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November 30, 2011

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

RE: Program Year Two Process Evaluation Report of *PPL Electric Utilities Corporation's* Act 129 Plan
Docket No. M-2009-2093216

Dear Secretary Chiavetta:

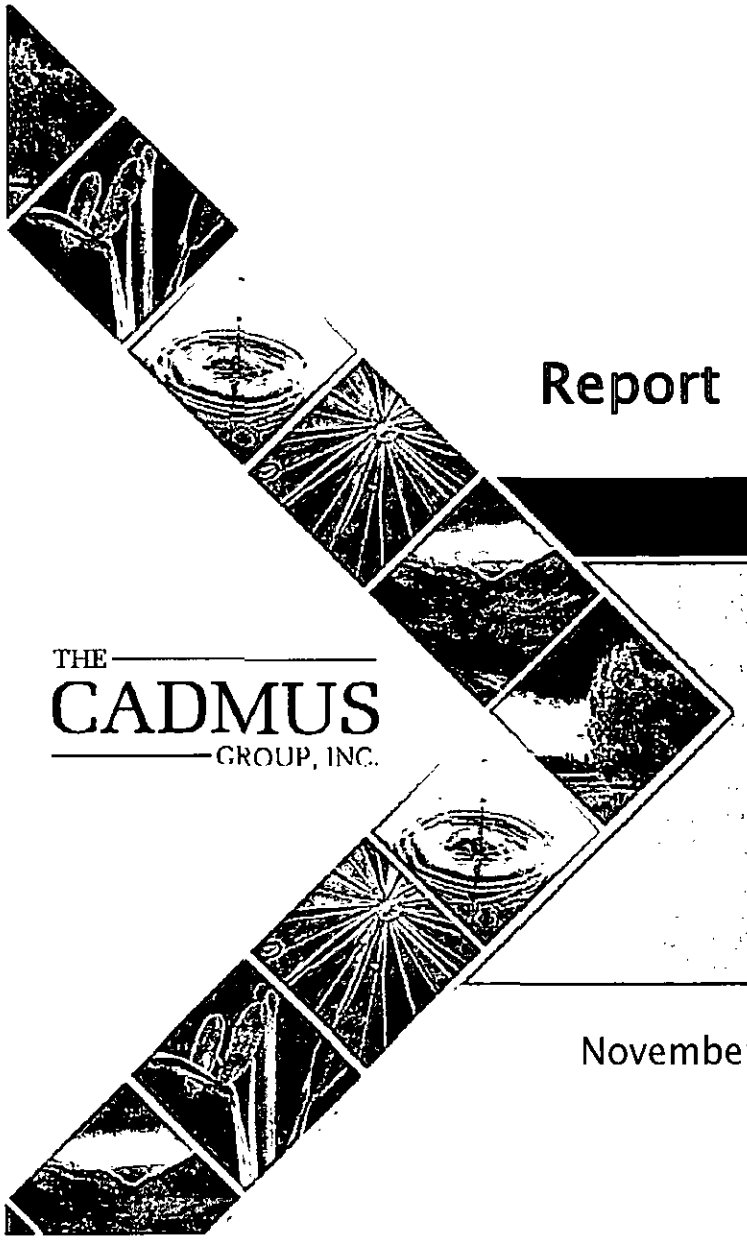
Enclosed for filing is the Program Year Two Process Evaluation Report of PPL Electric Utilities Corporation's ("PPL Electric") Act 129 Plan. PPL Electric is providing a copy its Process Evaluation Report to the Act 129 Statewide Evaluator. In addition, PPL Electric will post its Process Evaluation Report on its ePower website.

If you have any questions concerning this matter, please contact me at the address or telephone numbers provided above.

Respectfully Submitted,

Andrew S. Tubbs

AST/jl
Enclosures
cc: Richard F. Spellman, GDS Associates Inc., Act 129 Statewide Evaluator



THE CADMUS GROUP, INC.

Report

PPL Electric's Implementation of Act 129 Energy Efficiency & Conservation (EE&C) Plan

Program Year Two

Process Evaluation Report

November 2011

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Table of Contents

List of Tables

List of Figures

List of Acronyms

AHRI.....Air-Conditioning, Heating, and Refrigeration Institute
ARP.....Appliance Recycling program
ARRA .....American Reinvestment and Recovery Act
ASHP .....Air source heat pump
ATO .....Appliance Turn-In Order
BASs .....Business Account Specialists
BPI .....Building Performance Institute
C&I .....commercial and industrial
CAC .....central air conditioning
CAP.....Customer Assistance Program
CBOs.....community-based organizations
CFL .....compact fluorescent light
CMP.....custom measure protocol
COP.....coefficient of performance
CSP .....Conservation Service Provider
DCU .....digital cycling unit
DEP.....Department of Environmental Protection
DHP.....ductless heat pump
DLC.....Direct Load Control
DR.....demand response
DSM.....demand-side management
EDCs.....electric distribution companies
EE&C.....energy efficiency and conservation
EEMIS.....Energy Efficiency Management and Information System
EER.....energy-efficiency rating
EFT .....electronic funds transfer
EISA.....Energy Independence and Security Act
EMS .....energy management systems
EM&V.....evaluation, measurement, and verification
EPS.....E-Power Solutions (the commercial and industrial CSP)
ESCOs.....Energy Services Companies
FDSI.....Field Diagnostics Services, Inc.
FTP.....file transfer protocol
GNI .....government, nonprofit, and institutional
GSHP .....ground source heat pump
HPWH.....heat pump water heater
KAM .....Key Account Manager

LIHEAP .....Low-Income Home Energy Assistance Program
M&V .....measurement and verification
MOUs.....memorandums of understanding
POP .....point-of-purchase
PUC.....Public Utility Commission
PV .....photovoltaic
PY2 .....program year two
QA/QC .....quality assurance/quality control
SSMVPs .....site-specific measurement and verification plans
SWE .....Statewide Evaluator
Commission .....Pennsylvania Public Utility Commission
TOU .....Time-of-Use
TRC.....Total Resource Cost
TRM.....Technical Reference Manual
TWG .....Technical Working Group
USP .....Universal Services Program
WRAP .....Winter Relief Assistance Program

Executive Summary

Beginning in November 2009, PPL Electric Utilities (PPL Electric) launched a portfolio of 14 energy-efficiency programs to enable the Company to meet the energy and demand savings targets required under Pennsylvania Act 129. Following the end of the second compliance year of Act 129 (June 1, 2010, to May 30, 2011), PPL Electric collaborated with The Cadmus Group, Inc., to evaluate the programs' performance.

This process evaluation report identifies opportunities for improving and the effectiveness of PPL Electric's energy-efficiency programs, and it provides recommendations regarding the design and implementation, systems, processes, business controls, quality assurance, and other program elements.

As the EM&V Conservation Service Provider (CSP), Cadmus evaluated program materials and interviewed Act 129 management and program staffs, customer communications manager, major accounts managers, several delivery CSPs, and some program trade allies. These interviews focused on program status, operating features, and program delivery. Cadmus also surveyed a sample of participants in each of the active energy-efficiency programs and surveyed nonparticipants in some of the programs.

Summary of Conclusions and Recommendations

PPL Electric met its May 2011 compliance targets. In its first year of offering Act 129 programs, PPL Electric established a strong delivery platform and operational structure. During the second plan year (PY2), PPL Electric ramped up many programs. At the end of PY 2, several programs are meeting or exceeding their second year performance targets.

Cadmus' key conclusions and recommendations for PPL Electric are these:

- PPL Electric is well positioned to meet its September 2012 and May 2013 compliance targets. However, it is likely not possible to achieve the compliance targets within the customer sector proportions (savings and costs) estimated in the EE&C Plan.
- To meet the 3 percent energy reduction compliance target, PPL Electric should revise its EE&C Plan to reduce projected savings from the small commercial and industrial (small C&I) sector and increase projected savings from residential and/or large C&I sectors.
- The overall results by sector are these:
  - Results for the residential sector are ahead of the plan.
  - Results for the low-income sector are on target.
  - Results for the large commercial and industrial sector are ahead of target. PPL Electric has closed the Efficient Equipment and Custom programs to this sector and established a wait list.
  - Results for the institutional (government, schools, and non-profit) sector are on target, but much more effort than PPL Electric expected is needed to penetrate this sector.

  - ➢ Results for the small C&I sector are significantly behind the plan. This section is unlikely to achieve its savings target as estimated; however, the challenge to penetrate this sector is not unique to PPL Electric—other energy-efficiency programs in Pennsylvania and in other states face the same issues.
- To meet its overall compliance target for May 2013, PPL Electric must very likely shift some of its energy savings goals from the small C&I sector to other sectors such as large C&I and residential.
- As of October 2011, the reported energy savings for the small C&I sector was 155,722 MWh/yr and the total portfolio savings (all sectors) was 732,987 MWh/yr. The EE&C Plan projected 602,782 MWh/yr from the small C&I sector and 1,367,000 MWh/yr for the entire portfolio at the conclusion of the programs in 2013. Thus, PPL Electric needs to achieve 447,000 MWh/yr from the small C&I sector over the remaining 19 months to equal the small C&I projections in the EE&C Plan.

  That goal is equivalent to having approximately 25,000 participants, which is a 33-percent approximate penetration rate of the small C&I sector, excluding unoccupied accounts (such as cable TV amplifiers, security cameras, cell phone towers, and pedestrian crossing signs). As this number would also equal 71 percent of the total remaining portfolio savings, achieving this is not likely possible, especially since PPL Electric obtained only 155,722 MWh/yr (8,000 participants and 21 percent of portfolio savings) from this sector in the first 22 months.
- PPL Electric developed a good infrastructure supported by appropriately allocated internal and external resources. Internal processes were designed to integrate across programs and delivery functions to facilitate program implementation effectively.
- PPL Electric has adequate systems, processes, and business controls to manage, document, and track program activities.
- PPL Electric's approach to managing its internal and external processes is effective. The Company's management team identifies potential problems early and quickly implements solutions. Also, PPL Electric's management and staff are very committed to the success of the EE&C programs.
- PPL Electric's contracts with external partners (CSPs) are tailored to ensure appropriate accountability and effective program delivery. Overall, the CSPs perform well and PPL Electric has adequate collaboration with, and management of, its CSPs.
- Customers are generally satisfied with the programs.
- Rebate processing time is typically under four weeks for common prescriptive measures, and this is consistent with best practices.
- PPL Electric successfully implemented changes to the technical reference manual (TRM), custom measure protocols, the Audit Plan, and market conditions into its programs, systems, and processes.
  - ➢ The processes to identify, scope, approve, and implement these changes were much more costly, formal, and time consuming than PPL Electric expected.

  - Many of these changes impacted program design, measure eligibility, rebate forms, tracking systems, marketing and customer communication, and EM&V.
  - The changes made it more difficult to forecast costs and savings at completion.
  - The changes caused confusion and frustration among customers, trade allies, CSPs, and PPL Electric's staff
  - The changes increase EM&V and tracking system costs.
- Uncertainty about post-2013 EE&C requirements influences PPL Electric's short-term and longer-term decisions. Therefore, PPL Electric should continue to work with the Commission, other EDCs, and other stakeholders to define the post-2013 EE&C targets and rules by mid-2012. Uncertainty influences these types of decisions:
  - Whether PPL Electric should exceed savings targets in the current planning cycle (2009-2013), or will that jeopardize future compliance?
  - How best to manage staffing levels, development, and retention
  - Should PPL Electric invest in longer-term improvements to systems and processes?
  - How best to plan and market programs when customers' sense no urgency (attitudes such as *"The money will always be available, so why should I act now?")*
  - Whether to extend programs during the current planning cycle so as to avoid or decrease periods in which there are no programs
  - How best to perform operational planning, such as load and revenue forecasting
  - Whether to introduce new technologies now (such as LEDs) in preparation for the post-2013 programs.
- Although PPL Electric has reasonable systems and processes for forecasting performance (savings and costs) at completion (end of program year 2013)., it should continue to revisit the participation, savings, and cost estimates (planning assumptions) for PY3 and PY4 to align program activities with changing market conditions and anticipated impacts associated with future changes to the TRM.
- Continue to promote the Direct Discount delivery mechanism and recruit additional trade allies. This mechanism helps small C&I customers quickly implement projects with no paperwork and little upfront investment (the incentive, which cover up to approximately 75 percent of the project cost, is paid to trade allies).
- Continue to develop ways to identify GNI sector customers and to reach small C&I customers with appropriate and compelling marketing, and identifying efficiency measures that are appropriate for these customers.
- Internal communication between EE&C groups (marketing, programs, EM&V, market research, key account managers, administration, etc.) improved significantly in PY2 but could improve further.
- Provide customers and trade allies with more information about these critical issues: (1) How the Energy Information and Security Act of 2007 (EISA) will affect the types of light bulbs and lamps available in the marketplace; and (2) What lighting technologies comply with the new federal efficiency standards. Providing this information to customers presents PPL Electric with an excellent opportunity to enhance customer

service while easing customer transition to the new lighting technologies found on store shelves.

- Consider introducing customers to next generation lighting technologies by providing incentives for select models of LEDs and other bulbs that exceed EISA efficiency standards. To avoid the early adoption problems that CFLs encountered, offer incentives only for well-designed equipment that has been carefully evaluated.
- Currently, retailers are excited about the program's recycling component and that recycling bins were located in approximately 40 participating stores. Information about both the mercury content in CFLs and the CFL recycling best practices is available to customers on PPL Electric's Website and in brochures and posters used at community and retailer give-away events.
  - 15 percent of customer survey respondents who reported either having a burned-out CFL or disposing of a CFL in the previous 12 months said they recycled their spent CFLs at a hazardous waste center, while 10 percent reported disposing of CFLs in a recycling bin at a retail store.
  - 51 percent of respondents said they threw their spent CFLs in the trash, which is less than customers at other utilities.
  - To decrease the number of customers disposing of CFLs in the trash, consider enhancing program marketing and education efforts about both the mercury content in CFLs and the CFL recycling options.
- Make it clear to customers with complex or long-term projects that the process may span multiple months from initial application to rebate check payment. Participants will be less likely to be dissatisfied about the turn-around time if they enter the program with the knowledge that the process is not instantaneous.
- Develop an online dashboard in the Custom program to allow customers to see their projects' progress.
- Develop a formal, streamlined application process for landlord-tenant projects, where thorough data collection and tracking ensure accurate reporting.
- Improve CSP QA/QC in the Audit and Weatherization Program.

1. Introduction

In February 2010, the Pennsylvania Public Utilities Commission (Commission) approved PPL Electric's EE&C Plan for an extensive, four-year portfolio of energy efficiency, conservation, and peak load reduction programs. The portfolio consisted of 14 cost-effective, voluntary customer programs aimed at facilitating the reduction of electricity consumption and peak loads in every customer class. In accordance with Act 129 and Commission rules, PPL Electric's programs were projected to achieve energy reduction targets by May 31, 2011, and May 31, 2013, and peak load reduction target by September 30, 2012.

On May 25, 2011, the Commission released a formal Secretarial Letter providing guidance to PA electric distribution companies (EDCs) regarding Act 129 reporting requirements. The Secretarial Letter provided a schedule for annual reporting, including the requirement that a final annual report with process evaluation results be delivered to regulators by November 15 of each year. The Cadmus Group, Inc., (Cadmus) was selected to lead the four-year evaluation of PPL Electric's demand-side management (DSM) program portfolio. This document presents the results of Cadmus' process evaluation for program year 2 (PY2), which satisfies the Commission's process evaluation annual reporting requirement.

As of August 2011, 11 programs were operating, and 10 have more than a full year of operating history. One program, the Renewable Energy program, already achieved the majority of its goals and was closed.[1] PPL Electric will file a request with the Commission to eliminate from its EE&C portfolio two programs: New Home Construction and Time-of-Use Rates. In program year 3 (PY3), the Company will launch its commercial demand response program, Load Curtailment, and Direct Load Control for residential and small commercial customers. All programs discussed in this evaluation are shown in Table 1.

Table 1. PY2 Act 129 Programs

Program	Sectors Served
Efficient Equipment	All sectors
Energy Assessment & Weatherization	Residential
Behavior and Education	Residential
CFL Campaign	Targets residential, others participated
Appliance Recycling	Targets residential, others participated
Low-Income WRAP	Low income residential
E-PowerWise	Low income residential
Renewable Energy	Residential; Government/Non-profit/Institutional
HVAC Tune-Up	Small commercial
Custom Incentive	Commercial, Industrial
Load Curtailment (Will claim savings in PY3)	Industrial
Direct Load Control (Will claim savings in PY3)	Residential, Small commercial
New Home Construction	Residential: Program eliminated
Time-of-Use Rates	Residential: Program eliminated

[1] PPL Electric closed this program, with the exception of GSHPs for the government and nonprofit sector.

Purpose and Overview of This Report

The primary purposes of the process evaluation were to: (1) Assess program characteristics; (2) highlight opportunities for improvement; and (3) identify best practices that can be implemented to produce more efficient and more cost-effective programs.

Cadmus' process evaluation was designed to assist PPL Electric in improving the efficacy and effectiveness of its energy-efficiency programs and to provide specific and detailed recommendations for program changes. This evaluation consisted of in-depth examinations of the design, delivery, and operations of the energy-efficiency programs, so as to improve their ability to achieve energy savings and accomplish other program goals. The recommendations in this report affect key areas of the program's operational practices, such as marketing, program delivery bottlenecks, internal communications, and the incentive application process.

For this process evaluation, Cadmus looked at most of the programs' second year of performance (PY2). Most of PPL Electric's programs were running at a steady-state mode of operation; however, in a few cases, the programs were already closed or nearly closed, or still in a pre-launch phase.

As prescribed in the Statewide Evaluation team's Audit Plan, Cadmus' process evaluation assessed each program using a methodology and approach appropriate to providing accurate, meaningful feedback to program designers and managers, based on the stage of development of the respective program. The evaluation followed two tracks: (1) Assessing portfolio-level operations and functional support systems; and (2) assessing each program's delivery and implementation infrastructure, protocols, and performance.

The process evaluation examined the effectiveness of the following program components:

- Program design and administrative and operational systems
- Program tracking and information management systems
- Internal and external communications
- Program delivery and implementation
- Program staff understanding the program's goals and objectives
- Program staff and CSP performance
- Program marketing strategies and outreach efforts
- The marketing materials and incentive levels used to promote the program
- Internal reporting, controls, and management oversight
- Customer satisfaction and customer service experiences

Methodology

The process evaluation methodology consisted of these proven techniques, and a brief overview of these evaluation methodologies is provided after the list:

- Interviews with PPL Electric's program managers, support staff, and management
- Surveys with participants and nonparticipants;
- Site visits at a sample of pre-installation and post-installation participant sites; and
- QA/QC reviews of data collected in each program against data tracked in EEMIS and by other CSPs.

Interviews

To assess how well PPL Electric's internal delivery processes and interdepartmental integration were working, Cadmus interviewed the customer program specialists for every EE&C program. These are the managers who oversee all of the energy-efficiency programs and major support functions. We also interviewed with PPL Electric's Act 129 EE&C management, all of PPL Electric's implementation CSPs, and its administrative CSP.

Surveys

For PY2, Cadmus completed telephone surveys with a total of 1,572 participant and nonparticipant customers. These surveys were used for both the impact evaluation and the process evaluation. Surveys were conducted to verify measure installation, collect information regarding satisfaction and the participant's experience with the program, and inform estimates of freeridership and spillover.

We developed structured survey instruments for each program. The number of surveys conducted during the program year depended upon the complexity of the program, the program-specific issues identified, and the different types of measures offered through the program. Surveys were conducted with a representative sample of the customers who participated in the program's previous quarters. The overarching sampling plan met the requirements discussed in the Statewide Evaluator's (SWE's) Guidance Memo 003: Sampling Resolution Memo.

Site Visits

Site visits, which provide valuable data for impact evaluations, can also provide unique insights to inform a process evaluation. The primary purposes of the site visits were to: (1) Verify that the measures were installed; and (2) check the accuracy of reported or collected data used to determine energy savings.

Cadmus and its subcontractors completed over 350 participant site visits, verifying over 400 measures, 116 lighting projects, and 54 custom projects. Data collected or verified included building and space type, operating and occupancy schedules, operating hours, part-load ratio profiles, size and type of equipment, and other elements specified in the technical reference manual (TRM).

A detailed discussion of the methodology used to select the sample for site visits is provided in PY2 Annual Impact Report, Appendix A. The findings that resulted from the site visits are incorporated into each program process evaluation report in Chapter 4.

QA/QC Review of Program Data

Cadmus conducted a records review (desk review) of a sample of each program's PY2 records for the purpose of verifying the accuracy of data entry, the measures installed, and the measure quantity recorded. For this review, Cadmus selected a sample of records representing each major program component and stratified the records in each sample according to key delivery features.

Our assessment compared copies of rebate applications to data recorded and tracked by each implementation CSP for the same records selected for desk review, compared to the information recorded in EEMIS. We noted any differences within key data fields and verified the accuracy of calculations and other variables. The results of the QA/QC reviews are outlined in each program process evaluation in Chapter 4 of this report.

Appendix A offers a detailed discussion of Cadmus' process evaluation methodology.

How This Report Is Organized

This report describes the evolution and status of the EE&C programs in PPL Electric's portfolio during the second year of operation. It details the portfolio's operations and management, administrative approach, and significant supporting functions. (These functions include major accounts, marketing and communications, and the EEMIS data tracking system.) The report also discusses each individual program's progress in PY2 and offers recommendations to enhance the portfolio's efficiency and effectiveness, where warranted. It is organized as follows:

- ***Chapter 1, Introduction***, (this chapter) introduces the process evaluation report.
- ***Chapter 2, Portfolio Level Process Evaluation Status***, provides an overview of the portfolio's evolution, status to date, and anticipated modifications for the next plan year. It also contains discussions of PPL Electric internal operations, delivery infrastructure, market response, and external processes.
- ***Chapter 3, Portfolio-Level Process Evaluation Findings***, describes the evaluation results at the portfolio-level.
- ***Chapter 4, Program-Specific Process Evaluation Findings, Conclusions, and Recommendations***, describes the program-specific process evaluation results for each of the EE&C programs specified in the Act 129 program portfolio. Focusing on PY2 operations and QA/QC, this chapter provides key findings and recommendations for improvements to program processes.
- Appendix A. Process Evaluation Methodology.
- Appendix B. 2011 TRM Updates.
- Appendix C. PPL Electric Act 129 Organization Structure.

2. Portfolio-Level Process Evaluation

Overview of Portfolio Evolution and PY2 Status

Following Commission approval in October 2009, PPL Electric launched the first of its Act 129 programs in the same month. It then commenced a rapid roll-out of 10 programs within six months.

The PY1 evaluation, which occurred in the spring and early summer of 2011, provided an assessment of program design and development, CSP selection, program roll-out, launch, and early delivery activities and accomplishments for the programs with active operations. At this very early stage of operations, there was no opportunity to assess the programs' successes compared to their goals. However, the evaluation provided feedback and helped identify potential problems associated with program designs and operational practices that enabled program managers to take corrective actions early in program delivery.

At the end of PY2, 11 programs were operating, and 10 of those programs had more than a full year of operating history. All EDCs in Pennsylvania have interim compliance targets for 2011, so an evaluation of program progress against these targets provided an important measure of PPL Electric's momentum and the likelihood of achieving its four-year program targets.

Summary of Portfolio Results

At the portfolio level, PPL Electric's implementation of its EE&C Plan in PY2 was a success.

- The energy savings for the portfolio and the institutional sector met the May 2011 compliance targets and are on track to meet the May 2013 compliance targets.
- Peak load reductions for the portfolio are on track to meet the September 2012 compliance target, but there is no margin for uncertainty. The projected cost of the portfolio at completion is on track to be within the Act 129 cost cap.
- The majority of programs were on track with or ahead of their interim savings and participation targets.

Summary of Sector-Level Results

The performance at the sector level was mixed.

- The residential and large C&I sectors are ahead of target, so PPL Electric may need to close the programs (or slow their progress) ahead of schedule.
- Results for the low-income sector are on target.
- Results for the institutional (government, schools, and non-profit) sector are on target, but the amount of effort required to penetrate this sector is much more than PPL Electric expected.
- The small C&I sector is significantly behind the plan and will not likely achieve its savings target as estimated in the EE&C Plan. Thus, PPL Electric may decide to revise its EE&C Plan accordingly. (Note that the challenges encountered to penetrate this sector

are not unique, and other energy-efficiency programs in Pennsylvania and elsewhere have faced the same issues with this sector.)

Portfolio Progress Toward Goals

Act 129 requires all EDCs to reduce energy consumption by 1 percent by May 31, 2011, reduce energy consumption by 3 percent by May 31, 2013, and reduce peak load by 4.5 percent by September 30, 2012.

PPL Electric's EE&C Plan goals focused on specific energy and demand savings, participation targets, and budgetary targets for each program and for each of five target customer sectors. The Act further limited expenditures to 2 percent of 2006 annual revenues for each year of the four-year plan. Table 2 shows PPL Electric's interim and plan cycle performance goals, budget cap, and the portfolio's cumulative achieved savings at the end of PY2.

Table 2. PPL Electric Portfolio-Level Goals

	2011 MWh/yr Goal	2013 MWh/yr Goal	2013 Budget
Portfolio Total Goals	382,144	1,146,431	$246,005,505
PY2 Achieved Savings	133% of goal (506,243 MWh/yr)	44% of goal	34% of budget spent

The following sections of this report provide an overview of PPL Electric's progress against its Act 129 plan goals.

Summary of Portfolio Status

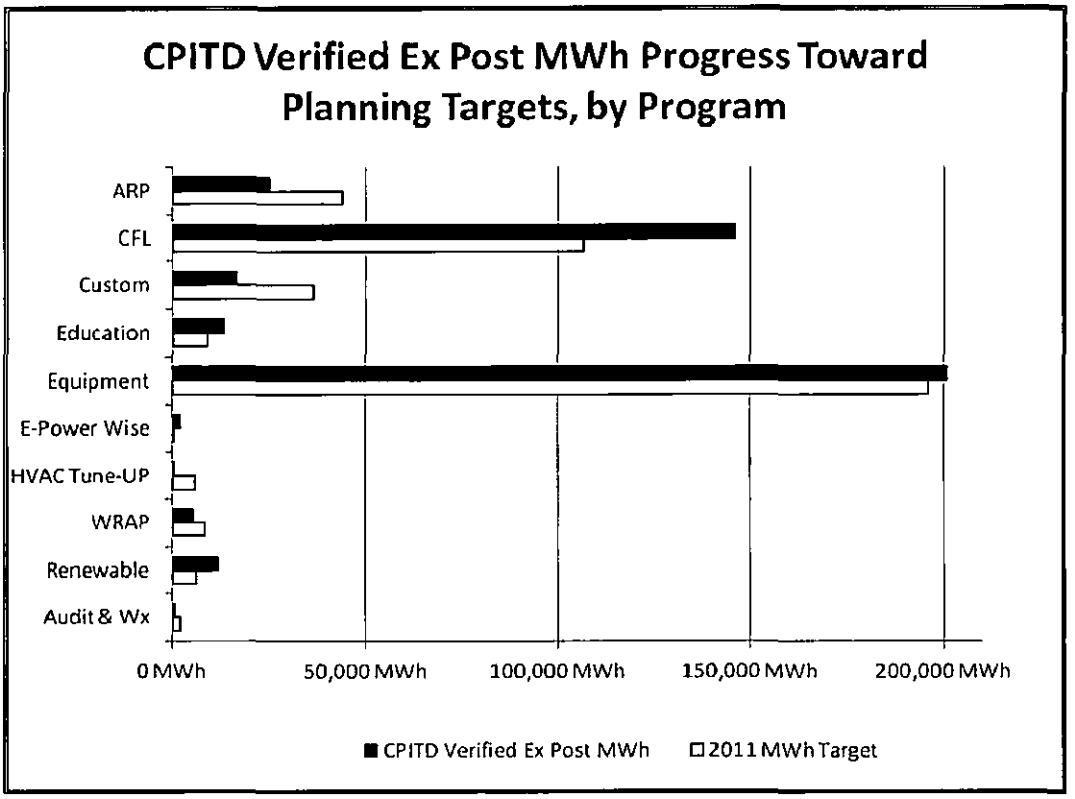
At the portfolio level, PPL Electric's Act 129 plan is on track. By March 2011, the Company had already achieved its 1 percent target for May 31, 2011. At the close of PY2, the Company's portfolio had achieved the following results:[2]

- A1-percent energy reduction compliance target for 2011.
- The cumulative verified energy savings for the portfolio at the close of PY2 was approximately 506,243 MWh/yr, which is approximately 133 percent of the May 31, 2011, compliance target.
- The cumulative verified gross demand reduction was 66.03 MW, which is approximately 22 percent of the May 31, 2013, compliance target (297 MW).
- The cumulative reported participation was 221,557 participants, based on the number of rebate forms and excluding the compact fluorescent lighting (CFL) program.
- Over 95,000 unique customer accounts participated (excluding CFLs).
- In the GNI sector, cumulative verified savings were 44,460 MWh/yr, which was 116 percent of the May 31, 2011, compliance target, and 39 percent of the 114,600 MWh/yr May 31, 2013, energy savings compliance target
- At its peak, over 400 retail stores offered program-discounted CFLs, and by year's end, more than 200 retail stores offered CFLs.

[2] Additional detail can be found in the PY2 Annual Impact Evaluation, dated Nov. 15, 2011.

- $35 million was paid in incentives in PY2, and $38.6 million cumulative was paid since the inception of PPL Electric's incentive payments.
- Net Present Value Total Resource Benefits (avoided electricity costs) over the lifetime of installed measures are approximately $400 million. This is based on energy efficiency measures installed since inception.
- As expected, the portfolio of programs passes the TRC: the PY2 benefit-to-cost ratio was 1.73, and the cumulative benefit-to-cost ratio was 1.77. The PY2 TRC ratio is 2.29 excluding renewable energy and low-income programs, offerings that are typically not cost effective.

Figure 1. Progress Toward May 2011 Planning Targets by Program, Showing Verified *Ex Post* Savings



At the sector and program levels, the results were mixed. The residential sector was ahead of its interim goal, with savings from the CFL Campaign, Renewable Energy program, and some measures in the Efficient Equipment Incentive program significantly exceeding their goals and bolstering the performance of the entire portfolio.

PPL Electric has scaled back certain residential programs to better manage goals for these reasons: (1) Some programs were far exceeding their targets; (2) some stakeholders expect the Company to achieve its 2013 savings goals essentially on target (in the sector proportions shown in the EE&C Plan); and (3) to prevent programs from closing too early (going dark). Scaling

back includes reducing rebates, eliminating measures, and/or cutting back on marketing. The Company is currently reviewing its residential sector objectives and expects to revise its EE&C Plan in late 2011.

Sector-Level Details

Performance in the large C&I sector (including projects with a reservation) exceeded 2011 target, and large C&I programs are currently fully committed. Consequently, PPL Electric established a wait list for large C&I programs, so that if funding becomes available, the wait-listed projects can move to active status. Also, the Company is reviewing its large C&I sector objectives and expects to revise its EE&C Plan in late 2011.

PPL Electric's low-income sector programs were approximately meeting their targets as projected in the EE&C Plan, and these programs are expected to deliver consistent savings throughout the remainder of the plan period and expected to meet 2013 targets. In addition to the two low-income specific programs, PPL Electric and Cadmus estimated the savings of low-income customers participating in programs open to all residential customers. The results are included in the Program Year 2 Final Annual Report.

For most of the program year, the performance of the small C&I sector and the GNI sector lagged behind expectations. It is important to note that PPL Electric is not unique in having difficulty reaching these sectors; the barriers are well documented in DSM efforts around the country. These sectors, which have proven extremely difficult to reach with traditional marketing, continue to struggle with major financial and staffing constraints in the turbulent economic environment. The investment required for capital improvement projects—even those with a one-year payback—is often considered discretionary spending and beyond the reach of most small businesses. Additionally, small commercial customers frequently occupy rented space and have little incentive to invest in facility upgrades.

GNI sector customers were difficult to identify since PPL Electric has typically classified customers according to their rate class, and GNI sector customers span all rate classes. These customers were hard hit by the economic downturn; they were under financial constraints; they often have long project approval cycles; and their budgets are often set several years in advance. However, despite the slow start in the GNI sector, PPL Electric recognized the barriers and implemented solutions to help overcome them. This strategy achieved strong results near the end of PY2. PPL Electric met both the portfolio and GNI goals for 2011 is positioned to meet the 2013 compliance target for the GNI sector.

Table 3 provides a summary of PPL Electric's sector-level interim energy savings goals and performance (cumulative verified savings), as well as the portfolio's performance against full-compliance energy and demand savings.

Table 3. PPL Electric Sector-Level Goals and Performance Summary

Sector	MWh/yr				
	2011 Plan Goal	Cumulative Verified Savings	Percent Achieved Toward 2011 Goal	2013 Plan Goal	Percent Achieved Toward 2013 Goal
Residential	176,404	314,191	178%	469,558	67%
Low-Income	8,831	8,310	94%	19,775	42%
Small C&I	163,521	83,572	51%	603,444	14%
Large C&I	31,500	61,827	196%	139,811	44%
GNI	37,051	41,461	112%	135,109	31%
Total	**417,307**	**509,361**	**122%**	**1,367,697**	**37%**

Note: Actual savings exclude committed projects with a reservation.

At the program level, results varied considerably from projections for several programs. Table 4 provides a summary of cumulative program-level performance (verified savings) against PPL Electric's 2011 targets.

Table 4. Cumulative Program Status Against 2011 Goals

Program	Sectors Served	Program Status	Percent MWh/yr Goal Achieved	Percent MW Goal Achieved
Efficient Equipment	All	On track	109%[3]	138%
Energy Assessment & Weatherization	Residential	Behind	34%	55%
CFL Campaign	Targets residential, others participated	Ahead	195%	86%
Appliance Recycling	Targets residential, others participated	On track	77%	176%**
Renewable Energy*	Residential; GNI	Mostly Closed*	237%	579%
Behavior and Education	Residential	On track	147%	0%
Low-Income WRAP	Low income residential	On track	74%	111%
E-PowerWise	Low income residential	On track	457%	372%
Custom Incentive	Commercial, Industrial	On track	46%[4]	34%
HVAC Tune-Up	Small commercial	Behind	8%	18%
Load Curtailment	Industrial	Launched in PY3		
Direct Load Control	Residential; small commercial	Launched in PY3		

* The Renewable Energy program achieved the majority of its 4-year goals and was closed, with the exception of GSHPs for the GNI sector.

** ARP likely has a high KW due to a difference in coincidence factor between the assumption in the EE&C plan and the TRM value. (The reverse is true for CFL).

[3] Excludes committed projects with a reservation.

[4] Excludes committed projects with a reservation.

Peak Load Reduction Status

During late PY2 and early PY3, the Company began marketing and recruiting customers for its two targeted demand-reduction programs: Direct Load Control (DLC) and Load Curtailment. Both programs launched in PY3. PPL Electric deferred launching these programs for two reasons:

- Act 129 required only that demand reduction targets be met in the period from June 1, 2012, to September 30, 2012. Thus, PPL Electric determined there was no advantage to launching its demand reduction programs before late PY2.
- PPL Electric decided not to execute contracts with demand response program CSPs until the Commission finalized EM&V protocols for determining the peak load reductions for those programs.

PPL Electric's recently launched recruitment for the DLC program is off to a good start. Approximately 20,000 of the 50,000 total expected customers have enrolled as of November 2011. During the summer of 2011, PPL Electric and the DLC CSP tested load forecasting processes, communication systems and process, and operational systems. The DLC CSP also performed metering studies to: (1) Evaluate different cycling strategies; (2) evaluate customer dropout rates; and (3) estimate the peak load reduction per device.

PPL Electric contracted with the Load Curtailment CSP in July, and the CSP is currently recruiting participants.

