Report.

2.2 Impact Summary by EDC

The following table contains a summary of the energy and demand savings impacts of each EDC during PY4.

Table 2-2: Summary of EDC Energy and Demand Savings

	Statewide	Duquesne	PECO	PPL	Met-Ed	Penelec	Penn Power	West Penn
PYTD Reported Gross[5] Energy Savings (MWh)	**329,254**	26,271	36,415	101,074	58,095	37,916	10,390	59,093
CPITD Reported Gross Demand Reduction (MWh)	**3,919,872**	342,738	1,133,349	1,107,995	381,759	372,990	126,004	455,037
CPITD-Q Gross[6] Energy Savings (MWh)	**3,843,465**	338,640	1,117,713	1,073,683	377,511	363,203	123,663	449,052
% of 2013 Energy Savings Target Achieved[7]	**89%**	**81%**	**96%**	**97%**	**86%**	**86%**	**88%**	**72%**
PYTD Reported Gross Demand Reduction (MW)	**65.92**	2.92	5	18.12	18.94	4.12	1.02	15.8
CPITD Reported Gross Demand Reduction (MW)	**598**	36	186	170.34	66	53	16	71
CPITD-Q Gross[8] Energy Savings (MW)	**582**	35	184	161.91	66	50	15	70
% of 2013 Demand Reduction Target[9]	**50%**	**32%**	**52%**	**57%**	**55%**	**49%**	**36%**	**45%**

[5] Gross savings represent change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated.

[6] CPITD-Q Gross = CPITD Verified Gross Savings through PY3 + PYTD Reported Gross Savings. All savings reported as CPITD –Q gross savings are computed this way. CPITD-Q savings provide the best available estimate of savings achieved through the current quarter. CPITD Verified Gross savings will be reported in the Annual Report. Verified gross impact is calculated by applying the realization rate to reported gross impacts. Realization rate is a term used in several contexts in the development of reported program savings. The primary applications include the ratio of project tracking system savings data (e.g. initial estimates of project savings) to savings (a) adjusted for data errors and (b) that incorporate evaluated or verified results of the tracked savings.

[7] Savings based on CPITD.

[8] CPITD-Q Gross = CPITD Verified Gross Savings through PY3 + PYTD Reported Gross Savings. All savings reported as CPITD –Q gross savings are computed this way. CPITD-Q savings provide the best available estimate of savings achieved through the current quarter. CPITD Verified Gross savings will be reported in the Annual Report. Verified gross impact is calculated by applying the realization rate to reported gross impacts. Realization rate is a term used in several contexts in the development of reported program savings. The primary applications include the ratio of project tracking system savings data (e.g. initial estimates of project savings) to savings (a) adjusted for data errors and (b) that incorporate evaluated or verified results of the tracked savings.

[9] Savings based on CPITD.

Cumulative Portfolio Energy Impacts

- The CPITD reported gross energy savings is 3,919,872 MWh.
- The CPITD-Q gross energy savings is 3,843,465 MWh.

Portfolio Demand Reduction[10]

- The CPITD reported gross demand reduction is 598 MW.
- The CPITD-Q gross demand reduction is 582 MW.

Low-Income Sector

- The number of measures offered to the Low-Income Sector comprises approximately 31 percent of the total number of measures offered through all programs.
- The CPITD reported gross energy savings for low-income sector programs is 158,114 MWh.
- The CPITD-Q gross energy savings for low-income sector programs is 157,109 MWh.

Government and Non-Profit Sector

- The CPITD reported gross energy savings for government and non-profit sector programs is 503,092 MWh.
- The CPITD-Q gross energy savings for government and non-profit sector programs is 475,194 MWh.

Program Year portfolio highlights as of the end of the reporting period:
The PYTD reported gross energy savings is 329,254 MWh.

The PYTD reported gross demand reduction is 65.92 MW.

The PYTD reported participation is 802,942 participants.[11]

2.3 Statewide Evaluator Summary

Below is a summary of the activities undertaken by the SWE team during the first quarter of Program Year 4.

The SWE has reviewed the EDC Quarterly Reports for PY4Q1 for completeness against the requirements of the SWE *Audit Plan*. The SWE reviewed the available CPITD reported gross impacts, CPITD-Q gross impacts, and PYTD gross impacts for each EDC. The SWE team audit activities and findings related to the savings reported in the EDCs' quarterly reports can be found in Section 3 of this report.

A summary of the SWE team findings includes:

- Currently[12] 67 programs have been implemented and are generating savings across the state.

[10] Demand reduction to include both the demand savings from the installation of energy efficiency measures and the demand reduction associated with demand response programs.
[11] Statewide participants are based upon the participant numbers reported by each EDC. Most EDCs excluded the number of CFL bulbs distributed from these numbers; other EDCs estimated the number of bulbs per participant and included that estimate in their totals.
[12] Currently as of August 2012.

- Progress towards 2013 MWh savings targets ranges from 71 percent - 95 percent.
- Progress towards 2013 MW reduction targets ranges from 31 percent - 55 percent.

Key SWE team activities during the PY4Q1 included the following:

- Residential program desk audits.
- Low-Income program desk audits.
- Non-residential program desk audits and on-site inspections.
- Participation in PEG meetings.

3 Statewide Evaluator Audit Activities

As part of the SWE audit activities, the members of the SWE team will meet with each EDC to review current program implementation and evaluation activities and to address any pressing issues. Currently, the SWE team holds bi-weekly teleconferences with each EDC to discuss current and planned M&V activities, to schedule upcoming site-visits and audit activities, and to address any unresolved questions or issues that may arise throughout the evaluation process. The SWE team also travels to each EDC and to specific project sites to conduct on-site audits of the various programs implemented in PY4. Additionally, the SWE team is in the process of conducting desktop audits for various programs. An update on each of these activities is provided in the following sections.

3.1 Audit Activities

3.1.1 Residential Programs

The residential programs audits typically consist of a desktop audit which includes a review of program kWh and kW savings calculations and database quality. The information required to conduct these reviews was provided by the EDCs in conjunction with their respective PY4Q1 reports. An update on these audits, by program type and EDC, is provided in the following sections.

3.1.2 Low-Income Programs

The low-income audit process involves quarterly desktop reviews to ensure that EDCs are utilizing TRM protocols and assumptions correctly, to verify that EDCs are reporting savings in accordance with custom protocols, and to validate that savings reported in EDC quarterly reports align with database extracts. In addition, the SWE verifies that EDCs are in compliance with the Act 129 mandate that the number of measures offered to the low-income sector is proportionate to the low-income sector's share of total energy usage.[13] The following sections offer EDC-specific low-income audit findings and recommendations.

For EDCs that conduct on-site inspections, the SWE conducts a desktop review of a select number of site visit reports. The review is intended to evaluate whether all measures are being installed by contractors, whether measures, such as smart strip plug outlets, are being installed correctly, that "job types" are being characterized correctly in accordance with EDC custom protocols, and whether the corresponding savings are correctly reported. For SWE review of EDC site visit reports in lieu of the SWE

[13] Act 129 includes a provision requiring EDCs to offer a number of energy conservation measures to low-income households "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 participation targets, or energy or demand savings.

conducting site visits the reports must meet the requirements outlined in Guidance Memo 16.[14] The receipt and review of these site visit reports typically lags by two quarters and therefore PY4Q1 reports will be reviewed during PY4Q3, with the exception of PECO for which the SWE will schedule 10 site visits of low-income installations in PY4Q3.

3.1.3 Non-Residential Programs

The following sections detail audit findings for non-residential programs. Each quarter, the SWE audits each of the non-residential programs run by the EDCs. Whereas residential programs are typically separated into discrete programs, most EDCs combine their non-residential programs into meta-programs for reporting and evaluation purposes. For example, a lighting program and an HVAC program may be combined into one efficient equipment program. The SWE audit of non-residential programs typically aligns with evaluation groups developed by EDC evaluators such that SWE audit findings and recommendations would be relevant and directly applicable to each EDC. One drawback to this approach is that program groupings are not always consistent between EDCs. For example, one EDC may group all prescriptive and custom projects into one program, whereas another will evaluate those two programs separately. In addition, there may be situations where one EDC uses different criteria to define their programs (e.g., building type vs. measure type). The SWE believes that auditing programs based on EDC program groupings produce the best and most relevant review.

The SWE audit activities vary from quarter to quarter based on what was accomplished by the EDCs and the EDC evaluators. The reviews generally target the following categories:

- Tracking database and reporting
- Reported kWh and kW savings
- Sampling plan
- Verified kWh and kW savings
- TRC test calculations

For the PY4Q1 report, the SWE performed the following activities.

- Tracking Database and Reporting
- Reported kWh and kW Savings
- Sampling Plan

3.2 Program Evaluation Group (PEG) Meetings

3.2.1 Program Evaluation Group Meeting, June 27th 2012

The SWE participated in a Program Evaluation Group meeting with the TUS staff, EDC representatives and EDC evaluators on June 27th, 2012 in Harrisburg, PA. The following topics were discussed.

- Planned Updates to the Pennsylvania TRM including
    - Updating CFL 'Hours of Use' and 'Coincidence Factors' to reflect more recent studies
    - Updating HVAC 'Equivalent Full Load Hours' (EFLH) to account for oversizing

[14] Guidance Memo 16 (distributed to the EDCs on September 6, 2012) provides guidance relating to the low-income site inspection process in PY4. If an EDC already conducts low-income site inspections, either with an independent evaluator or third-party contractor, site inspection reports can be submitted to the SWE in lieu of the SWE conducting independent inspections, provided the reports meet the SWE's needs. Otherwise, the SWE will conduct site inspections of 10 low-income installations per quarter and provide a report to the EDC.

  - Correcting inconsistencies with savings for room air conditioners
  - Reducing the stipulated daily usage of hot water to reflect the DOE Test Standard for Water Heaters
  - Updating savings for showerheads and faucet aerators in Multi-Family homes
  - Restructuring New Construction weather sensitive measures so they are based on software output rather than algorithms
  - Adding 'ENERGY STAR® Most Efficient Refrigerators, Freezers and Televisions.'
  - Updating dehumidifier and refrigerators to reflect new federal standards.
  - Updating refrigerator/freezer recycling protocols for removal and removal with replacement scenarios
  - Updating list of building types for Commercial and Industrial measures for consistency with ASHRAE and other TRMs
  - Using New Construction calculator developed by PPL/Cadmus based on ASHRAE standards for C&I New Construction Lighting projects
  - Updating Office Equipment measures based on more recent Cadmus study because it includes both field measurement and secondary research
- Changing EISA lighting standards and the effect on savings
- The new reporting format for EDC quarterly and annual reports
- Audit activities for certain residential programs switching to an annual rather than a quarterly
- audit
- A supplemental meeting was scheduled (see section 3.2.2) to discuss an update to the SWE DR Study.

3.2.2 Demand Response Study Update Meeting, July 5th 2012

The SWE participated in a DR Study Update meeting with the TUS staff, EDC representatives and EDC evaluators on July 5th, 2012 via teleconference. The following topics were discussed.

- An objective and overview of the study
- The research completed to date including development of the study approach and a review of DR programs in other states
- The Draft Survey presented by the SWE to the EDCs for review
- SWE Presentation on two-tailed versus one-tailed statistical tests

3.2.3 Program Evaluation Group Meeting July 24th 2012

The SWE participated in a Program Evaluation Group meeting with the TUS staff, EDC representatives and EDC evaluators on July 24th, 2012 via teleconference. The following topics were discussed.

- EDC's comments on the SWE's proposed changes to the TRM
  - Recommended an update to the HVAC 'Equivalent Full Load Hours' using a modeling approach consistent with Market Potential Study
  - Recommended including algorithms and assumptions in the TRM as opposed to single deemed values for appliances
  - Recommended continued discussion of C&I lighting updates
- The SWE proposed using an in situ metering study for appliance recycling in Pennsylvania
- Update on the SWE Demand Response Study
  - Review of EDC responses to the proposed SWE Survey Instrument
  - Discussion of sampling plan and what SWE needs from EDCs

    - Summary of remaining work to be done
        - Recommendation on cost-effectiveness testing and calculating T&D avoided costs
        - Economic modeling to calculate benefit/cost ratios
        - Conduct LMP analysis and summarize preliminary results
        - Develop interim report (November 2012)
        - Develop final reports (April 2013)
- Suggestion from EDCs that the SWE and EDCs discuss DOE uniform methods and impact on future versions of the TRM.

3.2.4 Program Evaluation Group Meeting August 22nd, 2012

The SWE participated in a Program Evaluation Group meeting with the TUS staff, EDC representatives and EDC evaluators on August 22nd, 2012 via teleconference. The following topics were discussed.

- PA PUC process and schedule for proposed updates for the 2013 TRM
- Updated template for the EDCs' annual report
- Updated due date for the EDC responses to the new annual data request will be December 1st
- Update on SWE White Paper on one-tailed versus two-tailed tests
- Paper will recommend the two-tailed test
- Presentation from SWE on how the options for determining kWh savings for refrigerator and freezer recycling
    - ENERGY STAR calculator method
    - Regression equation from Uniform Method Protocol (UMP) project
    - In situ metering study
- Additional research proposed on Equivalent Full Load Hours for C&I HVAC measures
    - 2014 TRM will be based on the eQUEST modeling
- Guidance memo on deemed savings for residential direct load control programs
- Update on Demand Response study
    - Reminder to EDCs on the data owed to the SWE Team, and the due date for this data

3.3 EDC Meetings

The SWE and TUS staff conduct bi-weekly meetings held by teleconference with each EDC. These calls provide an opportunity for the SWE to communicate with each EDC on their specific program and evaluations. Topics discussed on these calls are specific to the EDC's and SWE's needs. In the past quarter, EDCs have used these calls to discuss reporting schedules for summer 2013 Demand Response programs, questions concerning appropriate use of realization rates and other savings protocols, SWE data requests and a variety of other topics.

3.4 Status of TRM Update

In accordance with previous Commission Orders, the TRM will be updated for PY1 of Phase 2 of Act 129, effective June 1, 2013 to May 31, 2014 (2013 TRM). The EDCs and other interested parties proposed revisions to existing TRM measures based on PY3 findings and observations. The SWE, in collaboration with the PA PUC staff, EDCs and their EM&V contractors identified specific areas of improvement to the TRM for both commercial and residential protocols. The 2013 TRM Final Order and 2013 TRM Final Manual are still in the development phase and are scheduled for the Public Meeting on December 20, 2012.

Residential measure changes to the TRM include, but are not limited to, the following:

- Modification of Heating, Ventilation, and Air Conditioning (HVAC) Equivalent Full Load Hours (EFLH) and addition of a proper sizing savings algorithm;
- Clarification of lighting protocols regarding the hours of usage (HOU) of compact fluorescent light bulbs (CFL), updates to the algorithms for ENERGY STAR lighting, and clarification regarding the implementation of federal legislation and regulations;
- Clarification of ENERGY STAR Appliances protocol, including new protocols for each appliance, updated baseline assumptions, and inclusion of new and future standards;
- Update of Refrigerator/Freezer Replacement and Recycling protocols based on the latest available program data;
- Modification of electric hot water heater daily water usage assumption;
- Modification of low flow showerhead and faucet aerator assumptions; and
- Clarification of Residential New Construction protocols.

Commercial and industrial changes include, but are not limited to, the following:

- Clarification of lighting protocols regarding the HOU and coincidence factors (CF), building types, control technologies and savings factors, implementation of federal legislation and regulations, new construction calculator, and temperature ranges for interactive factor values;
- Clarification of HVAC protocols regarding EFLH;
- Clarification of Motors and Variable Frequency Drive (VFD) protocols regarding energy savings and demand savings factors, as well as operating hours;
- Clarification of Office Equipment Network Power Management Systems protocols regarding deemed savings values;
- Clarification of Light-Emitting Diode (LED) Channel Signage protocol regarding savings algorithm, and assumptions table;
- Clarification of refrigeration protocols regarding EFLH;
- Clarification of Low Flow Pre-Rinse Sprayers protocol regarding minimum code requirement for time of sale/retail program type;
- Clarification of Refrigeration – Evaporator Fan Controllers protocol regarding savings algorithm, definitions, and assumptions table;
- Clarification of Geothermal Heat Pumps protocol regarding language and definitions;
- Improvements to the functionality and scope of the TRM Appendix C (Lighting Inventory Tool) and Appendix D (Motor and Variable Frequency Drive Inventory Tool).

3.5 Demand Response Issues

During this quarter the SWE team began work on the Demand Response (DR) Study. Phase 1 of the report focused on a review of current program structures around the country which included: New York, Wisconsin, California, Illinois, Massachusetts and Ohio. This also included a review of program goals for each state compared to the structure and goals in PA.

An assessment of baseline development and measurement of reductions was conducted as well as a review of cost-effectiveness tests and treatments of payments in those cost tests.

An analysis of Location Marginal Pricing in the state was conducted over a several year period to evaluate the reasonableness of goal setting under Act 129 in comparison to the economic benefit based on the historic LMP prices in various regions of the state and EDC service territories

The Interim Report will serve as the basis for the Final DR study which will include an economic analysis of EDC DR activities in the summer of 2012 which will also take into account the impact of Act 129 and PJM programs on program participation.

3.6 Net-to-Gross Issues

There were no issues raised related to net–to-gross (NTG) during the first quarter of Program Year Four.

4 Duquesne Light Impact Summaries and Audit Findings

Section 4 contains information on Duquesne's energy and demand impacts to date, current evaluation activities and findings, and current SWE audit activities, findings, and recommendations.

Table 4-1: Summary of Duquesne Quarterly Report Impacts

	CPITD Reported Gross Impact	CPITD-Q Reported Impact [a]	Savings Achieved as % of 2013 Targets[e]
Total Energy Savings (MWh)	342,738	338,640	81%
Total Demand Reduction (MW)	36	35	32%
TRC Benefits ($) [a]	Not Reported	Not Reported	Not Applicable
TRC Costs ($) [b]	Not Reported	Not Reported	Not Applicable
TRC Benefit-Cost Ratio[c]	Not Reported	Not Reported	Not Applicable
CO_2 Emissions Reduction[d] (Tons)	277,618	274,298	Not Applicable

NOTES:
[a] Avoided supply costs, including the reduction in costs of electric energy, generation, transmission, and distribution capacity, and natural gas valued at marginal cost for periods when there is a load reduction. Subject to TRC Order. TRC Benefits reporting requirement is waived for quarterly reports.
[b] Costs paid by the program administrator and participants plus the increase in supply costs for any period when load is increased. Subject to TRC Order. TRC Costs reporting requirement is waived for quarterly reports.
[c] Subject to TRC Order. TRC Benefit-Cost Ratio reporting requirement is required in annual reports only.
[d] 8.1x10-4 metric tons of CO_2 per kWh (EPC's eGRID2007 Version 1.1, RFCE Region annual non-baseload CO_2 output emissions rate, year 2005 data).
[e] Savings based on CPITD.

Duquesne has reported PY4 gross energy savings for 13 programs. The following table provides a breakdown of the contribution of each program's gross energy savings towards the PY4 portfolio savings.

Table 4-2: Summary of Program Impacts on Gross Reported Portfolio Savings – Duquesne

Program:	Percent of PYTD Gross MWh Savings Portfolio
Residential: EE Program (REEP): Rebate Program	10%
Residential: EE Program (Upstream Lighting)	29%
Residential: School Energy Pledge	0%
Residential: Appliance Recycling	5%
Residential: Low-Income EE	3%
Residential: Low-Income EE (Upstream Lighting)	0%
Commercial Sector Umbrella EE	0%
Healthcare EE	0%
Industrial Sector Umbrella EE	0%
Chemical Products EE	0%
Mixed Industrial EE	8%
Office Building – Large – EE	12%
Office Building – Small EE	2%
Primary Metals EE	9%
Public Agency / Non-Profit	6%
Retail Stores – Small EE	11%
Retail Stores – Large EE	3%

4.1 Program Implementation and Evaluation Summary

The following table contains a summary of programs reporting participation and savings to-date, programs evaluated in PY4, and programs to be implemented or with no reported savings. Programs "implemented" include only those programs with reported gross impacts.

Table 4-3: Summary of Programs Implemented to Date by Duquesne

Programs Reporting PY4 Gross Savings:
• Residential: EE Program: Rebate Program • Residential: EE Program Upstream Lighting • Residential: Appliance Recycling • Residential: Low-Income EE • Commercial Sector Umbrella EE • Chemical Products EE • Mixed Industrial EE • Office Building – Large – EE • Office Building – Small EE • Primary Metals EE • Public Agency/Non-Profit • Retail Stores – Small EE • Retail Stores – Large EE
Programs to be Implemented or with No Reported PY4 Savings:
• Residential: School Energy Pledge • Residential: Low-Income EE (Upstream Lighting) • Healthcare EE • Industrial Sector Umbrella EE

4.2 Status of EM&V Activities

4.2.1 Status of EM&V Plans

No revised EM&V Plans were submitted for SWE review in PY4Q1.

4.2.2 Status of M&V Activities

In PY4Q1, Duquesne's evaluator, Navigant continued to schedule and conduct telephone and on-site verification and net-to-gross surveys with sampled PY3 participants.

Plans are also underway to enable surveying of Watt Choices Curtailable Load program participants, as part of the SWE's effort to estimate the extent to which customer load reductions resulting from EDC Demand Response programs would have occurred anyway due to the existence of PJM load reduction programs.

4.3 Residential Program Audit Summary

The following sections contain SWE findings and recommendations based on the audit of residential programs.

4.3.1 Residential Lighting Program

To audit these programs, the SWE team conducted the following activities:

- Verified the number of bulbs reported;
- Verified the savings protocol utilized to report kWh and kW savings;
- Verified the baseline assumptions utilized to calculate savings; and
- Verified the bulbs tracked against invoices received.

To verify each of these aspects, the SWE team reviewed those values reported in the PY4Q1 Report to the data tracked in the EDC's database and tracking system. The following table contains a summary of the SWE team audit findings and recommendations:

To audit these programs, the SWE team conducted the following activities:

- Verified the number of bulbs reported;
- Verified the savings protocol utilized to report kWh and kW savings;
- Verified the baseline assumptions utilized to calculate savings; and
- Verified the bulbs tracked against invoices received.

Table 4-4: Summary of CFL Program Audit - Duquesne

Category:	PY4Q1 Report:	Database Verification:	Notes:
No. Bulbs	Not Reported	N/A	Duquesne does not report individual bulb counts in their quarterly reports.
Gross Energy Savings	PYTD: 7,587 MWh	√	This represents the savings from bulbs sold through the upstream CFL program administered through Ecos.
Gross Demand Reduction	PYTD: 0.346 MW	√	This represents the savings from bulbs sold through the upstream CFL program administered through Ecos.
Use of TRM Protocols	Not Applicable	√	All savings calculated in accordance with the TRM protocols.
Baseline Assumptions	Not Applicable	√	All baseline assumptions valid.
Invoice Review	Not Applicable	√	A total of 2 individual invoices were reviewed for bulbs sold and distributed during PY4Q1. Bulb counts and total dollars reimbursed were verified.

4.3.2 Appliance Recycling Program

The SWE has started, in PY4, to conduct database sample checks for the Appliance Recycling program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that no program changes occurred in this quarter.

4.3.3 Efficient Equipment Program

The SWE has started, in PY4, to conduct database sample checks for the Efficient Equipment program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE did not encountered any QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of Program Year Four) will be available in the PY4 Annual Report. The SWE notes that no program changes occurred in this quarter.

4.3.4 New Construction Program

Duquesne did not have an active Residential New Construction Program in PY4Q1.

4.4 Low-Income Program Audit Summary

The SWE requested that Duquesne provide all spreadsheets and supporting calculations detailing program participation, energy and demand savings, and other relevant information such as measures installed. Duquesne's low-income program consists of the Low-Income Energy Efficiency Program (LIEEP), which consists primarily of kits, bulb giveaways and appliance removal and replacement, as well as a portion of the Upstream Lighting program, which is assumed to have low-income population participation. Savings for the latter is allocated annually and thus is not reported for the PY4Q1 report. Table 4-5 presents the LIEEP participation, energy savings, and demand impact listed in Duquesne's quarterly report, the corresponding information gleaned from the SWE's review of the database extract, and the discrepancy, if any, between the two.

Table 4-5: Low-Income Energy Efficiency Program Quarterly Report and Database Summary

	Participants	MWh/year	MW
PY4Q1 Report	1,317	913	0
Database	1,317	913	0
Discrepancy (Report - Database)	**0**	**0**	**0**

The SWE also selected a sample of 15 participants in the Duquesne database to verify that the measure calculations were consistent with TRM protocols. The savings calculations for the Apogee Kits were not adjusted in PY4 to reflect the fact that bulbs that previously had a 100 watt incandescent baseline now have a baseline assumption of 72 watts as a result of EISA 2007 standards. This baseline change impacts the (666) 23 watt CFLs distributed in Q1 as part of LIEEP.

Duquesne reported 26 measures available to the low-income sector, which is 38 percent of the total number of measures offered by Duquesne across all sectors. Therefore, Duquesne is in compliance with its proportion of measures target, which is 7.88 percent for Duquesne.

4.5 Non-Residential Program Audit Summary

Duquesne lists 11 programs under its non-residential portfolio. Seven of these programs are offered to the Commercial and Government/Non-Profit sectors and four are offered to the Industrial sector. Several of Duquesne's programs are composed of multiple sub-programs. For example, Duquesne's Public Agency/Non-Profit program is made up of the Education, Education – AF, Education – CCx, PAPP Public Agency Partnership, Non-Profit, PAPP Public Agency Partnership, PAPP-RE and Non-Profit customer segments. The abbreviations which follow these sub-programs further classify projects by type and CSP in Duquesne's tracking system, PMRS. This added layer of detail gives Duquesne flexibility in providing access to its tracking system and allows them to drill down to specific project types when viewing program impacts. However, this project classification system caused a reporting issue for PY4Q1 because energy and demand impacts were not counted from several sub-programs in the Duquesne PY4Q1 report.

There were no recorded projects in the Industrial Sector EE program during PY4Q1, but each of Duquesne's 10 other non-residential programs produced new energy and demand impacts during the quarter. Table 4-6 provides the reported number of participants, energy savings, demand savings and incentives paid from PY4Q1. The two Retail EE programs are presented together because Duquesne did not report the incentives paid to the Small and Large program separately. The gross reported energy savings for these programs was 13,862 MWh and the gross reported demand impact was 2.16 MW.

Table 4-6: Duquesne Non-Residential Programs Quarterly Summary

Program	Participants	MWh	MW	Incentives
Commercial Sector Umbrella EE	7	33	0.01	$3,000
Healthcare EE	2	0	0	$275,000
Industrial Sector EE	0	0	0	$0
Chemical Products EE	1	48	0.00	$16,000
Mixed Industrial EE	17	2,222	0.34	$88,000
Office Building Large EE	23	3,197	0.77	$72,000
Office Building Small EE	30	648	0.09	$68,000
Primary Metals EE	5	2,384	0.24	$78,000
Public Agency/Non-Profit	27	1,545	0.27	$139,000
Retail Stores - Small EE	50	2,915	0.30	$177,000
Retail Stores - Large EE	7	870	0.13	
Totals	**169**	**13,862**	**2.16**	**$916,000**

4.5.1 Review of Savings Database

Duquesne provided a database of all PY4Q1 activity to the SWE team for review. This database was presented at both the project level and the measure level. Table 4-7 provides the participant count, energy impact, peak demand impact and total incentives paid by program according to the Duquesne database extract. As with the previous section, the two retail programs (small and large) are presented together.