In its EM&V efforts, PPL Electric also found that in several programs, demand impacts resulting from energy-efficiency measures were lower than the Company's planning assumptions, and some expected energy savings have been further reduced because of changes in the TRM. Predicting the gap would widen, PPL Electric was considering adjusting its peak load reduction estimates expected from energy-efficiency measures and programs to reflect these results. The Company now expects to address this as part of revised EE&C Plan in late 2011.

Changes and Adjustments to Programs in PY2

On September 15, 2010, PPL Electric filed a petition requesting approval to modify its previously approved EE&C Plan. In its petition, PPL Electric proposed two modifications to its EE&C Plan: (1) a change to its CFL Campaign program; and (2) a change to the classification of certain direct and common costs. These changes shift costs between customer sectors but have no impact on total savings or total costs for the EE&C Plan. The Commission approved these two modifications in the Opinion and Order entered on January 28, 2011.

Further, on February 28, 2011, PPL Electric filed a more detailed black-line version of its EE&C Plan, which included several proposed modifications. The Commission approved the compliance filing in May 2011. The key modifications were these:

- A proposed increase of 50 MW in load reduction for the Load Curtailment program. The additional 50 MW of load curtailment slightly increases the energy savings (MWh/yr)

associated with those curtailments, thereby slightly increasing the energy savings for the program and for the EE&C Plan as a whole.

- Fine-tuning several rebate amounts, measure descriptions, and eligibility requirements.
- Adding measures to the Efficient Equipment Incentive program: Air-cooled chillers, ENERGY STAR® light fixture/ceiling fan combinations, T-5 and Super T-8 lighting, ENERGY STAR LED fixture retrofit kits, and cold cathode lighting.
- Deleting water heater setback from eligible measures in the Efficient Equipment Incentive program because savings and sustainability cannot be reasonably verified.
- Moving some measures from the Efficient Equipment Incentive program to the Custom Incentive program: Strip curtains, refrigeration night covers, and decreased cooling tower approach temperature.
- Deferring the launch of the Direct Load Control and Load Curtailment programs from January 2010 to late 2010/early 2011.
- Changing the proportion of the low-income segment's targeted contribution to energy savings; thus, conforming to the Commission's Low-Income Working Group Report.

Subsequent to the revised EE&C Plan approved in May 2011, PPL Electric continued to identify the program modifications needed to improve program performance, efficiency, or operations. PPL Electric plans to submit a revised EE&C Plan in late 2011.

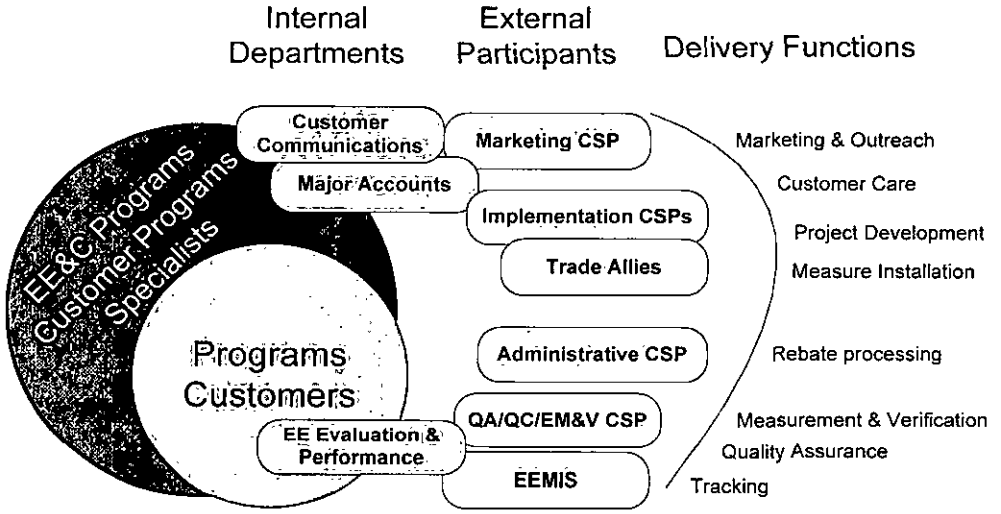
Program Administration and Internal Processes

PPL Electric's Customer Programs and Services (CP&S) Group oversaw the EE&C Portfolio of programs. CP&S is accountable for all programs, policies, procedures, and verification of all EE&C programs and communications. Appendix C contains an organizational chart showing the roles and responsibilities of the different departments within PPL Electric's CP&S group.

Operations and Management

As discussed in the PY1 process evaluation report, PPL Electric developed infrastructure—composed of internal and external resources—to fulfill its needs for program marketing, operations, and delivery. Each of the Act 129 programs was supported by an infrastructure tailored to ensure the program was delivered efficiently and effectively. Some programs utilized turn-key implementation CSPs who assumed primary responsibility for the majority of program delivery functions. Other programs were delivered through a combination of PPL Electric staff, CSPs, and trade allies. PPL Electric's internal support functions (e.g., customer communications) are integrated across programs to facilitate program implementation. Figure 2 illustrates this generalized program delivery structure.

Figure 2. Internal-External Program Delivery Structure



PPL Electric's internal processes were integrated across programs and delivery functions to facilitate program implementation. This approach enabled PPL Electric to oversee external resources tasked with supporting specific delivery functions.

Both internal and external program support personnel performed well in PY2. PPL Electric made a few internal staff changes within its work groups. Technical support staff members were added to the program evaluation and performance group; two staff members were added to the customer communications and education group; and one new staff member was added to the CP&S group to identify operational issues and improve internal processes, especially between the program and key account groups.

CSP Management

PPL Electric utilized CSPs to deliver services in support of its EE&C programs. Some CSPs operated as turn-key program delivery contractors, and others provided specific functions across multiple programs. As shown in Table 5, CSPs had major roles in delivering PPL Electric's programs.

Table 5. Conservation Service Providers – Program Year 2

Program	CSP	Role
Appliance Recycling	JACO	Turn-key implementation
CFL Campaign	Ecos	Turn-key implementation
Custom Incentive	E-Power Solutions (KEMA)	Implementation support for C&I and GNI
Direct Load Control	ComVerge	Turn-key implementation
Efficient Equipment Incentive	E-Power Solutions (KEMA)	Implementation support for the C&I and GNI sectors
Energy Assessment and Weatherization	eic|Comfort Home	Implements walk through surveys and administers comprehensive audit component
Energy Efficiency Behavior & Education	OPower	Turn-key implementation
E-PowerWise	Resource Action Programs	Turn-key Implementation
HVAC Tune-Up	FDSI	Turn-key Implementation
Load Curtailment	Enernoc	Turn-key Implementation
Functional tasks	U Marketing	Marketing
	Cadmus	EM&V; QA/QC
	CGI	Developed, maintains and hosts EEMIS
	Helgeson	Call center and rebate processing for: Efficient Equipment residential customers; HVAC tune-up contractors; Assessment and Weatherization

During PY2, only the CSP for the HVAC Tune-Up program underperformed. This was due in part due to timing issues around weather, contractors' maintenance seasons, and the cost of the diagnostic equipment, which was a deterrent to HVAC contractors. However, the CSP has developed a recovery plan that will be implemented at no additional cost. PPL Electric has suspended payments to this CSP until program recovery milestones are met.

The most significant change in PY2 (January 2010) was bringing in EPS to support program implementation for the C&I sector, in an effort to improve participation among small C&I and GNI sector customers. EPS had the primary responsibility to market and implement PPL Electric's C&I sector programs (Efficient Equipment and Custom Incentive Programs) and was expected to meet specific targets associated with the performance of these programs. The EPS team was responsible for educating and providing technical support to trade allies and customers, processing rebates, and conducting analyses to report *ex ante* energy savings.

During the second half of PY2, PPL Electric worked with EPS to develop a more robust range of program options for customers in the small C&I and GNI sectors. Strategies considered and/or implemented were these:

- Implementing changes to streamline existing rebate forms.
- Providing direct technical assistance to customers and trade allies.
- Expanding and enhancing outreach and training to targeted trade allies to increase their participation and promotion of the programs.
- Enhancing marketing and promotional efforts, particularly for the small C&I sector.
- Adding a small C&I direct installation (Direct Discount) delivery channel under the existing Efficient Equipment Incentive program.

EPS experienced a few obstacles early on, resulting from a large backlog of projects, customers encountering long delays getting rebates, and incomplete customer data. By the end of PY2, the team caught up with the backlog and was able to make very good progress, exceeding its GNI and large C&I sector goals. However, the small C&I sector continues to be a challenge.

Rebate Forms and Processing

An administrative CSP, Helgeson Enterprises (Helgeson), handled rebate processing for the Efficient Equipment program during PY2. This function operated well, and rebate processing time was under four weeks for most applications. Efficiency improvements were implemented to further reduce processing time and maintain customer satisfaction. Toward the end of PY2, Helgeson transitioned processing most C&I sector rebates to EPS.

While the administrative CSP did have some errors related to technology specifications and data, these were a relatively insignificant percentage of total transactions and were addressed when identified. The CSP provided PPL Electric with suggestions and recommendations to help reduce customer confusion and improve rebate forms. (For example, the administrative CSP advised PPL Electric to keep rebate forms to one page to increase the likelihood that customers would fill them out completely.)

Because the administrative CSP received many customer calls requesting clarification on the commercial lighting rebate applications, the CSP added a lighting hotline. At the onset, the CSP trained all staff to answer customer questions, but the Appendix C lighting forms (required for C&I sector lighting projects) were complex and difficult to complete. Later, one specialist was responsible for answering questions about Appendix C. However, at the end of PY2, EPS took over the lighting hotline, since it was responsible for program implementation for C&I customers.

Also at the end of PY2, PPL Electric updated its rebate forms in anticipation of the start of PY3 on June 1, 2011. In addition, the Company prepared to transition the responsibilities for commercial rebate processing from Helgeson to EPS. PPL staff reported EPS' responsibilities would include cross-checking customer applications against a database of previous participants to avoid double-dipping issues. EPS will not process commercial customer rebates for residential appliances, such as dishwashers and refrigerators. That task will stay with the current administrative CSP (Helgeson).

EEMIS Tracking System

PPL Electric's program participant and rebate tracking system, Energy Efficiency Management Information System (EEMIS), is an essential component of all Act 129 energy-efficiency programs. PPL Electric selected CGI to develop and manage EEMIS. EEMIS housed the transactional data specified in the TRM or Audit Plan (including rebate amounts, measure quantity, measure data, customer information, installation date, rebate paid date, and savings.)

The EEMIS implementation process and updates required more detail and were more complicated than originally anticipated. The implementation CSPs worked with PPL Electric and the EEMIS CSP to ensure they could upload data from their tracking systems to EEMIS. Subsequently, all CSPs tracked and uploaded a common set of data as well as data specific to their program. These details required that the EEMIS team customize the tracking system.

During PY 2, PPL Electric implemented several significant enhancements to the EEMIS structure to simplify and expedite future updates, such as TRM changes. Those enhancements gave PPL Electric the ability to use its own staff to modify EEMIS—such as its savings algorithms—more quickly and less expensively. The Company can also perform and mini-phase updates instead of using the EEMIS developers to implement large phase updates.

The EEMIS-reported participation and savings kept the PPL Electric managers and customer programs specialists informed about programs and progress toward goals. The system supported key activities (including marketing and outreach) and assisted the decision making. For example, the programs implementation team reported status by program on a monthly basis. This allowed management to see the numbers of rebates by program and measure, gauge program progress and uptake by sector, and view progress by other indicators.

In autumn 2010, PPL Electric developed a business intelligence software tool, MicroStrategies, which allowed the Company to download EEMIS data to develop more flexible *ad hoc* reporting. This proved to be a useful tool for analyzing information and provided specific business intelligence to guide program design and decision making.

Ultimately, the data recorded in EEMIS were used to verify energy and demand savings. This entailed each input to the savings algorithms being collected, recorded, tracked, and uploaded. In some cases for both fully deemed and partially deemed measures in the TRM, a deemed savings value was used as a proxy in the reported savings. EEMIS included a measures table, which recorded deemed savings that could be changed when, for example, the TRM values changed.

The CSPs determine the most appropriate manner in which to bundle rebates for their programs. Rebates and their associated data—called "work packages"—are then uploaded to EEMIS by various CSPs. Once data in the work package are recorded and approved in EEMIS, the data cannot be changed. This has prevented changes from one reporting period to the next and avoided confusion.

A change request document was developed for tracking all changes in EEMIS, such as upgrades and adjustments to deemed savings values. This document has been an invaluable tool for tracking, reporting, and verification. Known errors in EEMIS could be handled in one of three ways:

- ***Alternative 1.*** The work package could be deleted (and recorded as such), repaired, and re-uploaded as a new work package, so long as the data were not part of a extract provided to the EM&V CSP, to the SWE, or as part of a quarterly report.
- ***Alternative 2.*** The transaction could be corrected in EEMIS and documented by the change request process, so long as that transaction was not part of a data extract provided to the EM&V CSP, to the SWE, or as part of a quarterly report.
- ***Alternative 3.*** The errors could be addressed during the impact evaluation phase via an *ex ante* savings adjustment.

For example, early in PY2, when work packages for lighting rebates were first uploaded, the baseline condition was not always known. This caused the pre-retrofit condition to be entered the same as the post-retrofit condition, resulting in the appearance that there were zero savings from the project. This kind of error was handled outside of EEMIS, after *ex ante* savings were reported and during the verification phase.

In all cases, savings were verified by the EM&V CSP (Cadmus). Adjustments were made in two steps during the verification process after data were reported. For some measures with TRM-deemed savings, an adjustment was made to the population before verification. This included, for example, mapping rebates by applicants' ZIP code to one of the cities listed in TRM tables for the respective measure. The mapping adjusted the savings because different cities had different heating and cooling degree days, which affected the equipment operating hours (EFLH). This type of adjustment to the population was known as the "TRM *ex ante* adjustment." The second adjustment took place during the verification phase and affected the *ex post* verified savings. Additional discussion and detail of savings verification can be found in the PY2 Annual Impact Evaluation report, filed November 15, 2011.

The EEMIS reports for each Act 129 program are uploaded monthly and quarterly to the SWE SharePoint site and to Cadmus' FTP site. Monthly reports, which contain a subset of all data fields, are useful for tracking progress and planning evaluation activities. The quarterly and annual verification extract contained all fields captured in EEMIS.

In late PY2, for measures that have a savings algorithm in the TRM, the EEMIS team began developing the means to compute savings in EEMIS using inputs collected via rebate forms. Before this time, the savings values were static (fully deemed assumption of average savings for the measure) and recorded in the measures table. The intent was to track progress more closely, as programs neared the 2011 and 2013 targets. In implementing this approach, the EEMIS team assumed reported savings would more closely match the verified savings, since inputs for reported savings would now match those used to verify savings. The team started with HVAC measures and launched the system at the onset of PY3.

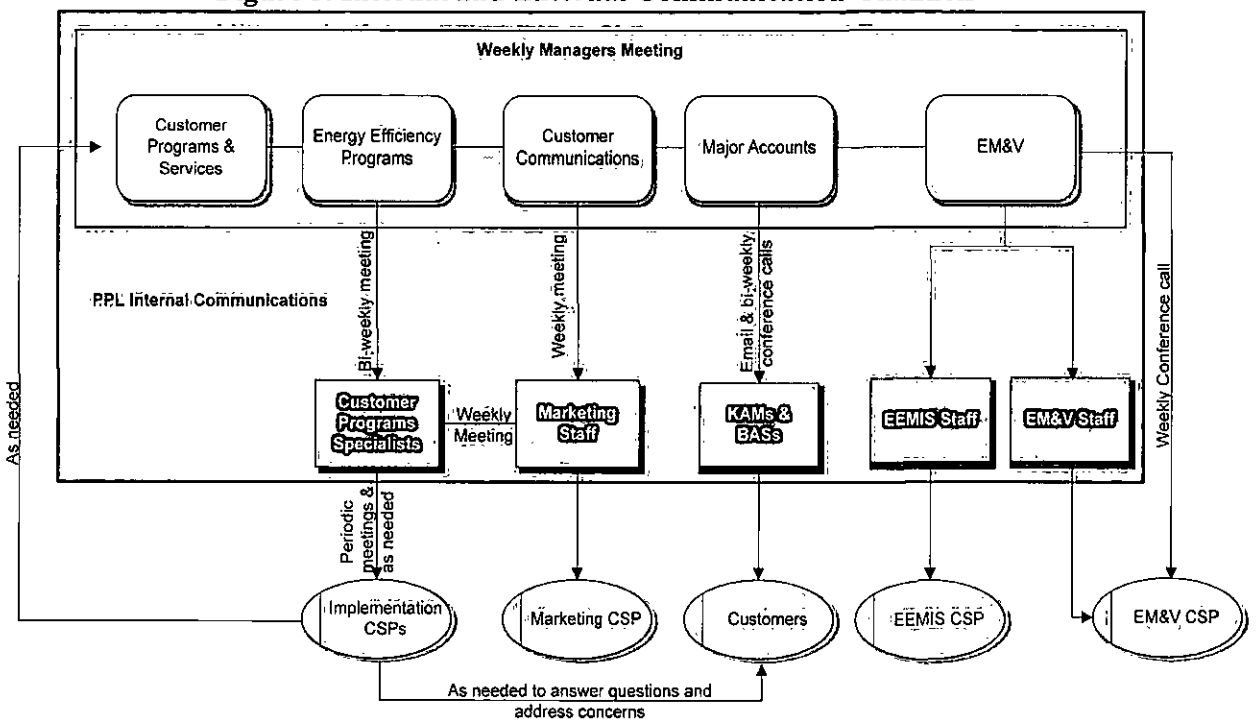
Overall, the EEMIS was successfully implemented, and it continued to evolve during PY2. PPL Electric's staff and EEMIS CSP were very responsive in identifying and/or addressing issues that arose. With each issue, the team learned how to improve the system overall.

Program Implementation and Delivery

Communications With Staff and External Participants

Communications among internal programs staff and management teams at PPL Electric were generally designed to accommodate best the needs of each. That is, each PPL Electric manager developed communications protocols and tools to facilitate regular communications among the manager's own team members and other members of the management team. PPL Electric's cultural environment encouraged collaboration and input from many parties.

Figure 3. Internal and External Communication Channels



While communications between the programs staffs and the management team were open and flexible, communications typically flowed from program staff through the managers of the energy-efficiency programs, who indicated this approach worked well.

The management teams meet every two weeks to: (1) Identify issues early and direct them to the correct groups to address; and (2) ensure consistent delivery and understanding of program information at the highest levels. *Ad hoc* meetings focused on issues that needed immediate attention. Managers noted that these meetings were very helpful, but there were still refinements needed to make communications even more effective and productive.

The major accounts team relied on e-mail and bi-weekly conference calls to discuss issues and provide updates. Any issue required an in-depth conversation was generally discussed in a separate conference call with appropriate parties. This system appeared to work well for the team, since many key account managers (KAMs) were in remote locations and had inconsistent schedules.

The entire Act 129 delivery staff became more diligent in providing updates and information immediately, which allowed for more planning and time to relay the information to the KAMs in remote locations. However, the lack of physical proximity to KAMs made communications more difficult. More direct, face-to-face communication with major accounts could be helpful, along with monthly meetings to facilitate better the integration of major accounts with EM&V, programs, and communications groups.

The customer communications team held internal meetings with managers weekly to discuss the Act 129 programs, keep managers apprised of activities and progress, and discuss issues as they emerged. This appeared to be a good way to keep all of the Act 129 groups informed and to identify issues that required input from multiple parties. While the system worked well, the communication efforts was challenging because various members of multiple teams provided input on any given marketing and communications decision. Another challenge was that the volume of information made it difficult to act on any but the most urgent issues.

With the exception of the KAMs' communications with their large C&I customers, PPL Electric staff had little direct communications with customers. Typically, customers took their questions or problems to the appropriate program CSP, the administrative CSP, or to EPS.

In general, program implementation CSPs communicated exclusively with the PPL Electric customer programs specialist who ran their program. The customer programs specialist typically arranged for periodic team meetings to discuss program progress, issues, and upcoming activities. In practice, the customer programs specialists spoke with their CSP point-of-contact several times per week to exchange ideas, ask or answer questions, and discuss issues as they arose. Depending on their role, turn-key program CSPs also periodically communicated with management-level groups within PPL Electric, particularly the EM&V team and customer communications. However, communications between these groups was primarily conducted on an as-needed basis.

In contrast to program-specific CSPs, EPS appeared to require more rigorous communications with PPL Electric since EPS' responsibilities spanned two major programs (the Efficient Equipment Incentive and Custom Incentive programs) and multiple management groups (the programs, communications, major accounts, and EM&V teams).

The functional CSPs, such as the marketing and EEMIS CSP, typically had one or two primary points of contact who held regular team meetings, and they communicated as needed on other issues.

Major Accounts

The major accounts group included several KAMs who supported PPL Electric's largest non-residential customers, and business account specialists (BASs) who supported medium sized non-residential customers. The KAMs provided advice to PPL Electric's C&I customers on a wide range of issues and concerns, such as billing, new service connections, power quality and outages, the removal of rate caps, energy-efficiency programs, and shopping for alternative electricity providers. KAMs typically had close personal relationships with their customers, often assisting them through one-on-one meetings. The KAMs' primary responsibilities related to PPL

Electric's Act 129 programs entailed promotion, education, and program facilitation, and coordination of M&V site visits.

In PY 1, the KAMs faced some challenges that primarily stemmed from: (1) The fast pace of program implementation; (2) evolving program rules following initial launch; and (3) a steep learning curve for program protocols and technical details. However, in PY2, many of the PY1 challenges had been addressed and Act 129 implementation was much smoother. In addition, the KAMs' familiarity with program details and protocols improved significantly during PY2, and they achieved a solid comfort level with the programs through direct project experience, and both formal and informal training from PPL Electric.

The Efficient Equipment Incentive Program's prescriptive measures were the most popular among KAM accounts, particularly lighting projects. The Custom Incentive program and commercial lighting applications continued to be challenging from a technical standpoint. The large C&I sector saw significant program activity during PY2 and approached full realization of its targets and subscription of Act 129 funds.

Among the major accounts group's significant challenges during PY2 were the continued complexity and long project timelines associated with the Custom Incentive Program. Challenges were also associated with keeping customers informed of the program's rapid evolution. Another challenge involved different interpretations of how to handle LEDs (that is, whether to include the technology under the prescriptive program or the custom program).

During the second half of PY2, the major accounts group worked with EPS to integrate and shift some responsibilities to EPS. Balancing the roles and responsibilities among KAMs and EPS is a work in progress. EPS redesigned some program processes and internal protocols while it got up to speed on the programs, and this resulted in a project backlog and caused frustrations among the KAMs. While the major accounts group preferred KAMs to be the primary point of contact for all large C&I customers, EPS also needed to contact customers directly to promote the programs. To address this issue, PPL Electric developed protocols to direct responsibility for communicating with customers at each step of a project's process. For example, EPS provided KAMs access to its customer portal so that KAMs could track the progress of their customer accounts' projects. In turn, KAMs provided leads and identified potential projects for EPS. Overall, major accounts and EPS have developed a successful relationship that works well.

Marketing and Communications

The customer communications and education group (the communications group) was formed in October 2009 to coordinate PPL Electric's EE&C program marketing efforts. The communications group's primary focus was to develop effective and consistent marketing messages to ensure customers understood program benefits and how to participate. Turn-key implementation CSPs coordinated with PPL Electric's communications group to ensure marketing materials and messaging were consistent with the e-Power brand.

PPL Electric's PY2 overarching marketing strategy focused primarily on general awareness, education, and targeting specific customer sectors such as GNI and small C&I. Program CSPs are responsible for marketing programs (Appliance Recycling, Direct Load Control, etc.). As the year progressed, PPL Electric assessed which programs or customer sectors needed promotion

and then developed program-specific and customer sector-specific advertising. Marketing channels included traditional marketing (such as print, television, online advertising, direct mail, bill inserts and messaging, case studies, the E-Power Website) and sponsorships that targeted specific customer sectors (such as sponsoring local baseball teams to increase awareness among residential customers).

The results of this strategy were mixed. In the residential market, the response rate was very good, particularly for prescriptive rebate measures. While it was difficult to determine a direct correlation between advertising and participation, anecdotal evidence indicated that residential customers are more exposed to and more likely to respond to mass media advertising, such as direct mail and print advertising. For example, PPL Electric reported it experienced one of its highest months of calls for the Residential Audit and Weatherization program following a direct mail and print advertising campaign.

Community-based organizations implemented and promoted PPL Electric's low-income E-PowerWise program to their clients, and this program exceeded its goals. PPL Electric used both a spring mailing and newspaper advertising to promote its low-income weatherization program, WRAP. PPL Electric suggested that this strategy generated a significant increase in participation.

Large C&I customers also responded well to PPL Electric's programs; however, outreach to this sector was primarily accomplished by one-on-one communications from trade allies and KAMs. PPL Electric's communications group marketed to large C&I customers, and these efforts have been very supportive of the KAM's outreach efforts.

The small C&I and GNI sectors did not respond to traditional marketing and outreach in the same way as the other sectors. These customers were difficult to reach through a broad-based approach, suffered from information overload, and lacked a dedicated account manager to provide individual outreach. Around mid-PY2 PPL Electric shifted a large portion of its marketing budget from the residential to the C&I sector, since residential customer response needed management against over-subscription. C&I sector marketing tactics included more online digital advertising (which got a good response and was very cost-effective) and more specific program and normative messaging supported by case studies, direct mail, print, television, and e-mail campaigns.

During PY2, PPL Electric developed a knowledge platform. Using specialized software, the Company worked with its marketing CSP to develop a market segmentation approach that used external data sources to provide better business insights. This is an ongoing process, and PPL Electric will continue to add robust and refined business intelligence to its database to support the development of targeted messaging.

EPS transitioned into the PPL Electric programs team and built up the trade ally network. The communications group supported EPS with changes to existing marketing collateral and adoption of new materials. EPS and PPL Electric teams will track the success of various market outreach approaches and then replicate and expand the best tactics.

Near the end of PY2, EPS developed and launched a comprehensive marketing plan to reach small C&I customers, and the highlights of the marketing plan were these:

- Hiring a professional marketing team to manage and implement the marketing tactics in the plan.
- Focusing heavily on trade ally outreach.
- Targeting the top 1,000 customers in the small C&I sector for direct outreach (using techniques such as outbound telephone calls, direct mail, and face-to-face meetings).
- Implementing broad direct mail campaigns that offered free products and services to the first 100 customers who signed up for programs.
- Conducting a city-by-city blitz that used local events to roll out the direct discount program (direct install); this entailed engaging the city's mayor to speak about PPL Electric's programs and attracting local media coverage.
- Providing door-to-door outreach.
- Targeting specific market segments with events, seminars, chamber of commerce activities, speaking engagements and traditional education and outreach.

As noted in the PY1 process evaluation report, one challenge was managing marketing tasks and expediting decisions as the programs continued to evolve. Although adjustments were less frequent once programs were well-established—all changes, such as adjusting rebate levels—were major undertakings. The change process entailed having each change go through multiple reviews and approvals by different departments, so that by the time the change was approved for incorporation into marketing materials, there was a rush to meet deadlines. This contributed to the perception that marketing and communications were a bottleneck.

During PY2, PPL Electric worked to expedite reviews and approvals of communications, which helped the process but did not eliminate the issue. However, the change management procedure has helped clarify the review process.

PPL Electric launched a new external Website at the onset of PY3. The new Website was designed to: (1) Reflect Act 129 program changes for PY3; (2) offer easier navigation and search capabilities; and (3) provide more comprehensive program information for customers.

Trade Allies

By providing products and services to customers in support of the various programs, trade allies and other market actors played an important role in the implementation of PPL Electric's EE&C portfolio. Many of the Company's programs depended on trade allies and other market actors to engage customers, promote programs, evaluate projects, furnish and install energy-efficient equipment, and provide energy-efficiency services.

As of April 2011, PPL Electric had 1,339 HVAC contractors and 360 lighting contractors active in its programs. Throughout PY2, the Company made a concerted effort to identify and reach out to trade allies, provide program training, and coordinate with the trade allies' schedules. This was particularly important with trade allies who deal primarily with large C&I customers, as the trade allies' early program experience (especially with custom and commercial lighting projects) was challenging due to the difficulties that occurred in the first year of those programs.

In addition to a series of program and sector-specific trade ally Webinars, training sessions, and periodic newsletter updates, PPL Electric held six trade ally meetings in March 2011. These March meetings, which attracted more than 300 attendees, were designed to update trade allies and stakeholders on Act 129 program activities and provide an opportunity to ask questions.

Participation of trade allies improved markedly over the last year, and the trade allies' feedback on the programs was generally positive. However, some frustration remained, particularly among trade allies involved in commercial lighting projects. Specifically, they found the PA lighting form (TRM Appendix C spreadsheet) to be cumbersome, time consuming, inflexible, and confusing. They also said it changed too often.

Lighting trade allies indicated they would also like greater certainty around the availability of rebates before they start a project. They suggested a two-step application process, where they could reserve funds at the onset of a project to ensure that rebates were available at project completion. As a result, for PY3, PPL Electric implemented a two-step application process for commercial lighting projects, and this two-step process will be expanded to other project types requiring a significant cash outlay and typically involving a longer timeline. The purpose of this change is to give customers greater certainty of the availability of funds before the customers begin a large capital improvement project.

During PY2, EPS offered Webinars and seminars for trade allies, which had a relatively high response rate. EPS helped trade allies complete the program applications and provided guidance and technical support. PPL Electric staff reported that EPS made helpful suggestions to align program protocols better with customer preferences. EPS will continue to increase these outreach efforts to trade allies during PY3.

EPS indicated that 30 new contractors agreed to participate in PPL Electric's direct discount service, a new delivery channel under the Efficient Equipment Incentive program. These contractors completed an application process, a reference check, and software training. They also met the insurance requirement for participating in the program.

EPS stated that initial feedback from these trade allies was mixed. While many trade allies commented that, compared to other utility programs, PPL Electric's EE&C programs are very good and offer larger incentives, several trade allies commented that the requirements and processes for documenting *ex ante* savings are onerous. EPS also reported that some trade allies were also unhappy with PPL Electric's plan to implement a waiting list for large C&I projects.

Market Response

Generally, the market response among residential and large C&I customers was very good, with greater-than-anticipated participation and overall positive customer response achieved in PY2. PPL Electric conducted advertisement tracking studies to determine customers' awareness of its programs and, in general, this effort was ahead of or on target with the Company's awareness goals. Advertising helped both the residential and commercial sectors increase program awareness and participation.

Residential Sector

In the residential sector, a combination of mass media advertising and in-store point-of-purchase (POP) advertising generated good results, with CFLs and refrigerator rebates getting the best results. The residential sector appeared to be influenced more by traditional media, and consumers responded better to "convenience" messages than to "environmental" messages, especially for appliance recycling.

Large C&I Sector

The large C&I customers led participation in the commercial sector. Lighting projects dominated project applications, followed by air source heat pumps (ASHPs). Some television commercials peaked interest among C&I sector customers, but the most effective marketing approach for this sector was word of mouth/direct outreach by trade allies, KAMs, and BASs.

While customers in the large C&I sector clearly took advantage of the significant savings opportunities and incentives available through PPL Electric programs, these customers had a much more rigorous level of data collection requirements, scrutiny, and verification protocols than customers in other sectors. The market response in the large C&I sector reflected the burden of these requirements, with both customers and trade allies expressing frustration with the complicated application processes, data requirements, and M&V requirements. Implementing a project through the Custom Incentive program or a commercial lighting project, for example, required collecting a significant amount of information from customers and, in many cases, customers did not have the information required to complete the necessary documentation.

Some customers also viewed site visit requirements for M&V as inconvenient and complicated. Scheduling and conducting site visits required involvement from multiple parties, which caused a bottleneck in the process and some frustration among some customers.

PPL Electric put a number of processes into place to address these customer concerns.

Small C&I Sector

The small C&I and GNI sectors were much more difficult to penetrate than the large C&I sector. Several factors appeared to contribute to the slower-than- anticipated uptake by the small C&I and GNI sectors.

- Small C&I customers did not have dedicated account representatives.
- These customers were hard hit by a turbulent and/or stagnant economy.
- Many small businesses suffered from major financial and staffing constraints.
- Small C&I customers lacked discretionary cash for capital improvements.
- Customers prioritized growing their core businesses and did not focus on energy-efficiency upgrades to their facilities.
- These customers did not respond to traditional media and were difficult to identify and reach.
- Many small C&I customers occupied rental space, so the split incentive barrier was common. Often, these customers do not own or control decisions regarding their

building, HVAC, or lighting systems. In some cases, these customers do not pay the electric bill for their space; it is paid by the landlord and embedded in the rent, an O&M charge, or a common-area charge.

- It is difficult to reach the specific person responsible for energy efficiency decisions.
- It is difficult and costly to get market research information, market potential, and market segmentation data for this diverse customer sector.

Despite these barriers, however, a new marketing plan coordinated between PPL Electric and EPS yielded early results. For example, efforts to market the Efficient Equipment program's new direct discount delivery mechanism to contractors had already attracted 30 contractors to the program by the end of PY2. In addition, EPS' outbound calls to customers were getting results.

Market response in the small C&I sector focused heavily on lighting projects. Near the end of PY2, PPL Electric announced a new two-step reservation and rebate process for lighting projects, which, coupled with lower incentives, would launch in PY3. This announcement resulted in a large volume of lighting project applications.

Despite these improvements, it likely will not be possible to achieve the small C&I savings forecasted in the EE&C Plan. The planning estimates for both the large and small C&I sectors were based on the 2008 distribution of energy load among commercial segments. When the EE&C Plan was developed, PPL Electric anticipated there would be some flexibility to adjust its plan quickly in response to changing market conditions and to differences between planning assumptions and actual performance. However, the process for identifying and approving changes takes much longer and is much more formal than PPL Electric expected. In addition, while some stakeholders (particularly those representing customer sectors) are receptive to changes, other stakeholders are not.

It is generally acknowledged that the small C&I and GNI sectors are difficult to reach and have been hard hit by the economic downturn. Also, the EE&C Plan appears to have significantly overestimated the percentage of total portfolio savings possible from the small C&I customer sector, regardless of the factors listed above. Using the percentage of total energy consumption for that sector was likely not the ideal way to estimate that sector's participation in energy-efficiency programs, regardless of the economy.

To meet its overall compliance target for May 2013, PPL Electric must likely shift some of its energy savings goals from the small C&I sector to other sectors (such as large C&I and residential). As of October 2011, reported energy savings for the small C&I sector was 155,722 MWh/yr and the total portfolio savings (all sectors) was 732,987 MWh/yr.

The EE&C Plan projected 602,782 MWh/yr savings from the small C&I sector and 1,367,000 MWh/yr savings for the entire portfolio at the conclusion of the programs in 2013. Therefore, PPL Electric would need 447,000 MWh/yr savings from the small C&I sector over the remaining 19 months to achieve the projections in the EE&C Plan for this sector. That is equivalent to having approximately 25,000 participants—a 33 percent approximate penetration rate of the small C&I sector, excluding unoccupied accounts (such as cable TV amplifiers, security cameras, cell phone towers, and pedestrian crossing signs). This would also be 71 percent of the

total remaining portfolio savings. However, achieving this participation rate is likely not possible, especially since PPL Electric obtained only 155,722 MWh/yr (8,000 participants and 21 percent of portfolio savings) from this sector during the first 22 months.

PPL Electric should continue to support the C&I CSP's efforts to increase participation among its small C&I and GNI customers, carefully monitor progress, and implement creative solutions to reach its targets. This should include, for example, the following: (1) Continuing planned outreach to the ESCOs and trade allies serving these sectors; (2) identifying a list of custom energy-efficiency measures appropriate for small C&I facilities; and (3) aggressively pursuing its Direct Discount delivery mechanism. PPL Electric should also continue its market segmentation analysis and then leverage this work to target the potential customer segments that are most likely to benefit from PPL Electric's programs.

Customer Response

Cadmus completed telephone surveys with participants in each EE&C program to: (1) Verify measure installation; (2) collect information regarding satisfaction and the participant's experience with the program; and (3) collect data to determine freeridership and spillover. (Cadmus' survey sampling and methodology are described in more detail in Appendix A of this report and in the Impact Evaluation report, Appendix L.)

Survey findings are included in the program-specific sections in Chapter 4 of this report, and the portfolio-level findings are summarized here by sector for five key areas:

- Awareness
- Reasons for participation
- Rebate processing time
- Overall program satisfaction
- Satisfaction with PPL Electric

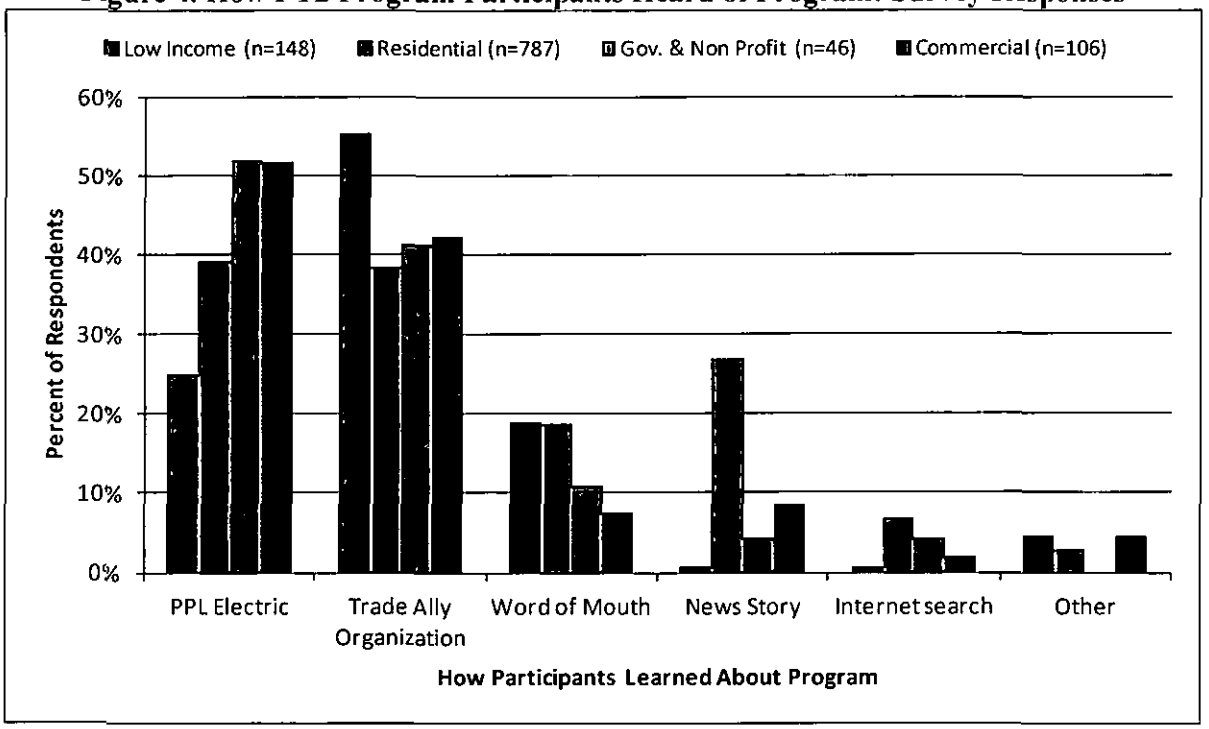
Cadmus' analysis used multiple participant surveys to inform the portfolio-level survey results. As such, the number of total respondents varies by sector.

Awareness

Across sectors, most survey respondents reported learning about the program in which they participated directly from PPL Electric through bill inserts, newsletters, the E-Power Website, an advertisement (TV/radio/newspaper), or a PPL Electric employee or customer service representative. Other successful marketing channels included trade ally organizations or, to a lesser extent, events and word-of-mouth. A large portion of residential customers heard about the program through earned media such as TV, radio, and/or newspaper stories.

Figure 4 shows how survey respondents heard about the programs in which they participated: *Efficient Equipment, Appliance Recycling, Low Income E-PowerWise, and the Audit and* Weatherization programs.

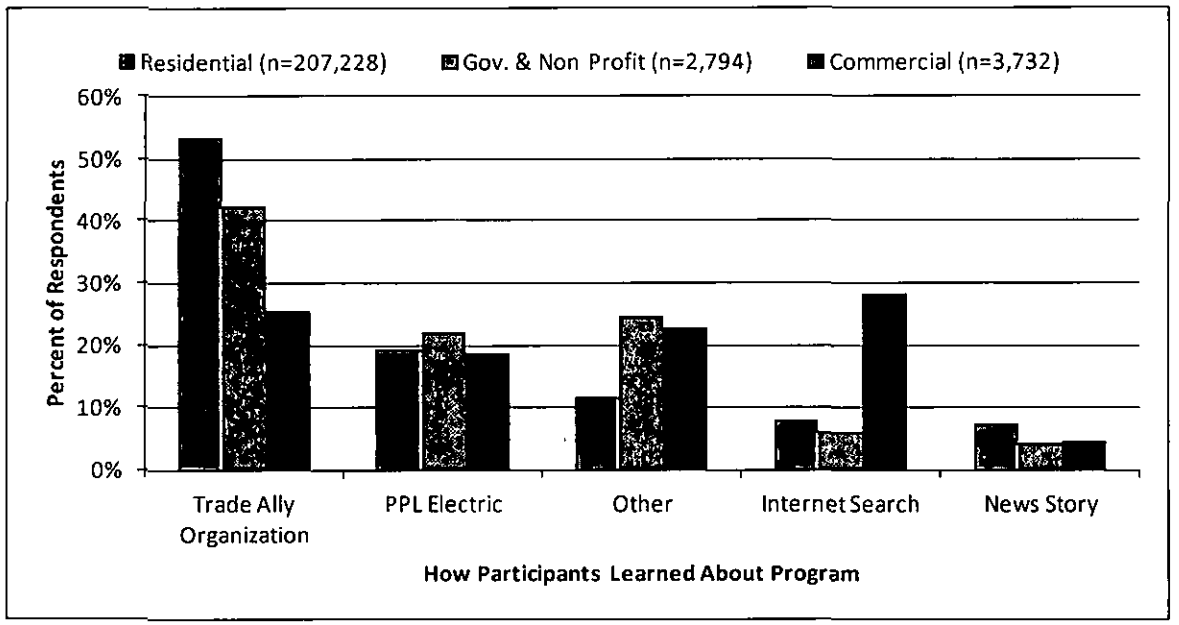
Figure 4. How PY2 Program Participants Heard of Program: Survey Responses



The rebate forms for the Efficient Equipment and the Assessment and Weatherization programs asked how customers learned of the program, and the responses to this question are shown in *Figure 5. In summary:*

- From the rebate entries, half of the respondents (53 percent) reported they heard about the program from trade allies, including, for example, in-store displays, contractors, and community agencies. (By contrast, 32 percent of survey respondents heard about the program through trade allies.)
- In addition, 19 percent of rebate form respondents (versus 31 percent of survey respondents) reported hearing about the programs through PPL Electric (e.g., bill inserts).
- 4 percent of survey respondents heard about the programs via Internet searchesversus 8 *percent of rebate form respondents.*

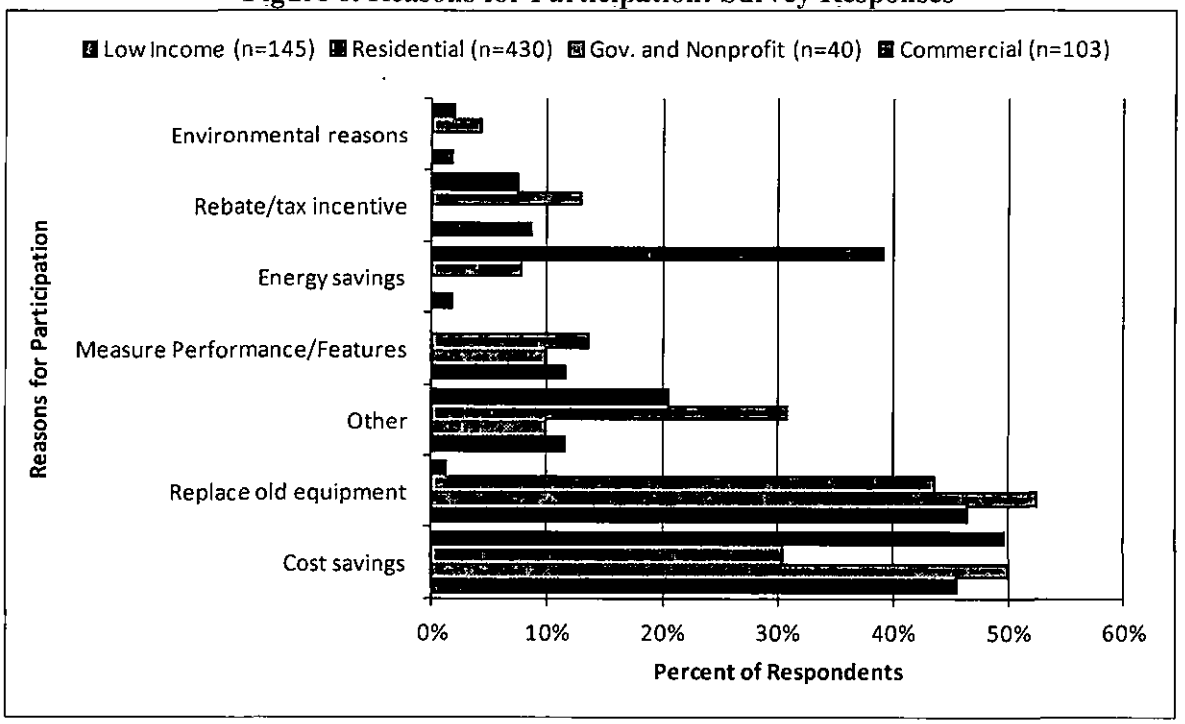
Figure 5. Rebate Form Results of How PY2 Program Participants Learned of Efficient Equipment and Assessment and Weatherization Programs



Reasons for Participation

Across sectors, 46 percent of respondents said they participated because of the savings anticipated from reduced energy bills and reduced operational and maintenance costs. Additionally, 35 percent of all survey respondents participated because they wanted to replace old, damaged, or outdated equipment. **Error! Reference source not found.** Figure 6 shows reported reasons for participation across all surveyed participants.

Figure 6. Reasons for Participation: Survey Responses[5]



Rebate Processing Time

In the PY1 process evaluation, rebate processing time was slower than expected and identified as an early challenge. During the first program year and into the second, PPL Electric worked with its administrative CSP to improve internal and external processes and shorten rebate processing time. PPL Electric's goal was to achieve an application-to-rebate-turn-around-time of four weeks or less.[6] The actual rebate processing during PY2 was 24 business days for C&I and 21 business days for residential rebates.

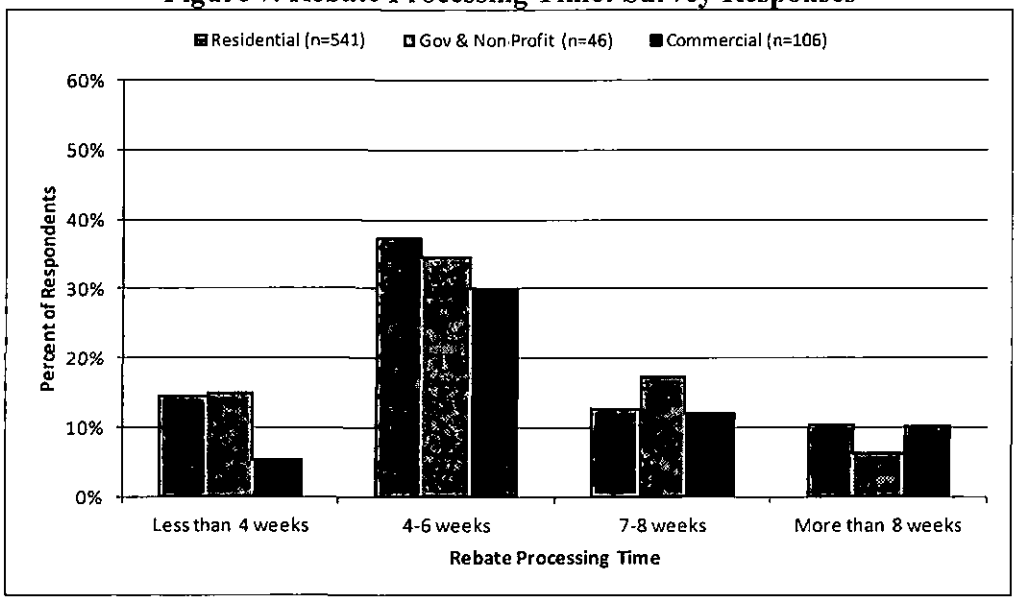
Most respondents to surveys conducted for the Efficient Equipment, Renewables, Assessment and Weatherization, and Appliance Recycling programs, recalled that it took from four to six weeks to receive their rebate check; however, a large portion reported that it took from seven to

[5] For the Low Income sector, responses categorized in Figure 6 as "Rebate/Tax Incentive" represent a 100 percent incentive since the program is free to participants.

[6] Custom program rebates are not processed by the administrative CSP, are more complicated, and may take longer.

eight weeks or longer. A higher portion of non-residential respondents reported it took from seven to eight weeks to receive their rebate. Figure 7 shows the reported rebate processing times among program participants.

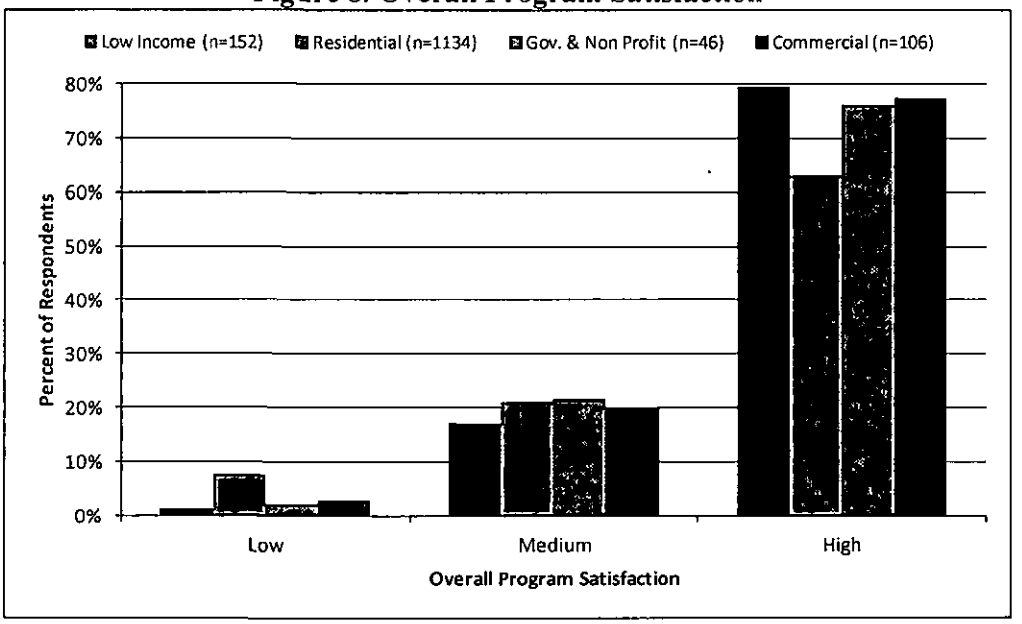
Figure 7. Rebate Processing Time: Survey Responses



Overall Program Satisfaction

As shown in Figure 8, survey respondents were very satisfied with PPL Electric programs overall; very few survey respondents gave low satisfaction ratings.

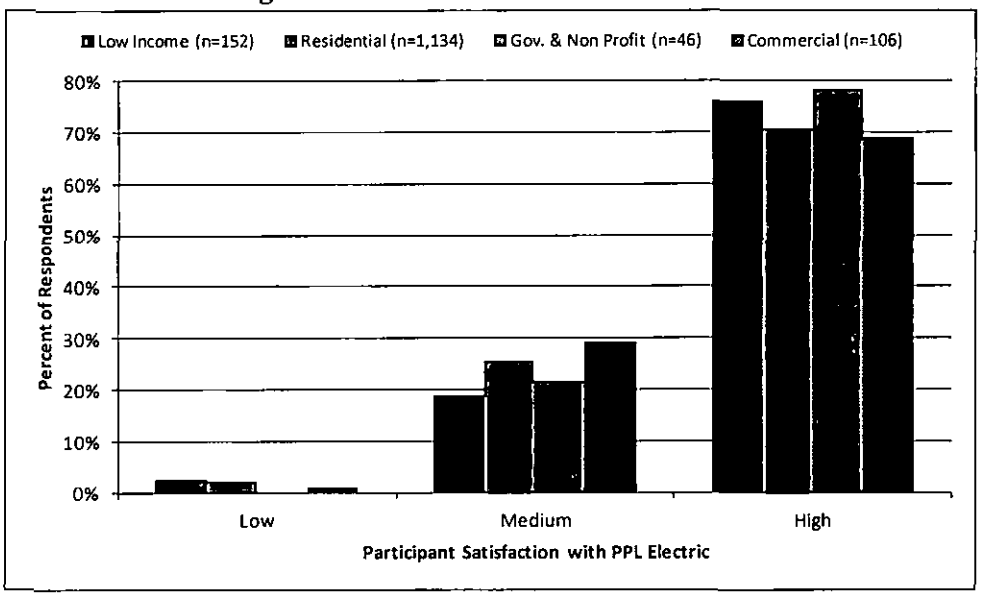
Figure 8. Overall Program Satisfaction



Satisfaction with PPL Electric

As shown in Figure 9, survey respondents were very satisfied with PPL Electric. The majority of program respondents from each sector gave PPL Electric high satisfaction ratings.

Figure 9. Satisfaction with PPL Electric

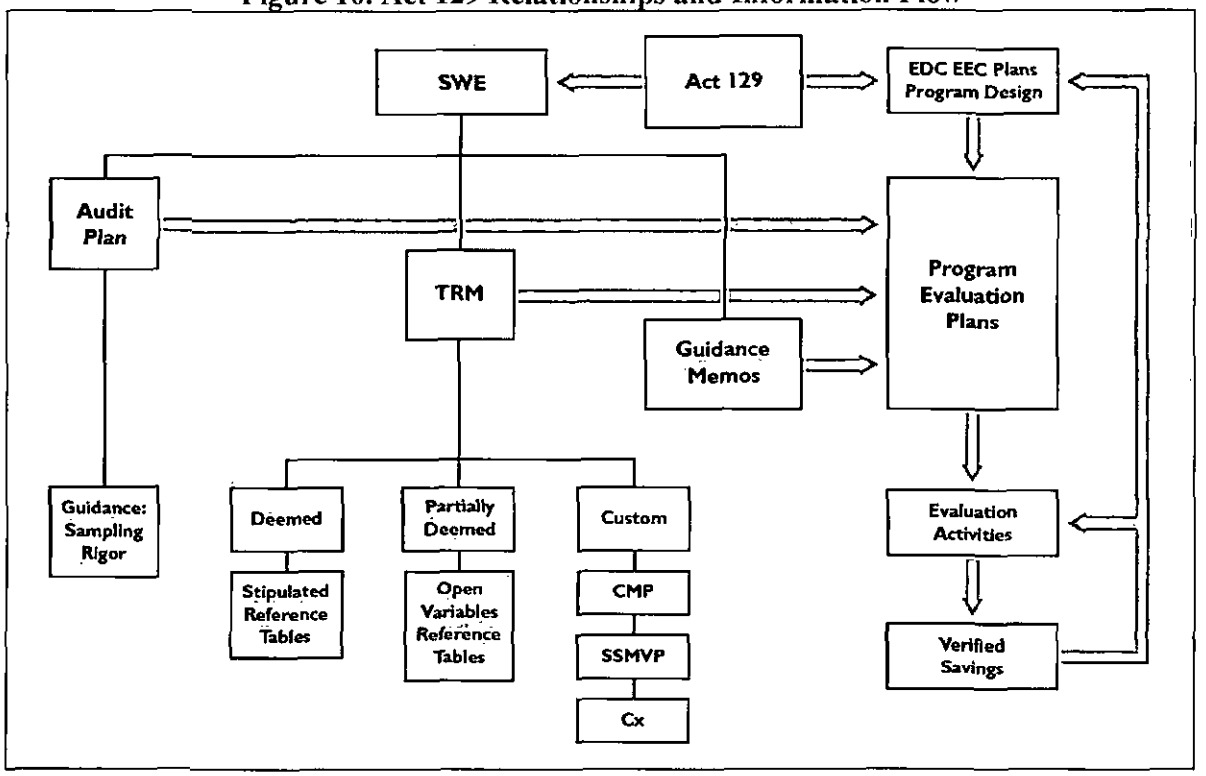


External Processes

The Pennsylvania Public Utilities Commission (Commission) oversees a Statewide Evaluator (SWE), who is charged with evaluating the utilities' energy-efficiency and conservation programs. Each electric distribution company (EDC) contracted with an independent evaluator.

Figure 10 shows the relationships and flow of information from the SWE into regulatory documents (such as the Audit Plan, the TRM, and guidance memos). In addition to the documents discussed in this chapter and shown below, the Commission's Secretarial Letters and Orders provided directives to the EDCs. These documents determined the form and content of the EDC's program design, evaluation plans, evaluation activities, and verified savings.

Figure 10. Act 129 Relationships and Information Flow



Statewide Evaluation Team (SWE)

The SWE team is an advisory group to the Commission, which retained the SWE team to audit the evaluation activities and program savings of the seven Pennsylvania EDC's EE&C Plans approved in accordance with Act 129.

The PPL Electric and Cadmus EM&V team participated in many discussions and meetings with the SWE, the Commission, and the Technical Working Group (TWG). The EM&V teams were committed to conducting evaluations meaningful to PPL Electric and in accordance with all of the overarching requirements. The EM&V teams worked with the SWE and resolved some of these issues, reduced some bottlenecks, and streamlined processes. For example, significant improvements were made to the custom measure protocol process.

The SWE submitted quarterly data requests to PPL Electric. The requested data were required to: (1) Accompany EEMIS extracts that reported participation and *ex ante* savings; and (2) be

packaged by sector in addition to the extracts by the individual programs. The SWE also required verification samples and supporting documentation.

Technical Reference Manual (TRM)

The TRM developed for Act 129 provided savings calculation methods to determine annual energy savings for energy-efficiency technologies and measures. The savings calculation method specified in the TRM influenced program design details such as: measure eligibility requirements, rebate application forms, the amount and type of information obtained from both the customers and the tracking systems.

The initial 2009 TRM was derived from the New Jersey TRM and compiled by the Commission. This initial TRM was in effect during the program and portfolio planning phase. However, because of limited time between the Act 129 legislation and the date that energy-efficiency plans were due, this first version of the TRM was incomplete to a significant degree. Subsequent versions added some measures and changed some measures. Most revisions and additions were discussed and/or developed within the TWG, which included EDCs, EM&V evaluators, PUC staff, and the statewide evaluator. Some of the TRM changes were significant, resulting in decreased savings and increased complexity in program design and implementation.

While the verification process was simplified by standardizing how savings were calculated and reported, this change also created a number of challenges. Sometimes, it was difficult to obtain accurate information from customers, and this information was needed by the utility and evaluator to determine *ex ante* savings in accordance with the TRM.

This was particularly problematic for measures with open variable algorithms in the TRM. For example, computing savings for commercial lighting projects required detailed information about pre- and post-installation conditions for lighting retrofits (such as ballast type, lamp type, wattage, building and space type, and lighting controls). Because customers were often unfamiliar with both the technical details (such as what SEER and capacity means for air conditioning equipment) and basic information (such as what type of equipment was installed), collecting the required data was difficult. In addition, coordinating five EDCs and independent evaluators, the PUC, and the SWE to reach agreement in a timely manner was a challenge, especially given time constraints and reporting deadlines.

In PY2, the 2010 TRM guided Act 129 EDCs in their EM&V approaches to determine *ex ante* and *ex post* savings. Where savings were fully deemed, PPL Electric incorporated the savings into its plans,,expecting to capture these deemed savings once the number of installations was verified. Where savings are determined from algorithms, PPL Electric designed rebate forms to capture the data needed as inputs.

The TRM contained both companion Excel workbooks for lighting and motors measures and tables that stipulated the effective full load hours (EFLH). The TRM's savings algorithms, workbooks, and associated tables directed the evaluation methods and, collectively, these materials were the primary driving force behind the approaches to EM&V and program planning efforts.

In November 2010, the PUC released the 2011 TRM Annual Update, which contained additional measures, edits, clarifications, and improved functionality. The update also specified new interim TRM measures approved for inclusion by the SWE since the release of the 2010 TRM. (Appendix C has a summary of these additional measures.)

To develop the new measure protocols and updates in the 2011 TRM Annual Update, PPL Electric and Cadmus participated in residential and commercial Technical Working Groups (TWGs) that included representatives from all EDCs and the SWE team. The TWGs identified and prioritized measures for inclusion in the 2011 TRM update, and members researched and reviewed measures collectively, although one EDC usually took the lead developing the protocol for a given measure. The TWGs met routinely throughout PY2.

As requested by the Commission, PPL Electric reviewed the proposed 2011 TRM and provided edits and comments during the public comment period. The Commission approved the annual TRM update in March 2011. Additionally, PPL Electric submitted to the SWE a list of proposed TRM measure additions and accompanying savings algorithms for the 2012 TRM. The list contained measures that PPL Electric offered through its EE&C programs but not included in the 2011 TRM.

Custom Measure Protocols

The 2009 Audit Plan specified that any measures not included in the TRM and any projects that included such measures were only eligible for PPL Electric incentives if a custom measure protocol (CMP) was developed to stipulate the *ex ante* and *ex post* savings calculation methodologies. This specification extended to the methods for determining *ex ante* and *ex post* savings for any measure not included in the TRM.

The EDCs and their EM&V CSPs developed CMPs to guide the EM&V process for custom measures through the first half of PY2. For PPL Electric, these custom measures included, for example, motors, compressed air measures, HVAC tune-up services, and savings related to behavioral changes resulting from a low-income education program.

CMPs were submitted to the SWE for review and approval—a process that often entailed having lengthy discussion between EDCs and the SWE team and preparing multiple iterations of the draft CMP. However, unless the savings methodology was approved by SWE, no savings could be claimed.

PPL Electric did not want to rebate measures for which savings were at risk. The lengthy process and uncertainty about SWE's approval stalled some projects and measure installation and caused customer frustration. This process also diverted resources from both PPL Electric and Cadmus, as various EM&V staff participated in numerous meetings, drafted CMPs, and changed evaluation methods and practices to conform to the SWE's directives.

After many discussions with the EDCs, the TWGs, the evaluation teams, and the SWE, the Commission determined that CMPs would no longer be needed and terminated development of new CMPs in Q3 PY2. Going forward, the implementation contractor or customer could determine the *ex ante* savings estimate, which would then be then verified by Cadmus (the

EM&V CSP). This significantly simplified and expedited the approval of custom projects, since Cadmus and the implementation CSPs could use any CMP already approved.

The process evaluation section for the Custom Incentive program (Chapter 4 of this report) contains a more detailed description of the M&V process and protocols used for custom projects.

Guidance Memos

The SWE released a number of guidance memos regarding evaluation methods and issues. The guidance memos were developed with input from the EDCs and their EM&V CSPs. Each memo brought the EDCs together to use common methods for reporting and verification. The memos describe the following:

- Treatment of LED Lighting
- Custom Measure Process Memo
- Sampling Resolutions Memo
- Calculating Coincident Demand for Non-Weather Dependent Measures
- Reporting Timing Issues
- Interim TRM Measures Approval Process
- Reporting Savings for Measures Without Approved Protocol

Audit Plan

The 2010 Audit Plan provided general guidance about evaluation methods and approaches. As programs evolved across the EDCs, the SWE strove to provide additional guidance so that the disparate EDCs approached the evaluation and verification processes with a common set of assumptions and rules.

The SWE updated the Audit Plan in November 2011, incorporating comments provided by the EDCs and their independent evaluators over the previous six months. The Audit Plan contains guidance and the SWE's expectations for EDC evaluation. It also contains measurement and verification protocols and plans and a discussion of potential audit activities that the SWE Team would conduct. Specifically, the Audit Plan addressed the following:[7]

- Audit activities to be undertaken by the SWE Team;
- Review of EDC EE&C program plans and impact evaluation expectations;
- Plans for developing and implementing annual updates to the TRM;
- The role of the TWG to update and clarify the TRM;
- EDC gross energy and demand impact evaluations with EM&V plan guidelines based on specified savings and sampling protocols;
- EDC process evaluations with guidelines for creating and conducting surveys;
- Review of EDCs' cost-effectiveness evaluations with guidelines for following the Total Resource Cost (TRC) Test described in the Commission's TRC Order of June 2009;

[7] Statewide Evaluation Team, Audit Plan, revised November 4, 2011. Page ix.

- Data tracking and reporting guidelines; and
- Deadlines for evaluation activities, audit activities, and reporting.

Technical Working Groups and Coordination with Other EDCs

For discussions of issues common to all EDCs implementing Act 129 programs, PPL Electric participated with other EDCs in bi-weekly calls moderated by the Energy Association of Pennsylvania (EAP). PPL Electric also met with other EDCs on an *ad hoc* basis to: (1) share best practices and lessons learned; (2) identify ways to increase consistency in program design and implementation approaches; and (3) discuss statewide requirements, barriers, and potential solutions to keep the EDC's EE&C programs on track. These meetings were very productive.

PPL Electric participated in a number of working groups: Demand Response, Low Income, residential and commercial TRM protocols, and the TWGs. The working groups had numerous meetings in which they resolved issues pertinent to each group. The TWG addressed the most diverse set of topics such as baseline and market potential, net-to-gross, TRC, and the Audit Plan. All of these issues and decisions ultimately affected the programs in numerous ways, from savings verification requirements and methods to data collection needs, rebate form changes, EEMIS structure, marketing, EM&V, and recruiting and educating trade allies and customers.

Stakeholder Meetings

During PY2, PPL Electric held two meetings with stakeholder groups (including statutory parties and advocates for each customer sector). Attendees completed a survey and commented on various aspects of the meeting and of the information in general. Survey results indicated that the majority felt the meeting met or exceeded their expectations, and they commented on these elements:

- Information on topics important to trade allies.
- The appropriate level of detail in the information shared by PPL Electric.
- Information that is useful to trade allies.
- Information that is timely.
- A forum to have input from trade allies heard.
- Enough time to cover all key areas of concern to trade allies.

3. Portfolio-Level Process Evaluation Findings, Conclusions, and Recommendations

Portfolio-Level Findings

By and large, the process evaluation found that PPL Electric developed a good delivery infrastructure supported by appropriately allocated internal and external resources. Internal processes were designed so they could be integrated across programs and delivery functions to best facilitate program implementation. PPL Electric's contracts with external partners (CSPs) were tailored to ensure appropriate accountability and effective program delivery. Overall, the Company's CSPs performed well.

PPL Electric is well positioned to meet its September 2012 and May 2013 compliance targets, although it is likely not possible to achieve the compliance targets within the customer sector proportions (savings and costs) estimated in the EE&C Plan. Because projected reductions are very close to the compliance target, with almost no margin for uncertainty, PPL Electric should revise its EE&C Plan to reduce projected savings from the small C&I sector and increase projected savings from residential and/or large C&I sectors in order to meet the 3 percent energy reduction compliance target.

Sector-level results are mixed. The following list summarizes key findings from PPL Electric's PY2 process evaluation.

- Results for the residential sector are ahead of plan:
  - The Efficient Equipment Program's prescriptive rebates, the CFL Campaign, and Renewable Energy programs did particularly well.
  - The photovoltaic (PV) (in all sectors) and residential ground source heat pump (GSHP) measures met their participation targets and expenditure allocation, so that PPL Electric eliminated incentives for those measures.
  - The Energy Assessment and Weatherization program (launched this year) and the Appliance Recycling program were slightly behind targets.
  - Results for the low-income sector (E-PowerWise and WRAP) are on target.
- Results for the large commercial and industrial sector are ahead of target and the Efficient Equipment Program and Custom Program for this sector is fully subscribed (included committed projects with a reservation).
- Results for the institutional (government, schools, and non-profit) sector are on target; however, much more effort than expected has been required to penetrate this sector. In mid-PY2, the government, nonprofit, and institutional (GNI) sector was behind target. Still, participation ramped up and achieved its target at the end of the program year. Programs contributing to these sectors are the Efficient Equipment Incentive program, the Custom Incentive program, and the Renewable Energy program (GNI sector).
  - The small C&I sector is significantly behind, and it will not likely achieve the savings target estimated in the EE&C Plan. Programs contributing to this sector included the

Efficient Equipment Incentive program, Custom Incentive program, and HVAC Tune-up.

Overall, program implementation is going well. PPL Electric developed a good infrastructure supported by appropriately allocated internal and external resources. PPL Electric management consistently proved its ability to identify problems and constraints quickly and move rapidly to execute solutions. PPL Electric's management and staff are very committed to the success of the EE&C programs.

PPL Electric has adequate systems, processes, and business controls in place to manage, document, and track program activities. The Company's approach to managing its internal and external processes is effective.

PPL Electric's contracts with external partners (CSPs) are tailored to ensure appropriate accountability and effective program delivery. The Company has adequate collaboration and management of its CSPs, who, overall perform well.

Customers are generally satisfied with the programs and rebate processing time is typically under four weeks for common prescriptive measures. This is consistent with best practices.

The significant challenges encountered in PY2 are these:

- To comply with the TRM, Audit Plan, and other requirements, program design, data requirements, rebate forms, QA/QC, and EM&V have become more complex than PPL Electric, CSPs, Trade Allies, and customers expected. Customers were frustrated with the complex paperwork/spreadsheets, documentation requirements, and the requirement for site visits to verify C&I lighting and custom projects. Non-residential lighting equipment has an especially complicated set of measures, procedures, and worksheets that require participants to provide detailed, measure-specific information about the original equipment and the new equipment. This is also the case for customers installing new motors and HVAC equipment. The complexity of the program—and, particularly, the application process—appears to be a barrier for some customers.
- The small C&I and GNI sectors were more difficult to penetrate than expected. In addition, PPL Electric realized that the planning assumptions for small C&I savings were significantly overestimated.
- Complicated Custom Incentive program requirements frustrated customers and were difficult to manage and administer.
- Uncertainty around post-2013 EE&C requirements influenced PPL Electric's short-term decisions (such as exceeding savings targets without jeopardizing future compliance targets) and made long-term program planning difficult.
- Changes to the TRM and EM&V requirements caused customer confusion and required changes to program implementation requirements (rebate forms, tracking systems, measure eligibility, customer communication, quality assurance/quality control (QA/QC), evaluation plans, etc.). These changes also made it difficult to forecast costs and savings.

To address these issues, PPL Electric implemented, or is considering implementing, these corrections:

- Modifying the EE&C Plan to forecast savings and costs more accurately among customer sectors and to reflect common costs, such as EM&V and tracking systems, more accurately.
- Adding a commercial implementation CSP to bolster small C&I and GNI participation and provide direct technical support to C&I customers and trade allies. The C&I CSP helps customers and trade allies complete the spreadsheet and application or to complete those documents for them. PPL Electric and the C&I CSP conducted numerous webinars and seminars to help trade allies better understand the requirements for lighting
- Adding a direct installation delivery channel for lighting measures offered to small commercial customers through the Efficient Equipment program.
- Implementing a two-step (reservation and rebate) process for commercial lighting projects through the Efficient Equipment program.
- Adjusting measure eligibility requirements and rebates so as to manage the Act 129 programs more effectively against goals and to align rebates better with savings.