Table 4-7: Duquesne Non-Residential Programs Savings Database Summary

Program	Participants	MWh	MW	Incentives
Commercial Sector Umbrella EE	7	33	0.01	$2,398
Healthcare EE	2	2,197	0.63	$266,994
Industrial Sector EE	0	0	0.00	$0.00
Chemical Products EE	1	48	0.00	$3,018
Mixed Industrial EE	17	2,222	0.34	$145,388
Office Building Large EE	23	3,197	0.77	$242,572
Office Building Small EE	30	648	0.09	$52,374
Primary Metals EE	5	2,384	0.24	$116,396
Public Agency/Non-Profit	27	8,968	1.99	$634,983
Retail Stores - Small EE	57	3,785	0.43	$170,145
Retail Stores - Large EE				
Totals	**169**	**23,480**	**4.50**	**$1,634,268**

In Table 4-8 the discrepancies between the reported figures and the information contained in the database are presented. All discrepancies are reported as follows:

$$\boldsymbol{Reported\ Figure - Database\ Summary = Discrepancy}$$

Table 4-8: Duquesne Non-Residential Program Discrepancies

Program	Participants	MWh	MW	Incentives
Commercial Sector Umbrella EE	0	0	0.00	$602
Healthcare EE	0	-2,197	-0.63	$8,006
Industrial Sector EE	0	0	0.00	$0
Chemical Products EE	0	0	0.00	$12,983
Mixed Industrial EE	0	0	0.00	-$57,388
Office Building Large EE	0	0	0.00	-$170,572
Office Building Small EE	0	0	0.00	$15,626
Primary Metals EE	0	0	0.00	-$38,396
Public Agency/Non-Profit	0	-7,423	-1.72	-$495,983
Retail Stores - Small EE	0	0	0.00	$6,855
Retail Stores - Large EE				
Totals	**0**	**-9,618**	**-2.35**	**-$718,268**

Table 4-8 shows that there was considerable variation between the reported impacts and the impact figures contained in the Duquesne tracking data for the Healthcare EE and Public Agency/Non-Profit programs. The SWE discussed this variation with Duquesne and its evaluation contractor and determined that the differences are a result of new program codes being added to PMRS system in PY4Q1. The impacts table in the quarterly report was created using an automated process which aggregated figures from a static list of program codes. The new program codes for the Healthcare – CCx, Healthcare – AF, PAPP – RE and Education – CCx were not included in the list of program codes to include in the quarterly summary. As a result, the energy impacts shown in the Duquesne PY4Q1 report were 9,618 MWh lower than what was actually achieved in the quarter. Similarly, demand impacts were undercounted by 2.35 MW. Duquesne and its evaluator have taken corrective actions to ensure that all non-residential savings transactions will be reported in the future. The PYTD and CPITD energy and demand figures in the PY4Q2 report will reflect the impacts which weren't reflected in the PY4Q1 numbers.

The total reported incentive amounts for PY4Q1 were $718,268 lower than the rebates shown in the savings database. This is because Duquesne reports the incentives that were actually paid during the quarter rather than the sum of the incentives associated with projects completed in the quarter.

4.5.2 Review of Sample Design

Duquesne's PY4Q1 report did not address the design of the evaluation samples for PY4. The SWE has reviewed the sample design of Duquesne's non-residential program evaluations in previous program years and found it to be adequate to achieve the confidence and precision levels required by the Audit Plan. The SWE understands that Duquesne will continue to divide its non-residential projects into two groups for evaluation. One evaluation group includes the Commercial and the Government/Non-Profit

sectors and the other evaluation group includes projects from the Industrial sector. The SWE will request a preliminary list of sampled projects from Duquesne's evaluator in early 2013 to ensure that the PY4 evaluation efforts are on track to deliver verified savings estimates which meet the mandated confidence and precision values.

4.5.3 On-site Inspections

Duquesne has not begun its on-site inspections of PY4 installations. The SWE plans to conduct ride-along site inspections of PY4 installations beginning in early 2013.

4.6 Final Recommendations

The SWE recommends that Duquesne and its evaluator perform a comparison between the values reported in quarterly reports and those listed in quarterly tracking data extracts. This comparison will help ensure the ex ante impacts shown in the filed reports reflect all transactions from the period.

Low-income savings calculations for CFLs that assumed a 100 watt baseline in prior program years should be adjusted to 72 watts in accordance with the 2012 TRM.

5 PECO Impact Summaries and Audit Findings

Section 5 contains information on PECO's energy and demand impacts to date, current evaluation activities and findings, and current SWE audit activities, findings, and recommendations.

Table 5-1: Summary of PECO Quarterly Report Impacts

	CPITD Reported Gross Impact	CPITD-Q Reported Impact	Savings Achieved as % of 2013 Targets[e]
Total Energy Savings (MWh)	1,133,349	1,117,713	96%
Total Demand Reduction (MW)	186	184	52%
TRC Benefits ($) [a]	Not Reported	Not Reported	Not Applicable
TRC Costs ($) [b]	Not Reported	Not Reported	Not Applicable
TRC Benefit-Cost Ratio[c]	Not Reported	Not Reported	Not Applicable
CO_2 Emissions Reduction[d] (Tons)	918,013	905,348	Not Applicable

NOTES:
[a] Avoided supply costs, including the reduction in costs of electric energy, generation, transmission, and distribution capacity, and natural gas valued at marginal cost for periods when there is a load reduction. Subject to TRC Order. TRC Benefits reporting requirement is waived for quarterly reports.
[b] Costs paid by the program administrator and participants plus the increase in supply costs for any period when load is increased. Subject to TRC Order. TRC Costs reporting requirement is waived for quarterly reports.
[c] Subject to TRC Order. TRC Benefit-Cost Ratio reporting requirement is required in annual reports only.
[d] 8.1x10-4 metric tons of CO_2 per kWh (EPC's eGRID2007 Version 1.1, RFCE Region annual non-baseload CO_2 output emissions rate, year 2005 data).
[e] Savings based on CPITD.

PECO has reported PY4 gross energy savings for 11 programs. The following table provides a breakdown of the contribution of each program's gross energy savings towards the PY4 portfolio savings.

Table 5-2: Summary of Program Impacts on Gross Reported Portfolio Savings – PECO

Program:	Percent of PYTD Gross MWh Savings Portfolio
Smart Lighting Discounts Program	7%
Smart Appliance Recycling Program	4%
Smart Homes Rebates Program	7%
Residential Conservation Voltage Reduction	0%
Low-Income Energy Efficiency Program	25%
Low-Income Conservation Voltage Reduction	0%
C&I Smart Equipment Incentives - Retrofit	29%
C&I Smart Equipment Incentives - Multi-Tenant	0%
C&I Smart Equipment Incentives - Appliance Recycling	0%
C&I Smart Construction Incentives	2%
C&I Conservation Voltage Reduction	0%
Government/Non-Profit Smart Equipment Incentives - Retrofit	24%
Government/Non-Profit Smart Equipment Incentives - Multi-Tenant	0%
Government/Non-Profit Smart Equipment Incentives - Appliance Recycling	0%
Government/Non-Profit Smart Construction Incentives	2%
Government/Non-Profit Conservation Voltage Reduction	0%

5.1 Program Implementation and Evaluation Summary

The following table contains a summary of programs reporting participation and savings to-date, programs evaluated in PY4, and programs to be implemented or with no reported savings. Programs "implemented" include only those programs with reported gross impacts.

Table 5-3: Summary of Programs Implemented to Date by PECO

Programs Reporting PY4 Gross Savings:
• Smart Lighting Discounts Program • Smart Appliance Recycling Program • Smart Homes Rebates Program • Low-Income Energy Efficiency Program • C&I Smart Equipment Incentives - Retrofit • C&I Smart Equipment Incentives - Multi-Tenant • C&I Smart Equipment Incentives - Appliance Recycling • C&I Smart Construction Incentives • Government/Non-Profit Smart Equipment Incentives - Retrofit • Government/Non-Profit Smart Equipment Incentives - Multi-Tenant • Government/Non-Profit Smart Construction Incentives
Programs to be Implemented or with No Reported PY4 Savings:
• Residential Conservation Voltage Reduction • Low-Income Conservation Voltage Reduction • C&I Conservation Voltage Reduction • Government/Non-Profit Smart Equipment Incentives- Appliance Recycling • Government/Non-Profit Conservation Voltage Reduction

5.2 Status of EM&V Activities

5.2.1 Status of EM&V Plans

No revised EM&V Plans were submitted for SWE review in PY4Q1.

5.2.2 Status of M&V Activities

Each program's evaluation updates and findings are as follows:

- Low-Income Energy Efficiency Program: PECO plans to conduct process evaluation activities including in-depth interviews with utility and implementation contractor staff and telephone surveys of participants starting in the PY4Q2. Navigant will also be modifying the on-site visit protocol to conform to the new SWE requirements as described in the Guidance Memo provided on September 6, 2012.[15]
- Smart Lighting Discounts: The M&V completed for the PY4Q1 report consisted of reviewing the 1st quarter tracking data provided to the evaluation team by PECO program staff, as well as reviewing all of the manufacturer invoices received and approved by PECO and Ecos through the end of August 2012. The data used to estimate the PY4 PYTD savings for this report was based upon the manufacturer invoices.
- Smart Appliance Recycling: The first and second waves of participant surveys, for all PY3 participants, were completed in early March and mid-September, respectively. Early review of Wave 1 findings reveals a 100 percent verification rate and other findings related to the part-use factor, NTG ratio, and process related feedback that are in line with previous evaluations. The Wave 2 survey data have yet to be analyzed.
- Smart Home Rebates: During this quarter, the process evaluation conducted interviews with PY3 trade allies and completed a telephone survey of PY3 participants. At the same time, the impact evaluation began to review samples of participant measure data. Analysis and findings from both process and impact evaluations are currently underway with an expected report at the end of calendar year 2012. Evaluation of PY4 activities will begin after the start of calendar year 2013.
- Smart Equipment Incentives Commercial and Industrial (SEI C&I) Program: The evaluation of the Smart Equipment Incentives Commercial and Industrial Program will align closely with the PY3 evaluation in terms of approaches and tasks. In PY4, the team will complete an initial sample design based on Q1 and Q2 completed project files as well as any available pipeline project information. The sample will be designed to achieve an 85/15 or better level of confidence and relative precision at the program-level. Based on the initial sample design, the team will choose projects to sample from the project population and request project files from PECO/KEMA. Similar to PY3, the team will use a lower level of rigor for the Stratum 3 projects. Stratum 3 projects are the smallest of the projects in terms of energy savings; collectively, they account for about one-third of total savings. Verification for Stratum 3 projects will typically consist of file reviews and phone verifications only; however, this will be determined on a case-by case basis. Verification for larger Stratum 1 and 2 projects will continue to rely on use of on-site M&V. For the process evaluation, the team plans to interview program staff and implementation

[15] Guidance Memo 16 provides guidance relating to the low-income site inspection process in PY4. If an EDC already conducts low-income site inspections, either with an independent evaluator or third-party contractor, site inspection reports can be submitted to the SWE in lieu of the SWE conducting independent inspections, provided the reports meet the SWE's needs. Otherwise, the SWE will conduct site inspections of 10 low-income installations per quarter and provide a report to the EDC.

contractor staff. In addition, the team will complete surveys with program participants. Other surveys may be fielded depending on the findings from PY3. Computer-aided telephone interview (CATI) surveys will be utilized to both assess the program satisfaction as well as supplement impact evaluation findings. Also similar to PY3, multi-tenant projects will not be evaluated as part of the SEI C&I program for PY4 but will instead be evaluated in conjunction with the PECO Smart Home Rebates program, as the customers and measures are more similar to that residential program.

- Smart Equipment Incentives Government, Institutional and Non-Profit Program (SEI GIN): Consistent with the evaluation of the SEI C&I Program, the PY4 evaluation of the SEI GIN Program will align closely with the PY3 evaluation in terms of approaches and tasks. In PY4, the evaluation team will complete an initial sample design based on Q1 and Q2 completed project files as well as any available pipeline project information. The sample will be designed to achieve an 85/15 or better level of confidence and relative precision at the program-level. Similar to PY3, the evaluation team will use a lower level of rigor for the Stratum 3 projects and the evaluation activities will typically consist of file reviews and phone verifications only; however, this will be determined on a case-by case basis. Verification for larger Stratum 1 and 2 projects will continue to rely on the use of on-site M&V. Consistent with the PY3 evaluation, desk review and invoice review will be used for verification of the Stratum 4 traffic light replacement projects; for street lighting projects within Stratum 4, phone verifications in addition to desk reviews and invoice reviews will be conducted. For the process evaluation, consistent with the PY3 approach, the evaluation team plans to interview key program staff and implementation contractor staff. In addition, the team will complete surveys with program participants as a way to better understand customer satisfaction and perceptions related to the program, as well as to gather data to support the NTG analysis. Other surveys may be fielded depending on the process evaluation findings from PY3. Computer-aided telephone interview (CATI) surveys will be utilized to assess the program effectiveness and to supplement the impact evaluation findings. Also similar to PY3, multi-tenant projects will not be evaluated as part of the SEI GIN program for PY4, but will instead be evaluated in conjunction with the PECO Smart Home Rebates program, as the customers and measures are more similar to that residential program.
- Smart Construction Incentives: Navigant is currently in the final stages of the PY3 evaluation. The process surveys and in-depth interviews with participants and trade allies are nearly complete, and all on-site visits have been completed. Navigant will complete the impact analysis for the annual report to be filed in November. The PY4 evaluation will begin after the conclusion of the PY3 evaluation.
- Residential Smart AC Saver Program: Navigant utilized the “Deemed Savings Estimates for Legacy Air Conditioning and Water Heating Direct Load Control Programs in PJM Region” report in conjunction with the PECO tracking database of residential customers to predict reduction by connected air conditioning load. These predicted savings values will be utilized at the end of the control season to calculate residential load reductions for PY4. Participant surveys were conducted immediately following two control events to understand customer satisfaction with control events, how the customer handles their AC on a typical summer day and during heat waves, noticeability of load control events, and how participants and their homes respond to these events.
- Commercial Smart AC Saver Program: Following the final month of the PY4 curtailment season, Navigant will utilize the data from the M&V group (a sample of participants that had additional metering equipment installed on their air conditioners) to calculate load reduction for the commercial direct load control population. In parallel with the post event surveys of the

residential DLC population, Navigant conducted surveys with the commercial population immediately following two control events to understand customer satisfaction with control events, how the customer handles their AC on a typical summer day and during heat waves, noticeability of load control events, and how participants and their businesses respond to these events.