Portfolio-Level Conclusions and Recommendations

The Rapid Rollout Created Challenges, But It Ultimately Paid Off

From the outset, PPL Electric adopted an aggressive approach to program implementation. To meet the Act's significant targets within the three-year compliance period, PPL Electric developed and launched 10 of its new programs as quickly as possible, which resulted in some start- up challenges. However, despite the early challenges, PPL Electric's rapid rollout proved to be a good strategy. Not only did it give the Company a full year of operations experience with most programs, it allowed PPL Electric to implement outreach activities immediately and to accumulate early savings toward its targets. PPL Electric achieved its 1 percent 2011 targets, and it is well positioned to meet its 3 percent 2013 targets and set asides for the institutional and low-income sectors.

Going forward, PPL Electric will revisit the participation and savings targets for PY3 and beyond, aligning program activities with market conditions and anticipated impacts associated with future changes to the TRM.

Solidify Important Regulatory Details and Rules

PY2 can be characterized as a swiftly moving balancing act to manage regulatory requirements, maintain customer satisfaction, and meet targets. PPL Electric's management has repeatedly proven its ability to identify problems and constraints quickly and move rapidly to execute a solution. While many PPL Electric staff members experienced challenges, they also noted that most of the early planning and implementation hurdles had been addressed and resolved.

While working to meet targets for the two compliance years, 2011 and 2013, an overarching uncertainty about post Act 129 constrained decision-making about activities to meet these targets

and to plan for the future. Uncertainty about post-2013 EE&C requirements also influences PPL Electric's short-term and long-term decisions about issues such as:

- Should PPL Electric exceed savings targets in the current planning cycle (2009-2013) or will that jeopardize future compliance?
- What is the optimal approach to managing staffing levels, development, and retention?
- Should PPL Electric invest in longer-term improvements to systems and processes?
- What can be done to address the customers' lack of urgency in the current planning cycle? (This is reflected in the attitude, *"The money will always be available, so why act now?"*)
- Should programs be extended during the current planning cycle to avoid or shorten the periods without programs?
- What is the optimal approach to operational planning, such as load and revenue forecasting?
- Should new technologies be introduced now (such as LEDs) in preparation for the post-2013 programs?

PPL Electric indicated it is working closely with the Commission, SWE, and other EDCs to establish post-2013 targets and rules as early as possible. The Company's leadership thinks it is critical to know the post-2013 targets and rules by mid-2012 to provide sufficient lead time to develop, approve, and launch programs on June 1, 2013, immediately after the current program cycle ends. Otherwise, programs will "go dark," which will make restarting such programs much more costly and challenging.

The changes to the TRM that reduced savings also created uncertainty about future savings. This led to concerns that: (1) there would not be enough time remaining in the EE&C cycle to make up for any shortfall; and (2) yearly TRM changes will continue post-2013, which will increase the uncertainty in future EE&C Plans.

Consistent, Inclusive Communications are Important

Maintaining consistent, productive communications—specifically regarding customer communications and education—presented an ongoing challenge for the internal management team, program staffs, and functional support teams. During PY2, EE&C staff made a great deal of progress toward developing protocols and tools to support internal communications within and among groups. However, the vast amount of information exchanged, individuals involved in decisions, and necessary collaboration between and among groups contributed significantly to the communication challenges. *Ad hoc* emails, telephone communications, and staff meetings seemed insufficient to support structured decision-making, particularly when multiple parties expected to review and approve decisions. Also, the information overload meant staff could only deal with the most urgent priorities. However, as more effective communications developed, a greater sense of collaboration among the program and functional support teams also grew, which helped processes flow more smoothly.

Recognizing the communication challenges resulting from program changes, PPL Electric's management team identified the need for a change management procedure. Thus, during PY2, the Company developed and implemented a formal change management procedure, which described the process for requesting, reviewing, approving, communicating, documenting, and implementing changes. This process was applied to requested changes in the design and/or implementation of PPL Electric's Act 129 EE&C Plan, programs, systems, processes, documentation, EEMIS database, and customer communications. It entailed determining how a change might impact the various aspects of the program, including rebates, measure eligibility, savings, tracking systems, marketing and customer communications, stakeholder review, Commission approval, EM&V, budgets, and other factors.

Changes required formal approval from each relevant member of the Customer Programs and Services management team, including managers of: (1) energy efficiency evaluation and performance, (2) customer programs, (3) major accounts, (4) customer communications and education, (5) marketing research, (6) implementation and development, (7) customer programs and services, and (8) others, depending on the nature of the change (legal, regulatory strategy, the vice president of customer services, rates, etc.). The change management process greatly improved internal communication business controls.

Going forward, PPL Electric's Act 129 team should continue using the communications and documentation tools, refining them to meet needs. Keeping all teams well informed of processes and changes is critical. Checking in with each department to identify what has worked well, remaining challenges, and additional communications needs will enable PPL Electric to refine its procedures.

Make It Easier to Participate

To comply with the TRM, Audit Plan, and other requirements, the program design, data requirements, rebate forms, QA/QC, and EM&V have become more complex than was expected by PPL Electric, CSPs, trade allies, and customers. The complexity of the program, and particularly the application process, appears to be a barrier for some customers.

Some of the difficulty encountered by participants, trade allies, and PPL Electric are illustrated in these examples:

- Customers were frustrated with the complex paperwork/spreadsheets, documentation requirements, and the requirement for site visits to verify C&I lighting and custom projects.
- Non-residential lighting equipment has an especially complicated set of measures, procedures, and worksheets that require participants to provide detailed, measure-specific information about the original equipment and the new equipment. This is also the case for customers installing new motors and HVAC equipment.
- In the custom program, the participation process may span multiple months from initial application to rebate check payment. Turn-around time can be an issue when customers are not anticipating a long and complicated process.
- Non-residential lighting equipment has an especially complicated set of measures, procedures, and worksheets that require participants to provide detailed, measure-specific

information about the original equipment and the new equipment. The same is true for customers installing new motors and HVAC equipment. The complexity of the program, and particularly of the application process, appears to be a barrier for some customers.

- In the low-income sector, multifamily housing seems to change ownership frequently. The long process to acquire approval of the owner—followed by acquiring the approval of individual tenants—becomes even longer when the building changes ownership. The approval process must begin again, which is a loss of valuable time.
- In the residential assessment and weatherization program, field technicians who were required to use specialty software developed a work-around, because entering data at the time of the audit wasn't practical, and the tool did not offer desired flexibility.
- In a small commercial program where specialty software is used to diagnose rooftop units, contractors encountered a sharp learning curve for understanding how to use the tool and input data. Contractors also encountered technical difficulties in downloading and saving data.
- In a low-income program, energy education—which is often provided in a group setting—is the primary measure offered. Community agencies providing the training reported that many of their clients prefer one-on-one education at the agency office or in the client's homes. Limiting the program to only one means of providing education (whether a group setting or an individual meeting) could result in limited participation.

PPL Electric has identified a number of solutions to these issues in efforts to make it easier to participate. The Company should continue to work toward implementing procedures to simplify participation for customers and trade allies. Some of the procedures under discussion or in development are these:

- Making it clear to customers with complex or long-term projects that from initial application to rebate check payment, the process may span a number of months. Participants will be less likely to be dissatisfied about the turn-around time if they enter the program with the knowledge that the process is not instantaneous.
- Developing an online dashboard in the Custom program to allow customers to see the progress of their projects.
- Creating a two-step application process for long-term projects to mitigate customer and trade ally risk and to improve trade ally relationships. Through this process, customers may reserve rebate funds before proceeding with their project.
- Developing new ways to identify GNI customers and reach small C&I customers with appropriate and compelling marketing; also, identifying efficiency measures appropriate for these customers.
- Developing a formal, streamlined application process for landlord-tenant projects, where data collection and tracking ensure accurate reporting.
- Examining software-related challenges to address issues and providing staff training or modifying the procedures or the software to ensure correct use. Assisting these

contractors will facilitate buy-in and satisfaction and, ultimately, increase participation as they bring more customers into the programs.

Changing Standards Will Impact the Programs

The changing lighting standards will affect PPL Electric's ability to claim savings from CFLs. Consequently, PPL Electric and its customers need more information about: (1) How the Energy Information and Security Act of 2007 (EISA) will affect the types of light bulbs and lamps available in the marketplace; and (2) the lighting technologies that comply with the new federal efficiency standards. Providing this information to customers presents PPL Electric with an excellent opportunity to enhance its customer service while easing its customers' transition to the new lighting technologies found on store shelves.

Related to the purchase of CFLs is their disposal. This evaluation determined that a large number of customers still dispose of spent CFLs in the trash. Many customers also have questions about the bulb's mercury content. To decrease the number of customers disposing of CFLs in the trash and address their questions, PPL Electric consider enhancing program marketing and education efforts about the mercury content and the recycling options.

Going forward, PPL Electric should consider introducing customers to next generation lighting technologies by providing incentives for select models of LEDs and other bulbs that exceed EISA efficiency standards. To avoid the early adoption problems encountered with CFLs, the Company should offer incentives only for well-designed equipment that has been carefully evaluated.

Continue the Focus on Data Quality

The EEMIS tracking system was customized to meet the data tracking needs of each Act 129 program. It evolved and improved substantially over PY2, with the EM&V and EEMIS teams ever vigilant to: (1) Improve and maintain data quality; and (2) align EEMIS better to the TRM protocols.

As programs launched, saw the first participants, and matured, some programs experienced data issues at each stage. PPL Electric's and Cadmus' QA/QC and verification efforts identified data quality issues. Once identified, PPL Electric was quick to address areas that needed attention. For example, in one program, the implementation CSP's internal QA/QC process was inadequate to ensure data quality and consistency. Going forward, PPL Electric could conduct QA/QC checks and use drop-down lists (specifically, for the measure quantity fields and on the values recorded in the measure quantity and recommended measures fields) to reduce the data entry errors in the implementation CSP's tracking database could be reduced using drop-down lists for the measure quantity fields and conducting QA/QC checks on the values recorded in the measure quantity and recommended measures fields.

In the Renewables program, there were several deficiencies in the processes for data collection and data transfer to EEMIS. Information needed to calculate savings was not always collected on the rebate form or, when it was collected, it was not always transferred to EEMIS. In another program, phone numbers were not transferred from paper applications to EEMIS, although these phone numbers were needed for EM&V survey calls to customers.

Overall, EEMIS data quality is very good. The types of data quality issues found are not uncommon for large and complex programs that have evolving data collection and tracking systems. Still, it is important to identify and address these issues so that data are collected to track program progress and conduct EM&V activities correctly.

PPL Electric should: (1) Continue its focus on data quality; (2) assess the source of discrepancies; (3) clarify data collection requirements; and (4) revise data handling processes to prevent errors. In addition, making the recommended changes to rebate forms and data entered into EEMIS would allow Cadmus to select more representative samples of the population, which would result in more accurate calculations of program savings. This would help streamline the EM&V process and improve overall administrative efficiency. It would also reduce the number of site visits or phone calls required to gather missing data.

4. Program-Specific Process Evaluations

Purpose and Methodology

Cadmus conducted the process evaluation of PPL Electric's EE&C programs to help determine what is working well and where the challenges are. Based on this information, Cadmus can recommend modifications to refine the programs.

The PY2 process evaluation focused primarily on the following:

- Documenting changes or adjustments made to program designs, operations, management, or delivery;
- Assessing program progress;
- Identifying success factors that contributed to program results;
- Identifying challenges or obstacles that may have impacted a program's ability to meet its targets or to operate efficiently;
- Understanding how issues identified in the PY1 process evaluation were addressed;
- Assessing the market response from, and interactions with, customers, trade allies, and CSPs; and
- Identifying implementation barriers.

For the evaluation, Cadmus relied heavily on interviews with the following: Act 129 management and program staff, customer communications, and major accounts staff, and several delivery CSPs. Cadmus' participant and nonparticipant surveys provided additional insights about customer satisfaction, program barriers, and market response.

Cadmus customized interviews with each program's customer programs specialist to incorporate findings from the PY1 process evaluation, program activities over PY2, and current market conditions. The interviews also contained standard questions focused on the effectiveness of the delivery approach, the program status, the marketing and communications efforts, the forms and rebates, and the market response. Additionally, Cadmus' process evaluation incorporated findings from customer surveys and an assessment of QA/QC procedures.

Each of the following sections provides details on program-specific process evaluation interviews and results:

- Efficient Equipment
- Energy Assessment & Weatherization
- Behavior and Education
- CFL Campaign
- Appliance Recycling
- Low-Income WRAP
- E-PowerWise
- Renewable Energy

- HVAC Tune-Up
- Custom Incentive
- Load Curtailment (Will claim savings in PY3)
- Direct Load Control (Will claim savings in PY3)
- New Home Construction
- Time-of-Use Rate

Organization of the Reports

Each program report includes an executive summary that can serve as a stand-alone overview document and contains a brief statement of program objectives, status, key findings, and a summary of conclusions and recommendations.

Following the program executive summary, each report discusses the program status, delivery processes, marketing, forms and rebates, QA/QC, and customer satisfaction.

The detailed conclusions, which are based on evaluation findings, are provided at the end of each section. This is followed by detailed recommendations for actions that may help PPL Electric change program delivery to improve performance or increase organizational efficiency.

Efficient Equipment Incentive Program

Executive Summary

The objectives of the Efficient Equipment Incentive program are these: (1) Provide customers with opportunities to reduce their energy costs and increase efficiency; (2) encourage customers to install high-efficiency HVAC, lighting, and appliances; (3) encourage customers to use ENERGY STAR-rated equipment; (4) promote market transformation for high-efficiency appliances and equipment; (5) promote PPL Electric EE&C programs; and (6) achieve significant energy savings in all customer sectors.

The Efficient Equipment Incentive program is the largest program in PPL Electric's Act 129 portfolio. The program goal is to install nearly 4.2 million measures through 2013, with a total reduction in electricity consumption of 715,875 MWh/yr and 127 MW.

Currently, the Efficient Equipment Incentive program is one of PPL Electric's most successful programs. It offers a diverse range of prescriptive efficiency measure incentives for the residential, commercial, and GNI sectors. During PY2, the Company exceeded its targets for the C&I sector and for several measures in the residential sector. However, participation has lagged in the small C&I and GNI sectors.

The process evaluation for this program for PY2 entailed these activities:

- Interviews with the customer programs specialist and PPL Electric's management team;
- Telephone surveys with PPL Electric residential customers; and
- A review and comparison of CSP and EEMIS program data files.

Key Findings

The key findings from the process evaluation are these:

- Overall, the program participation and rebate processes have been operating well. The program met its overall (all sectors) PY2 goals, but fell short of expectations associated with the small C&I sector.
- At the end of PY2, this program was fully subscribed for the large C&I sector, including committed projects with a reservation. PPL Electric established a waiting list in case any committed projects do not materialize.
- Participation by residential sector is significantly ahead of forecasts in the plan, so PPL Electric has adjusted measures and rebates during PY2 to slow participation.
- During PY2, PPL Electric hired EPS to administer and deliver the program to the C&I sector and to improve performance, particularly among small C&I and GNI customers.
- As the program matures, customer and trade ally familiarity with the forms has improved, and their confusion and reluctance to participate has declined.
- PPL Electric program staff reported that customer and trade ally feedback indicated their continued support for a two-step application process for longer-term projects. The Company has addressed this by allowing customers to reserve funds beginning in PY3.
- Rebate processing time was initially slower than expected. PPL Electric successfully implemented corrective actions to expedite rebate processing, including redistributing non-residential rebate processing responsibilities to EPS.
- The administrative CSP noticeably improved staff industry knowledge and launched a lighting hotline to assist customers with commercial lighting rebate application forms. This function was transferred to the C&I implementation CSP at the close of PY2.
- For some measures, the cost of processing rebates exceeds the rebate itself, while the savings are marginal. Recognizing this, PPL Electric has dropped some of these measures during PY2 and plans to drop others in PY3.
- Surveyed participants are very satisfied with the program.
- Most participants said they signed-up for the program because they wanted to upgrade old equipment. The second most-common reason participants gave was the desire to reduce energy costs.
- Residential customers learned of the program primarily through stores while commercial customers learned of the program through bill inserts, newsletters, and the E-Power link.

Conclusions

- Overall, PPL Electric's Efficient Equipment Incentive program is successful.

- In the large C&I sector, demand was higher than expected and funds for those customers have been depleted. In contrast, a shortfall of small C&I and GNI participation will require PPL Electric to take actions to meet savings targets for this program.
- In PY2, PPL Electric implemented several significant improvements to the program operations and delivery. These improvements reduced rebate processing time, simplified and streamlined the lighting application forms, provided needed commercial lighting technical support, and boosted participation in the small C&I and GNI sectors. Changes are expected to improve customer satisfaction and program performance overall. However, as previously noted, PPL Electric will likely need to shift projected savings from the small C&I to other sectors if it is to achieve the overall portfolio compliance target, since this program contributes significant savings.
- It is generally acknowledged by EDCs and those working in the energy industry, that the small C&I and GNI sectors, which have been hard hit by the economic downturn, are difficult to reach. Additionally, complicated commercial lighting and HVAC applications continue to be a barrier for some participants. It may not be possible for PPL Electric to completely mitigate these factors, and it is not known whether these issues will ultimately affect the Company's ability to meet its targets in these sectors.
- Non-residential lighting equipment has an especially complicated set of measures, and this fact requires participants to provide detailed, measure-specific information. The complexity of the program and of the application process appears to be a barrier for some customers.
- Confusion surrounding landlord-tenant relationships creates difficulties in processing rebates and tracking savings.
- As the program matures, both customers and vendors have become more familiar with the various program forms. As a result, the confusion and a reluctance to participate noted earlier in the program have declined in these groups.
- In some cases, high administrative costs and low measure savings may negatively impact the program cost-effectiveness.

Recommendations

- Continue to work with EPS to target small businesses and GNI customers directly.
- Continue improving and simplifying program forms to the extent possible. (This including the PA lighting form and the supporting tables in the TRM.)
- Implement a two-step application process for long-term projects to mitigate customer and trade ally risk and to improve trade ally relationships.
- Develop a formal, streamlined application process for landlord-tenant projects. Ensure that related data collection and tracking are adequate for accurate reporting.
- Continue to examine the cost of processing rebates, the expected and actual participation, and the expected savings, as these efforts will help identify those high-cost, low-saving program measures. Eliminate those that do not significantly contribute to portfolio savings.

- Revise the EE&C Plan to shift projected savings from the small C&I sector to other sectors that participate in this program.

Program Overview

PPL Electrics' Efficient Equipment Incentive program promotes the purchase and installation of a wide range of high-efficiency equipment, including technologies appropriate to specific building types and sectors. The program provides customers with financial incentives to offset the higher purchase costs of energy-efficient equipment, and offers information on the features and benefits of energy-efficient equipment. The targeted equipment includes cooling, lighting, and water heating equipment; appliances; and other measures (ENERGY STAR-labeled equipment is specified when available).

The Efficient Equipment Incentive program is available to all customer sectors. Marketing strategies, measure lists, participation goals, budgets, energy savings and demand reduction goals, and other aspects of the program are tailored separately to the residential and non-residential (commercial and industrial) sectors.

This program met its overall targets for PY2, with mixed results for each sector served by the program. In general, the residential sector is on target to meet 2013 goals. The program is now closed to large C&I customers due to high demand, as PPL Electric has already committed its expected funding those customers. The small C&I and GNI sectors, however, ramped up slowly, and the small C&I sector did not meet PY2 targets.

PPL Electric hired EPS to implement this program for the commercial sector, in part to improve performance in the small C&I and GNI sectors. The Company updated rebate forms for PY3, and this effort is expected to ease the application process for smaller customers. Rebate processing times decreased to desired levels in PY2, and the administrative CSP successfully launched a lighting hotline to assist customers with the commercial lighting rebate applications. This function was transferred to EPS at the end of PY2.

Program Implementation

Program Status

During the last half of PY2, PPL Electric worked extensively with EPS to help the new CSP transition into its role as a turn-key implementer for the C&I sector. The learning curve was steep; however, EPS has an extensive background in program delivery and offers technical expertise. EPS' transition into the PPL Electric program delivery structure involved identifying nuances with PPL Electric's programs and customizing some of its strategies to fit the situation.

In PY1, the process evaluation identified issues surrounding the involvement of KAMs, particularly their lack of familiarity with the program due to rapid rollout and little or no experience with energy efficiency before the implementation of Act 129 programs. With some formal training and informal support, the KAMs' familiarity with the program has increased considerably during PY2. However, commercial lighting projects are still challenging, due to complex rebate forms. (Also, it appears that some customers abandoned their lighting projects as a result.)

The addition of EPS to support customers with lighting applications should help to alleviate this issue further. Now that the program is closed to large C&I customers, KAMs will focus on targeting large GNI customers.

Helgeson Enterprises is the administrative CSP responsible for processing all of the program rebates. Because the energy industry was a new market for this CSP in PY1, it initially struggled to answer customer questions and process technical rebate application information. To address this, Helgeson hired experts to train staff on the lighting forms, and the firm developed a glossary and questions database to improve the staff's overall knowledge. The administrative CSP had a strict quality control process in place that assisted the overall program to operate more smoothly. Overall, PPL Electric staff members were impressed with how quickly Helgeson learned about the industry.

Over PY2, Helgeson's role expanded to include staffing and operating a lighting hotline, which was launched for customers who had difficulty completing the complicated forms. Helgeson staff coached C&I customers through the process of completing lighting project rebate forms. This function transferred to EPS at the close of PY2.

The program's rebate processing turn-around time was an early challenge. To alleviate delays between receiving customer invoices and rebate applications and paying customer rebates, PPL Electric worked closely with Helgeson to identify ways to improve both internal and external processes. Invoices are now submitted to PPL Electric at the rate of two or three times per week, and the invoices are paid using electronic funds transfer (EFT), which has improved processing time. In PY1, PPL Electric expected the administrative CSP to achieve application-to-rebate turn-around times of four weeks or less in PY2. Currently, the rebate processing takes between 21 and 25 days, well within expectations and consistent with best practices.

Program Processes

EPS began working with PPL Electric in late PY2, advising the company on commercial lighting and other measures specific to the C&I sector and directly supporting customers with program participation, particularly with filling out commercial lighting applications. In addition to working directly with C&I and GNI customers, EPS reviewed and suggested changes to existing rebate forms. Their goal was to streamline the customer process of filling out forms, as a means of improving overall participation.

Updates to rebate forms were limited to those forms that PPL Electric controlled. The PA lighting form (Appendix C), which is used statewide, was required for all customers seeking rebates for commercial lighting projects. This form causes the most difficulty for C&I customers and is a barrier to many customers, trade allies, and vendors. Some customers may have abandoned the rebate process because the form is too time consuming, particularly for one-off projects and small projects. Going forward, EPS engineers will be available to complete the lighting form for customers and/or offer technical support.

In late PY2, EPS prepared to launch a new program delivery channel—a direct discount component targeted specifically to small commercial customers. The program component will offer incentives of 17 cents per kWh/yr saved, and this will be paid directly to trade allies who install lighting and HVAC measures. The program allows vendors and contractors to offer

customized installation packages that include pre-approved rebates based on estimated energy savings. These projects may require as little as a 25-percent customer investment. Customers are billed only for the post-rebate project cost so that only minimal capital investment is required.

EPS will be responsible for pre-approving the installation packages, conducting quality assurance on installed projects, and processing incentives directly to vendors. This program delivery channel is designed to remove the cost barrier for small commercial customers by paying rebates directly to contractors and minimizing the cost and program paperwork required. EPS developed the software, reports and delivery systems, and launched this program component at the end of PY2.

Landlord/tenant issues have become a relatively common problem for this program. PPL Electric staff reported several projects were delayed because there was confusion as to who paid for the project and who the metered customer was. Also, in some situations, the landlord owned the lighting/HVAC and would not allow the tenant to replace or modify it. In other situations, the landlord owned the equipment, would allow the tenant to replace/modify it, but the tenant was reluctant to invest in equipment/building he did not own and may not use long term. While there are workarounds for reporting, these are labor intensive and inefficient. A more streamlined approach needs to be developed to accommodate these situations.

Marketing

Marketing for PPL Electric's EE&C programs is generally targeted to customer segments and includes general education rather than program-specific messaging. The Company employs a variety of techniques: print, television, online advertising, direct mail, bill inserts, and sponsorships. All contribute to raising awareness about the programs and the benefits of efficiency.

While these marketing channels have worked particularly well for residential customers, the approaches were not as effective promoting participation among small C&I and GNI customers. This customer sector required more targeted outreach and dedicated resources. Going forward, PPL Electric's marketing will largely focus on the small C&I sector, through an integrated effort between customer communications and EPS. The approach will use direct outreach to customers and trade allies by EPS, coupled with mass media approaches developed by the communications group (specifically, television, print, and digital advertising) and case studies targeted to the small C&I and GNI sectors. Also, EPS will follow up with customers to encourage participation. However, PPL Electric is concerned that this sector will be difficult to reach because of budget constraints.

The non-residential customer programs specialist (EPS) is the primary contact for trade allies, responding to their questions on a daily basis. While PPL Electric has dedicated a portion of the e-Power Website for trade allies, EPS is responsible for increasing marketing and outreach to trade allies. EPS will staff a commercial lighting hotline to assist with commercial lighting project questions.

In the non-residential sector, KAMs had the primary responsibility for marketing and delivering the program to large C&I and large GNI customers. KAMs are tasked with explaining program details to customers, answering questions, and assisting customers in the participation process. KAMs also were communication liaisons between PPL Electric program staff and large non-

residential customers. Many of those responsibilities have now transitioned to—or are shared with—EPS.

Forms and Rebates

Program documents and interviews with PPL Electric and administrative CSP staff indicated that the program forms underwent changes in PY2 so as to: (1) Facilitate efficient program delivery; (2) incorporate TRM changes; and (3) allow PPL Electric to calculate savings more accurately. These changes included:

- Adding the PA lighting form for commercial lighting projects;
- Bifurcating the HVAC form based on the size of the equipment to address differences in savings between residential and commercial-sized units;
- Adding a ductless heat pump (DHP) rebate form; and
- Updating the efficient motor rebate forms to reflect new motor standards.

In PY1, PPL Electric staff members stated that they wanted to keep the customer rebate process as simple as possible, so they designed a one-step application process. Over the course of PY1 and PY2, however, several commercial customers and trade allies requested the ability to reserve rebates, since their projects can be complicated and time-consuming to implement. The one-step incentive process discouraged some customers from committing to the program, since they did not want to risk that funds would not be available or that their equipment would not be eligible for incentives by the completion of their projects. Based on this feedback, the PPL Electric managers and staff recognized the need for the two-step process and implemented it for lighting in PY2.

Quality Assurance and Quality Control

As part of the evaluation process, Cadmus reviewed of program quality metrics, including customer satisfaction and data integrity.

Residential Customer Satisfaction

Cadmus' customer surveys asked a series of questions to assess participant satisfaction with several components of the Efficient Equipment Incentive Program. Customer satisfaction among the residential sector was consistently high. A total of 224 participants responded to questions regarding their satisfaction with the overall program, the completion and submission of required forms, and the performance of the purchased measure. Respondents rated items on a scale from 1 to 10, with 1 representing "least satisfied" and 10 representing "most satisfied." These values were organized into three groups: from 1 to 3 (dissatisfied), from 4 to 7 (moderately satisfied), and from 8 to 10 (very satisfied).

Figure 11 shows the results of the residential customer satisfaction survey.

- For the overall program, 88 percent of respondents were very satisfied, with 52 percent awarding a perfect 10 rating. Only two respondents (less than one percent) were dissatisfied.
- The lowest satisfaction ratings were associated with completing the forms required to receive the rebates. The mode response was a rating of 10 (86 respondents or 38 percent), while 80 percent of the participants were very satisfied, and 17 percent moderately satisfied. Five customers were dissatisfied.
- Satisfaction with the measure purchased was the highest of the three categories, with 138 perfect ratings (62 percent) and 93 percent of respondents very satisfied. Only one rating was below a score of 5.

Figure 11. Residential Participant Satisfaction

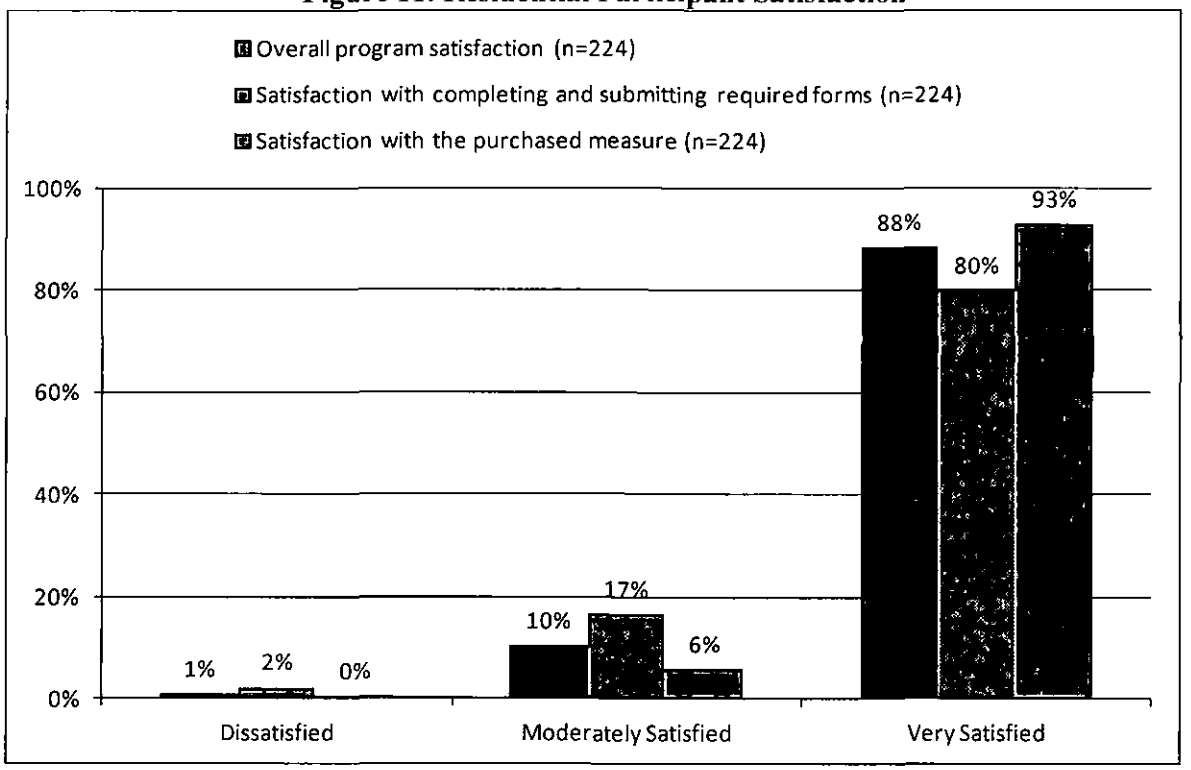
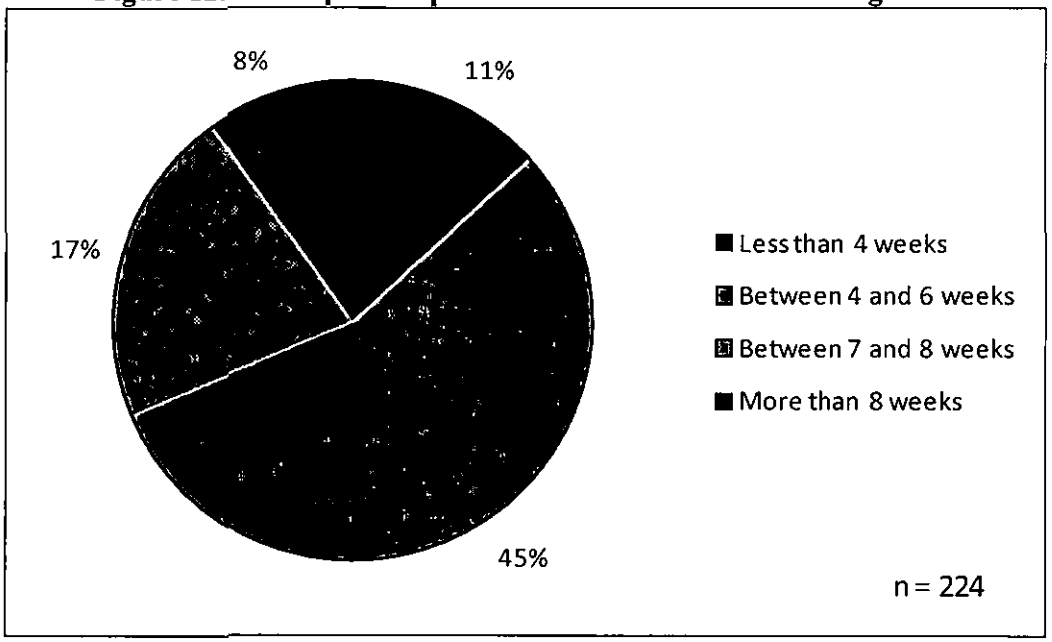


Figure 12 shows the participant-reported time for processing incentive checks.

- Of the 224 surveyed residential participants, 45 percent reported they received their incentive check within four to six weeks.
- About 11 percent (one in nine respondents) reported receiving their check in less than four weeks.
- Only 8 percent of respondents said it took longer than eight weeks to receive their incentive check.
- Note that 17 percent of respondents did not remember or were unable to answer the question.
- Three respondents had yet to receive their rebates.

Figure 12. Participant-Reported Incentive Check Processing Time



Commercial Customer Satisfaction

Within the commercial sector, satisfaction was generally high, although slightly more skewed toward the moderately satisfied category when compared to the residential data. A total of 141 commercial participants provided ratings using the same scale as the residential customers. A subset of that group, 33 participants, offered satisfaction ratings on two separate measures.

Figure 13 shows the satisfaction ratings from commercial customers.

- Approximately 74 percent of commercial respondents were very satisfied with the overall program, with 59 total customers providing a score of 10.
- Satisfaction with required forms corresponded with the lowest average ratings for both residential and commercial sectors. Although most participants were very satisfied (62 percent), 8 percent were dissatisfied and 4 percent (six respondents) were extremely dissatisfied, providing a rating of 1.
- Satisfaction with the installed measures was extremely high, with more than 91 percent of customers providing a rating of 8 or higher for both their first and second measures.
- Of the 33 participants who provided a rating for their second installed measure, 73 percent (24 respondents) gave a score of 10, and only one score was below 8.