- Permanent Load Reduction: There has been no participation in this program to date; however, one participant is expected to complete a project in PY4. Evaluation of this project will likely be conducted in conjunction with the evaluation of the Smart Equipment Incentives program.
- Demand Response Aggregator: The impact evaluation of this program will consist of developing baselines for each participant and each event, using the PJM protocols and calculating demand reduction relative to those baselines during each event hour. Impact evaluation activities in PY4Q1 included processing data from some participants during some of the curtailment events to validate that Navigant's and PECO's models were calculating the same demand reductions.
- Distributed Energy Resources: Similar to the DRA program, evaluation work for DER during PY4Q1 included estimating demand impacts for some participants and validating that Navigant's and PECO's models agreed.

5.3 Residential Program Audit Summary

5.3.1 Residential Lighting Program

To audit these programs, the SWE team conducted the following activities:

- Verified the number of bulbs reported;
- Verified the savings protocol utilized to report kWh and kW savings;
- Verified the baseline assumptions utilized to calculate savings; and
- Verified the bulbs tracked against invoices received.

To verify each of these aspects, the SWE team reviewed those values reported in the PY4Q1 Report to the data tracked in the EDC's database and tracking system. The following table contains a summary of the SWE team audit findings and recommendations:

Table 5-4: Summary of CFL Program Audit - PECO

Category:	PY4Q1 Report:	Database Verification:	Notes:
No. Bulbs	PYTD: 53,324	√	This represents the number of bulbs reimbursed and given-away through the Smart Lighting Program in PY4Q1.
Gross Energy Savings	PYTD: 2,518 MWh	√	This represents the savings from bulbs reimbursed and given-away through the Smart Lighting Program in PY4Q1.
Gross Demand Reduction	PYTD: 0.1 MW	√	This represents the savings from of bulbs reimbursed and given-away through the Smart Lighting Program in PY4Q1.
Use of TRM Protocols	Not Applicable	√	All savings calculated in accordance with the TRM protocols.
Baseline Assumptions	Not Applicable	√	All baseline assumptions valid.
Invoice Review	Not Applicable	√	A total of 4 individual invoices were reviewed for bulbs sold and distributed during PY4Q1. Bulb counts and total dollars reimbursed were verified.

5.3.2 Appliance Recycling Program

The SWE has started, in PY4, to conduct database sample checks for the Appliance Recycling program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not

encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that the decrease in the incentive offered for recycled appliances (reduction from $35 in PY3Q2 to $15 in PY3Q3) continues to affect participation levels in PY4Q1. However, participation has increased in PY4Q1 from PY3Q4.

5.3.3 Efficient Equipment Program

The SWE has started, in PY4, to conduct database sample checks for the Efficient Equipment program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that there were no program changes in the Efficient Equipment Program.

5.3.4 New Construction Program

PECO did not have an active Residential New Construction Program in PY4Q1.

5.4 Low-Income Program Audit Summary

The SWE requested that PECO provide a quarterly database extract, consisting of all spreadsheets and supporting calculations detailing program participation, energy and demand savings, and other relevant information such as measures installed. The SWE compared the data provided in the quarterly data extract to PECO's PY4Q1 report. The savings listed in the quarterly report and the database extract are presented in Table 5-5. There is a minor discrepancy of less than 0.1 MW in demand savings between the two sources, with the database extract reporting a demand impact of 0.43 MW. The discrepancy appears to be due to rounding.

Table 5-5: Low-Income Energy Efficiency Program Quarterly Report and Database Summary

	Participants	MWh/year	MW
PY4Q1 Report	2,394	9,171	0.5
Database	2,394	9,171	0.43
Discrepancy (Report - Database)	**0**	**0**	**< 0.1**

Low-Income Energy Efficiency Program (LEEP) participant savings are recorded based on "measure group," which is determined by both the type of space heating and measures installed. The SWE verified that appropriate savings values were applied based on measure group. These savings are established from results of the most recent four-year average of billing analysis. Ultimately, all PY4 results will be based on 2008-2009 LIURP and PY1 and PY2 LEEP data and therefore PY4Q1 results are subject to change.

The LIURP program consistently distributed a maximum of four CFLs and therefore the billing analysis can only be extended to the LEEP program energy savings for the first four CFLs installed. The SWE verified the savings for a sample of 10 participants receiving in excess of four bulbs to ensure the savings calculations followed TRM protocols. No discrepancies were found.

Lastly, PECO offered 44 measures to the low-income sector in PY4Q1, which is 35.48 percent of the total number of measures offered across all sectors. Therefore, PECO is in compliance with its proportion of measures target, which is 8.05 percent.

5.5 Non-Residential Program Audit Summary

PECO reported savings impacts from four non-residential programs in PY4Q1: Smart Equipment Incentives C&I, Smart Equipment Incentives Government Non Profit (GNP), Smart Construction Incentives C&I and Smart Construction Incentives GNP. The participation, energy and demand impacts of the multi-tenant components of the Smart Equipment Incentives programs were reported separately for PY4Q1. Incentives paid to multi-tenant participants were not reported separately. Incentives from the Smart Construction Incentives GNP program were not reported separately from Smart Equipment Incentives GNP program. The gross reported energy savings of these programs was 20,631 MWh and the gross reported demand savings was 3.2 MW and almost $1.79 million in incentives were paid to participants. The reported number of participants, energy savings, demand savings and incentives paid from PY4Q1 are shown below in Table 5-6. Demand impact figures were adjusted to reflect a line loss factor of 7.1 percent prior to reporting. Incentive payments that were reported at an aggregate level are represented by merged cells in Table 5-6.

Table 5-6: PECO Non-Residential Programs Quarterly Summary

Program	Participants	MWh	MW	Incentives
Smart Equipment Incentives - C&I	86	10,422	1.8	$800,000
Smart Equipment Incentives - C&I Multi-tenant	21	25	0.0	
Smart Equipment Incentives - GNP	70	8,731	1.2	$905,000
Smart Equipment Incentives - GNP Multi-tenant	5	1	0.0	
Smart Construction Incentives - GNP	6	684	0.1	
Smart Construction Incentives - C&I	2	768	0.1	$86,000
Totals	**190**	**20,631**	**3.2**	**$1,791,000**

5.5.1 Review of Savings Database

PECO provides several reports to the SWE which capture program activity at various levels of detail. One report provides information at the project level, another at the measure level. These reports are produced separately for each program. Since PY3Q2, at the request of the SWE, PECO has provided a single report which tracks all non-residential activity at the project level in a single database. The contents of this database are summarized below in Table 5-7. The SWE applied a line loss factor of 7.1 percent to demand impacts and rounded incentive amounts to the nearest $1,000 to facilitate a comparison with reported figures.

Table 5-7: PECO Non-Residential Programs Savings Database Summary

Program	Participants	MWh	MW	Incentives
Smart Equipment Incentives - C&I	86	10,422	1.7	$800,000
Smart Equipment Incentives - C&I Multi-tenant	21	25	0.0	
Smart Equipment Incentives - GNP	70	8,731	1.1	$905,000
Smart Equipment Incentives - GNP Multi-tenant	5	1	0.0	
Smart Construction Incentives - GNP	6	684	0.1	
Smart Construction Incentives - C&I	2	768	0.1	$86,000
Totals	**190**	**20,631**	**3.1**	**$1,791,000**

In Table 5-8, the discrepancies between the reported figures and the information contained in the database are presented. All discrepancies are reported as follows:

$$\boldsymbol{Reported\ Figure - Database\ Summary = Discrepancy}$$

Table 5-8: PECO Non-Residential Program Discrepancies

Program	Participants	MWh	MW	Incentives
Smart Equipment Incentives - C&I	0	0	0.0	$0.00
Smart Equipment Incentives - C&I Multi-tenant	0	0	0.0	
Smart Equipment Incentives - GNP	0	0	0.0	$0.00
Smart Equipment Incentives - GNP Multi-tenant	0	0	0.0	
Smart Construction Incentives - GNP	0	0	0.0	
Smart Construction Incentives - C&I	0	0	0.0	$0.00
Totals	**0**	**0**	**0.0**	**$0.00**

The participation counts, energy savings, demand savings and incentive amounts in the project databases match the reported numbers perfectly for each of the non-residential programs.

5.5.2 Review of Sample Design

PECO's PY4Q1 report indicated that the design of the PY4 evaluation sample will align closely with the sample design from PY3. Following the close of PY4Q2, PECO will complete an initial sample design based on the projects completed in Q1 and Q2 as well as any available pipeline project information. The SWE plans to request this sample design for review in early 2013. The assumptions used in the sample

design for PECO's Smart Equipment GNP program will be of particular interest to the SWE. During PY3, PECO's sample design assumed a coefficient of variation of 0.4 based on the results of the PY2 evaluation for this program. However, the complexity of the conservation measures have increased as the program has matured and the differences between ex ante and ex post savings values have become more pronounced. The observed coefficient of variation for PECO's PY3 evaluation of the Smart Equipment Incentives GNP program was higher than the value assumed in the sample design and this led to a poorer precision value than anticipated. The SWE has discussed this issue with PECO and its evaluation contractor and understands that a more conservative approach is planned for PY4 to ensure evaluation results will achieve the annual confidence and precision levels required by the Audit Plan.

5.5.3 On-site Inspections

PECO has not begun its on-site inspections of PY4 installations. The SWE plans to conduct ride-along site inspections of PY4 installations beginning in early 2013.

5.6 Final Recommendations

The SWE recommends PECO and its evaluation contractor use the results of the PY3 non-residential evaluations to inform the sample design for PY4. A conservative approach would be to add 0.2 to the coefficient of variation observed for each program in PY3 to ensure that the annual confidence and precision levels required in the Audit Plan are met or exceeded.

6 PPL Impact Summaries and Audit Findings

Section 6 contains information on PPL's energy and demand impacts to date, current evaluation activities and findings, and current SWE audit activities, findings, and recommendations.

Table 6-1: Summary of PPL Quarterly Report Impacts

	CPITD Reported Gross Impact	CPITD-Q Reported Impact	Savings Achieved as % of 2013 Targets[e]
Total Energy Savings (MWh)	1,107,995	1,073,683	97%
Total Demand Reduction (MW)	170.34	161.91	57%
TRC Benefits ($) [a]	Not Reported	Not Reported	Not Applicable
TRC Costs ($) [b]	Not Reported	Not Reported	Not Applicable
TRC Benefit-Cost Ratio[c]	Not Reported	Not Reported	Not Applicable
CO_2 Emissions Reduction[d] (Tons)	897,476	869,683	Not Applicable

NOTES:
[a] Avoided supply costs, including the reduction in costs of electric energy, generation, transmission, and distribution capacity, and natural gas valued at marginal cost for periods when there is a load reduction. Subject to TRC Order. TRC Benefits reporting requirement is waived for quarterly reports.
[b] Costs paid by the program administrator and participants plus the increase in supply costs for any period when load is increased. Subject to TRC Order. TRC Costs reporting requirement is waived for quarterly reports.
[c] Subject to TRC Order. TRC Benefit-Cost Ratio reporting requirement is required in annual reports only.
[d] 8.1x10-4 metric tons of CO_2 per kWh (EPC's eGRID2007 Version 1.1, RFCE Region annual non-baseload CO_2 output emissions rate, year 2005 data).
[e] Savings based on CPITD.

PPL has reported PY4 gross energy savings for 9 programs. The following table provides a breakdown of the contribution of each program's gross energy savings towards the PY4 portfolio savings.

Table 6-2: Summary of Program Impacts on Gross Reported Portfolio Savings – PPL

Program:	Percent of PYTD Gross MWh Savings Portfolio
Appliance Recycling Program	6%
Residential Lighting Program	23%
Custom Incentive Program	16%
Energy Efficiency Behavior & Education Program	0%
Efficient Equipment Incentive Program	51%
E-Power Wise Program	0%
Low-Income WRAP	2%
Renewable Energy Program	0%
HVAC Tune-Up Program	0%
Residential Energy Assessment & Weatherization Program	1%

6.1 Program Implementation and Evaluation Summary

The following table contains a summary of programs reporting participation and savings to-date, programs evaluated in PY4, and programs to be implemented or with no reported savings. Programs "implemented" include only those programs with reported gross impacts.

Table 6-3: Summary of Programs Implemented to Date by PPL

Programs Reporting PY4 Gross Savings:
• Appliance Recycling Program • Residential Lighting Program • Custom Incentive Program • Efficient Equipment Incentive Program • E-Power Wise Program • Low-Income WRAP • Renewable Energy Program • HVAC Tune-Up Program • Residential Energy Assessment & Weatherization Program
Programs to be Implemented or with No Reported PY4 Savings:
• Energy Efficiency Behavior & Education Program

6.2 Status of EM&V Activities

6.2.1 Status of EM&V Plans

In PY3Q4, PPL updated the evaluation plans to reflect revised measurement and verification approaches. The revised plans better reflected program participation and measure uptake (programs or measures scaled up or scaled down), and the addition of delivery channels. The revised plans guided the PY3 and PY4 evaluations. These plans were submitted to the SWE team via the SWE Sharepoint site.

PY4 sampling plans were developed early in PY4 for each program, with sampling plans guiding sample selection for each quarter. The sampling plans, reflecting the SWE's sampling guidelines, were based on the following five primary instructions

1) 90/10 confidence and precision (C/P) for the Residential Portfolio.

2) 90/10 C/P for the Non-Residential Portfolio.

3) 85/15 C/P for each program, within each portfolio.

4) The government, non-profit, and institutional sector, and low-income sector populations should be treated as independent program populations (and sampled at 85/15 C/P) if their contributions to the respective sector-level portfolios are more than 20 percent.

5) All C/P levels are minimums, with EDC evaluators encouraged to exceed minimum requirements.