Figure 13. Non-Residential Participant Satisfaction

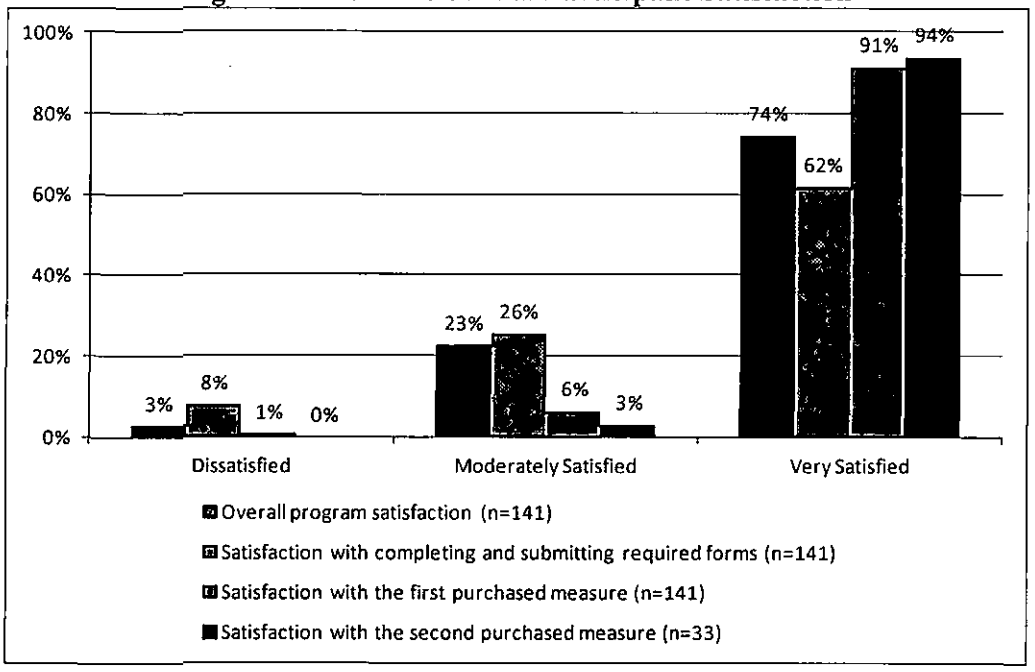
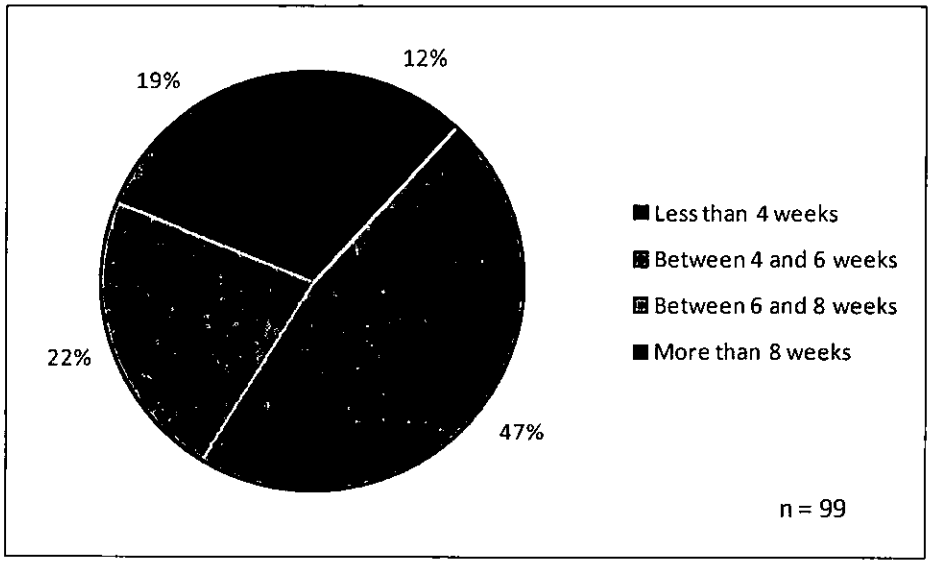


Figure 14 shows the participant-reported processing time for commercial rebates.

- Of the 99 respondents to the commercial participant survey, 47 percent reported receiving their incentive check within four to six weeks.
- While 12 percent of respondents received their check in less than four weeks, 22 percent received their checks within six to eight weeks.
- 19 percent said it took longer than eight weeks to receive their incentive check.
- Approximately 13 percent of respondents did not remember when their check arrived, and one person was still waiting for the rebate.

Figure 14. Participant Reported Incentive Check Processing Time



Trade Ally Satisfaction

PPL Electric increased its efforts to reach trade allies with information, meetings, and training (specifically, at trade ally meetings throughout the Company's service territory), resulting in an increase in overall trade ally participation since PY1. For example, PPL Electric's presentation to lighting trade allies on January 29, 2011, was interactive and well received, and it generated the following comments and suggestions:

- Trade allies want to be certain that funding is available before they start a project. They prefer a two-step application process (step 1 is the reservation of funds; step 2 is the project's completion and the rebate payment) or a commitment letter from PPL Electric.
- Customers and trade allies do not want to pay for pre- and post-metering to determine savings for custom projects.

- Trade allies do not like the PA Lighting Form (Appendix C spreadsheet) and reported that very few states require it. It is cumbersome, time consuming, inflexible, confusing, frustrating, and it duplicates some of the information they prepare for the customer.
- Trade allies would like to have rebates available for C&I sector energy audits that identify recommendations for prescriptive measures.

PPL Electric reports that although trade allies were generally satisfied with the EE&C programs, they voiced some frustrations with the Efficient Equipment Incentive program, particularly with the complicated commercial lighting rebate forms and the uncertainty of funding for long-term commercial programs. To monitor progress, Cadmus will interview trade allies in the PY3 process evaluation.

Records Review

As the EM&V CSP, Cadmus selected and reviewed a sample of 839 records, including record for residential appliances, HVAC equipment, and commercial lighting.

Records Review Methodology

Cadmus compared and mapped each data field across several different sources: (1) customer applications and documentation submitted with the applications; (2) the administrative CSP database; (3) the EEMIS database; (4) rebate forms; (5) data collected during the participant surveys; (6) data collected during the site visits; and (7) product specifications from manufacturers. Cadmus reviewed the data it determined to be most important for identifying participants and calculating energy savings. It also documented and tracked all data entry discrepancies.

Database Review Methodology

Cadmus compared records in the EEMIS database to the corresponding records in the administrative CSP database (i.e., the records before the CSP uploaded data to EEMIS).

QA/QC Findings

The review of the records and database uncovered issues with some key fields needed to calculate measure savings and with the process by which rebates were handled and recorded. While initially caused some difficulties in calculating *ex ante* adjusted savings, the issues have largely been resolved in PY2, and they do not present a significant barrier to evaluation, recording savings, or overall data integrity.

- ***EEMIS does not contain data for all of the variables needed to calculate measure savings.*** In some cases, the rebate form does not request data. In other cases, the data are collected on the rebate form but not entered into EEMIS. This issue applies to only a few measures and was largely resolved during PY2.
- ***The manufacturer and model number are not recorded consistently or completely.*** If the manufacturer and model number are accurately entered for appliances such as refrigerators and dehumidifiers, the manufacturer specifications could be used to locate the values for missing fields required for the savings calculations. However, it is difficult

to record this information accurately and consistently because customers do not always report the correct data or follow the manufacturers' format.

- ***Customers overlook key information.*** Customers frequently do not enter their fuel source for water heating on forms for dishwashers and clothes washers. Also, when customers are requested to attach the AHRI certificate for HVAC equipment, they occasionally attach a stimulus funding form or some other forms associated with the equipment. These issues could be resolved by making the field for listing the fuel source for water heat more prominent on the form and providing more direction on AHRI documentation. However, capturing fuel source information is not critical to the evaluation efforts, since that can be collected through surveys and site visits. While customers are required to submit AHRI certificates for selected rebates, this requirement does not appear to be consistently enforced, Also, the large majority of customers do qualify for the rebates they receive.
- ***Measures are incorrectly rebated.*** This review uncovered a few instances where heat pump water heaters (HPWHs) were rebated as ASHPs. There were similar issues where DHPs were rebated as ASHP or central air conditioning (CAC). That scenario, while understandable because of the similarity in measures, was problematic because DHPs were not eligible for rebates at that time. After the problem was identified by Cadmus, it was immediately resolved by the administrative CSP.
- ***Savings are being double counted.*** Some of the commercial lighting projects uploaded to EEMIS in the first quarter of PY2 had double-counted savings, because some customers submitted an Appendix C with their rebate application. While double counting was a serious issue for Q1, it was resolved and was not an issue for the remainder of PY2. In the second quarter of PY2, there were 50 projects for which customers did not submit an Appendix C with their rebate application, so these projects were recorded without savings. This problem was resolved over the course of PY2; in Q4 there were only 2 projects with zero savings.

EM&V

While PPL Electric made significant progress in simplifying the program structure, the TRM protocols continue to be challenging. The TRM protocols require that rebate forms collect significant amounts of information, and these requirements complicate the rebate forms, tracking system design, and EM&V. In many cases, customers do not have the required technical information or equipment specifications.

Residential Audit and Weatherization Program

Executive Summary

The objectives of the Residential Audit and Weatherization program are to: (1) provide both walk-through and comprehensive energy audit options for customers; (2) give customers an opportunity to reduce their energy costs and increase their energy efficiency; (3) encourage customers to weatherize their homes by offering bonus rebates; (4) install low-cost energy

savings measures for immediate savings; (5) promote PPL Electric programs; and (6) obtain energy savings of 5,960 MWh/yr and 590 kW.

As this program launched May 2010, PPL Electric did not record any participants until PY2 Q2. Since the Company combined participation and savings targets for the first two program years, the participation and savings lagged behind target. However, with no savings posted to EEMIS in the first quarter of PY2, the program achieved 77 percent of its PY2 participant target (64 percent of its combined PY1 and PY2 participation) and exceeded the PY2 participation goal for audits by 15 percent.

In PY2, no bonus rebates for weatherization measures were uploaded to EEMIS. If participation continues at the current level, the program is on track to exceed PY3 participation targets, although the program is not likely to meet savings targets without bonus rebates for weatherization measures.

These process report findings are based on an analysis of interviews with the following:

- The customer programs specialist;
- Two representatives from the Residential Energy Survey CSP (eic|ComfortHome);
- The program manager;
- The analyst responsible for managing and uploading the data to EEMIS;
- Two trade allies who, together, conducted 40 percent of the comprehensive audits completed during PY2; and
- Phone surveys of 68 randomly selected Q2 and Q3 program participants.

Key Findings

The key findings from the process evaluation are these:

- The Residential Audit and Weatherization program did not meet its participation and savings goals for PY2 due to a slow start in fielding the program, but participation increased in the last quarter of PY2.
- The ratio of audits to surveys is exceeding the program planning assumption of 20 percent audits and 80 percent surveys.
- By implementing several process changes, PPL Electric increased program operating efficiency, facilitated rebate processing, and improved its ability to claim savings. The program is running smoothly.
- There appears to be a direct correlation between PPL Electric's marketing efforts and the number of customer requests for surveys and audits.
- PPL Electric maintains good communications with its trade allies through regular conference calls and a link on the PPL Electric E-Power Website.
- The two contractors reported entering data onto paper forms during the audits and then inputting these data later into APOGEE reporting software.

- Contractors were frustrated with the PDF reports produced by APOGEE software and want the flexibility to add more customer-specific information, such as photos.
- Data in the implementation CSP's tracking database and in EEMIS should match the data recorded by the surveyors and auditors on the rebate applications. Data discrepancies appear to be data entry errors, but there are also discrepancies between the implementation CSP's program tracking database and EEMIS that cannot be explained by data entry errors. These discrepancies may be occurring during the upload process or during editing of uploads flagged with errors.
- The administration CSP did not record weatherization bonus rebates in PY2, although customers submitted forms, 39 of which were approved.

Conclusions

- While PPL Electric is behind in its participant and savings goals for PY2 due to a delayed launch, it may be possible to close the gap through carefully-regulated marketing.
- Revising the Home Energy Audit Report to address contractor concerns could result in a higher quality report and increase contractor buy-in and customer satisfaction with the report.
- Contractors were frustrated with both the APOGEE software and the program process, so rather than follow the program's design, the contractors collected data on paper forms and then transferred it to their laptop at a more convenient time. While this may be due to an unwillingness among contractors to change their delivery practices, it may reflect the software's lack of intuitiveness and/or user-friendliness.
- The implementation CSP's internal QA/QC process was inadequate for ensuring data quality and consistency. There are serious implications if the data quality is not improved.
- The administration CSP rejected 36 percent of bonus applications. The eligibility language on the Audit Bonus Rebate Application may be ambiguous to customers. The rebate form does not clearly state that: (1) the customer must install a minimum of two measures, or (2) whether the two measures must be installed at the same time. This could be contributing to the high rejection rate for bonus applications.
- PPL Electric recognizes contractors do not understand how leads are generated, so it is addressing this issue through continued communication with trade allies. The Company is working to manage contractors' expectations and increase their desire to participate in the program.
- Failure to process bonus rebate applications may be due to miscommunication or lack of clarity around data entry directions.

Recommendations

- Consider increasing marketing to maintain current participation levels.
- Continue to keep contractors informed about the program and address trade allies' issues.

- Revisit the data entry screens in APOGEE and work with the software company to determine a data entry method that will meet the needs of both the contractors and the program.
- Work with APOGEE to modify the reports to allow for greater flexibility, such as the ability to more site-specific recommendations and photos.
- Reduce data entry errors in the implementation CSP's tracking database by having drop-down lists for the measure quantity fields and then conducting QA/QC checks on the values recorded in that field and in the recommended measures field.
- Assess the source of discrepancies between the bonus measure recommendations recorded in the implementation CSP's tracking database and EEMIS, and then revise data handling processes to prevent these errors.
- Clarify the data collection requirements for the bonus rebates and related measures and then provide these clarifications to the administration CSP to facilitate the accurate recording and uploading of data to EEMIS.

Program Overview

PPL Electric's Residential Audit and Weatherization program provides residential customers with information on their home's energy performance and recommends the most effective, highest priority energy-efficiency actions they can take. The program provides customers with two tracks: (1) a walk-through survey delivered by the Residential Energy Survey CSP, eic|ComfortHome, to evaluate major electric equipment and building envelope characteristics; and (2) a comprehensive energy audit with diagnostic testing delivered through PPL Electric's network of Building Performance Institute (BPI)-trained and certified energy auditor trade allies.

The Residential Audit and Weatherization program launched in May 2010 and did not record any participants until PY2 Q2. By the close of PY2, the program achieved 64 percent of its combined PY1 and PY2 participation, 42 percent of its combined savings goal of 2,020 MWh/yr, and 19 percent of its combined savings goal of 0.2 MW.

Program Implementation

Program Status

During PY2, the program recorded 902 surveys, 389 audits, and claimed savings of 857 MWh/yr and 0.04 MW. PPL Electric anticipated a ratio of 80 percent surveys to 20 percent audits. The participant data recorded through PY2 demonstrated the program exceeded the anticipated percentage of audits, with a final ratio of 70 percent surveys to 30 percent audits. No bonus rebates were posted in EEMIS in PY2.

Table 6. PY2 Participation

Audit Type	Program Year 2 Participants	Program Year 2 Combined Goal	Percent of Combined Goal	Program Year 2 Stand-Alone Goal	Percent of Stand-Alone Goal
Surveys	900	1,616	56%	1,344	67 %
Audits	388	404	96%	336	115%
Total	1,288	2,020	64%	1,680	77%

PPL Electric combined participation and savings targets for the first two program years. At the close of PY2, the program achieved 64 percent of its combined participation goal, 42 percent of its combined MWh/yr savings goal, and 19 percent of its combined MW savings goal. Although the program did not meet the combined savings goals, note that with no savings posted to EEMIS in the first quarter of PY2, the program achieved 77 percent of its stand-alone PY2 participant target. In fact, it exceeded the stand-alone PY2 participation goal for audits by 15 percent, with only three-quarters of the year's participation. If participation continues at the current level, the program is on track to exceed its participation targets for PY3, although it is not likely to meet its savings targets without posting any bonus rebates.

Table 7. Program Year 2 Claimed Savings

	PY 2 Savings	PY 2 Combined Goal	Percent of Combined Goal	PY 2 Stand-Alone Goal	Percent of Stand-Alone Goal
MWH/YR	857	2,063	42%	1,721	50%
MW	0.04	0.21	19%	0.17	23%

Program Processes

The program launched in May 2010, and during this first year of program implementation, PPL Electric, Helgeson, and eic|ComfortHome made several changes to the original program design to facilitate better implementation. Representatives from eic|ComfortHome and PPL Electric reported that, overall, the program is running well.

The surveyor or auditor provided the program participants with a customized report containing recommendations on energy-efficiency actions for their homes. The surveyors/auditors also installed low-cost energy saving measures at the time of the visit, and they directed participants to other PPL Electric programs for additional incentives on equipment upgrades or to participate in demand response programs. To encourage customers to follow through on recommendations, PPL Electric may send bonus rebates for the installation of more than one recommended qualifying measure.

Although contractors conducted surveys and audits during PY2 Q1, no savings were claimed until Q2. One aspect of the program process created a delay in incentive processing and, consequently, in the ability to claim participants and savings in EEMIS. As described in the PY1 Process Evaluation, the original program process required survey customers and their surveyor to complete and sign a Home Energy Survey Form. Both the customers opting for the comprehensive audit and their auditor were required to complete and sign a Home Audit Rebate Application. Customers were then responsible for sending in the completed and signed forms to

the administrative CSP. The administrative CSP in turn notified the implementation CSP that survey forms were received, and the audit rebates were paid. At this point, the record was eligible for upload into EEMIS by the implementation CSP.

The customers did not always immediately mail in the survey forms and audit rebate applications, which caused a backlog of records to accumulate in the implementation CSP's program tracking database. Since the records were not uploaded in a timely manner, PPL Electric was unable to record these audits in a timely manner.

To address this issue, PPL Electric, eic|ComfortHome, and Helgeson changed the process for handling forms and rebates. Now the surveyors and auditors send the forms directly to eic|ComfortHome, rather than to Helgeson. The implementation CSP reviewed the forms and applications for completeness and then provided information to PPL Electric, which notified Helgeson to make the rebate payments. Records were then immediately eligible for uploading into EEMIS, which enabled PPL Electric to record the audits and claim the savings.

A larger number of comprehensive audits occurred in PPL Electric's service territory than was originally anticipated, which was good news to both PPL Electric and the trade allies. The trade allies were concerned that the less expensive $50 surveys would undercut their audit businesses.

While bonus rebate applications were submitted, they had a high rejection rate. To be approved for a bonus rebate payment, the applicant must install at least two recommended measures (ceiling insulation, wall insulation, duct sealing, and/or air sealing). Additionally, the administrative CSP must have a survey or audit on record for the PPL Electric account number provided on the bonus rebate application. If either of these conditions is not met, the rebate application is rejected. As of July 2011, the administrative CSP had received 107 bonus rebate applications: 68 were approved and 39 were rejected (a 36 percent rejection rate). The representative from Helgeson noted the majority of rejected bonus rebates were because the customer installed only one measure.

Cadmus noted that the language regarding bonus rebates on PPL Electric's application may be ambiguous to customers, who consequently do not understand they must install a minimum of two measures to be eligible for a bonus rebate. The rebate application reads as follows: "*You will receive $50 for the first two measures and an additional $50 for each measure installed thereafter if you qualify.*" Some customers may interpret that they will receive $50 for *each* of the first two measures, rather than $50 for the first two measures combined.

Currently, the only way PPL Electric tracks follow-through on audit recommendations is through bonus rebate applications for insulation, infiltration, and duct sealing. By the close of PY2, none of the 68 approved bonus rebates were uploaded to EEMIS. After some investigation, Cadmus determined that there may be a communication breakdown in the process for reporting bonus claims in EEMIS and, as a result, the savings resulting from bonus rebate measures were not recorded for PY2. This issue has since been resolved, and Helgeson plans to upload this information in PY3.

PPL Electric is currently looking into ways to tie participation in other Act 129 programs to surveys and audits in EEMIS, as this will help the Company determine whether the program is

successfully influencing participation in other programs. In addition, PPL Electric is considering following up with survey and audit participants about their intent to act on the recommendations made in the surveys and audits.

- One trade ally interviewed by Cadmus plans to send follow-up e-mails to his audit customers to ask whether they have taken action and, if so, on which recommendations.
- Another trade ally, who also sells additional services, reported that between approximately 10 and15 percent of his audit customers follow through on actions he recommended in the audit. He stated that there is higher follow-through on recommendations by audit customers than by customers who call for an estimate on a specific service. He suspects this is because customers requesting an estimate are price-shopping, while the audit customers have the audit report and more information at their disposal.

One recommendation made in the PY1 Process Evaluation involved the process of ordering and distributing the direct installation measures. The original process used Lowe's as an intermediary to distribute direct installation measures to surveyors and auditors. Because of the multiple points at which the materials changed hands, the PY1 Process Evaluation identified a potential for security breaches and recommended that PPL Electric look for ways to reduce the number of material exchanges from the implementation CSP to contractors. A further recommendation entailed implementing an inventory management system for tracking individual measures in a centralized database system and where contractors must submit customer affidavits certifying they received the measures in their kit.

After PPL Electric implemented those recommendations, Lowe's was no longer used as an intermediary because it was not sufficiently responsive. The implementation CSP now orders and packages the materials into kits and then distributes four to eight kits at a time to auditors and up to 25 to surveyors. The implementation CSP checks and reconciles the inventory distributed to each auditor against the monthly recorded installations before providing additional kits. Surveyors are financially responsible for the kit inventory. At the end of the program, or at the end of a surveyor's employment at eic|ComfortHome, any uninstalled inventory must be returned, or the value of the materials will be deducted from the surveyor's final paycheck.

Another recommendation made in the PY1 Process Evaluation was to create both a formal network and the communication tools needed to support trade ally participation in the program, as the program relies heavily on open-market trade allies for promotion and delivery. PPL Electric has a trade ally link on its Website and holds regularly scheduled conference calls with participating contractors. In addition, the eic|ComfortHome manager is in regular contact with auditors to schedule work, conduct QA/QC activities, and order supplies. This manager described communication with the auditors as good.

The PY1 Process Evaluation noted that some trade allies objected to the requirements (such as liability insurance and drug testing) for participating in the program because these were not required in past PPL Electric programs. The Residential Audit and Weatherization program is open to participation by all trade allies. However, PPL Electric will continue to maintain the insurance and drug testing requirements because the requirements are appropriate, and current participating trade allies have met them.

Marketing

PPL Electric markets the program through bill inserts, on its Website, and through traditional media advertising. The customer programs specialist, the implementation CSP, and the trade allies interviewed by Cadmus all emphasized that requests for surveys and audits were directly related to PPL Electric's marketing efforts. Both the implementation CSP and the trade allies stated they knew when PPL Electric initiated a marketing push because the number of calls for surveys and audits increased.

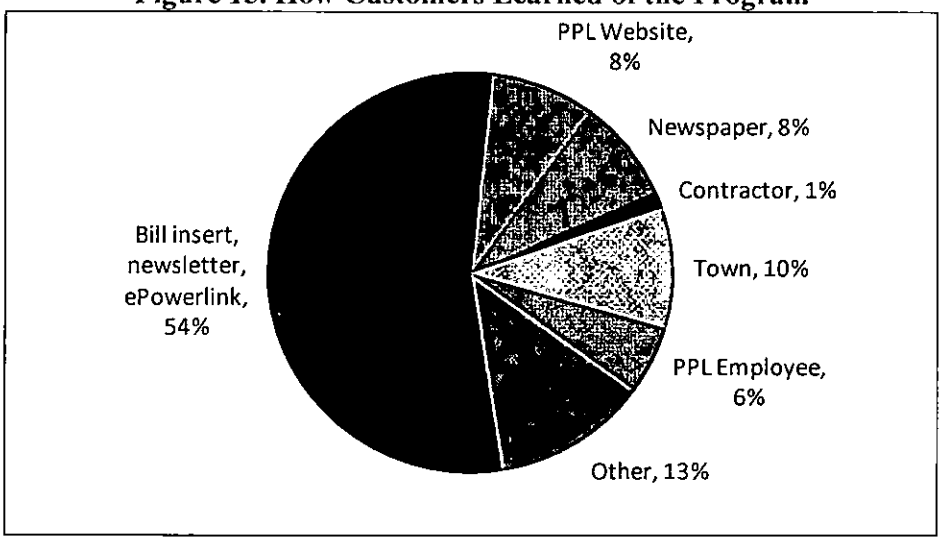
While it seems clear that PPL Electric could meet its participation and savings goals for this program by increasing its marketing efforts, the Company's staff noted the program has a total resource cost (TRC) test ratio of 1.2. PPL Electric prefers to concentrate its resources on more cost-effective programs. The Company views the Residential Audit and Weatherization program as a way to educate its customers about energy efficiency in the hope that these customers will then implement other major energy-efficiency measures.

Trade allies advertise the program on their Websites. One trade ally also advertises the program on its company Facebook page and with yard signs. Another trade ally markets the program extensively at home shows in addition to its Website. Neither firm took advantage of the PPL Electric cooperative advertising offered because both were satisfied with the number of audits they conducted.

As shown in Figure 15 on the next page, PPL Electric's media channels—such as bill inserts, the *Connect* newsletter, and E-Powerlink—were the primary way customers heard about the program, with 54 percent citing this as their information source. Other sources of program information are the PPL Electric Website, newspaper and television advertisements, town meetings, word-of-mouth, and home shows or fairs.

Cadmus conducted a phone survey of 68 randomly selected PY2 Q2 and Q3 program participants. Respondents were asked how they learned about PPL Electric's Residential Audit and Weatherization program.

Figure 15. How Customers Learned of the Program



Forms and Rebates

The program includes three application forms, one for each track of the program.

1. ***The Home Energy Survey Form.*** Customers who choose the $50 walk-through survey fill out this form, which is not a rebate application. Its purpose is to document program participation and the number of direct installation measures installed during the survey.
2. ***The Home Energy Audit Rebate Application.*** Customers who choose the comprehensive audit complete this form with their auditor, who submits it for the customer to receive a rebate for the audit. The application also documents the number of direct installation measures installed during the audit.
3. ***The Mail-In Survey/Audit Bonus Rebate Application.*** Customers who act on at least two recommended measures fill out this rebate application with their installation contractor. The customer submits the application to receive a rebate of from $50 to $150.

Customers no longer send the Home Energy Survey Form or the Home Energy Audit Rebate Application to the administrative CSP for processing. The surveyors and auditors now complete the forms and send them directly to the implementation CSP. This change has greatly facilitated rebate processing and shortened the interval in which surveys and audits are conducted and savings are recorded by PPL Electric. The Mail-In Survey/Audit Bonus Rebate Applications are still mailed to the administrative CSP for processing. Noted above, Cadmus believes that ambiguous language in the Bonus Rebate Application may be contributing to the high rejection rate for bonus rebates.

During the desk review, Cadmus noted that several versions of program forms were used for both surveys and audits throughout the program year, and some forms did not require recording the quantities of direct installation measures installed. Consequently, some surveyors/auditors simply checkmark these boxes, making it impossible to verify measure quantities. The form dated January 31, 2011, contains the most comprehensive instructions and set of fields for collecting information accurately; however, the forms that did not stipulate the collection of measure quantities were still in use during PY2 Q3.

The implementation CSP created the forms and updated them several times to refine and improve the quality of the data collected. After updated versions of the survey/audit form were approved by PPL Electric, they were distributed to all surveyors and auditors with the instructions to discard all previous forms. The implementation CSP followed up with those surveyors and auditors who continued to use older versions of the forms.

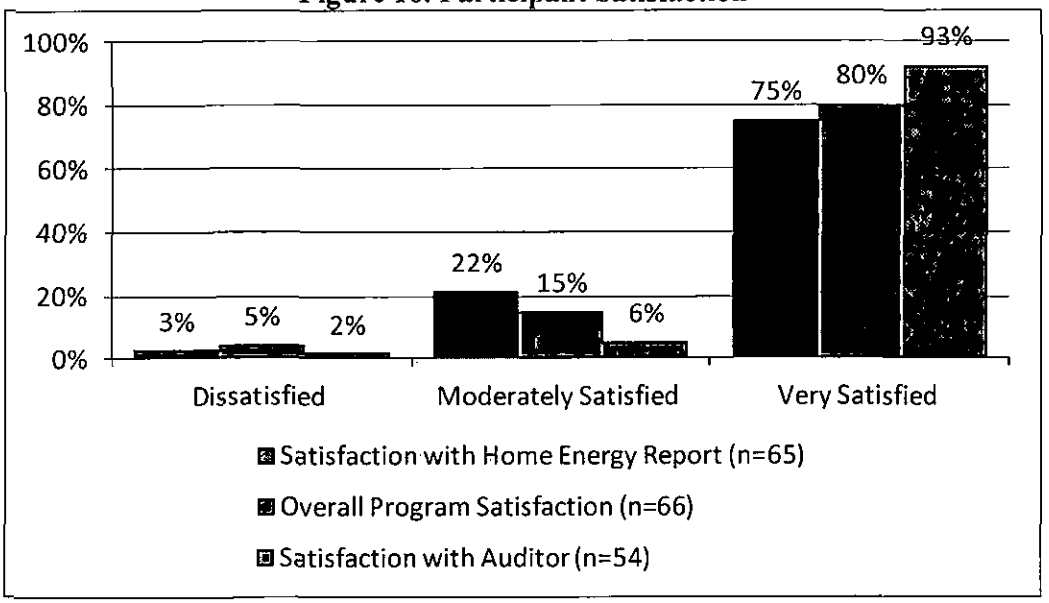
Quality Assurance and Quality Control

Customer Satisfaction

In their interviews, the trade allies reported that many homeowners were already knowledgeable about energy use, had taken some actions to be more energy-efficient, and were seeking additional information about actions they could take. The perceived that customers seemed pleased, informed, and enlightened by the program. The customers also stated the blower door and duct blaster tests were eye-openers for them.

Figure 16 provides participant satisfaction ratings for the program overall, the auditor, and the Home Energy Report.

Figure 16. Participant Satisfaction



In the participant phone survey, respondents rated their satisfaction with various aspects of the program, such as their program experience overall and the report they received. The questions used a scale of from1 to 10, with 1 being extremely dissatisfied and 10 being completely satisfied. Overall, participants were very satisfied with the program.

- Of the 68 respondents, 80 percent assigned their overall program experience an 8-to-10 rating (very satisfied).
- 15 percent indicated they were moderately satisfied (rating of from 4 to 7).
- Only three of the 68 respondents reported dissatisfaction with the program (a rating of from 1 to 3).
- Two respondents said the program was not what they expected.
- One respondent said the survey provided information they already knew or that the information was not helpful.

Of the 68 participants, 55 received a walk-through survey and 13 received a comprehensive audit.

- Of the 55 walk-through survey respondents, 83 percent indicated being very satisfied with their overall program experience, and 11 percent were moderately satisfied.
- Of the 13 comprehensive audit respondents, nine indicated they were very satisfied with their overall program experience (69 percent), and four said they were moderately satisfied (31 percent).

Satisfaction with the Home Energy Report provided at the conclusion of the survey or audit was also high, with 75 percent of respondents being very satisfied with the report.

- Respondents who received a walk-through survey were more likely to report being very satisfied with the Home Energy Report, with 81 percent rating their satisfaction between 8 and 10.
- 22 percent indicated they were moderately satisfied with the report.

In contrast, seven of the 13 comprehensive audit respondents indicated they were very satisfied with the Home Energy Report (54 percent), while six indicated they were moderately satisfied (46 percent).

Among respondents who received walk-through surveys, the satisfaction with the auditor conducting the survey was very high: 93 percent reported they were very satisfied, and 6 percent reported they were moderately satisfied. Ten of the 13 respondents who received comprehensive audits were very satisfied with the process of finding a qualified auditor, and only one respondent was dissatisfied.

The participant-reported rebate check processing time is shown in Figure 17. Of the 13 respondents, 10 said they were very satisfied with the rebate amount, seven of the 13 indicated they were very satisfied with the timeliness of the rebate payment, and three indicated they were moderately satisfied. Only one respondent indicated dissatisfaction with the timeliness of rebate payment.

Figure 17. Participant Reported Rebate Check Processing Time

- Six of the 13 respondents reported receiving their checks within six weeks
- Two respondents reported receiving their checks within seven to eight weeks.

- Two respondents reported receiving their checks after eight weeks, and these were the two respondents providing the two lowest satisfaction ratings with rebate check-processing time.
- Three respondents did not know how long it took to receive their rebate check.

Trade Ally Satisfaction

Trade allies were asked to comment on which aspects of the program were working well. One stated that requiring auditors to have BPI building analyst certification worked well because it ensured consistency between the audits. The implementation CSP noted that he thinks customers like having a list of qualified contractors from whom to choose.

The biggest challenge for PPL Electric was managing trade ally expectations. While the freedom to choose a contractor may appeal to customers, some audit contractors expressed frustration because PPL Electric did not provide direct leads to specific customers. The Company worked with the audit contractors to help them understand that while their contact information is available on the program Website, ultimately the customers decide which contractor will conduct their audit.

Trade allies interviewed were pleased to have the opportunity to inform customers about the most cost-effective ways they can use energy more efficiently in their homes. One trade ally also sold additional services, and the program audits provided leads for additional business opportunities. His company sold more services to customers who had audits than to those who called for a quote on a specific service or measure. The audit-only trade ally enjoyed teaching customers about which measures were cost-effective.

Both trade allies interviewed voiced concerns about the APOGEE software and database. The original program design called for auditors to enter all data into a laptop, where data would automatically load into the central APOGEE database and print out the audit report on a portable printer. This allowed the auditor to give the report to the customer either at the time of the audit or shortly thereafter. Both trade allies said this was not a workable model, since a comprehensive audit takes several hours. Both said they recorded the data on paper forms and entered it into APOGEE later. One stated that entering the data into the laptop would increase the duration of the audit and not be a good use of the homeowner's or his time. However, entering data on paper forms rather than directly into the database or into an electronic entry form introduces an opportunity for data entry errors.

Both auditors were concerned the APOGEE report recommendations were too general. Although one auditor used the comment fields, his comments often exceeded the space provided. Both auditors took photos and infrared pictures of the homes during the audits and wanted to include these in the report. The current format does not accommodate photos.

In addition to the APOGEE reports, both auditors created customized reports for their customers, which took several hours to produce. One auditor stated it would be beneficial for the APOGEE report output to be in an editable format, such as Microsoft Word, rather than a PDF, and said he would like the reports to discuss all energy use in the home, not just electricity use.

Both trade allies stated that more training on the APOGEE software would be beneficial.

Records Review

Cadmus conducted a desk review of a sample of the program's PY2 Q2 and Q3 records to verify the accuracy of data entry, the measures installed, and the measure quantity recorded. Of the 25 records reviewed, 12 from Q2 and 13 from Q3.

After an initial review of the participant data revealed that six records in Q2 and two in Q3 contained values in the "Quantity" field that were greater than the number of direct installation measures allowed by the program, Cadmus selected these records for desk review. It then selected the rest of the sample points for each stratum via simple random sampling.

In each sample, the records were stratified by audit type: survey, all-electric audit (PEY1), or CAC only audit (PEY2). Approximately 80 percent of program participants opted for walk-through surveys, so Cadmus selected half of the sample points from walk-through audits. The remaining sample points were evenly split between the two audit types (all-electric or CAC). Cadmus compared information on the survey and rebate forms to values in eic|ComfortHome's program tracking database and then compared it to the information recorded in EEMIS.

QA/QC Issus Identified

Cadmus recorded the discrepancies listed in Table 8.

Table 8. Data Discrepancies in Residential Audit and Weatherization Records

Data Discrepancy Noted	Number of Occurrences Out of 25
Measure quantity on form doesn't match recorded value in EIC database or EEMIS	15
Measure quantity on form doesn't match recorded value in EIC database but does match recorded value in EEMIS	3
Measure recommendation on form matches EIC database, but not EEMIS	12
Measure recommendation on form matches EEMIS, but recommendation recorded in EIC database is different	7
Customer name or street address on the form doesn't match EIC database and EEMIS	3

Many of the discrepancies seem to be data entry errors that could be avoided by the use of drop-down boxes, which would limit entry of measure quantities to those allowable by the program. Adding QA/QC for data entry on all fields would also help to increase the accuracy of the database.

The sources of other data discrepancies—such as the difference between the EIC database and EEMIS—are not clear and should be investigated. It is possible that the errors could be occurring during either the editing process or the data conversion process from the CSP database to the upload file. The implementation CSPs can change uploaded data in EEMIS while the upload is still in progress. However, the CSP reported data is edited in their own tracking database or the transfer file and then data are reloaded to EEMIS.

Finding the source of these errors is important because recommended measures need to be recorded accurately in EEMIS or else the subsequent customer applications for the bonus rebate request will be rejected. In addition, the CSP's inventory control system depends on accurate information about the number of direct-installation measures installed by each surveyor or auditor. As yet, disagreements between the CSP and the surveyors have not occurred; however,

disagreements could occur if there is inaccurate information about the number of kits distributed and measures installed.

EM&V

Because no bonus rebates were uploaded during PY2, the savings for this program result from the measures installed during the survey or audit. EM&V efforts focused on detailed records reviews to verify the number of measures installed and on the customer surveys to estimate measure retention rates. No site visits were conducted for Home Assessment and Weatherization in PY2, because no records for installation of additional measure (ceiling and wall insulation, duct and air sealing) were uploaded.

Compact Fluorescent Lighting Campaign

Executive Summary

The objectives of the CFL Campaign are to: (1) provide a mechanism for customers to easily obtain discounted ENERGY STAR-qualified CFLs; (2) help transform the market for ENERGY STAR-qualified CFLs and increase the number of qualified products purchased and installed in PPL Electric's service territory; (3) encourage customers to install CFLs obtained through give-aways; (4) increase customer awareness and understanding of the benefits and proper uses of CFLs; (5) promote customer awareness of the ENERGY STAR label; (6) promote other PPL Electric energy-efficiency programs; and (7) distribute 7,125,000 CFLs with a total savings of 292,137 MWh/yr and 45.6 MW.

After 24 months of operation (and with 24 months of operation remaining), the program was ahead of its energy saving targets. As of May 31, 2011, the CFL Campaign had achieved 207,838 MWh/yr in energy savings (71 percent of its expected total four-year) and 12.4 MW in demand savings (27 percent of its expected total).

For the CFL Campaign process evaluation in PY2, Cadmus interviewed the PPL Electric staff and the CSP (Ecos) staff. Cadmus also completed a total of 282 telephone surveys with PPL Electric residential customers (104 in PY2 Q1 and 178 in PY2 Q3) and it reviewed and compared the CSP and EEMIS program databases.

Key Findings

The key findings from the process evaluation of the CFL Campaign are these:

- The CFL Campaign was extremely successful in PY2.
  - After 24 months of operation, it had achieved 71 percent of its expected four-year energy savings and 27 percent of its expected four-year demand savings.
  - Program-discounted CFLs were available for customer purchase at approximately 430 retail locations throughout PPL Electric's service area and through its E-Power Website.

  - ➢ In collaboration with a number of community and retail organizations, PPL Electric distributed free CFLs to customers in its service territory at approximately 70 successful retailer and community-based give-away events throughout the year.
- Due to the program's overwhelming success over the past two program years, PPL Electric may try to slow the program's pace in PY3.
- The CFL CSP was effective in its implementation efforts, trade ally (manufacturer and retailer) management, data tracking, and reporting.
- The manufacturers' buy-downs, negotiated by the CFL CSP, are appropriately adjusted on an ongoing basis.
- CFLs sold through the E-Power Website are now tracked in EEMIS.
- Although the interest level for CFL recycling varies by community, several retailers are enthusiastic about the program's recycling component. Thirty-three independent retailers have program-sponsored CFL recycling bins at their stores, and another 30 stores (Home Depot and Lowe's) in PPL Electric's service area have CFL recycling bins sponsored by their respective corporate recycling efforts.
- Nearly 26 percent of customer survey respondents reported recycling used CFLs at a retail store or hazardous waste center, while 51 percent reported disposing of spent CFLs in the trash.
- During give-away events, many customers asked about the mercury content in CFLs and about CFL recycling. Increasing numbers of customers also asked about Energy Independence and Security Act (EISA) and the types of lighting that comply with EISA.
- In response to several requests, PPL Electric made bulk purchases of discounted CFLs available in PY2 to non-residential participants in the Efficient Equipment Incentive Program.
- The customer programs specialist and the CFL CSP have addressed many of the program's earlier logistical issues by implementing weekly and bi-weekly coordination meetings and making monthly visits to participating retail stores.
- The CSP continued to experience some difficulty determining whether specific lighting retailers are PPL Electric customers and are, thus, eligible to participate in the CFL Campaign.
- The records review found that all EEMIS variables used to calculate energy and demand savings were identical to those in the CSP's database. Also, some SKUs, incandescent wattage values in the CFL Type text field were incorrect; however, these errors do not affect savings calculations.
- Due to the federal lighting standards that will be phased in beginning on January 1, 2012, PPL Electric is considering changing the CFL Campaign. Information. Specifically, incentives for next generation lighting technologies may be added to the campaign in PY3. To reflect the program's expanded offerings, the CFL Campaign will likely be renamed the "Residential Lighting" program in PY3.

Conclusions

- The CFL Campaign's continued success in PY2 is attributable in large part to the CSP's effective management of and collaboration with manufacturer and retail partners, effective collaboration and communication with PPL Electric, and its successful community-based give-away events.
- Due to the program's overwhelming success over the past two program years, PPL Electric will need to manage the program's pace in PY3 to avoid over-subscription of the full EE&C Plan program cycle and risk closing the program early.
- PPL Electric is proactively responding to changes in the residential lighting market by considering the introduction of LEDs and other next generation lighting technologies to the program, and the Company will rename the CFL Campaign as the Residential Lighting program in PY3.
- PPL Electric's residential customers want and need more information about: (1) How EISA will affect the types of light bulbs available in the marketplace; and (2) what lighting technologies comply with the new federal efficiency standards. Providing this information to customers presents PPL Electric with an excellent opportunity to enhance its customer service while easing its customers' transition to the new lighting technologies they will find on store shelves.
- PPL Electric's residential customers want and need more information about the mercury content in CFLs and about CFL recycling. Providing this information to customers presents PPL Electric with another opportunity to enhance its customer service.
- Improvements to PPL Electric's customer database may result in streamlining the process of determining whether lighting retailers are PPL Electric customers and, thus, eligible to participate in the CFL Campaign.
- EEMIS contains accurate data for all variables used to calculate energy and demand savings. Correcting inaccurate data in one of the text fields, however, would help to ensure EEMIS is internally consistent.

Recommendations

- Change the CFL Campaign name to the Residential Lighting program. With increasing numbers and types of efficient lighting technologies entering the market (and perhaps also the program), the "CFL Campaign" program name will soon be obsolete.
- Slow the program's pace so that it better tracks with the original plan; this will likely entail scaling back program marketing and decreasing the incentives on spiral CFLs (of which the general population is already widely aware). By slowing the program's pace, PPL Electric can avoid having to close the program's retail component midway through the current program cycle, which would likely result in customer confusion and frustration.
- Enhance customer service to help prepare customers for upcoming changes in the residential lighting market by providing updated program collateral materials, bill inserts, and feature articles in the *Connect* newsletter. The materials should explain the new EISA lighting standards, how these standards will affect customers' day-to-day lives, and the

next generation lighting technologies that are becoming available. Additional EISA information could also be provided at participating retail locations that are willing to dedicate floor/shelf space to this messaging.

- Introduce customers to next-generation lighting technologies by providing incentives for select models of LEDs and other bulbs that exceed EISA efficiency standards. (However, offer incentives only for well-designed equipment that has been carefully evaluated.) This may reduce the occurrence of the early adoption problems that CFLs encountered.
- Although PPL Electric's customers dispose of fewer CFLs in the trash than the customers of utilities in other states, PPL Electric could reduce that percentage further if it enhances program marketing and education efforts about both the mercury content in CFLs and the recycling options. This could be accomplished by providing more (or featured) information on the E-Power Website, bill inserts, and in the newsletter, *Connect*. Additional CFL recycling information could be provided at participating retail locations that are willing to dedicate floor/shelf space to this messaging.
- Continue bi-weekly meetings with the CFL CSP and PPL Electric's E-Power team to facilitate good communication and give-away event coordination. Continue the CSP's monthly retail store visits to: (1) Inspect the POP materials; (2) ensure retail staff members are properly educated about efficient lighting; and (3) address retailers' questions.
- Assign a PPL Electric customer service staff member who is very familiar with the Company's customer database, to work with the customer programs specialist to determine whether candidate lighting retailers are in PPL Electric's service territory.
- Correct the incandescent wattages reported in the CFL Type text field in EEMIS to avoid confusion and ensure EEMIS is internally consistent.

Program Overview

PPL Electric launched its CFL Campaign in January 2010 to promote the acquisition and installation of ENERGY STAR-qualified CFLs throughout its service area. The program supports market transformation activities with the goal of achieving permanent, measurable improvements in lighting end use. The program is available to all PPL Electric customers.

From the CFL Campaign's inception, it has offered two components:

- An upstream retail lighting component that provides incentives to CFL manufacturers. The upstream incentives then trickle down to consumers, effectively "buying down" the retail price of ENERGY STAR CFL bulbs. The majority of program-discounted CFLs are sold in retail stores, although PPL Electric also offers program-discounted CFLs through an on-line retail store.
- A give-away component that provides customers with free ENERGY STAR CFLs at PPL Electric-sponsored events. These events, which were held throughout the year, were coordinated with sponsoring trade allies and community groups.

For the retail program component, manufacturer incentives were available to customers year-round. These incentives varied by CFL feature (e.g., standard spiral, dimmable, 3-way), shape (e.g., flood, bullet), and package size.

The CFL Campaign is the second largest program in PPL Electric's portfolio in terms of energy and demand savings (excluding load control and rate programs). Program Implementation

Program Status

After 24 months of operation (and with 24 months of operation remaining), the program was ahead of its energy savings targets. As of May 31, 2011, the CFL Campaign had achieved 71 percent of its expected total four-year energy savings of 292,137 MWh/yr and 27 percent of its expected four-year demand savings of 45.6 MW. The program's total cost (including common program costs) over the four-year period is expected to be nearly $18 million.

At its peak, program-discounted CFLs were available for customer purchase at approximately 430 retail locations throughout PPL Electric's service area, as well as from the E-Power Website. Additionally, through collaboration with a number of community and retail organizations, PPL Electric distributed CFLs for free to customers at nearly 90 successful retailer and community-based give-away events throughout the year.

The program's CFL recycling campaign has also been successful and has 33 participating independent retailers (in addition to two national chains that run their own corporate CFL recycling program).

Due to the program's overwhelming success over the past two program years, PPL Electric likely will increase the projected savings of this program, within budget, to help offset the shortfall from the small C&I sector.

For PY3, the CFL Campaign is considering providing information about—and possibly incentives for—some models of next-generation lighting technologies. The addition of incentives for these technologies could help introduce customers to new types of bulbs as EISA begins to take effect on January 1, 2012. Next-generation residential lighting technologies (such as LEDs and 2X incandescent bulbs) have advanced rapidly in recent years, and ENERGY STAR began qualifying LEDs toward the end of 2010. With the inclusion of these additional types of bulbs, the CFL Campaign will likely be renamed the Residential Lighting program in PY3.

Program Processes

All three of the program's CFL distribution mechanisms are functioning very well.

- As of May 31, 2011, program-discounted CFLs were for sale in roughly approximately 430 retail stores. This is a significant expansion over the 324 stores that offered program-discounted CFLs as of the end of PY1.
- The give-away component of the program was extremely successful in PY2. In addition to giving CFLs away (or offering them as buy-one, get-one-free) at 17 retail store-sponsored events, PPL Electric distributed CFLs at 71 sporting events, street fairs and festivals, expos, and other community-based events. PPL Electric is assessing the

feasibility of also offering CFLs through Meals on Wheels, American Red Cross stations, retirement homes, and food banks.

Residents in all areas of PPL Electric's service area had opportunities to receive free bulbs. The give-away events were held in 39 cities across the service area, including both small cities (e.g., Meshoppen, with fewer than 900 residents) and large cities (e.g., Allentown, with a population of over 118,000).

- CFLs were available for purchase via PPL Electric's E-Power Website; the Website averaged approximately 580 unique visitors per month in PY2.[8]

PPL Electric staff reported the CFL CSP continued to do an excellent job of managing participating manufacturers and retailers.

- On a monthly basis, the CSP reviewed proposals, negotiated program participation terms, and updated memorandums of understanding (MOUs) with manufacturers and retailers.
- During each month of PY2, the CSP visited participating retail stores (averaging over 400 store visits per month) to: (1) Ensure pricing accuracy; (2) install and ensure the prominent placement of POP displays (where permitted); (3) confirm inventory was sufficient; (4) train staff on the benefits and details of the program; and (5) confirm that recycling containers were available to customers, as applicable.

Some of the program's success can be attributed to the successful working relationship between the CFL CSP and PPL Electric. Interview respondents valued the mutual support, the clear communications, and the quick response to questions.

The CFL CSP reported that several retailers are excited about the program's recycling component. Thirty-three independent retailers have program-sponsored CFL recycling bins at their stores, and another 30 stores (Home Depot and Lowe's) in PPL Electric's service area have CFL recycling bins sponsored by their respective corporate recycling efforts. The CSP explained that participation in the recycling portion of the program is contingent on retailer interest, noting that some cities/towns were more recycling-oriented than others. Information about the mercury content in CFLs and CFL recycling was available to customers on PPL Electric's Website and in brochures and posters used at community and retailer give-away events.

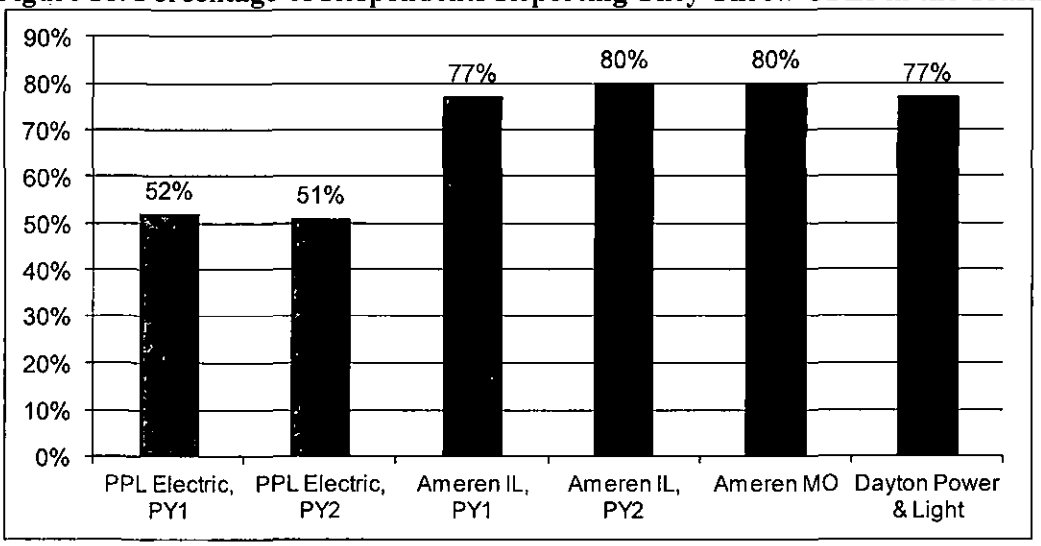
Of customer survey respondents who reported having a CFL burn out or disposing of a CFL in the previous 12 months, 15 percent reported recycling their spent CFLs at a hazardous waste center, and 10 percent reported disposing of CFLs in a recycling bin at a retail store. Fifty-one percent of respondents said they threw their spent CFLs in the trash.[9]

[8] The number of unique visitors per month varied widely, ranging from a low of 379 in September 2010 to a high of 1,344 in July 2010.

[9] In PY1, 52 percent of PPL Electric's telephone survey respondents said they threw their spent CFLs in the trash.

As shown in Figure 18, fewer PPL Electric customers report disposing of their CFLs in the regular trash than do customers at other utilities.

Figure 18. Percentage of Respondents Reporting They Threw CFLs in the Trash



Of the 23 percent of PPL Electric survey respondents who reported doing something "other" with their spent CFLs, the majority (20 percent of all respondents) said they were storing the spent CFLs in their homes.

The CFL CSP uploads data to EEMIS monthly, and PPL Electric staff members coordinate with the CSP to track program data. PPL Electric continues to be very satisfied with the CFL CSP's monthly reports and the "Your Ecos" dashboard, which enables the Company to monitor program achievements and progress toward goals.

The only data tracking change implemented for the CFL Campaign in PY2 involved CFL purchases made through the E-Power Website. These purchases are no longer tracked in a separate database (as they were in PY1), but are now tracked in EEMIS, as are CFLs purchased from brick-and-mortar retail stores and distributed at give-away events.

In PY1, several lighting distributors/suppliers and Energy Services Companies (ESCOs) requested that PPL Electric enable them to purchase large quantities of program-discounted CFLs through alternative channels. PPL Electric responded to this request in PY2 by developing a bulk CFL purchasing option through the commercial and industrial Efficient Equipment Incentive Program.

PPL Electric and the CFL CSP implemented several systems that addressed the logistical challenges reported in PY1. First, the customer programs specialist and the CFL CSP meet weekly to discuss the program's progress, necessary adjustments (e.g., to incentives for particular CFL models), upcoming give-away events, and other program details. They also meet bi-weekly with the E-Power team to coordinate give-away events. During these meetings, the

team establishes roles and responsibilities for each event (e.g., CFL transportation and event staffing). In addition, the CSP makes monthly visits to the retailers, as noted above.

The CSP continues to confront challenges using PPL Electric's customer database. Since participating retailers must be PPL Electric customers, the CSP relies on the database to assess whether an interested retailer is eligible to participate. When a candidate retailer participant is identified, the CSP provides its name (and account number, if available) to the customer programs specialist, who then contacts PPL Electric's customer service department to determine whether the retailer is a PPL Electric customer. The database often cannot recognize a PPL Electric customer when there are minor data entry differences (inclusion of "Inc." at the end of the customer's name, capitalization versus lower-case letters, etc.). The eligibility confirmation process could be streamlined if PPL Electric assigned a customer service staff member (one who is very familiar with the customer database) to determine the retailers' eligibility for the CFL Campaign.

To alleviate bottlenecks, PPL Electric continues to assess its internal review process. In particular, the contract and RFP review process has been improved (specifically for RFPs soliciting bids from manufacturers interested in supplying CFLs for give-away events), as has PPL Electric's internal review of the CFL CSP's advertising and POP materials.

Marketing

The program continued to reach customers through the same approaches employed in PY1: billboards within the service area

- Bill inserts
- Word-of-mouth,
- -E-Power Website
- POP displays and program information available at participating retail stores
- Radio and newspaper advertisements about give-away events and the program in general
- Materials disseminated at give-away events

While the majority of respondents to Cadmus' telephone survey were not aware of the CFL Campaign (which is typical and expected for an upstream program), most customers (37 percent) reported first learning about CFLs from TV/radio/newspaper ads or stories not sponsored by PPL Electric. Twenty percent first learned about CFLs from retail store displays or ads, while 16 percent reported being informed by friends or family members.

During its regular retail store visits, the CFL CSP and retailers worked together to adjust the marketing approach to elicit the best customer response possible. These adjustments entailed tailored marketing materials and adjusted incentive levels based on sales patterns for specific products. PPL Electric's customer communications team assisted the CFL CSP by sponsoring selected sporting events, at which E-Power promotional videos were screened and give-aways were offered at the games.

While the program-induced price reductions are the program's primary selling points, the opportunity to save energy is also an important selling point. This was corroborated by the CSPs'

discussions with thousands of customers at CFL give-away events, where customers told the CSP they are pleased that program-discounted CFLs can help them save money and energy.

The CFL CSP continued to be responsible for trade ally participants, drawing on the strong working relationships established with a range of manufacturers, national retailers, local and smaller chains, and independent stores to enlist them in the program. Based on higher-than-expected CFL sales and trade ally participation, it appears the program's customer and trade ally marketing approaches were effective.

CFL Discounts

The CSP regularly analyzed program sales and adjusted CFL incentives in accordance with the guidelines (both for MWh/yr savings and the budget) set forth in the CSP's contract with PPL Electric. PPL Electric believes that program CFLs are appropriately discounted for two reasons:

- Customers have been so responsive to the program that it has well exceeded its PY2 goals.
- The CFL CSP is able to leverage his experience implementing similar lighting programs nationwide, his long-standing relationships with CFL manufacturers (who, in turn, have long-standing relationships with lighting retailers), and his role implementing a CFL program for a neighboring Pennsylvania EDC, in which the CSP negotiates appropriate CFL buy-downs with participating manufacturers.

Quality Assurance and Quality Control

As part of the evaluation process, Cadmus conducted a review of program quality metrics, including customer satisfaction and data integrity.

Customer Satisfaction

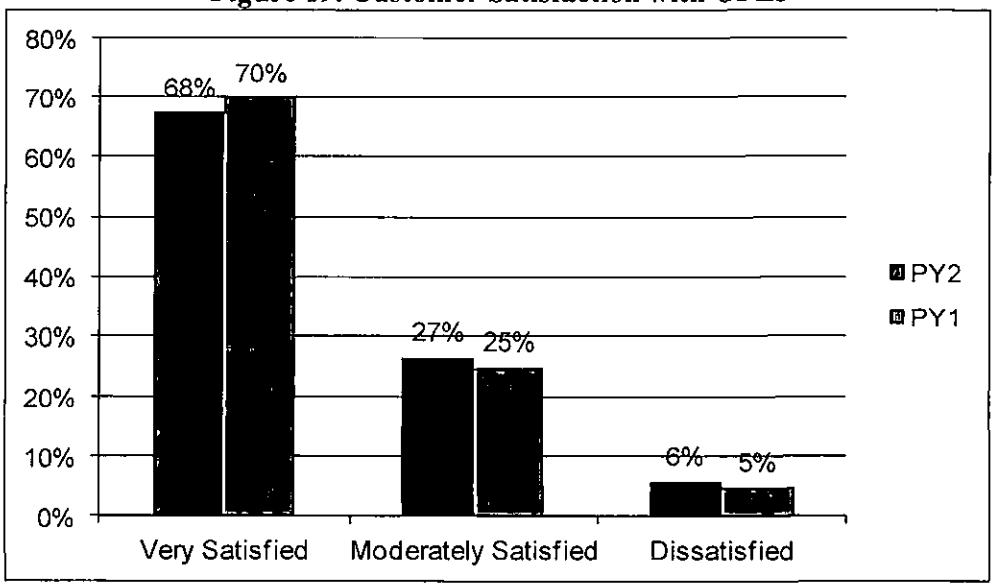
Due to the upstream nature of the CFL Campaign, PPL Electric does not definitively know—and therefore cannot track—which customers were program participants. Furthermore, customers who purchased program-discounted CFLs were generally not aware they were participating in a PPL Electric-sponsored program. Thus, Cadmus was unable to query participating customers about their satisfaction with the CFL Campaign.

However, Cadmus did conduct two rounds of telephone surveys with randomly selected residential customers in PY2. In these surveys, 89 percent of respondents reported being aware of standard spiral CFLs, although fewer than half were aware other types of specialty CFLs such as dimmable and 3-way.

Respondents who previously or currently used CFLs were asked about their overall satisfaction with CFL technology. Of the 200 respondents to this survey question, 68 percent were very satisfied with their CFLs, 27 percent were moderately satisfied, and only 6 percent were dissatisfied.

As shown in Figure 19, these results are comparable to those found during the PY1 customer survey.

Figure 19. Customer Satisfaction with CFLs



The three most common reasons for respondents' dissatisfaction with CFLs were these:

- The bulbs burned out, broke, or stopped working (32 percent).
- The bulbs take a long time to reach full brightness (18 percent).
- The bulbs are not bright enough (14 percent).

All survey respondents who mentioned seeing or hearing about PPL Electric's sponsorship of the CFL buy-down also reported that the selection of CFLs offered through the program met their needs.

The CFL CSP, who had direct contact with thousands of PPL Electric customers at give-away events throughout PY2, reported mostly positive feedback from these events. Customers at these events asked about the mercury content in CFLs and about CFL recycling, and they began to ask more questions about EISA and lighting technologies that comply with the new federal standard.

In PY2, PPL Electric responded to 36 calls about the CFL Campaign, which is a dramatic reduction from the 235 program-related calls received by the customer service department in PY1. In PY2, customers inquired about the location of participating stores, CFL usage (e.g., one customer wanted assistance identifying an appropriate energy-efficient replacement for his incandescent flood lamp), recycling options, and safety concerns. Several customers also inquired about PPL Electric's other energy-efficiency offerings and about Energy Star programs.

Records Review

Cadmus reviewed the census of CFL Campaign records to assess data integrity. This review revealed that for all of the variables used to calculate energy and demand savings, the values in EEMIS were identical to those in the program CSP's database. The records-to-records comparison did show, however, that for several SKUs, the incandescent wattage reported in the "CFL Type" text field in EEMIS was incorrect, but these errors do not affect the savings calculations.

To confirm that savings calculations were based on the highest of the three incandescent and CFL wattages, Cadmus reviewed the data for 3-way CFLs and verified this was the case for 100 percent of the records.

EM&V

In the 2011 TRM, two corrections were made to the peak demand savings equation for Energy Star CFLs:

- The wattage is divided by 1,000 so the peak demand savings are shown in the appropriate units (i.e., kilowatts, or kW, rather than in watts).
- The CFL in-service rate (ISR) multiplier was incorporated into the equation.

PPL Electric was already making the first correction to its peak demand savings calculated before the TRM was updated TRM. The second correction (incorporating the ISR) will be put into effect beginning with the PY3 program savings calculations.

Appliance Recycling Program

Executive Summary

The objectives of the Appliance Recycling program (ARP) are to: (1) encourage customers to dispose of their inefficient appliances or eliminate a second unit that may not be needed; (2) reduce the use of secondary, inefficient appliances; (3) ensure appliances are disposed of in an environmentally responsible manner; (4) ensure appliances are not resold in a secondary market; (5) promote other PPL Electric energy-efficiency programs; (6) collect and recycle 69,600 appliances through 2013; and (7) reduce energy use by 114,761 MWh/yr and 13 MW.

After 19 months of operation, the program is slightly behind its MWh/yr savings and participation goals, however is exceeding MW targets. As of the end of PY2 (May 31, 2011), ARP achieved 30 percent of its 114,761 MWh/yr four-year savings goal, 55 percent of its four-year 13 MW goal, and 32 percent of the four-year participation (units recycled) target.

For PY2, the program achieved 71 percent of its MWh/yr savings goal, 119 percent of its MW goal, and 76 percent of the participation (units recycled) target.

Cadmus' PY2 ARP process evaluation consisted of interviews, surveys, and a database review.

- Interviews were conducted with the customer programs specialist and the program CSP (JACO).
- Telephone surveys were completed with 142 participants to assess customer satisfaction with the program and awareness
- Telephone surveys were completed with 134 nonparticipants. These surveys identified customers who discarded a program-eligible appliances outside of the PPL Electric ARP, and the questions for this group focused on program awareness and reasons for not participating.
- Cadmus also reviewed and compared the implementation CSP and EEMIS program databases.

Key Findings

These are the process evaluation's key findings:

- ARP's participation levels were lower than those anticipated in the EE&C Plan for PY2. Because of this, PPL Electric increased marketing efforts to boost participation and revisited participation targets for future program years.
- The 2011 TRM reduced the savings for recycled refrigerators and this will reduce the projected savings for this program.
- Participants learned about the program primarily through earned media, such as news stories. Nonparticipants suggested the PPL Electric inform customers about ARP through bill inserts. PPL Electric has not utilized bill inserts as an outreach tactic for this program.
- The two most common reasons for joining the program were, in this order: (1) participants wanted to replace their old unit, and (2) they wanted to receive the incentive.
- The ARP CSP recommended increasing incentive levels to improve participation. This strategy is supported by Cadmus' experience evaluating other appliance recycling programs across the nation, PPL Electric research, and customer survey results.
- PPL Electric and the ARP CSP successfully partnered with major appliance retailers Best Buy and Sears to offer recycling services with the purchase of a new energy-efficient unit. This action made participation more convenient for customers.
- PPL Electric feels that customers may not be educated about the benefits of saving energy through recycling, and that increasing educational information that emphasizes the benefits of energy savings may increase participation.
- Surveyed participants are very satisfied with the program overall and with the ARP CSP.
- QA/QC tracking and reporting issues from PY1 were addressed during PY2, confirmed through random manual checks of EEMIS data against the ARP CSP's database; however, PPL Electric prefers a more automated system.

Conclusions

- Although program delivery is efficient, customers are satisfied, and the program functions well, the participation and savings are below projected PY2 and four-year targets. This may be due to lower market demand following the strong first year and an overestimated harvest rate in the EE&C Plan. For future program years, participation is expected to remain consistent with PY2 levels, or could decrease further if the program is still experiencing pent up demand.
- The 2011 TRM changes will have multiple negative impacts on the ARP, such as:
  - Reducing unit savings and changing the PY3 program delivery process, making it very challenging for PPL Electric to meet its four-year savings targets.
  - Necessitating several changes to program processes and tracking, adding complexity to the existing processes.
  - Adding cost and complexity to the evaluation and QA/QC methodology of verifying whether customers replaced their unit and determining if the replacement is high-efficiency or standard efficiency.
- Partnering with major appliance retailers Best Buy and Sears to offer recycling services with the purchase of a new energy-efficient refrigerator/freezer is making enrollment and participation more convenient for customers who purchase a new high-efficiency unit. There may be an opportunity to replicate this model with more retailers to further boost participation if some of the entry barriers can be overcome.
- The finding that replacing old equipment is the top reason for participation among survey respondents highlights the importance of expanding PPL Electric's retail partnerships.
- Although PPL Electric has expanded marketing in some areas and had success with many tactics (e.g., earned media), they may be missing an opportunity to increase outreach through bill inserts—a valuable, broad reaching marketing channel—which have not yet been utilized for the program.[10]
- Saving energy is not a top priority among participants, likely because they are unaware of the energy saving benefits of recycling.
- The incentive was more important among PY2 respondents compared to PY1, which suggests that increasing the incentive could boost participation.
- Data tracking issues identified in PY1 were addressed during PY2 through random manual checks; however, errors are more likely to happen without having a more robust and automated QA/QC system in place.

[10] PPL Electric reported that the first bill insert for ARP is planned for August 2011 (PY3).

Recommendations

- Consider revising the EE&C Plan to reduce the number of refrigerators and the total savings to reflect TRM changes and actual market conditions.
- To increase the likelihood of meeting revised targets, increase program marketing, especially through bill inserts. Timing marketing efforts with seasonal peaks during the spring and summer months could further stimulate participation.
- Earned media through news stories has been a very successful marketing tactic since program inception, and continues to be the number one way participants learn about the ARP. As such, PPL Electric should continue to use this outreach channel whenever possible.
- As supported by the PPL Electric panel study and by Cadmus' evaluation findings, education about the energy cost of an old unit compared to a more-efficient unit should be included in marketing messages to inform customers about the cost savings available by replacing their inefficient appliances. This message should be included in marketing materials, such as brochures, that are distributed by trade allies and retail partners.
- Given that customers mainly participate because they want to replace an old appliance, PPL Electric should expand the retail partner program component. This could be accomplished by reaching out to more big-box retail chains and creating strategies to reduce entry barriers for smaller, independent retailers.
- Increasing the ARP incentive could help boost participation, as supported by feedback from the ARP CSP and customer programs specialist, as well as participant survey results, findings from the PPL Electric panel study, and evidence from other appliance recycling programs around the country and in Pennsylvania. To increase participation, PPL Electric should consider increasing incentive levels from $35 to $50 per recycled refrigerator/freezer. Note that PPL Electric is maintaining the incentive levels because of budget constraints and inconclusive evidence that increased incentives will directly increase the participation rate.
- Implement an automated QA/QC system to check for data inconsistencies across EEMIS and the ARP CSP database. This could be a simple Microsoft Excel system that flags inconsistencies on a census of records.

Program Overview

The ARP offered pick-up and recycling of inefficient refrigerators, freezers, and room air conditioners from customers' homes. The ARP primarily targets residential customers, but was open to all PPL Electric customers with a working, residential-grade refrigerator, freezer, or room air conditioner. Rebates were limited to two eligible refrigerators or freezers and two room air conditioners per customer address per year.

- Participating customers received a $35 incentive per refrigerator or freezer collected from their homes and recycled through the program.

- Room air conditioner pick-up was not offered as a stand-alone service, but was eligible for recycling at the same time a refrigerator or freezer was picked up. (The incentive for room air conditions was $25 per fan motor.)

The PY2 program continued to experience high customer satisfaction and high-quality program delivery; however, ARP was behind in meeting annual participation and savings targets and was under budget. PPL Electric feels that the primary reasons that ARP is not meeting its targets are these:

- The program's harvest rate goals were set too high for the market, and
- Current incentive levels may be too low to recruit potential participants.

Program Implementation

Program Status

After 19 months of operation, the program is slightly behind its MWh/yr savings and participation goals. However the program is exceeding MW targets: as of the end of PY2 (May 31, 2011), ARP achieved 30 percent of its 114,761 MWh/yr four-year savings goal; 55 percent of its four-year 13 MW goal; and 32 percent of the four-year participation (units recycled) target.

For PY2, the program achieved 71 percent of its MWh/yr savings goal; 119 percent of its MW goal; and 76 percent of the participation (units recycled) target.

PPL Electric staff felt that the primary reasons ARP was not meeting its targets are these: (1) The program's harvest rate assumptions in the EE&C Plan were set too high for the market; and (2) current incentive levels may be too low to adequately recruit potential participants.

The ARP CSP, however, felt that the harvest rate goal was within a reasonable range compared to other utility harvest rates nationally. The CSP said increasing the frequency of bill inserts and the spending on marketing—in addition to considering increasing incentive amounts—would likely result in participation increases.

In an effort to meet goals, PPL Electric explored the options of increasing incentive levels and revisiting participation targets to increase participation.

Program Processes

During PY2, the ARP made several changes that enhanced program offerings. Shortly after PY2 began, PPL Electric and the program CSP partnered with major appliance retailers, Best Buy and Sears, and offered (optional) recycling services with the purchase of a new energy-efficient unit. Through this retail pilot program, customers could opt to have their old unit picked up for recycling when the new unit was delivered by the retailer, making appliance recycling more convenient for customers who purchase a new, energy-efficient unit. Marketing and outreach activities for this new feature included bill inserts, in-store displays, and knowledgeable retail sales staff.

In this offering, the retail clerk verified that the appliance purchaser was a PPL Electric customer through an in-store online portal connected to the ARP CSP. Once customer status was verified,

the ARP CSP provided the retailer with an Appliance Turn-In Order (ATO) number, and the sales clerk wrote the ATO number on a sticker for the customer to place on the old unit. The sales clerk scheduled delivery of the new unit. The retailer picked-up staff the old unit with the ATO sticker, verified the unit was operational, and subsequently stored the old unit in their warehouse until picked up as part of a larger batch by the ARP CSP.

As expected with the launch of a new program feature, PPL Electric and the ARP CSP reported that implementation was somewhat slow to start and the pilot experienced some minor setbacks in the early months. For example, the customer verification process took too long initially. It also required a lot of training to ensure retail staff were using the PPL Electric signage and were giving customers accurate promotional information. After the initial launch of the retail pilot, PPL Electric reported it ran smoothly. From January 1 through May 31, 2011, 909 customers recycled appliances through the retail pilot program.

The ARP CSP and PPL Electric are working to expand this program offering to other retailers. However, some barriers were identified: (1) Few of the small independent retailers were able to facilitate secure access to the JACO database on their computer system to verify customer eligibility; (2) the program required that a minimum number of units be collected in a given month to be economically feasible; and (3) there must be a process in place that guaranteed each unit could be matched to the customer who turned it in.