6.2.2 Status of M&V Activities

PPL's PY4Q1 evaluation activities and measure verifications included: record reviews, participant surveys, site visits, and metering. Records reviews also played a primary role in quality assurance and quality control (QA/QC). (Site visits, by their nature, included records reviews.) Where metering was conducted, the sample would be nested within site visits.

Additionally, PPL completed phone surveys for several residential and commercial programs in PY4Q1. Phone survey goals included: verification, assessing satisfaction and process-related issues; and collecting data needed to calculate the Net To Gross (NTG) ratio. All surveys addressed the PY3 program year.

Each program specific evaluation updates and findings are as follows:

Appliance Recycling Program: During PY4Q1, the EM&V CSP verified the number of records in the Energy Efficiency Management Information System (EEMIS) for PY4Q1 by reconciling EEMIS data with the Q1 program database from JACO (the program CSP). As noted in the PY3 annual report, JACO's database had 389 records not uploaded to EEMIS in PY3. Uploading errors were identified, and the PY3 missing records were present in the PY4Q1 EEMIS records.

Custom Incentive Program: Ongoing evaluation of large custom projects continued in PY4Q1. In addition, during PY4Q1, some verification activities continued for large strata projects from PY3; verification activities were concluded for a sample of six PY3 small strata projects. In PY4Q1, PPL Electric paid and claimed savings for one large combined heat and power project (which does not yet have verified results). This project (Project 199) accounted for 45 percent of claimed savings for the quarter.

Direct Load Control Program: Events called during PY4Q1 were being analyzed at the time of this report, and findings will be reported during PY4Q2 in a standalone report.

Efficient Equipment Incentive Program (C&I lighting): During PY4Q1, the EM&V CSP completed site visits for the PY3 Q4 sample. Results from analysis and final determination of realization rates, currently underway, will be incorporated into the PY3 annual report.

Load Curtailment Program: Events called during PY4Q1 currently were being analyzed at the time of this report, and findings will be reported during PY4Q2 in a standalone report.

Renewable Energy Program: This program closed in PY3. A records review will be conducted for wait-listed projects receiving rebates in PY4.

6.3 Residential Program Audit Summary

6.3.1 Residential Lighting Program

To audit these programs, the SWE team conducted the following activities:

- Verified the number of bulbs reported;
- Verified the savings protocol utilized to report kWh and kW savings;
- Verified the baseline assumptions utilized to calculate savings; and
- Verified the bulbs tracked against invoices received.

To verify each of these aspects, the SWE team reviewed those values reported in the PY4Q1 Report to the data tracked in the EDC's database and tracking system. The following table contains a summary of the SWE team audit findings and recommendations:

Table 6-4: Summary of CFL Program Audit - PPL

Category:	PY4Q1 Report:	Database Verification:	Notes:
No. Bulbs	PYTD: 77,238	√	This represents the number of bulbs reimbursed and given-away through the Residential Lighting Program and entered in PPL's database in PY4Q1.
Gross Energy Savings	PYTD: 23, 183 MWh	√	This represents the savings from bulbs reimbursed and given-away through the Residential Lighting Program and entered in PPL's database in PY4Q1.
Gross Demand Reduction	PYTD: 4.8 MW	√	This represents the savings from bulbs reimbursed and given-away through the Residential Lighting Program and entered in PPL's database in PY4Q1.
Use of TRM Protocols	Not Applicable	√	All savings calculated in accordance with the TRM protocols.
Baseline Assumptions	Not Applicable	√	All baseline assumptions valid.
Invoice Review	Not Applicable	√	A total of 4 individual invoices were reviewed for bulbs sold and distributed during PY4Q1. Bulb counts and total dollars reimbursed were verified.

6.3.2 Appliance Recycling Program

The SWE has started, in PY4, to conduct database sample checks for the Appliance Recycling program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that the database error in PY3 where 389 records were not uploaded into the EEMIS database from the JACO database has been reconciled and the PY4Q1 EEMIS database contains these records.

6.3.3 Efficient Equipment Program

The SWE has started, in PY4, to conduct database sample checks for the Efficient Equipment program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that there were no program changes in the Efficient Equipment Program.

6.3.4 New Construction Program

PPL did not have an active Residential New Construction Program in PY4Q1.

6.4 Low-Income Program Audit Summary

The SWE requested that PPL provide a database extract, consisting of all spreadsheets and supporting calculations detailing program participation, energy and demand savings, and other relevant information such as measures installed. The SWE verified the participation and savings recorded in the database extract and compared these values to those reported in PPL's quarterly report. The results for the E-Power Wise program are presented in Table 6-5 and those for the Winter Relief Assistance Program (WRAP) in Table 6-6.

Table 6-5: E-Power Wise Quarterly Report and Database Summary

	Participants	MWh/year	MW
PY4Q1 Report	604	360	0.0
Database	604	360	0.0
Discrepancy (Report - Database)	**0**	**0**	**0.0**

Table 6-6: Winter Assistance Relief Program Quarterly Report and Database Summary

	Participants	MWh/year	MW
PY4Q1 Report	1,115	2,097	0
Database	1,115	2,097	0
Discrepancy (Report - Database)	**0**	**0**	**0.0**

The SWE reviewed ten individual measure calculations for a sample of E-Power Wise kits. For those measures reviewed, all calculations were consistent with TRM protocols and assumptions. The SWE also reviewed a sample of five WRAP participants to verify that the correct savings were applied based on the WRAP job type (Baseload, Low Cost, and High Cost). Job types with an installation date prior to April of 2012 had reported savings that utilized billing analysis results from PY3Q1. New billing analysis results became available as of PY3Q4 that would subsequently be applied to all PY3 jobs. PPL noted that retroactive savings adjustments are not made to the EEMIS tracking system when new billing analysis results are provided but instead adjustments are made ex ante. Ultimately, PY4 billing analysis will result in ex ante adjustments to the savings, but PY4Q1 reported results do not incorporate the latest billing analysis for all installations.

Lastly, PPL offered 54 measures to the low-income sector in PY4Q1, which is 36.99 percent of the total number of measures offered across all sectors. Therefore, PPL is in compliance with its proportion of measures target, which is 8.64 percent.

6.5 Non-Residential Program Audit Summary

PPL listed six programs under the non-residential umbrella, which includes the SCI, LCI, and GNP sectors. All six programs achieved energy and demand savings during PY4Q1. PPL's programs are designed to be cross-cutting, allowing customers from all rate classes to participate in the programs. Because the revised quarterly report format does not include sector level insight, the SWE was unable to separate the participation and impacts of the non-residential portions of PPL's programs from the participation and impacts from the residential portion. This sector level information will be presented in the annual report.

6.5.1 Review of Savings Database

PPL provided a series of databases capturing all PY4Q1 activity to the SWE team for review. Table 6-7 provides the participant count, energy savings and demand savings, by program and sector, according to the PPL database extracts. The SCI sector contributed the largest ex ante energy savings (36,202 MWh) and the greatest ex ante peak demand savings (7.73 MW). Lighting retrofit projects accounted for almost 70 percent of the gross reported energy savings and almost 80 percent of the gross peak demand savings from non-residential customers in PY4Q1.

Table 6-7: PPL Non-Residential Programs Savings Database Summary

Sector	Program	Participants	MWh	MW
Small C&I	Appliance Recycling	80	157	0.03
Small C&I	C&I Lighting - New Construction	19	1,568	0.37
Small C&I	C&I Lighting Retrofit	1,001	32,799	7.15
Small C&I	Custom Incentives	7	968	0.14
Small C&I	EE Non-Lighting	146	552	0.05
Small C&I	HVAC Tune-Up Program	101	158	0.00
Large C&I	C&I Lighting Retrofit	28	3,699	0.47
Large C&I	Custom Incentives	13	14,539	1.47
Large C&I	EE Non-Lighting	2	41	0.00
Gov't/Non-Profit	Appliance Recycling	1	2	0.00
Gov't/Non-Profit	C&I Lighting - New Construction	16	912	0.21
Gov't/Non-Profit	C&I Lighting Retrofit	181	8,068	1.40
Gov't/Non-Profit	Custom Incentives	3	414	0.05
Gov't/Non-Profit	EE Non-Lighting	87	975	0.07
Gov't/Non-Profit	Renewable Energy Program	23	78	0.03
Totals		**1,708**	**64,928**	**11.44**

6.5.2 Review of Sample Design

PPL has developed a preliminary EM&V sampling plan for PY4Q1, which targets precision of 15 percent at 85 percent confidence by strata and program. PPL uses a stratified sampling approach in the non-residential sectors. In the Efficient Equipment Program-Commercial Non-Lighting Measures, PPL assumes a coefficient of variation (C_v) of 0.5 based on PY3 results. 80 percent of samples are drawn from the measures/measure groups that contribute 80 percent of savings (excludes lighting measures), and 20 percent samples drawn from the remaining measures/measure groups. In the Commercial Lighting Measures and Direct Discount Program, a C_V of 0.4 is assumed and the target precision is 10 percent at 90 percent confidence. PPL's evaluation contractor plans to use three strata for the PY4 evaluation of this program. Fifty percent of the samples will be drawn from the largest projects which account for 50 percent of savings. Thirty percent of the samples will be drawn from the intermediate-size projects that contribute 30 percent of the program savings and 20 percent of the samples will be drawn from the balance of smaller projects. PPL included all applicants from PY4Q1 in the PY4 evaluation sample for the

Renewable Energy Program, since only two institutional customers received rebates in this period[16]. In the HVAC Tune-up Program, tracking data was used to identify the number of units receiving measures, and the final PY4 verification sample will be selected at the close of the program year.

6.5.3 On-site Inspections

PPL recently began its on-site inspections of PY4 installations. The SWE will begin conducting ride-along site inspections of PY4 installations in PY4Q2.

6.6 Finals Recommendations

The majority of the energy and demand savings PPL reported from non-residential programs in PY4Q1 were from lighting projects. The SWE encourages PPL to pursue savings from additional measure categories to help diversify its non-residential portfolio.

7 Met-Ed Impact Summaries and Audit Findings

Section 7 contains information on Met-Ed's energy and demand impacts to date, current evaluation activities and findings, and current SWE audit activities, findings, and recommendations.

Table 7-1: Summary of Met-Ed Quarterly Report Impacts

	CPITD Reported Gross Impact	CPITD-Q Reported Impact	Savings Achieved as % of 2013 Targets[e]
Total Energy Savings (MWh)	381,759	377,511	86%
Total Demand Reduction (MW)	66	66	55%
TRC Benefits ($) [a]	Not Reported	Not Reported	Not Applicable
TRC Costs ($) [b]	Not Reported	Not Reported	Not Applicable
TRC Benefit-Cost Ratio[c]	Not Reported	Not Reported	Not Applicable
CO_2 Emissions Reduction[d] (Tons)	309,225	305,784	Not Applicable

NOTES:
[a] Avoided supply costs, including the reduction in costs of electric energy, generation, transmission, and distribution capacity, and natural gas valued at marginal cost for periods when there is a load reduction. Subject to TRC Order. TRC Benefits reporting requirement is waived for quarterly reports.
[b] Costs paid by the program administrator and participants plus the increase in supply costs for any period when load is increased. Subject to TRC Order. TRC Costs reporting requirement is waived for quarterly reports.
[c] Subject to TRC Order. TRC Benefit-Cost Ratio reporting requirement is required in annual reports only.
[d] 8.1x10-4 metric tons of CO_2 per kWh (EPC's eGRID2007 Version 1.1, RFCE Region annual non-baseload CO_2 output emissions rate, year 2005 data).
[e] Savings based on CPITD.

[16] This figure differs from the participation count shown in Table 6-7 for the Renewable Energy Program (23). PPL defines participation for reporting using the 'Job ID' field in its tracking system. These 23 Job IDs came from two distinct customers and these two customers were selected for the evaluation sample.

Met-Ed has reported PY4 gross energy savings for nine programs. The following table provides a breakdown of the contribution of each program's gross energy savings towards the PY4 portfolio savings.

Table 7-2: Summary of Program Impacts on Gross Reported Portfolio Savings – Met-Ed

Program:	Percent of PYTD Gross MWh Savings Portfolio
Demand Reduction	0%
Home Energy Audits and Outreach	30%
Appliance Turn-In	5%
EE HVAC	1%
EE Products	14%
New Construction	0%
Behavioral Modification and Education	0%
Multiple Family	1%
WARM Programs	1%
Small C&I Equipment	14%
Large C&I Equipment	29%
PJM Demand Response	0%
Street Lighting	0%
Non-Profit	0%
Remaining Government/Non-Profit	4%

7.1 Program Implementation and Evaluation Summary

The following table contains a summary of programs reporting participation and savings to-date, programs evaluated in PY4, and programs to be implemented or with no reported savings. Programs "implemented" include only those programs with reported gross impacts.

Table 7-3: Summary of Programs Implemented to Date by Met-Ed

Programs Reporting PY4 Gross Savings:
• Home Energy Audits and Outreach • Appliance Turn-In • EE HVAC • EE Products • Multiple Family • WARM Programs • Small C&I Equipment • Large C&I Equipment • Remaining Government/Non-Profit
Programs to be Implemented or with No Reported PY4 Savings:
• Demand Reduction • New Construction • Behavioral Modification and Education • PJM Demand Response • Street Lighting • Non-Profit

7.2 Status of EM&V Activities

7.2.1 Status of EM&V Plans

No revised EM&V Plans were submitted for SWE review in PY4Q1.

7.2.2 Status of M&V Activities

Met-Ed plans to begin all PY4 evaluations including site-visits, online surveys, telephone surveys, engineering review and verification surveys, calculation reviews, QC inspector reviews and billing analysis in November 2012.

7.3 Residential Program Audit Summary

7.3.1 Residential Lighting Program

To audit these programs, the SWE team conducted the following activities:

- Verified the number of bulbs reported;
- Verified the savings protocol utilized to report kWh and kW savings;
- Verified the baseline assumptions utilized to calculate savings; and
- Verified the bulbs tracked against invoices received.