Marketing

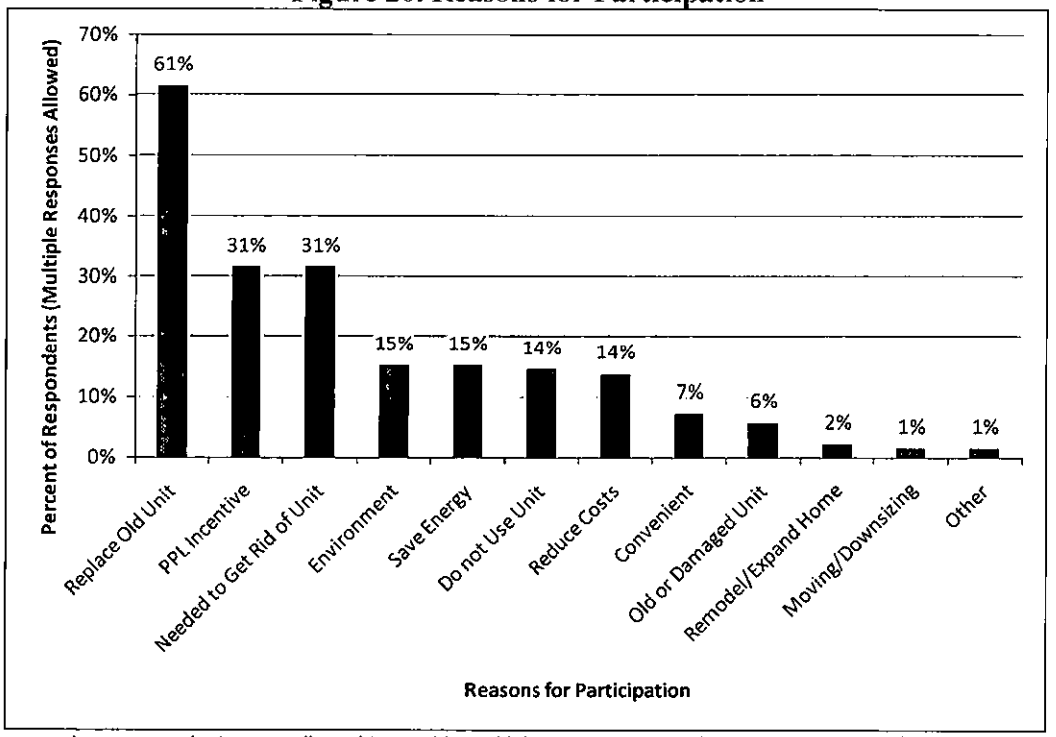
During PY1, independent retailers typically marketed the program to customers, regardless of whether they partnered directly with the program. Several new developments during PY2 improved marketing and outreach. With the new retail participation channel, program marketing shifted from an environmental message to an emphasis on the convenience of having old appliances picked up for free. The ARP CSP reported that convenience is the number one feature customers like about the program, followed by energy savings, and the incentive.

Cadmus' surveys with 140 program participants partially supported this assumption. (Note that respondents often gave more than one answer.)

- 61 percent of participants said they signed-up for the program because they wanted to replace their old unit;
- 31 percent wanted to receive the incentive; and
- 31 percent needed to get rid of an older appliance.

Figure 20 shows the reasons PY2 survey respondents reported for participating in the program.

Figure 20. Reasons for Participation

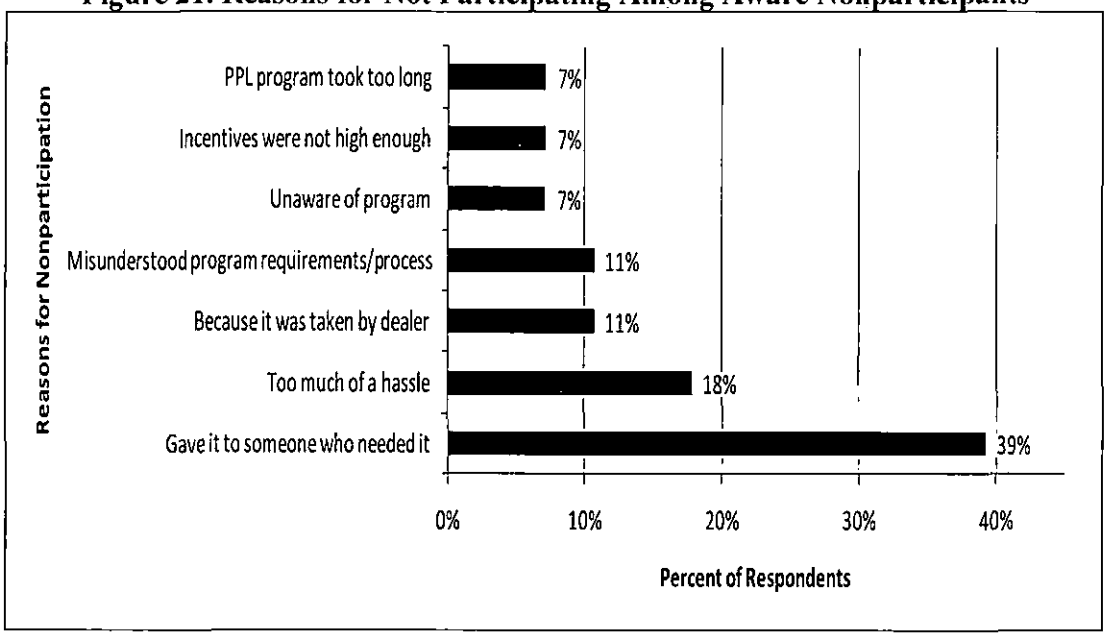


* In cases where respondents were allowed to provide multiple responses to a given survey question (such as with this question), we report results as the percentage of respondents (not responses). As such, total percentages may exceed 100 percent. Responses exclude "don't know." Respondent n = 140

Cadmus conducted surveys with 134 nonparticipants who discarded appliances during the program year. Figure 21 shows the reasons given by nonparticipants for not participating.

- Of the 21 percent (28 respondents) who knew about PPL Electric's ARP when they discarded an appliance, 11 did not recycle through ARP because they gave the appliance to someone who needed it.
- Other reasons for nonparticipation were these:
  - The "*hassle*" of participating (five respondents);
  - The dealer took the unit (three respondents); and
  - The nonparticipants misunderstood the program requirements (three respondents).

Figure 21. Reasons for Not Participating Among Aware Nonparticipants



n=28

Marketing through direct mail targeted 400,000 customers in select ZIP codes and demographic groups. The ARP CSP implemented the direct mail campaign in two waves of 200,000 pieces of mail during April 2011, the fourth quarter of PY2.

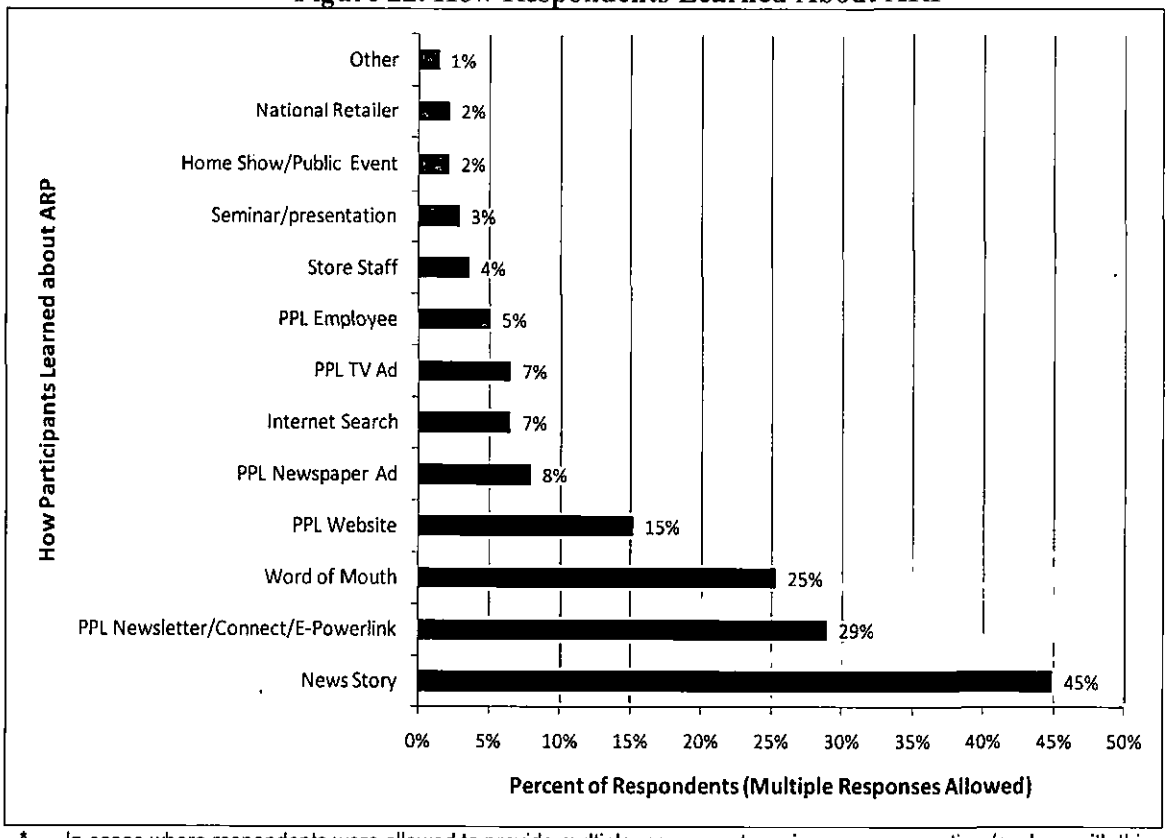
PPL Electric hosted a successful public relations event at the appliance recycling facility with students from a local school who had recycled their school refrigerators and replaced them with energy-efficient units for free, courtesy of PPL Electric. The event generated both television and print earned media. Additional outreach included an April 2011 advertisement in the local newspaper; fliers; a March 2011 article in the *Connect* newsletter; displays at the Historical Society; advertisements on JACO pick-up trucks, and newspaper and television advertisements.

The ARP CSP leaves program materials with each customer at the time of the appliance pickup, including a letter thanking the customer for participating, information about other PPL Electric

programs, and additional literature the participant can share with a friend about ARP and other PPL Electric programs. ARP information was also included with rebate checks sent to participants of other programs, encouraging cross-program participation.

Figure 22 shows how participants learned about the program during PY2. Participants most frequently mentioned they learned about the program through earned media. Most of the 138 respondents learned about the program through a news story (45 percent); PPL Electric's newsletter (29 percent); word-of-mouth (25 percent); and the PPL Electric Website (15 percent). Multiple responses were allowed for this survey question.

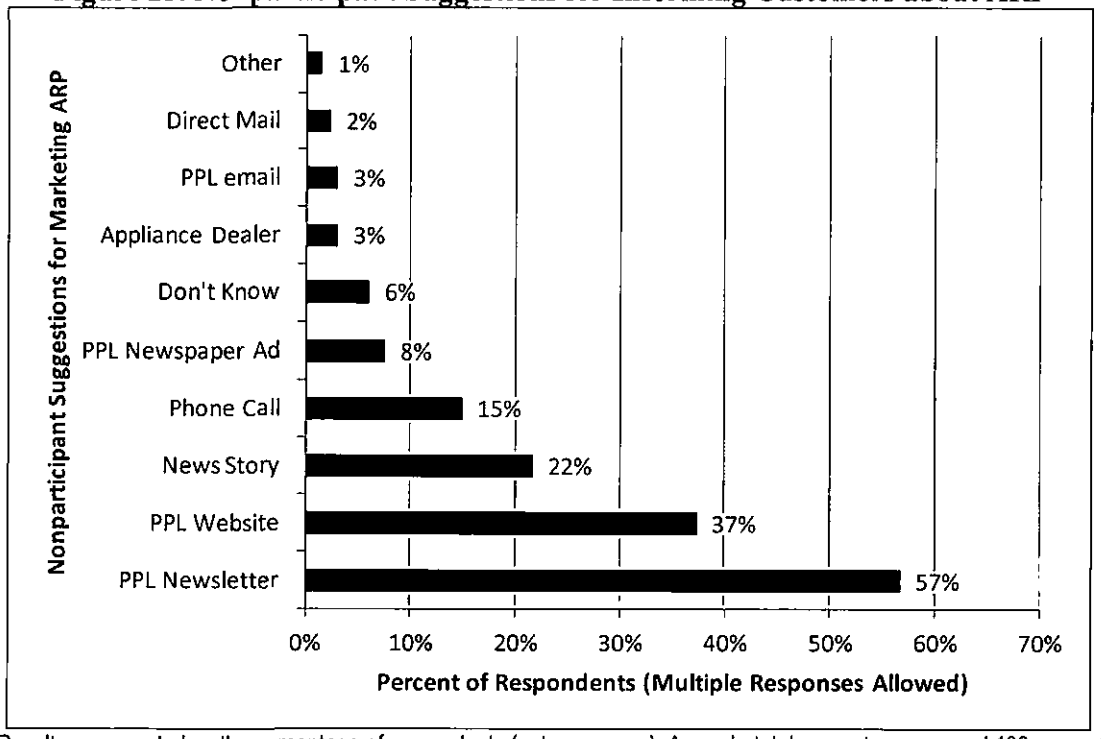
Figure 22. How Respondents Learned About ARP



* In cases where respondents were allowed to provide multiple responses to a given survey question (such as with this question), we report results as the percentage of respondents (not responses). As such, total percentages exceed 100 percent. Responses exclude "don't know." Respondent n = 138

As shown in Figure 23, when asked the best way to inform customers about the ARP, 126 nonparticipants most frequently suggested marketing through a PPL Electric newsletter/bill insert/Connect/e-Power link (57 percent), and through a news story (22 percent).

Figure 23. Nonparticipant Suggestions for Informing Customers about ARP



* Results are reported as the percentage of respondents (not responses). As such, total percentages exceed 100 percent. Responses exclude "don't know." Respondent n = 127

Overall, the ARP CSP and retail partners effectively marketed the program. The ARP CSP felt utility bill inserts should be used; PPL Electric did not use bill inserts in PY2. The first bill inserts were planned for August 2011 (PY3).

In future program years, PPL Electric plans to conduct joint marketing with a neighboring EDC, First Energy, targeting customers in bordering service territories. This effort will initially focus on television advertisements with both PPL Electric and First Energy logos. PPL Electric also plans to work with the C&I implementation CSP to provide marketing materials to that sector.

In a panel study PPL Electric conducted in January 2011, customers indicated that deciding to participate was difficult without being able to compare the current energy cost of their appliance with a newer, more efficient appliance. Based on this, it appears more pronounced educational information about the benefits of energy savings could help increase participation.

Forms and Rebates

During PY2, the program forms and incentive levels were not changed. PPL Electric would like to streamline the online sign-up option to make it easier for customers to access the sign-up page.

The ARP CSP recommended increasing incentive levels to improve participation, and PPL Electric is considering this option. This strategy was supported by results from the January 2011 panel study with 320 respondents. PPL Electric asked customers about various rebate levels and asked how likely these would be to persuade them to recycle their appliance. Raising the incentive from $25 to $35 had little to no impact on customer's interest in participating; however, raising it to $50 increased interest by 20 percent among two major respondent groups. Those customers reporting that $50 was too little to persuade them would prefer an incentive of well over $100 per unit.

Cadmus' evaluation surveys found that most participants were satisfied with the existing incentive levels; however 15 percent of respondents were only moderately satisfied with the current incentive. Furthermore, the incentive was the second most frequently mentioned reason for participation among survey respondents.

Based on Cadmus' experience evaluating recycling programs in other states, there are two primary ways that appliance recycling programs typically boost participation: (1) increasing marketing and outreach efforts; and (2) increasing incentive levels. As supported by feedback from the ARP CSP, PPL Electric,, participant survey results, findings from a PPL Electric panel study, and evidenced by other appliance recycling programs around the country and in PA, increasing the incentive level could help boost participation. For example, after First Energy increased its incentive levels to $50 in December 2010, PPL Electric noted that FE experienced a significant increase in participation as a result.

Quality Assurance and Quality Control

As part of the process evaluation and QAQC reviews, Cadmus reviewed program quality metrics, including data integrity and customer satisfaction with the program.

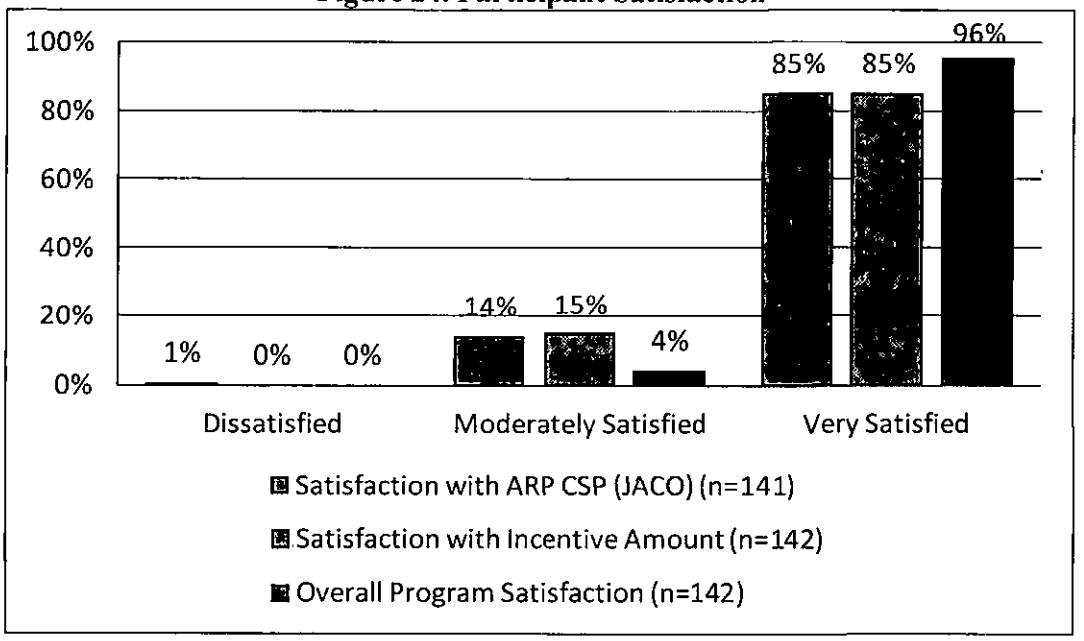
Customer Satisfaction

Cadmus' participant surveys asked a series of questions to assess participant satisfaction with several components of ARP. Overall, the ARP participant survey respondents were very satisfied with the program.

Of the 142 participant respondents, 96 percent were very satisfied with the program overall and four percent were moderately satisfied. Eighty-five percent were very satisfied with the incentive amount, while 15 percent were moderately satisfied. Eighty-five percent of 141 respondents were very satisfied with the ARP CSP and 14 percent were moderately satisfied. PPL Electric was pleased with the ARP CSP's performance in implementing this program and noted that the CSP properly manages customer issues (as they arise), are responsive, and present solutions to problems.

Figure 24 provides participant satisfaction ratings for the program overall, incentive amount received, and experience with the ARP CSP.

Figure 24. Participant Satisfaction



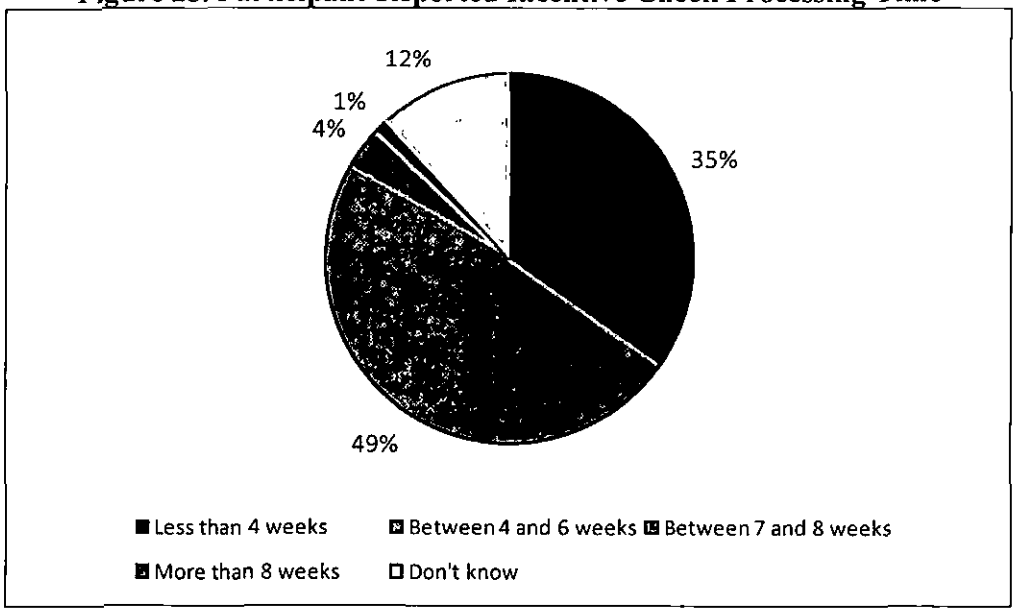
Additional survey questions assessed participant satisfaction with the program processes. Of 139 respondents, 89 percent were very satisfied with the process for signing up for the program, while 11 percent were moderately satisfied. Of the 85 customers that visited the PPL Electric Website, 87 percent were very satisfied with the information provided, and 13 percent were moderately satisfied.

Of the 141 participant survey respondents, 89 percent were very satisfied with the time frame in which they received their incentive check from the ARP CSP, while 10 percent were moderately satisfied.

As shown in Figure 25, roughly half of 142 surveyed participants reported receiving their incentive check in four and six weeks and over one-third (35 percent) reported receiving their check in less than four weeks. Only 5 percent of respondents said it took longer than six weeks to receive their incentive check.

Only four participant survey respondents complained about the program. Two people experienced miscommunications regarding the time or location of their appliance pick-up. One person was unsatisfied with the timeliness of the incentive payment (although this person reported receiving the check within four to six weeks of participation). Another person said the pick-up contractor was "*rude and unprofessional.*" However, overall, the issues causing dissatisfaction among customers appear to be anomalies.

Figure 25. Participant-Reported Incentive Check Processing Time



n=142

Records Review

Cadmus reviewed the census of ARP CSP records against the EEMIS records to assess data integrity.

In PY1, Cadmus identified a number of minor discrepancies between EEMIS and the ARP CSP database, none of which had any effect on the reported quantity of units recycled, incentive amounts paid, or energy and demand savings. The total quantity of recycled units tracked in EEMIS for PY1 was 405 units less than the total quantity of units tracked in the ARP CSP database. Cadmus found this discrepancy was a result of work packages that were not uploaded to EEMIS for approval. These work packages were identified and included in EEMIS in PY2.

Cadmus identified a handful of records with zeros entered as account numbers in both EEMIS and the ARP CSP database. The ARP CSP was made aware of this issue and corrected them

where possible. PPL Electric instituted a process whereby they conduct random manual checks of EEMIS data against the ARP CSP database before granting approval to upload the data. They would like a more automated system to be more thorough and efficient.

In PY2, there were three discrepancies between EEMIS and the ARP CSP (JACO) tracking database that affected the savings realization rate. The ARP CSP database recorded two fewer refrigerators/freezers and one less room air conditioner than EEMIS. Therefore, the net change from the records review for this program was two fewer refrigerators/freezers, and one less room air conditioner.

There was one instance identified through survey verification efforts where a customer explained the refrigerator did not turn on when plugged in (a program eligibility requirement), resulting in a net change of one less refrigerator. Because this is a sizable program that recycled thousands of appliances in PY2, this adjustment had minimal effect on the savings realization rate. Based on these verification findings, the PY2 annual realization rate for this program is 100 percent.

EM&V

The Commission made major changes to the 2011 TRM (slated to take effect PY3). The Commission introduced a new measure in the 2011 TRM for recycling plus refrigerator/freezer replacement, which attributes savings of 1,205 kWh/yr for older units replaced with a high-efficiency unit. Previously, the savings were the same as recycling without replacement (1,728 kWh/yr). There are no deemed savings assigned in the 2011 TRM for replacement with a standard efficiency unit. The updated TRM protocol has been a major concern during PY2 for PPL Electric and other EDCs. There is concern that these changes conflict with program theory and recent ARP evaluation methodologies in other states. Changes are likely to have significant adverse impacts on PPL Electric's ability to meet four-year Act 129 savings targets.

There is also concern that PPL Electric's ARP will not be able to screen customers who have replaced their unit with a standard efficiency unit because this could lead to customers "gaming" the program. As a result, PPL Electric will likely choose to recycle all eligible units—regardless of replacement status—and experience a larger savings realization rate adjustment for units that were determined to have been replaced.

Additionally, the energy savings for recycling and retiring a unit (without replacement) were decreased from 1,728 kWh/yr to 1,659 kWh/yr per unit.

Renewable Energy Program

Executive Summary

The objectives of the Renewable Energy program are to: (1) provide customers with opportunities to self-generate electricity using clean, renewable resources; (2) encourage customers to install PV systems and geothermal heat pumps; (3) encourage market transformation toward clean, renewable energy generation; and (4) achieve 1,260 installed measures and a total reduction of 18,500 MWh/yr and 2,000 kW.

Due to a very high level of interest and rapid over-subscription, PPL Electric closed the Renewable Energy program for all technologies and all sectors, with the exception of institutional GHSP. At the close of PY2, the Renewable Energy program had achieved 64 percent of its expected four-year energy savings of 18,491 MWh/yr and had exceeded its expected peak demand savings of 2 MW, achieving 2.3 MW. The program's total cost (including common program costs) over the four-year period is expected to be just over $5.6 million.

The Renewable Energy program process evaluation for PY2 included an interview with the customer programs specialist and telephone surveys with 118 program participants.

Key Findings

The following are key findings from the process evaluation.

- Demand for renewable energy in PPL Electric's service territory was considerably higher than anticipated. From the outset, the Renewable Energy program experienced participation levels that far exceeded those estimated in the EE&C Plan.
- Because the program exceeded participation targets, PPL Electric closed the PV portion of the program in May 2010, and closed the residential GSHP portion of the program at the end of January 2011. PPL Electric continues to accept institutional GSHP rebate applications.
- The largest challenge in PY2 was closing the program. PPL Electric learned they needed to establish eligibility requirements and communicate these requirements to customers. The process of closing the residential GSHP rebate portion of the program was improved based on the lessons PPL Electric learned when closing the PV program.
- Due to the customers' immediate and overwhelming response to the program, PPL Electric never implemented a formal marketing campaign. Customers responded to the notification letters PPL Electric sent out, the information about the program on the Website, and trade ally promotion of the program.
- The program faced a significant challenge in PY1 due to the Department of Environmental Protection (DEP) position on "double dipping" of PV incentives, resulting in considerable confusion for PPL Electric customers regarding eligibility. However, because program participation rates exceeded expectations in PY2, the double-dipping policy was not seen as a barrier.
- There are several deficiencies in data collection and data transfer to EEMIS. Information needed to calculate savings is not always collected on the rebate form or, when it is collected, is not always transferred to EEMIS.
- Many installed PV systems exceeded the maximum capacity rebated by the program. This resulted in higher than expected savings.
- Calculating savings for the measures in this program, particularly for institutional GSHP projects, was complex and could not always be standardized.

Conclusions

- Over-subscription in the Renewable Energy program shows that demand for renewable energy in PPL Electric's service territory is considerably higher than anticipated.
- PPL Electric did not anticipate the challenges associated with closing the PV program early, particularly around defining eligibility and application rules.
- Many residential customers installed PV systems that were considerably larger than the maximum capacity rebated by the program. This resulted in higher than expected savings for the program.
- Many residential customers installed systems larger than the maximum rebated capacity in either the PPL Electric or the DEP program, and the double-dipping policy allowed these customers to benefit from both programs. However, the challenges PPL Electric faced navigating the double-dipping policy were costly and cumbersome, and the issue was confusing to customers.
- There is interest in and energy savings available from GSHPs that warrants continuing incentives as part of the portfolio of measures, even if PPL Electric closes the Renewable Energy program. For example, residential GSHP systems could be included under the residential Efficient Equipment Incentive program if they are cost-effective, and non-residential systems could be included under the Custom Incentive program if they are cost-effective.
- Making the recommended changes to rebate forms and data entered into EEMIS would allow Cadmus to select a more representative sample of the population and calculate more accurate program savings. This would help to streamline the EM&V process and improve overall administrative efficiency. In addition, it would reduce the number of site visits required to gather missing data.
- PPL Electric faced many unexpected challenges with this program, including mitigating customer confusion and navigating the double-dipping policy. Cadmus also faced unexpected challenges dealing with insufficient data for savings calculations, developing a new savings calculation methodology for non-residential customers, and providing recommendations to SWE about how to treat unexpected system configurations.

Recommendations

- Update the institutional GSHP rebate application to collect additional information needed to determine savings per the new calculation methodology. The additional information to collect includes the project type (new construction or retrofit); the previous heating and cooling equipment types; EER; COP; and the horsepower of the ground loop pump. These recommendations are associated with recording and tracking data:
  - Enter the capacity of both PV and GSHP systems into the database to allow Cadmus to select a more representative sample of the population and to calculate accurate savings for the program.
  - For GSHPs, always enter the model number into EEMIS so that the capacity and efficiency can be found in the AHRI database.

  - ➢ Return GSHP rebate forms without an AHRI certificate to the applicant, with a request that they provide the certificate or other documentation on the system's EER and COP values.
  - ➢ For PV projects, transfer tilt and azimuth information to the database in all instances so that savings can be estimated in the absence of a record review or site visit.
- As planned, close the institutional GSHP portion of the program when rebate funds are exhausted.
- If PPL Electric considers offering a renewable energy program in its next EE&C portfolio, the Company should carefully evaluate the program's overall cost-effectiveness and coordinate closely with the DEP to ensure the rebates complement, rather than compete, with programs offered by the DEP.
- If PPL Electric includes a renewable energy program in future EE&C plans, the Company should evaluate options for offering lower incentives in order to spread the benefits over a larger number of participants.
- Because GSHPs can be cost-effective and serve the small commercial and government/institutional sectors well, PPL Electric could allow non-residential GSHPs under the Custom Incentive program and consider including residential GSHP systems under the residential Efficient Equipment Incentive program. However, the eligibility requirements should include a minimum efficiency level greater than code so that energy savings are achieved.

Program Overview

The Renewable Energy program was available to residential and institutional customers (such as government agencies, non-profit, and schools). It used the same delivery and administrative strategies for both customer sectors, though budgets, savings, and impacts were tracked and reported separately.

The Renewable Energy program encouraged PPL Electric's customers to install a solar PV array or GSHP at their home or institutional building. The program offered a financial incentive that reduced initial system costs. In May 2010, PPL Electric closed the residential PV portion of the program after it was open only for a few months. The residential PV portion of the program experienced rapid over-subscription, largely because rebates were paid retroactively for systems installed after July 1, 2009, as allowed by the PUC Order. PPL Electric also stopped accepting institutional PV rebate applications, and reserved funds for eight projects, with additional projects on a waiting list. Thos on the wait list may receive funding if the reserved projects are not completed within 12 months.

PPL Electric closed the residential GSHP portion of the program at the end of January 2011. The program continues to accept institutional GSHP rebate applications, and will accept applications until the rebate money is fully allocated.

After 22 months of operation, the program was ahead of its savings targets: as of March 2011, the Renewable Energy program had achieved 64percent of its expected total four-year savings of 18,491 MWh/yr and exceeded the peak demand goal of 2 MW. The program's total cost

(including common program costs) over the four-year period is expected to be just over $5.6 million.

Program Implementation

Program Status

Due to very high level of interest and rapid over-subscription, the Renewable Energy program was closed for all technologies and all sectors, with the exception of institutional GHSP. From the outset, interest in the program—especially in the residential PV component—far exceeded PPL Electric's planning expectations. For example, while the EE&C Plan estimated 45 residential PV participants in PY1 through PY4, PPL Electric paid 130 rebates for residential PV systems before closing the program in May 2010. Likewise, the plan forecasted 900 residential GSHP participants in PY1 through PY4, but provided over 1,400 rebates before closing this portion of the program at the end of January 2011.

PPL Electric continues to accept institutional GSHP applications, and will keep this portion of the program open until the funding is fully allocated. Table 9 shows the number of applications submitted and the number of unique customers that participated in the program. Each customer could submit more than one application.

Table 9. Projected Versus Actual Program Participation

Program Segment	Expected Total Participation PY1-PY4	Actual Participation (Applications) PY1-PY2 Q3	Actual Participation (Customers) PY1-PY2 Q3
PV – Residential	45	128	128
PV – Non-Residential	15	8	8
GSHP – Residential	900	1,494	1,420
GSHP – Non-Residential	300	78	28
Total	**1,260**	**1,708**	**1,584**

In both the residential and institutional sectors, the average system size installed was larger than anticipated. In the residential sector, this did not impact the number of rebates that PPL Electric could provide, since the incentive per system was capped. However, the maximum incentive in the institutional sector could be quite large, since the program allowed one customer to apply for rebates for multiple buildings. Non-residential GSHP and PV applications received through PY2 Q4 revealed that several systems were installed with a greater capacity than anticipated in the EE&C Plan. As a result, although fewer institutional projects were installed than forecasted by the EE&C Plan, the projects achieved higher savings. Table 10 shows the projected versus actual average size of systems by sector and technology.

Table 10. Projected Versus Actual System Sizes

Program Segment	Projected Average Size (EE&C Plan)	Actual Average Size PY1-PY2 Q3	Size Range PY1-PY2 Q3
PV – Residential	3.0 kW	6.6 kW	0.9 to 18.5 kW
PV – Institutional	9.0 kW	176.8 kW	3.3 to 1,236 kW
GSHP – Residential	3.0 tons	4 tons	0.4 to 16 tons
GSHP – Institutional	145.9 tons	115 tons	4 to 588 tons

Program Processes

The Renewable Energy program achieved participation levels that are orders of magnitude higher than PPL Electric anticipated.

In PY1, coordinating with the PA DEP Sunshine Solar Rebate program on double-dipping of PV systems (i.e., receiving rebates from both the state and PPL Electric's program) presented a challenge for PPL Electric. Customers were confused about their eligibility and felt the double-dipping policy was unfair and that they should be eligible for both programs.

In March 2010, PPL Electric and regulators reached an agreement whereby customers could receive PPL Electric rebates for additional capacity after exceeding the state rebate cap, or alternatively could receive the state rebate for the remaining capacity after meeting the PPL Electric rebate cap. Customers who had applied for a state rebate prior to January 29, 2010, when the DEP issued an addendum to the reservation request, remained eligible for both rebates. Although PPL Electric staff and management reported that the double-dipping policy resulted in considerable confusion for their customers, program participation rates exceeded expectations and the double-dipping policy was not a barrier to participation.

In PY1, PPL Electric staff and management were concerned about the DEP's plan to offer loans for residential GSHP installations starting in the summer 2010, and that they would release a double-dipping policy similar to the PV double-dipping policy. However, in PY2 this was no longer a concern since the residential GSHP portion of the program was over-subscribed and closed at the end of January 2011. No conflicts with the DEP's loan program were reported.

The biggest challenge in PY2 related to ending the program. During the process of closing the PV portion of the program, PPL Electric created a reservation process and waiting list for PV rebates. Initially, customers had many questions about eligibility, cut-off dates, and application details. PPL Electric learned that they needed to clearly define eligibility and application requirements and communicate these requirements to customers, for example, setting postmark deadlines for mail-in rebate forms, requiring the system already be installed.

When the time came to close the residential GSHP rebate portion, the process went more smoothly and caused less customer confusion because of the lessons PPL Electric learned while closing the PV program.

Marketing

In PY1, PPL Electric reported that the program never embarked on a formal marketing campaign. PPL Electric sent notifications about the rebate program to customers who had submitted interconnect forms for PV systems. In addition, information about the program was available on the PPL Electric Website, and trade allies promoted the program to their customers. With the immediate, overwhelming customer response to the program, there was no need for additional program marketing, and no marketing was conducted in PY2.