To verify each of these aspects, the SWE team reviewed those values reported in the PY4Q1 Report to the data tracked in the EDC's database and tracking system. The following table contains a summary of the SWE team audit findings and recommendations:

Table 7-4: Summary of CFL Program Audit – Met-Ed

Category:	PY4Q1 Report:	Database Verification:	Notes:
No. Bulbs	Not Reported	PYTD: 44,195	This represents the number of bulbs reimbursed through the upstream CFL program.
Gross Energy Savings	Not Reported	PYTD: 7,460 MWh	Met-Ed does not report CFL savings separately in their reports.
Gross Demand Reduction	Not Reported	PYTD: 0.39 MW	Met-Ed does not report CFL savings separately in their reports.
Use of TRM Protocols	Not Applicable	√	All savings calculated in accordance with the TRM protocols.
Baseline Assumptions	Not Applicable	√	All baseline assumptions valid.
Invoice Review	Not Applicable		A total of 4 individual invoices were reviewed for bulbs sold and distributed during PY4Q1. Bulb counts and total dollars reimbursed were verified.

7.3.2 Appliance Recycling Program

The SWE has started, in PY4, to conduct database sample checks for the Appliance Recycling program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that there were no program changes to the Appliance Recycling program.

7.3.3 Efficient Equipment Program

The SWE has started, in PY4, to conduct database sample checks for the Efficient Equipment program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that there were no program changes to the Efficient Equipment program.

7.3.4 New Construction Program

Residential New Construction Program audit activities are performed and reported for all quarters on an annual basis.

7.4 Low-Income Program Audit Summary

The SWE requested that Met-Ed provide a database extract, consisting of all spreadsheets and supporting calculations detailing program participation, energy and demand savings, and other relevant information such as measures installed. The SWE verified the calculations of total participation, energy savings and demand savings and compared the values to those presented in Met-Ed's PY4Q1 report. As is shown in Table 7-5, no discrepancies were found between the database and the quarterly report. It should be noted that the figures presented in the table are the sum of WARM Plus and WARM Extra Measures, collectively referred to as the WARM Programs in the Met-Ed quarterly report.

Table 7-5: WARM Programs Quarterly Report and Database Summary

	Participants	MWh/year	MW
PY4Q1 Report	479	513	0.10
Database	479	513	0.10
Discrepancy (Report - Database)	**0**	**0**	**0.00**

The SWE also reviewed savings data for a sample of nine WARM Extra Measures participants and six WARM Plus participants. Met-Ed is appropriately applying the TRM algorithms and assumptions for most WARM Extra Measures savings calculations. The lone exception is the baseline for 21-25 watt CFL, which was the 100 watt incandescent in prior program years, but has shifted to 72 watts in PY4 due to EISA 2007 standards. Met-Ed has been made aware of this issue and noted to the SWE that the database has not yet been updated from the PY3 assumptions.

The SWE noted that all WARM Plus savings were reported based on the 2009 LIURP billing analysis. A more recent billing analysis was completed after the publication of Met-Ed's PY4Q1 report, the results of which are published in Met-Ed's PY3 Annual Report and will be used for future reporting of PY4 WARM Plus installations.

Met-Ed offered seven measures to the low-income sector in the first quarter of program year four, which is 17 percent of the total number of measures offered across all sectors. Therefore, Met-Ed is in compliance with its proportion of measures target, which is 7.84 percent. It should be noted that Met-Ed stated that the proportion of measures target is 9 percent, which is incorrect. The target it set at 7.84 percent for Phase I of Act 129.

7.5 Non-Residential Program Audit Summary

Met-Ed defines programs within its non-residential portfolio primarily by customer sector. The Small CI Equipment, Large CI Equipment, Street Lighting, Non-Profit and Remaining Government/Non-Profit programs each reported energy and demand savings in PY4Q1. The reported gross energy savings from non-residential programs in PY4Q1 was 27,556 MWh and the reported gross demand savings was 16.08 MW. The number of participants, gross reported energy impact and gross reported demand impact for PY4Q1 are shown in Table 7-6. The Large CI Equipment program generated over 60 percent of the non-residential energy savings for the quarter and over 70 percent[17] of the non-residential peak demand savings.

Table 7-6: Met-Ed Non-Residential Programs Quarterly Summary

Program	Participants	MWh	MW
Small C&I Performance Contracting/Equipment	66	8,329	3.12
Large C&I Performance Contracting/Equipment	10	16,657	11.48
Non-Profit	3	62	0.02
Remaining Government/Non-Profit	17	2,501	1.46
Street Lighting	1	7	0.00
Totals	**97**	**27,556**	**16.08**

7.5.1 Review of Savings Database

FirstEnergy provided the SWE team a database of project activity for each of its operating companies. This database contained the key reporting metrics for each project reporting savings in the quarter as well as additional detail on the types of efficient equipment installed at each site to generate savings. Table 7-7 contains the total participant counts, energy savings and demand savings by program, from Met-Ed non-residential projects in the FirstEnergy savings database. Incentive amounts were not provided in the FirstEnergy extract for the non-residential projects and are omitted from Table 7-7.

Table 7-7: Met-Ed Non-Residential Programs Savings Database Summary

Program	Participants	MWh	MW
Small C&I Performance Contracting/Equipment	66	8,329	3.12
Large C&I Performance Contracting/Equipment	10	16,657	11.48
Non-Profit	3	62	0.02
Remaining Government/Non-Profit	17	2,501	1.46
Street Lighting	1	7	0.00
Totals	**97**	**27,556**	**16.08**

[17] This figure refers to permanent peak demand reduction from Energy Efficiency. Demand Response programs also generated temporary (one-time) demand reductions during PY4Q1, but those impacts are not addressed in this report.

In Table 7-8 the discrepancies between the reported figures and the information contained in the FirstEnergy tracking database are presented. All discrepancies are reported as follows:

$$\boldsymbol{Reported\ Figure\ -\ Database\ Summary = Discrepancy}$$

Table 7-8: Met-Ed Non-Residential Program Discrepancies

Program	Participants	MWh	MW
Small C&I Performance Contracting/Equipment	0	0	0.00
Large C&I Performance Contracting/Equipment	0	0	0.00
Non-Profit	0	0	0.00
Remaining Government/Non-Profit	0	0	0.00
Street Lighting	0	0	0.00
Totals	**0**	**0**	**0.00**

The contents of the program tracking data supplied by FirstEnergy for PY4Q1 matched the figures reported in the Met-Ed PY4Q1 report perfectly. No discrepancies were identified in the number of participants, energy impacts or peak demand impacts.

7.5.2 Review of Sample Design

The Met-Ed PY4Q1 report identified the component groups which FirstEnergy's evaluation contractor will divide the non-residential programs into for evaluation. Each of the non-residential evaluation groups will employ a stratified sampling approach and the primary evaluation activity will be on-site inspections. Met-Ed plans to begin its PY4 evaluation in November of 2012. The SWE will request the sample design for each evaluation group in early 2013 and review to ensure that the sampling plan is adequate to achieve the annual confidence and precision targets set forth in the Audit Plan. The SWE will also compare the PY4 sample design to the results of Met-Ed's PY3 evaluation to verify that the results of program evaluations are being used to refine the sampling assumptions for the following year.

7.5.3 On-site Inspections

Met-Ed has not begun its on-site inspections of Program Year 4 installations. The SWE plans to conduct ride-along site inspections of PY4 installations beginning in early 2013.

7.6 Final Recommendations

The SWE recommends that Met-Ed incorporate the results of the PY3 evaluations of non-residential programs into the sample designs for PY4. Updating the estimated coefficient of variation in the required sample size calculation based on the results of the previous year's evaluation is a good practice that will help prevent over or under sampling.

Met-Ed should continue to use the proportion of low-income measures target set for Phase I of Act 129 for PY4. Also, low-income savings calculations for CFLs that assumed a 100 watt baseline in prior program years should be adjusted to a 72 watt baseline in accordance with the 2012 TRM.

8 Penelec Impact Summaries and Audit Findings

Section 8 contains information on Penelec's energy and demand impacts to date, current evaluation activities and findings, and current SWE audit activities, findings, and recommendations.

Table 8-1: Summary of Penelec Quarterly Report Impacts

	CPITD Reported Gross Impact	CPITD-Q Reported Impact	Savings Achieved as % of 2013 Targets[e]
Total Energy Savings (MWh)	372,990	363,203	86%
Total Demand Reduction (MW)	53	50	49%
TRC Benefits ($) [a]	Not Reported	Not Reported	Not Applicable
TRC Costs ($) [b]	Not Reported	Not Reported	Not Applicable
TRC Benefit-Cost Ratio[c]	Not Reported	Not Reported	Not Applicable
CO_2 Emissions Reduction[d] (Tons)	302,122	294,194	Not Applicable

NOTES:
[a] Avoided supply costs, including the reduction in costs of electric energy, generation, transmission, and distribution capacity, and natural gas valued at marginal cost for periods when there is a load reduction. Subject to TRC Order. TRC Benefits reporting requirement is waived for quarterly reports.
[b] Costs paid by the program administrator and participants plus the increase in supply costs for any period when load is increased. Subject to TRC Order. TRC Costs reporting requirement is waived for quarterly reports.
[c] Subject to TRC Order. TRC Benefit-Cost Ratio reporting requirement is required in annual reports only.
[d] 8.1x10-4 metric tons of CO_2 per kWh (EPC's eGRID2007 Version 1.1, RFCE Region annual non-baseload CO_2 output emissions rate, year 2005 data).
[e] Savings based on CPITD.

Penelec has reported PY4 gross energy savings for 10 programs. The following table provides a breakdown of the contribution of each program's gross energy savings towards the PY4 portfolio savings.

Table 8-2: Summary of Program Impacts on Gross Reported Portfolio Savings – Penelec

Program:	Percent of PYTD Gross MWh Savings Portfolio
Demand Reduction	0%
Home Energy Audits and Outreach	39%
Appliance Turn-In	8%
EE HVAC	1%
EE Products	19%
New Construction	0%
Behavioral Modification and Education	0%
Multiple Family	1%
WARM Programs	1%
Small C&I Equipment	7%
Large C&I Equipment	12%
PJM Demand Response	0%
Street Lighting	0%
Non-Profit	1%
Remaining Government/Non-Profit	11%

8.1 Program Implementation and Evaluation Summary

The following table contains a summary of programs reporting participation and savings to-date, programs evaluated in PY4, and programs to be implemented or with no reported savings. Programs "implemented" include only those programs with reported gross impacts.

Table 8-3: Summary of Programs Implemented to Date by Penelec

Programs Reporting PY4 Gross Savings:
• Home Energy Audits and Outreach • Appliance Turn-In • EE HVAC • EE Products • Multiple Family • WARM Programs • Small C&I Equipment • Large C&I Equipment • Non-Profit • Remaining Government/Non-Profit
Programs to be Implemented or with No Reported PY4 Savings:
• Demand Reduction • New Construction • Behavioral Modification and Education • PJM Demand Response • Street Lighting

8.2 Status of EM&V Activities

8.2.1 Status of EM&V Plans

No revised EM&V Plans were submitted for SWE review in PY4Q1.

8.2.2 Status of M&V Activities

Penelec plans to begin all PY4 evaluations including site-visits, online surveys, telephone surveys engineering review and verification surveys, calculation reviews, QC inspector reviews and billing analysis in November 2012.

8.3 Residential Program Audit Summary

8.3.1 Residential Lighting Program

To audit these programs, the SWE team conducted the following activities:

- Verified the number of bulbs reported;
- Verified the savings protocol utilized to report kWh and kW savings;
- Verified the baseline assumptions utilized to calculate savings; and
- Verified the bulbs tracked against invoices received.

To verify each of these aspects, the SWE team reviewed those values reported in the PY4Q1 Report to the data tracked in the EDC's database and tracking system. The following table contains a summary of the SWE team audit findings and recommendations:

Table 8-4: Summary of CFL Program Audit – Penelec

Category:	PY4Q1 Report:	Database Verification:	Notes:
No. Bulbs	Not Reported	PYTD: 38,594	This represents the number of bulbs reimbursed through the upstream CFL program. There is a difference of 600 bulbs; the SWE team requests that Penelec clarify this variance.
Gross Energy Savings	Not Reported	PYTD: 6,665 MWh	Penelec does not report CFL savings separately in their reports.
Gross Demand Reduction	Not Reported	PYTD: 0.35 MW	Penelec does not report CFL savings separately in their reports.
Use of TRM Protocols	Not Applicable	√	All savings calculated in accordance with the TRM protocols.
Baseline Assumptions	Not Applicable	√	All baseline assumptions valid.
Invoice Review	Not Applicable		A total of 4 individual invoices were reviewed for bulbs sold and distributed during PY4Q1. Bulb counts and total dollars reimbursed were verified.

8.3.2 Appliance Recycling Program

The SWE has started, in PY4, to conduct database sample checks for the Appliance Recycling program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that there were no program changes to the Appliance Recycling program.

8.3.3 Efficient Equipment Program

The SWE has started, in PY4, to conduct database sample checks for the Efficient Equipment program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that there were no program changes to the Efficient Equipment program.

8.3.4 New Construction Program

Residential New Construction Program audit activities are performed and reported for all quarters on an annual basis.

8.4 Low-Income Program Audit Summary

The SWE requested that Penelec provide a database extract, consisting of all spreadsheets and supporting calculations detailing program participation, energy and demand savings, and other relevant information such as measures installed. The SWE verified the calculations of total participation, energy savings and demand savings and compared the values to those presented in Penelec's PY4Q1 report. As is shown in Table 8-5, no discrepancies were found between the database and the quarterly report. It should be noted that the figures presented in the table are the sum of WARM Plus and WARM Extra Measures, collectively referred to as the WARM Programs in the Penelec quarterly report.

Table 8-5: WARM Programs Quarterly Report and Database Summary

	Participants	MWh/year	MW
PY4Q1 Report	624	456	0.09
Database	624	456	0.09
Discrepancy (Report - Database)	**0**	**0**	**0.00**

The SWE also reviewed savings data for a sample of 15 WARM Extra Measures participants. Penelec is appropriately applying the TRM algorithms and assumptions for most WARM Extra Measures savings calculations. The lone exception is the baseline for 21-25 watt CFL, which was the 100 watt incandescent in prior program years, but has shifted to 72 watts in PY4 due to EISA 2007 standards. Penelec has been made aware of this issue and noted to the SWE that the database has not yet been updated from the PY3 assumptions.

The SWE noted that all WARM Plus savings were reported based on the 2009 LIURP billing analysis. A more recent billing analysis was completed after the publication of Penelec's PY4Q1 report, the results of which are published in Penelec's PY3 Annual Report and will be used for future reporting of PY4 WARM Plus installations.

Penelec offered seven measures to the low-income sector in PY4Q1, which is 17 percent of the total number of measures offered across all sectors. Therefore, Penelec is in compliance with its proportion of measures target, which is 9.51 percent. It should be noted that Penelec stated that the proportion of measures target is 10 percent, which is correct if rounding to the nearest whole percentage, but the SWE noted that for the other FirstEnergy Companies the percentages were adjusted from those outlined in the Low-Income Working Group Report. The target it set at 9.51 percent for the duration of Phase I of Act 129.

8.5 Non-Residential Program Audit Summary

Penelec lists six programs in its non-residential portfolio. No PY4Q1 activity was reported for the PJM Demand Response Program although the program was active during the period. The SWE expects preliminary results from the summer curtailment season to become available in early 2013. Table 8-6 provides the figures reported in the Penelec Quarterly Report for each of its other five non-residential programs. The reported gross energy savings is 11,742 MWh and the gross reported demand savings is 1.73 MW. Penelec's reported peak demand reductions do not reflect a line loss adjustment.

Table 8-6: Penelec Non-Residential Programs Quarterly Summary

Program	Participants	MWh	MW
Small C&I Performance Contracting/Equipment	60	2,702	0.52
Large C&I Performance Contracting/Equipment	32	4,601	0.46
Street Lighting	4	67	0
Non-Profit	4	229	0.07
Remaining Government/Non-Profit	59	4,143	0.68
Totals	**159**	**11,742**	**1.73**

8.5.1 Review of Savings Database

FirstEnergy provided the SWE team a database of project activity for each of its operating companies. The SWE team identified each of the distinct participants and the energy and demand impacts associated with that participant for each of Penelec's non-residential programs. The tracking data provided by FirstEnergy did not include incentive amounts. Table 8-7 provides the participant counts and the sum of the energy and demand impacts for each program.

Table 8-7: Penelec Non-Residential Programs Savings Database Summary

Program	Participants	MWh	MW
Small C&I Performance Contracting/Equipment	60	2,702	0.52
Large C&I Performance Contracting/Equipment	32	4,601	0.46
Street Lighting	4	67	0
Non-Profit	4	229	0.07
Remaining Government/Non-Profit	59	4,143	0.68
Totals	**159**	**11,742**	**1.73**

In Table 8-8 the discrepancies between the reported figures and the information contained in the FirstEnergy tracking database are presented. All discrepancies are reported as follows:

$$\textit{Reported Figure} - \textit{Database Summary} = \textit{Discrepancy}$$

Table 8-8: Penelec Non-Residential Program Discrepancies

Program	Participants	MWh	MW
Small C&I Performance Contracting/Equipment	0	0	0.00
Large C&I Performance Contracting/Equipment	0	0	0.00
Street Lighting	0	0	0.00
Non-Profit	0	0	0.00
Remaining Government/Non-Profit	0	0	0.00
Totals	**0**	**0**	**0.00**

No variance was observed between the savings database and Penelec's PY4Q1 report. For each program the number of participants, energy impact and peak demand impact from the program tracking data matched what was reported in the quarterly report. Rebate amounts were not included in the program tracking data so the SWE was not able to audit the incentives payment amounts reported for non-residential programs.

8.5.2 Review of Sample Design

The program design and corresponding sample design are uniform between Met-Ed, Penelec and Penn Power and were discussed in section 7.5.2. A summary of the Penelec non-residential sampling plan from PY3 will be presented in the SWE PY3 Annual Report. It is expected that Penelec will use the findings from PY3 to inform its sample design for PY4. The SWE will request a preliminary PY4 sampling plan from each of the EDCs in early 2013 to verify that evaluation activities are targeting the confidence and precision requirements laid out in the Audit Plan.

8.5.3 On-site Inspections

Penelec has not begun its on-site inspections of PY4 installations. The SWE plans to conduct ride-along site inspections of PY4 installations beginning in early 2013.

8.6 Final Recommendations

The SWE recommends that Penelec include the ex ante results of its summer curtailment activities in the PYTD and CPITD peak demand reduction values of its PY4Q2 report.

Penelec should continue to use the proportion of low-income measures target set for Phase I of Act 129 for PY4. Also, low-income savings calculations for CFLs that assumed a 100 watt baseline in prior program years should be adjusted to 72 watts in accordance with the 2012 TRM.

9 Penn Power Impact Summaries and Audit Findings

Section 9 contains information on Penn Power's energy and demand impacts to date, current evaluation activities and findings, and current SWE audit activities, findings, and recommendations.

Table 9-1: Summary of Penn Power Quarterly Report Impacts

	CPITD Reported Gross Impact	CPITD-Q Reported Impact	Savings Achieved as % of 2013 Targets[e]
Total Energy Savings (MWh)	126,004	123,663	88%
Total Demand Reduction (MW)	16	15	36%
TRC Benefits ($) [a]	Not Reported	Not Reported	Not Applicable
TRC Costs ($) [b]	Not Reported	Not Reported	Not Applicable
TRC Benefit-Cost Ratio[c]	Not Reported	Not Reported	Not Applicable
CO_2 Emissions Reduction[d] (Tons)	102,063	100,167	Not Applicable

NOTES:
[a] Avoided supply costs, including the reduction in costs of electric energy, generation, transmission, and distribution capacity, and natural gas valued at marginal cost for periods when there is a load reduction. Subject to TRC Order. TRC Benefits reporting requirement is waived for quarterly reports.
[b] Costs paid by the program administrator and participants plus the increase in supply costs for any period when load is increased. Subject to TRC Order. TRC Costs reporting requirement is waived for quarterly reports.
[c] Subject to TRC Order. TRC Benefit-Cost Ratio reporting requirement is required in annual reports only.
[d] 8.1x10-4 metric tons of CO_2 per kWh (EPC's eGRID2007 Version 1.1, RFCE Region annual non-baseload CO_2 output emissions rate, year 2005 data).
[e] Savings based on CPITD.

Penn Power has reported PY4 gross energy savings for six programs. The following table provides a breakdown of the contribution of each program's gross energy savings towards the PY4 portfolio savings.

Table 9-2: Summary of Program Impacts on Gross Reported Portfolio Savings – Penn Power

Program:	Percent of PYTD Gross MWh Savings Portfolio
Demand Reduction	0%
Home Energy Audits and Outreach	38%
Appliance Turn-In	9%
EE HVAC	3%
EE Products	40%
New Construction	0%
Behavioral Modification and Education	0%
Multiple Family	0%
WARM Programs	0%
Small C&I Equipment	8%
Large C&I Equipment	1%
PJM Demand Response	0%
Street Lighting	0%
Non-Profit	0%
Remaining Government/Non-Profit	0%

9.1 Program Implementation and Evaluation Summary

The following table contains a summary of programs reporting participation and savings to-date, programs evaluated in PY4, and programs to be implemented or with no reported savings. Programs "implemented" include only those programs with reported gross impacts.

Table 9-3: Summary of Programs Implemented to Date by Penn Power

Programs Reporting PY4 Gross Savings:
• Home Energy Audits and Outreach • Appliance Turn-In • EE HVAC • EE Products • Small C&I Equipment • Large C&I Equipment
Programs to be Implemented or with No Reported PY4 Savings:
• Demand Reduction • New Construction • Behavioral Modification and Education • Multiple Family • WARM Programs • PJM Demand Response • Street Lighting • Non-Profit • Remaining Government/Non-Profit

9.2 Status of EM&V Activities

9.2.1 Status of EM&V Plans

No revised EM&V Plans were submitted for SWE review in PY4Q1.

9.2.2 Status of M&V Activities

Penn Power plans to begin all PY4 evaluations including site-visits, online surveys, telephone surveys engineering review and verification surveys, calculation reviews, QC inspector reviews and billing analysis in November 2012.

9.3 Residential Program Audit Summary

9.3.1 Residential Lighting Program

To audit these programs, the SWE team conducted the following activities:

- Verified the number of bulbs reported;
- Verified the savings protocol utilized to report kWh and kW savings;
- Verified the baseline assumptions utilized to calculate savings; and
- Verified the bulbs tracked against invoices received.

To verify each of these aspects, the SWE team reviewed those values reported in the PY4Q1 Report to the data tracked in the EDC's database and tracking system. The following table contains a summary of the SWE team audit findings and recommendations:

Table 9-4: Summary of CFL Program Audit – Penn Power

Category:	PY4Q1 Report:	Database Verification:	Notes:
No. Bulbs	Not Reported	PYTD: 23,978	This represents the number of bulbs reimbursed through the upstream CFL program. There is a difference of 582 bulbs; the SWE team requests that Penn Power clarify this variance.
Gross Energy Savings	Not Reported	PYTD: 4,091MWh	Penn Power does not report CFL savings separately in their reports.
Gross Demand Reduction	Not Reported	PYTD: 0.21 MW	Penn Power does not report CFL savings separately in their reports.
Use of TRM Protocols	Not Applicable	√	All savings calculated in accordance with the TRM protocols.
Baseline Assumptions	Not Applicable	√	All baseline assumptions valid.
Invoice Review	Not Applicable	√	A total of 4 individual invoices were reviewed for bulbs sold and distributed during PY4Q1. Bulb counts and total dollars reimbursed were verified.

9.3.2 Appliance Recycling Program

The SWE has started, in PY4, to conduct database sample checks for the Appliance Recycling program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that there were no program changes to the Appliance Recycling program.

9.3.3 Efficient Equipment Program

The SWE has started, in PY4, to conduct database sample checks for the Efficient Equipment program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that there were no program changes to the Efficient Equipment program.

9.3.4 New Construction Program

Residential New Construction Program audit activities are performed and reported for all quarters on an annual basis.

9.4 Low-Income Program Audit Summary

Penn Power's WARM Plus program closed at the end of January 2012 and WARM Extra Measures closed in March 2012. Therefore there was no WARM program activity in PY4Q1 and as a result there are no values presented in Table 9-5.

Table 9-5: WARM Programs Quarterly Report and Database Summary

	Participants	MWh/year	MW
PY4Q1 Report	0	0	0.00
Database	0	0	0.00
Discrepancy (Report - Database)	**0**	**0**	**0.00**

Penn Power reported offering seven measures to the low-income sector in PY4Q1, which is 17 percent of the total number of measures offered across all sectors. However, it does not appear that Penn Power accounted for the fact that the WARM programs are now closed. Factoring in the removal of the WARM programs reduces the number of measures offered to the low-income sector to four, which is 9.76 percent of the total measures offered by Penn Power. Therefore, even with the removal of the WARM programs, Penn Power is in compliance with its proportion of measures target, which is 8.16 percent. It should be noted that Penn Power stated that the proportion of measures target is 11 percent, which is incorrect. The target it set at 8.16 percent for Phase I of Act 129.

9.5 Non-Residential Program Audit Summary

Penn Power lists six programs under its non-residential umbrella, which includes the SCI, LCI and GNP sectors. Only two of these programs reported savings during PY4Q1. The reported number of participants, energy savings and demand savings are presented for these two programs in Table 9-6. The gross reported energy savings of these programs was 926 MWh and the gross reported demand savings were 0.17 MW. Incentive amounts were not included in the tracking database for non-residential customers, so these figures are not included in Table 9-6. Notice that all 26 of the rebated projects in the quarter came from the Commercial and Industrial sector. The SWE recommends that Penn Power and its implementation contractor investigate the lack of participation from the GNP sector in PY4Q1 to determine whether the absence of GNP participation was an anomaly or if the program marketing message should be modified to stimulate additional projects in this sector.

Table 9-6: Penn Power Non-Residential Programs Quarterly Summary

Program	Participants	MWh	MW
Small C&I Performance Contracting/Equipment	25	865	0.17
Large C&I Performance Contracting/Equipment	1	61	0
Totals	**26**	**926**	**0.17**

9.5.1 Review of Savings Database

FirstEnergy provided the SWE team a database of project activity for each of its operating companies for PY4Q1. This database comes from Penn Power's implementation contractor originally and is then modified by the evaluation contractor to comply with the SWE's formatting requests. Table 9-7 provides

the total participant counts, energy savings and demand savings, by program, from Penn Power non-residential projects in the FirstEnergy savings database.

Table 9-7: Penn Power Non-Residential Programs Quarterly Summary

Program	Participants	MWh	MW
Small C&I Performance Contracting/Equipment	25	865	0.17
Large C&I Performance Contracting/Equipment	1	61	0
Totals	**26**	**926**	**0.17**

In Table 9-8, the discrepancies between the figures reported in Penn Power's quarterly report and the information contained in the savings database are presented. All discrepancies are reported as follows:

$$\boldsymbol{Reported\ Figure - Database\ Summary = Discrepancy}$$

Table 9-8: Penn Power Non-Residential Program Discrepancies

Program	Participants	MWh	MW
Small C&I Performance Contracting/Equipment	0	0	0.00
Large C&I Performance Contracting/Equipment	0	0	0.00
Totals	**0**	**0**	**0.00**

9.5.2 Review of Sample Design

The program design and corresponding sample design are uniform between Met-Ed, Penelec and Penn Power and were discussed in section 7.5.2. A summary of the Penn Power non-residential sampling plan from PY3 will be presented in the SWE PY3 Annual Report. It is expected that Penn Power will use the findings from PY3 to inform its sample design for PY4. The SWE will request a preliminary PY4 sampling plan from each of the EDCs in early 2013 to verify that evaluation activities are targeting the confidence and precision requirements laid out in the Audit Plan.

9.5.3 On-site Inspections

Penn Power has not begun its on-site inspections of PY4 installations. The SWE plans to conduct ride-along site inspections of PY4 installations beginning in early 2013.

9.6 Final Recommendations

The SWE is slightly concerned by the lack of participation from the GNP sector during PY4Q1 and recommends that Penn Power examine its pipeline of in-progress Energy Efficiency transactions. If participation in this sector appears low moving forward, the SWE encourages Penn Power to examine the program design to see if modifications may be necessary.

Penn Power should continue to use the proportion of low-income measures target set for Phase I of Act 129 for PY4. In addition, the measures associated with the WARM programs should be removed from the measure count since the programs are closed.

10 West Penn Power Impact Summaries and Audit Findings

Section 10 contains information on West Penn Power's energy and demand impacts to date, current evaluation activities and findings, and current SWE audit activities, findings, and recommendations.

Table 10-1: Summary of West Penn Power Quarterly Report Impacts

	CPITD Reported Gross Impact	CPITD-Q Reported Impact	Savings Achieved as % of 2013 Targets[e]
Total Energy Savings (MWh)	455,037	449,052	72%
Total Demand Reduction (MW)	71	70	45%
TRC Benefits ($) [a]	Not Reported	Not Reported	Not Applicable
TRC Costs ($) [b]	Not Reported	Not Reported	Not Applicable
TRC Benefit-Cost Ratio[c]	Not Reported	Not Reported	Not Applicable
CO_2 Emissions Reduction[d] (Tons)	368,580	363,732	Not Applicable

NOTES:
[a] Avoided supply costs, including the reduction in costs of electric energy, generation, transmission, and distribution capacity, and natural gas valued at marginal cost for periods when there is a load reduction. Subject to TRC Order. TRC Benefits reporting requirement is waived for quarterly reports.
[b] Costs paid by the program administrator and participants plus the increase in supply costs for any period when load is increased. Subject to TRC Order. TRC Costs reporting requirement is waived for quarterly reports.
[c] Subject to TRC Order. TRC Benefit-Cost Ratio reporting requirement is required in annual reports only.
[d] 8.1x10-4 metric tons of CO_2 per kWh (EPC's eGRID2007 Version 1.1, RFCE Region annual non-baseload CO_2 output emissions rate, year 2005 data).
[e] Savings based on CPITD.

West Penn Power has reported PY4 gross energy savings for nine programs. The following table provides a breakdown of the contribution of each program's gross energy savings towards the PY4 portfolio savings.

Table 10-2: Summary of Program Impacts on Gross Reported Portfolio Savings – West Penn Power

Program:	Percent of PYTD Gross MWh Savings Portfolio
Residential Appliance Turn-In	5%
Residential Energy Efficient Products	16%
Residential Energy Efficient HVAC Equipment	2%
Residential Home Performance	3%
Critical Peak Rebate (CPR)	0%
Limited Income Energy Efficiency (LIEEP)	1%
Join Utility Usage Management (JUUMP)	1%
Commercial and Industrial Equipment- Small	7%
Time of Use (TOU) with Critical Peak Pricing (CPP)	0%
Commercial and Industrial Equipment- Large	5%
Customer Load Response	0%
Customer Resources Demand Response	0%
Distributed Generation	0%
Conservation Voltage Reduction (CVR)	58%
Governmental and Institutional	0%

10.1 Program Implementation and Evaluation Summary

The following table contains a summary of programs reporting participation and savings to-date, programs evaluated in PY4, and programs to be implemented or with no reported savings. Programs "implemented" include only those programs with reported gross impacts.

Table 10-3: Summary of Programs Implemented to Date by West Penn Power

Programs Reporting PY4 Gross Savings:
• Residential Appliance Turn-In • Residential Energy Efficient Products • Residential Energy Efficient HVAC Equipment • Residential Home Performance • Limited Income Energy Efficiency (LIEEP) • Join Utility Usage Management (JUUMP) • Commercial and Industrial Equipment- Small • Commercial and Industrial Equipment- Large • Conservation Voltage Reduction (CVR)
Programs to be Implemented or with No Reported PY4 Savings:
• Critical Peak Rebate (CPR) • Time of Use (TOU) with Critical Peak Pricing (CPP) • Customer Load Response • Customer Resources Demand Response • Distributed Generation • Governmental and Institutional

10.2 Status of EM&V Activities

10.2.1 Status of EM&V Plans

No revised EM&V Plans were submitted for SWE review in PY4Q1.

10.2.2 Status of M&V Activities

West Penn Power plans to begin all PY4 evaluations including site-visits, online surveys, telephone surveys, engineering review and verification surveys, calculation reviews, QC inspector reviews and billing analysis in November 2012.

10.3 Residential Program Audit Summary

10.3.1 Residential Lighting Program

To audit these programs, the SWE team conducted the following activities:

- Verified the number of bulbs reported;
- Verified the savings protocol utilized to report kWh and kW savings;
- Verified the baseline assumptions utilized to calculate savings; and
- Verified the bulbs tracked against invoices received.

To verify each of these aspects, the SWE team reviewed those values reported in the PY4Q1 Report to the data tracked in the EDC's database and tracking system. The following table contains a summary of the SWE team audit findings and recommendations:

Table 10-4: Summary of CFL Program Audit – West Penn Power

Category:	PY4Q1 Report:	Database Verification:	Notes:
No. Bulbs	Not Reported	PYTD: 66,340	West Penn Power does not report CFL sales separately in their reports.
Gross Energy Savings	Not Reported	PYTD: 10,233 MWh	West Penn Power does not report CFL savings separately in their reports.
Gross Demand Reduction	Not Reported	PYTD: 0.48 MW	West Penn Power does not report CFL savings separately in their reports.
Use of TRM Protocols	Not Applicable	√	All savings calculated in accordance with the TRM protocols.
Baseline Assumptions	Not Applicable	√	All baseline assumptions valid.
Invoice Review	Not Applicable	√	A total of 4 individual invoices were reviewed for bulbs sold and distributed during PY4Q1. Bulb counts and total dollars reimbursed were verified.

10.3.2 Appliance Recycling Program

The SWE has started, in PY4, to conduct database sample checks for the Appliance Recycling program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that there were no program changes to the Appliance Recycling program.

10.3.3 Efficient Equipment Program

The SWE has started, in PY4, to conduct database sample checks for the Efficient Equipment program on an annual basis. This decision was made by the SWE and TUS in acknowledgement that the SWE has not encountered any unresolved QC issues with this program in PY2 or PY3. Results of the annual database sample check (with samples drawn from each quarter of PY4) will be available in the PY4 Annual Report. The SWE notes that there were no program changes to the Efficient Equipment program.

10.3.4 New Construction Program

West Penn Power did not have an active Residential New Construction Program in PY4Q1.

10.4 Low-Income Program Audit Summary

The SWE requested that West Penn Power provide a database extract, consisting of all spreadsheets and supporting calculations detailing program participation, energy and demand savings and other relevant information such as measures installed. Participation, energy savings, and demand savings calculations were verified and compared to the figures reported in the West Penn Power quarterly report. A comparison of the quarterly report and database extract results for the Limited Income Energy Efficiency Program (LIEEP) are presented in Table 10-5 and for the Joint Utility Usage Management Program (JUUMP) in

Table **10-6.**

Table 10-5: Limited Income Energy Efficiency Program Quarterly Report and Database Summary

	Participants	MWh/year	MW
PY4Q1 Report	833	666	0.07
Database	833	666	0.07
Discrepancy (Report - Database)	**0**	**0**	**0.00**

Table 10-6: Joint Utility Usage Management Program Quarterly Report and Database Summary

	Participants	MWh/year	MW
PY4Q1 Report	342	508	0
Database	342	508	0
Discrepancy (Report - Database)	**0**	**0**	**0.00**

The SWE also reviewed the reported savings and underlying assumptions and calculations for a sample of 15 low-income participants. LIEEP participant savings are calculated on a per measure basis using TRM algorithms and assumptions. The SWE replicated savings calculations and only noted one error, specifically that the baseline for 21-25 watt CFL has not been adjusted from 100 watts to 72 watts in accordance with the 2012 TRM. The shift in baseline is a result of EISA 2007 standards. West Penn Power has been made aware of this issue and noted to the SWE that the database has not yet been updated from the PY3 assumptions.

For JUUMP participants West Penn Power uses a savings value of 1,495 kWh for tracking and reporting. Due to issues related to integration into the FirstEnergy tracking system, West Penn Power had to develop a savings estimate for all JUUMP projects. As a proxy, the Penn Power WARM “baseload” job savings were used since the mix of measures between the programs is similar. However, final verified results will be based on evaluation results of the West Penn Power JUUMP.

West Penn Power offered 10 measures to the low-income sector in the first quarter of program year four, which is 24 percent of the total number of measures offered across all sectors. Therefore, West Penn Power is in compliance with its proportion of measures target, which is 8.5 percent. It should be noted that West Penn Power stated that the proportion of measures target is 10 percent, which is incorrect. The target it fixed at 8.5 percent for Phase I of Act 129.

10.5 Non-Residential Program Audit Summary

Since PY3Q3, West Penn Power has reported the impacts produced by its non-residential energy efficiency programs using the same categories as the other three FirstEnergy companies. Three programs reported savings for the quarter and the gross energy savings from these three programs was 7,829 MWh. The gross reported demand savings was 0.83 MW. The reported participation, gross energy impact, gross demand impact and incentive amounts for each program is provided in Table 10-7. West Penn Power also reported a gross energy savings of 34,391 MWh and a gross demand savings of 12.4 MW from its Conservation Voltage Reduction (CVR) program. The CVR program savings estimates are based on a preliminary engineering estimate. Three sets of retrofit isolation tests are planned for Fall 2012, Winter 2013 and Summer 2013 in order to develop verified savings estimates.

Table 10-7: West Penn Power Non-Residential Programs Quarterly Summary

Program	Participants	MWh	MW
Commercial & Industrial Equipment - Small	86	3,873	0.37
Commercial & Industrial Equipment - Large	23	3,106	0.39
Governmental and Institutional	11	850	0.07
Totals	**120**	**7,829**	**0.83**

10.5.1 Review of Savings Database

West Penn Power provided a tracking database to the SWE team detailing project activity during PY4Q1. During the previous two quarters West Penn Power's non-residential projects have been implemented both by West Penn Power and FirstEnergy's implementation contractor SAIC. The implementation transition appears complete because all 120 PY4Q1 non-residential transactions were submitted via SAIC. The number of participants, sum of the reported gross energy savings and sum of gross demand savings, by program, from the program tracking data are shown below in Table 10-8.

Table 10-8: West Penn Power Non-Residential Programs Savings Database Summary

Program	Participants	MWh	MW
Commercial & Industrial Equipment - Small	86	3,873	0.37
Commercial & Industrial Equipment - Large	23	3,106	0.39
Governmental and Institutional	11	850	0.07
Totals	**120**	**7,829**	**0.83**

In Table 10-9, the discrepancies between the reported figures and the information contained in the program databases are presented. All discrepancies are reported as follows:

$$\boldsymbol{Reported\ Figure - Database\ Summary = Discrepancy}$$

Table 10-9: West Penn Power Non-Residential Program Discrepancies

Program	Participants	MWh	MW
Commercial & Industrial Equipment - Small	0	0	0.00
Commercial & Industrial Equipment - Large	0	0	0.00
Governmental and Institutional	0	0	0.00
Totals	**0**	**0**	**0.00**

The SWE found no discrepancies between the figures reported in West Penn Power's PY4Q1 report and the contents of the program tracking data. Rebate amounts were not included in the program tracking data so the SWE was unable to audit the incentive payments contained in the PY4Q1 report.

10.5.2 Review of Sample Design

The SWE expects the sample design for West Penn Power to be very similar to that of Met-Ed, Penelec and Penn Power for PY4. Applying the results of the PY3 evaluation to the PY4 sample design will be more difficult for West Penn Power because of the implementation transition which occurred during the second half of PY3. The SWE encourages West Penn Power to consider the historic results of the other three FirstEnergy companies when designing the PY4 evaluation sample. The SWE will request a preliminary PY4 sampling plan from each of the EDCs in early 2013 to verify that evaluation activities are targeting the confidence and precision requirements laid out in the Audit Plan. The SWE will also work with West Penn Power's evaluation contractor to develop an audit strategy for the Conservation Voltage Reduction program.

10.5.3 On-site Inspections

West Penn Power has not begun its on-site inspections of PY4 projects. The SWE plans to conduct ride-along site inspections of PY4 installations beginning in early 2013.

10.6 Finals Recommendations

The reported impacts from West Penn Power's Conservation Voltage Reduction (CVR) program were substantial. This program accounts for 7.56 percent of West Penn Power's CPITD gross reported energy savings and 17.39 percent of the CPITD gross reported demand savings. The SWE encourages West Penn to provide updates on the results of the retrofit isolation tests as they become available.

West Penn Power should continue to use the proportion of low-income measures target set for Phase I of Act 129 for PY4. Also, low-income savings calculations for CFLs that assumed a 100 watt baseline in prior program years should be adjusted to 72 watts in accordance with the 2012 TRM.

11 Summary and Recommendations

The SWE team, the PA PUC TUS staff, the EDCs and the EDC evaluation contractors have worked hard to develop a solid foundation for the EM&V of the Act 129 Energy Efficiency and Demand Response programs. The SWE team notes that improvements continue to be made to the SWE audit processes and appreciates the support and responsiveness of the Energy Association, the Pennsylvania EDCs and their evaluation contractors.

Based on the findings from the SWE audit activities conducted in PY4Q1, the SWE team makes the following recommendations to the PA PUC relating to the Act 129 Energy Efficiency and Demand Response programs:

- The SWE recommends that EDCs revise their low-income savings calculations for CFLs to reflect the 2012 TRM. The 100 watt baseline in prior program years should be adjusted to 72 watts.
- The SWE recommends that all EDCs incorporate the results of the PY3 evaluations of non-residential programs into the sample designs for PY4. Updating the estimated coefficient of variation in the required sample size calculation based on the results of the previous year's evaluation is a good practice that will help prevent over or under sampling.
- The SWE recommends that EDCs continue to use the proportion of low-income measures target set for Phase I of Act 129 for PY4.