Forms and Rebates

PPL Electric did not change application forms in PY2, so the same data collection challenges that Cadmus experienced in PY1 still existed in PY2, as information key to calculating energy savings, such as EER and COP, was not requested on the application form. PPL Electric, however, has revised the institutional GSHP application form to collect this additional data from applicants in PY3.

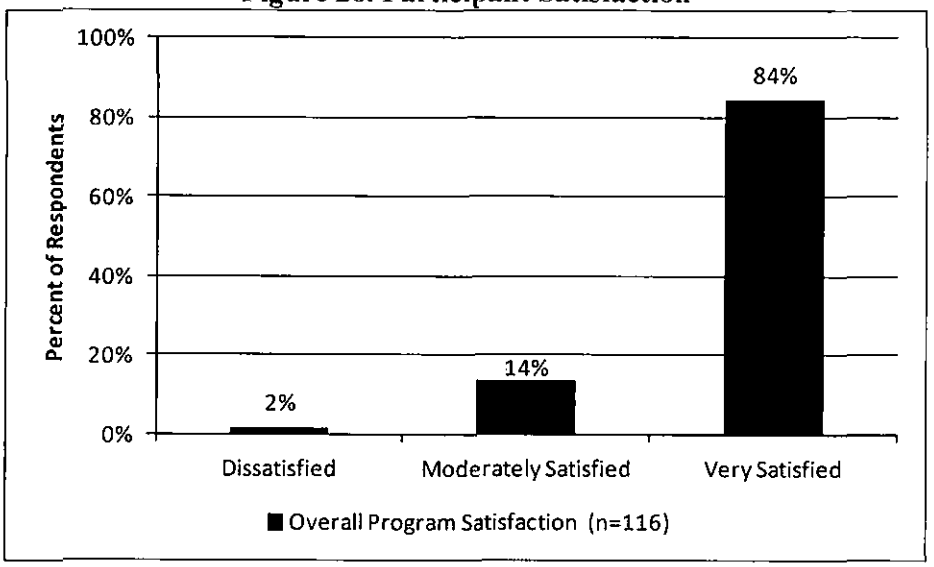
Quality Assurance and Quality Control

As part of the evaluation process, Cadmus conducted a review of program metrics including customer satisfaction and data integrity.

Customer Satisfaction

Cadmus measured customer satisfaction with the program through surveys. Overall, the Renewable Energy program participant survey respondents were very satisfied with the program. Of the 116 participant survey respondents who answered this question, 84 percent were very satisfied with the program, 14 percent were moderately satisfied, and only 2 percent were dissatisfied (Figure 26).

Figure 26. Participant Satisfaction



Records Review

Cadmus reviewed a sample of records to assess data integrity, selecting a stratified of 202 records from PY2 for review. The records selected included 81 PV systems (from 81 sites) and 121 GSHPs (from 77 sites). We stratified the PV and GSHP samples by residential and governmental/institutional sites. We selected larger capacity systems for the sample, as these systems account for the majority of program savings. Note that some projects contained more than one record.

Cadmus compared and mapped each data field across several different sources: (1) customer applications and documentation submitted with the applications, (2) the administrative CSP database, (3) rebate forms, (4) data collected during participant surveys, and (5) data collected during site visits. The CSP reviewed all the data they determined to be most important to identify participants and calculate energy savings, and documented all data entry discrepancies.

Cadmus compared records in the EEMIS database to the same records in the administrative CSP database and to the original applications.

QA/QC Findings

Records Review Findings

- The records review uncovered issues with some of the key fields needed to calculate measure savings, including data that was not collected on the rebate forms.
- For GSHPs, the configuration, EER, and COP were not requested on the rebate form. This information is necessary for calculating energy savings.
- AHRI certificates were included with most, but not all GSHP applications. The AHRI certificate is required and contains important information for calculating project savings, including the system capacity, EER, and COP.
- The customer segment was entered incorrectly in four instances for GSHP systems and three instances for PV systems.
- The GSHP capacity and PV capacity, both of which were requested on the rebate forms, were not transferred to the database.
- PV system tilt and azimuth were transferred to the database in most, but not all instances.

Database Review Findings

The database review uncovered issues with some of the key fields needed to calculate measure savings, including model numbers and capacity.

- The model number and capacity of GSHPs were both present in the CSP database, but the data were not always entered into EEMIS.
- The capacity of the PV system was present in the CSP database, but the data were not entered into EEMIS.

EM&V

In PY2, Cadmus discovered that the TRM methodology for calculating savings for commercial GSHP systems was incorrect. Cadmus proposed a new methodology that required collecting more data than currently collected on the application form. Site visits were needed to collect required data, thus, Cadmus increased the number of site visits in the verification sample.

The new methodology retained the previously specified baseline system, which meets GSHP code, for new construction projects and replacement of non-electric heating systems. GSHP systems which replace electric heating may use an air source heat pump that meets code as the baseline.

The additional fields for collecting data on a revised application form included the project type (new construction or retrofit); the type of heating and cooling equipment that was replaced; the heating fuel type of the replaced heating equipment; the installed equipment's EER and COP; and the horsepower of the ground loop pump.

In addition to revising the commercial GSHP savings calculation methodology, Cadmus discovered that some commercial system configurations were unique to the site. These configurations typically involved looping the working fluid from the GSHPs through rooftop units or through a chiller. Because the system design is site-specific, a standard calculation methodology was not applicable for these customers.

Direct Load Control Program

Executive Summary

The objectives of the Direct Load Control (DLC) program are to: (1) provide incentives to residential and small commercial customers willing to reduce their energy during summer peak hours; (2) educate customers about energy efficiency and peak periods; and (3) obtain participation by approximately 45,000 customers with a total demand reduction of 32 MW.

PPL Electric formally launched participant recruitment for the DLC program in March 2011. By the end of May 2011, nearly 5,000 digital cycling units (DCUs) were installed and approximately 10,000 customers had signed up for the program.

The process evaluation of the DLC program included interviews with the customer programs specialist and the program CSP (ComVerge). Because the program only recently launched a pilot test stage, Cadmus did not conduct participant surveys.

Key Findings

The following are key findings from the process evaluation.

- Although this program's launch was delayed pending finalization of the SWE/PUC's evaluation protocol (method to determine savings), the DLC program appears to be off to

a strong start. Proper planning by PPL Electric and efficient startup of the DLC CSP has allowed the program to ramp up quickly.

- Significant effort was put into developing an appropriate evaluation protocol.
- PPL Electric limited its exposure to risks of not meeting its demand reduction goals by including performance requirements within the DLC CSP's contract.
- With approximately 10,000 customers enrolled within the first three months of program launch, the DLC program is off to a strong start.
- A small number of participants left the program because of perceived discomfort that resulted from cycling off their air conditioning systems during peak hours.

Conclusions

- For much of PY2, PA EDCs lacked an approved methodology for quantifying program impacts, which delayed the program's launch. However, that delay is not expected to prevent the CSP from enrolling enough participants.
- PPL Electric's approach to involve its DLC CSP in developing program strategy before being formally under contract allowed the CSP to conduct a well-planned, effective program launch and to quickly ramp up marketing and DCU installations.
- A limited number of customers left the program because they perceived discomfort during event hours, even though these customers did not have M&V test equipment and their A/C units were not cycled during the event. This could be a relatively common psychological response to PPL Electric's notification of DLC events.
- Because the DLC program only recently launched, there is not enough information about the program performance to recommend adjustments to strategies or delivery protocols. As planned, PPL Electric and its EM&V CSP will evaluate impact results after testing during the summer of 2011 so that ample time remains for any necessary corrections to data collected before 2012.

Recommendation

PPL Electric's contract with the DLC CSP requires that the CSP recruit participants and that the CSP deliver savings. Thus, it is not PPL Electric's responsibility to retain participants. However, the DLC CSP may want to maintain records of the customers who exit the program, their reasons for leaving, and whether these customers had equipment that was actually cycled off. This information could be used to determine whether these customers may be experiencing actual discomfort, or if their discomfort is predominantly perceived. If the issue appears to be perceived discomfort, consider discontinuing notifications to customers of planned DLC events.

Program Overview

The DLC program aims to reduce peak electric demand by an average of 33 MW over the 100 hours of greatest electric demand during the summer of 2012. (Savings will only be claimed during this period.) The program reduces peak electricity usage through demand control units (DCUs) installed on customers' central air conditioners (CACs) or heat pumps, which allow the units to be cycled off during peak periods for durations and frequencies determined by the DLC

CSP. PPL Electric anticipates approximately 50,000 customers would enroll in the program. This equates to a relatively conservative demand reduction goal of 0.66 kW per device.

A third-party DLC CSP, ComVerge, implemented the program on a turn-key basis. The DLC CSP is responsible for marketing and recruiting customers, forecasting peak hours, installing control devices on customer equipment, processing applications, tracking program data, and providing customer data to PPL Electric through EEMIS.

The DLC program is available to all customer sectors except large C&I, and will likely operate weekdays between noon and 7:00 p.m. during the summer of 2012 (June 1 – September 30), with trial events conducted in the summer of 2011 for the 100 participants equipped with M&V meters.

The DLC CSP began recruiting participants for the DLC program in March 2011, with results in PY2 Q4. As currently structured in Act 129, peak load reduction compliance targets apply only during the summer 2012. As such, this is a one-year program unless peak load reduction targets are extended beyond 2012.

Program Implementation

Program Status

PPL Electric formally launched participant recruitment for the DLC program in March 2011. By the end of May 2011, the program CSP had installed nearly 5,000 DCUs and approximately 10,000 customers had signed up for the program. By the middle of June 2011 (early PY3), 15 hours of curtailment had been called on approximately 60 M&V equipped participants. PPL Electric will continue testing on peak days throughout the summer 2011 on a total of 100 M&V equipped customers. Events held during the summer of 2011 are intended to test the systems and provide an early indication of demand reduction that can be expected in the summer of 2012.

As reported in PY1, uncertainty surrounding how to measure and value savings from the DLC program was a bottleneck for the program. PPL Electric could not execute a contract with the DLC CSP until the final evaluation methodology was approved by the SWE and PUC. PPL Electric's most significant accomplishment in PY2 was working with the demand response working group, comprised of representatives from other EDCs and the SWE, to develop evaluation and valuation of savings methodologies accepted by the SWE and approved by the PUC.

The TRM initially specified a fully-deemed value for DLC devices, although some parameter specifications were unclear. The SWE then decided not to include demand response program values in the TRM, and considered using PJM savings measurement methodologies, which use partially-deemed savings values that depend on cycling rates and the actual weather during the peak hour events.

PPL Electric, along with other EDCs, worked with the SWE and PUC over the course of 15 months and 10 meetings to determine the methodology to estimate savings. In the March 4, 2011 Secretarial Letter, the Commission directed all EDCs to provide information that would allow the SWE to evaluate the programs using the protocols and procedures established by PJM. Due

to the structure of the Act 129 targets, PPL's ability to meet its demand reduction goals relies not only on the MW reduction capability of its demand response programs, but also on its ability to accurately forecast the top 100 hours. As part of the 2012 TRM revisions issued in October 2011, the Commission proposed a method for determining the peak 100 hours and for determining the average demand reduction over those peak hours

PPL Electric issued an RFP in November 2009 and received bids in early 2010 for a DCL CSP. However, PPL Electric put contracting with a DLC CSP on hold for nearly a year due to the uncertainty around the evaluation methodology. Upon gaining an approved methodology, PPL Electric entered into a contract with the DLC CSP. PPL Electric established a good working relationship with the DLC CSP during the evaluation methodology delay, and the contracting process was quite straightforward and handled efficiently.

In a relatively short time after contract approval by the Commission, the DLC program was underway. The DLC CSP quickly organized internal support divisions, established and deployed an operational team, and began marketing the program and enrolling customers.

Program Processes

The DLC CSP will dispatch all events through its Apollo software system. PPL Electric and the DLC CSP will both determine when to call events (each will initiate 50 hours of events). To better ensure achieving an average 33 MW reduction in capacity over the peak 100 hours, additional event hours may be called.

The DLC CSP is responsible for installing all program DCUs. The CSP established headquarters in Allentown, PA to serve as the hub for the team of technicians installing the devices. The technicians inspect each customer's CAC or heat pump system to determine its suitability before installing the DCU. If the technician determines that a customer's equipment is in sufficient condition, they install the device. As part of this process, the technician records information about the equipment including the make, model, approximate age, nameplate values, and size. Upon completion, the CSP tests the DCU installation to ensure it is operational and can receive the radio signal used to initiate cycling events.

Marketing

The DLC CSP provided turn-key marketing for the DLC program. PPL Electric provided a master customer list from which the DLC CSP analyzed monthly customer consumption to estimate the presence of CAC. From this list of potential participants, the DLC CSP initiated a direct mail campaign promoting the program's economic value and the social benefits of improved reliability and sustainability. The only other marketing channel was the E-Power Website. PPL Electric has not yet determined if other marketing channels will be utilized.

The DLC CSP served as the primary point of customer contact and maintained a call center through which customers signed up for the program and called with questions or concerns. All customer calls and correspondence were directed to the DLC CSP.

Forms and Rebates

Customers enroll by completing a card (sent to them via direct mail), calling the DLC CSP, or from PPL Electric's Website. As participants, they receive a $32 incentive, paid at the end of each peak summer period.

Quality Assurance and Quality Control

Customer Satisfaction

Since customer enrollment began recently and only M&V test participants will experience cycling events during the summer of 2011, Cadmus did not conduct customer surveys in PY2. After the summer of 2012 (PY4), Cadmus will survey a random sample of program participants regarding satisfaction with the program and related topics.

The DLC CSP is responsible for handling complaint resolution and, regardless of the outcome, the CSP is expected to report each complaint to PPL Electric. If a complaint cannot be resolved by the DLC CSP, it will be escalated to the PPL customer programs specialist for the next appropriate level of action. There have been no complaints about DCU installations.

A limited number of customers left the program because they felt uncomfortable during event hours. However, these participants did not have M&V equipment and did not have their A/C units cycled. Their decision was wholly due to a perceived discomfort because of the notification. Several other utilities have discontinued notifying customers of DLC events, which largely mitigated the issue of perceived discomfort.

DLC studies have shown that a 50 percent control strategy should have a minimal impact on temperatures within a participant's home. A 50 percent cycling strategy means that the A/C compressor is cycled off for approximately 50 percent of its natural duty cycle. For example, if an A/C normally runs for 40 minutes per hour, then it would only run for 20 minutes per hour during a cycling event. Under a 50 percent cycling strategy, the inside temperature in most homes will only go up about 2 degrees over a 4 hour cycling event. A 2 degree difference is likely to be unperceivable to most people, unless they're consciously thinking about it.

Records Review

To ensure the DLC CSP is collecting the correct data in a useful data format in preparation for the summer of 2012, Cadmus will review program data files for a sample of approximately 50 participants after testing during the summer of 2011. This will provide 85 percent confidence and 15 percent precision across all participants (and for each of the two customers sectors participating in the program).

Behavior and Education Program

Executive Summary

The objectives of the Behavior and Education program are to: (1) educate customers about free (no cost) or very low-cost energy-efficiency measures and behaviors that can reduce their energy consumption and demand; (2) educate customers about PPL Electric's online resources and energy-efficiency conservation programs; (3) encourage customers to adopt more energy-efficient behaviors and install energy-efficiency measures in their homes; and (4) obtain participation by 100,000 customers with a reduction of 18,100 MWh/yr and 2 MW.

The program met its PY2 participation goal by sending Home Energy Reports to 50,000 residential customers in the first year. Preliminary *ex ante* savings estimates from the CSP suggest the program is on track to exceed its annual savings goal. PPL Electric contracted with the implementation CSP to deliver reports to a minimum of 100,000 additional residential customers in PY3 and PY4.

The Behavior and Education program process evaluation included interviews with the customer programs specialist and the program CSP (OPower). Telephone surveys were conducted with 320 PPL Electric customers who received Home Energy Reports and 43 additional customers who received one or more reports but opted out of the program. This process evaluation addresses delivery, status, goals, implementation, marketing, and quality assurance.

Key Findings

- PPL Electric's pilot Behavior and Education program ran smoothly in PY2. The program was implemented according to plan. No major implementation issues were reported, and the program achieved its participation and savings goals.
- PPL Electric and the implementation CSP, OPower, have a very good working relationship and communicate regularly and effectively.
- Most Behavior and Education program participants responding to a survey rated the program very highly, with 78 percent stating they were moderately to very satisfied with the program.
- A significant percentage of participants (22 percent) expressed dissatisfaction with the program. Dissatisfied participants said the reports were inaccurate or did not provide useful information. Eleven percent of participant respondents said that since receiving a report, their opinion of PPL Electric has decreased somewhat or significantly.
- Seventy-nine percent of participants said they had taken steps to make their home more efficient since receiving a Home Energy Report. The most common steps were replacing incandescent bulbs with CFLs or other efficient lights (27 percent of reported actions), turning off lights in unoccupied rooms and installing lighting sensors (17.3 percent), and buying energy-efficient appliances (10.6 percent).

- Customers who opted out of the program tended to be less educated, older, and have a lower household income than those who did not opt out. The most frequently cited reason (32 percent) for opting out was that the information in the reports was inaccurate. The overall opt-out rate was low, affecting just 1.1 percent, N=532 of customers receiving reports.
- Only 60 percent of participants reported finding the neighbor comparison useful or somewhat useful in providing them with perspective about their own energy consumption. In contrast, 80 percent of participants found the "own home annual comparison" useful or somewhat useful.

Conclusions

- The program implementation process has been smooth and in PY2 the program was on track to achieve its goals. The successful implementation of the program means that PPL Electric and the CSP have laid the groundwork to expand the program in future years.
- The CSP's monthly reports of *ex ante* savings estimates must be revised and reformatted before they can be delivered to management. This is a correctable inefficiency in program administration.
- The CSP indicated they can assess the program demand savings impacts using data from smart meters that were installed in some homes receiving Home Energy Reports. By sharing AMI demand data with the CSP, PPL Electric will potentially be able to claim some demand savings during the 2012 compliance year.
- Participants in the Behavior and Education program expressed lower levels of satisfaction with the program than participants in other PPL Electric programs. Satisfaction with the Behavior and Education program may be lower because receiving a Home Energy Report is involuntary.
- Many customers have had a negative reaction to the neighbor comparison portion of the Home Energy Reports, and this opinion appears to track with program dissatisfaction among participants who opted out of the program. Comparisons with neighbors' homes, particularly for those whose homes compare unfavorably, may create an instinctual negative reaction that reflects poorly on PPL Electric in general.

Recommendations

- Educate participants more about the construction and interpretation of the neighbor comparisons. Many customers object to the comparisons for a variety of reasons, but additional education and explanation might alleviate some of their concerns.
- Study the report modules and consider revising those that generate high levels of dissatisfaction. For example, consider revising some of the language of neighbor comparisons to be less provocative, such as having ratings based on a more general comparison of similar homes in the area (e.g., by saying they have "room for improvement").
- Consider adopting a Web interface that allows customers to update their profiles. Many customers claimed the neighbor comparisons were inaccurate because they did not take

into account special characteristics of their homes. A Web interface would be a convenient way for customers to update their information.

- Work with the CSP to develop a monthly reporting format that could be shared directly with PPL Electric management. Currently, PPL Electric's staff must clean up the report to make it presentable to managers.

Program Overview

The Behavior and Education program is designed to encourage customers to implement free or low-cost measures and adopt energy saving practices and behaviors. PPL Electric contracted with OPower, a third-party implementation CSP, to develop and deliver Home Energy Reports tailored to each customer and to encourage behavioral change. Helgeson Enterprises serves as the administrative CSP, staffing a customer call center and providing customer service for the Behavioral and Education Program.

The Home Energy Reports contain the following information:

- Comparison of a customer's energy usage in the current year to their consumption in the same months of the previous year.
- Comparison of a customer's energy consumption to the consumption of other, comparable customers in the same geographical area. This is known as the neighbor comparison.
- Tips about how to save energy and reduce demand during peak hours. These tips include:
  - General conservation tips such as turning down the thermostat, turning off lights, shortening showers, etc.
  - Low-cost, energy-efficiency tips, such as replacing incandescent lights with CFLs, installing weather stripping, and using power strips.
  - Tips about ways to reduce peak load during peak load season, and shift energy use to off-peak periods.
  - Promotions of other PPL Electric residential programs.

According to the program theory, by educating customers about their energy consumption and conservation and giving them peak demand reduction strategies, customers will reduce their energy use and achieve cost savings by changing their behavior. In addition, customers will become more engaged with PPL Electric.

PPL Electric implemented the Behavior and Education program in PY2. Since the program has a measure life of one year, only savings achieved during each compliance year will be counted towards compliance.

Program Implementation

Program Status

The program launched in April 2010. The program met its first year participation goal by sending reports to 50,000 residential customers located in four metropolitan areas: Harrisburg,

Allentown, Williamsport, and Scranton. Preliminary *ex ante* savings estimates from the CSP suggested the program was on track to exceed its annual savings goal.

PPL Electric contracted with OPower to become the implementation CSP and deliver Home Energy Reports to a minimum of 100,000 additional residential customers in PY3 and PY4. Customers who received reports and did not opt out of the program in PY2 will continue to receive reports in PY3 and PY4. PPL Electric's savings goals are to achieve 25,000 MWh/yr of savings each year in PY3 and PY4.

The CSP worked closely with PPL Electric to design the Home Energy Report (the information content and presentation). The CSP also selected customers eligible for participation, established procedures for transferring billing and other customer data, and set up customer service. PPL Electric provided the CSP with its residential customer database and billing histories, which allowed the CSP to select the pool of customers who received the Home Energy Reports.

The program CSP evaluated and fine-tuned the program, analyzing billing data to assess program results and identify opportunities to increase savings and customer satisfaction. The CSP and PPL Electric worked together to implement improvements to the Home Energy Reports, and both parties consulted regularly about the program's progress. For example, based on PPL Electric's request, OPower incorporated modules promoting the residential Assessment and Weatherization and Appliance Recycling programs in the recent reports.

Program Processes

No significant problems with program implementation were reported. The CSP fine-tuned the Home Energy Reports messaging in the second half of PY2, and will analyze the impacts of the changes, which are described in greater detail below.

The CSP reported *ex ante* savings estimates to PPL Electric on the 15th of every month and provided an in-depth *ex ante* savings analysis on a quarterly basis. The monthly reports are not formatted in a way that can be presented directly to upper management, so reports need to be cleaned before passing them along.

Both PPL Electric and the CSP reported that their regular weekly communication is effective and that their working relationship is strong. They mutually appreciate the professionalism, innovation, and openness to new ideas. The CSP is interested in determining the demand savings that could be attributed to this program. Since PPL Electric installed smart meters in some of the homes that receive Home Energy Reports, they agreed to share the data with the CSP to examine the program's demand impacts. Cadmus also provided input into the methodology the CSP proposed to measure demand savings. Cadmus will evaluate any claimed demand savings in PY3.

Marketing

Unlike other PPL Electric Act 129 programs, the Behavior and Education program does not require customers to apply to participate, in fact, participation is involuntary. The CSP mails Home Energy Reports directly to customers who are eligible for the program. Thus, PPL Electric does not market the program.

In addition to delivering reports to customer homes, the CSP has the ability to send educational messages to customers through e-mail, text, and on its Website. However, PPL Electric has not yet incorporated any of these additional offerings into the program. The only Web presence for the program is a static page with a list of frequently asked questions.

Quality Assurance and Quality Control

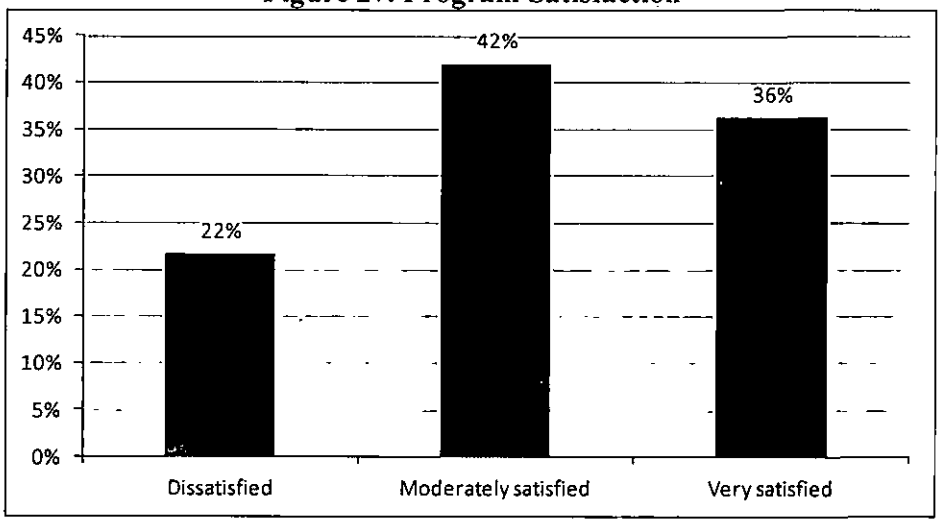
As part of the evaluation process, Cadmus examined customer satisfaction. Because savings for the Behavior and Education program are not tracked in EEMIS, Cadmus did not conduct a records review.

Cadmus conducted a survey with a random sample of customers who received Home Energy Reports in PY 2, along with a survey of customers who opted out of the program after receiving a Report. Cadmus surveyed 320 program participants and 43 opt-outs. The surveys covered customer comprehension of the Home Energy Reports, actions taken in response to the reports, customer satisfaction, and demographic and home characteristics. Cadmus also conducted interviews with the Behavioral and Education Program manager and CSP staff. The process evaluation findings were based on analysis of the interviews and survey responses.

Customer Satisfaction

Customer satisfaction with PPL Electric's Behavior and Education program was generally high. Figure 27 shows the distribution results of self-reported satisfaction with the program from the participant survey (n=314).

Figure 27. Program Satisfaction



On a scale from 1 to 10, with 1 being extremely dissatisfied and 10 being extremely satisfied, 78 percent of 314 respondents rated the program as a 4 or higher (moderately satisfied or very satisfied). Approximately 36 percent reported being very satisfied. Of the customers that gave a rating less than 4, most (62 percent) gave a rating of 1. Thus, most dissatisfied customers had a strong dislike of the program.

Overall, satisfaction with the Behavior and Education program was generally lower than for other Act 129 programs. The likely reason for this outcome is that participation in other PPL Electric programs is voluntary, whereas PPL Electric enrolls participants in the Behavior and Education program without their knowledge.

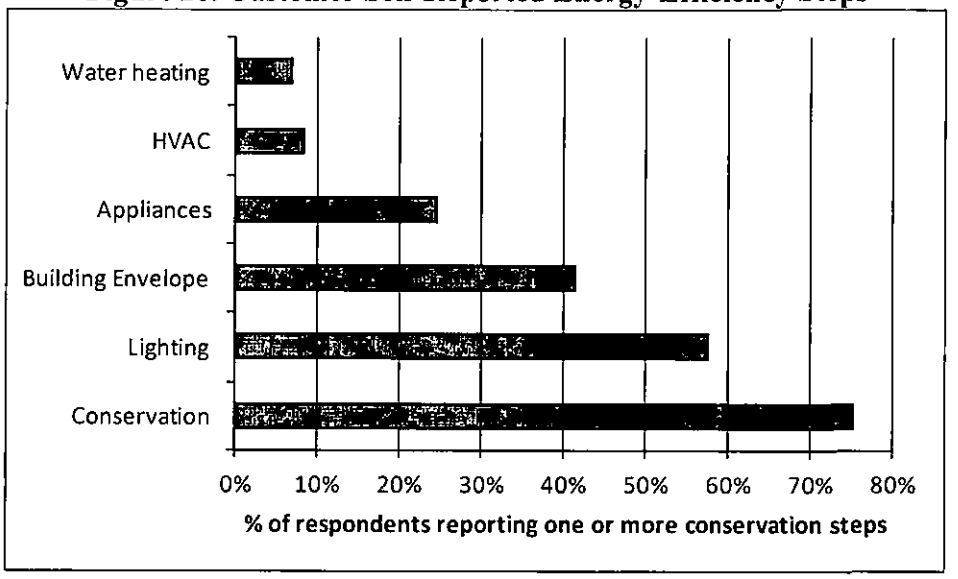
Participants who reported they were dissatisfied with program (rating < 4) cited a number of reasons for their dissatisfaction, the most common of which were:

- The reports were inaccurate, misleading, or unclear.
- The reports did not provide any helpful information.
- The neighbor comparison was inaccurate.
- The reports were a waste of PPL Electric resources.

Of the 274 respondents, 79 percent reported that since receiving a Home Energy Report, they had taken one or more steps to reduce their energy consumption, including changing their behavior, purchasing high-efficiency appliances, and upgrading their home's envelope.[11]

Figure 28 shows the steps that participants reported taking to increase the energy efficiency of their homes (n=215).

Figure 28. Customer Self-Reported Energy-Efficiency Steps



The most frequently cited changes were replacing incandescent light bulbs with CFLs or other efficient lights (58 percent of respondents) and general conservation measures including turning off lights in unoccupied rooms, unplugging appliances, and programming thermostats (75

[11] The EM&V CSP did not field a parallel survey of program nonparticipants, so caution should be exercised in attributing behavior, appliance buying habits, and envelope changes to the Home Energy Reports. Changes for some measures will be attributed to the program in the impact evaluation. Cadmus will compare participation in PPL Electric rebate programs between Behavior and Education program participants and nonparticipants.

percent). The next most common steps reported were buying energy-efficient appliances (25 percent) and installing insulation, efficient windows, or other envelope measures (41 percent). Smaller percentages of respondents reported actions involving space heating or cooling (8 percent) or water heating measures (7 percent). Only 12 percent of respondents reported that they had received or applied for a rebate for a measure they had installed since receiving a Home Energy Report.[12]

Halfway through PY2, less than one percent of households (0.7 percent, n=347 out of 50,000) receiving a Home Energy Report had opted out of the program. Cadmus completed 43 surveys with customers who opted out of the program before November 30, 2010.

Based on demographic information collected during the survey, customers who opted out of the program tended to be less educated, older, and less affluent than those who did not opt out, though only the difference in age was statistically significant (based on a χ^2 test). Opt-outs were also more likely to have electric heat and fewer people in the home. The differences in age and family size are likely related, as many older customers may be empty nesters. There were no significant differences between participants and opt-outs in the age of the home and homeownership status.

Table 11 summarizes the reasons customers reported for opting out of the program. The most frequently cited reason (32 percent) for opting out was that the information in the Home Energy Report was inaccurate. Twenty-two percent of opt-outs did not find the information useful for reducing their energy consumption. The remaining opt-outs objected to the neighbor comparison, felt the reports were an invasion of their privacy, or did not want to participate for other reasons.

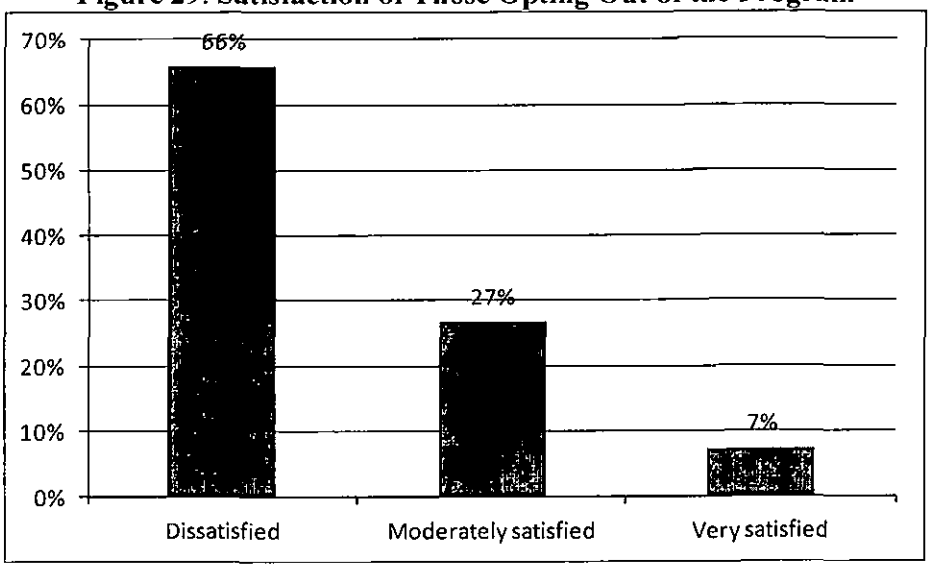
Table 11. Reasons for Opting Out of Program

Reported Reason	Percent
Reports are inaccurate	32%
Information in report is not useful	22%
Do not want to participate in program	15%
Reports are violation of privacy	12%
Do not care about neighbors' consumption	10%
Other	10%

Not surprisingly, customers who opted out of the program also had low satisfaction with the program. As Figure 29 shows, 66 percent of customers opting out reported dissatisfaction with the program. On a scale of from 1 to 10, fifty-six percent said they were extremely dissatisfied (rating=1) (n=41).

[12] Savings from rebated measures may be counted towards the Behavior and Education program as well as the applicable rebate program. However, in other utilities' service territories, OPower has found that the amount of savings overlap is minimal. The small percentage of rebated measures that customers reported taking actions on are consistent with OPower's finding. See the program impact evaluation for a discussion about how the savings overlap was estimated.

Figure 29. Satisfaction of Those Opting Out of the Program



It is important to note that while opt-outs were vocal about their dissatisfaction with the program, they constituted a small amount of customers receiving reports (532 out of 50,000).

PPL Electric expressed concern about the negative customer reaction to the neighbor comparison in the Home Energy Reports. They noted that some customers have expressed doubts about the reliability of comparisons, and several of the survey respondents said they did not trust them. These customers were more likely to give the program an unfavorable rating.

The survey asked respondents about their recall and understanding of the neighbor comparisons and whether the information was useful in providing them with some perspective about their own energy consumption. Most respondents remembered the neighbor comparison and the other modules. Reported recall was 94 percent for the neighbor comparison, 76 percent for the comparison of current and previous year-to-date home consumption, and 71 percent for the action steps.

Almost all respondents (98 percent) reported that they fully or somewhat understood the comparison of their current consumption to the previous year. A slightly smaller percentage (92 percent) reported that they understood the neighbor comparison.

About 80 percent of respondents said they found the comparison of current to previous year consumption very useful or somewhat useful in providing them with a perspective about their energy consumption. In contrast, just 59 percent said the same about the neighbor comparison. Forty-one percent said the neighbor comparison was not at all useful.

Respondents were asked how they thought their home energy consumption compared to the neighbor group, and many reported that the neighbor comparison was inaccurate. Just 16 percent of respondents believed their home energy consumption was very similar to homes in the neighbor group. Forty-six percent believed their home was somewhat similar, and almost 40 percent said their home was not at all similar.

Respondents cited a number of reasons they believed their home was different from their neighbors' homes, as shown in Table 12, the most frequently cited reasons were the size of the home, appliance use, heating fuel, and weatherization.

Table 12. Reasons Why Respondents' Home Differs from Neighbors' Homes

Reason	Percentage
Home is more or less efficient than neighbors	24.3%
Size/type of home	16.0%
Use more electricity/appliances are on regularly	15.0%
Don't know	13.6%
Type of fuel/heating system used (electric/gas/oil)	13.1%
Age of home	8.3%
Number of occupants	8.3%
Time spent at home	6.3%
Home extras (e.g., pool/hot tub/exterior lighting)	5.8%
Heat/cool house to comfort, not for energy efficiency	2.4%
Every home is different	1.5%
Medical condition/age requires more energy usage (heat/AC)	1.0%
Age of other occupants in the neighborhood	1.0%

Some customers are dissatisfied with the neighbor comparisons, so PPL Electric and the CSP are working to manage these concerns. The administrative CSP has been trained on how to respond to customers who question or disagree with the comparisons.

Customers can update or correct information about their homes in the CSP's database by calling customer service. Participants do not currently have the option of correcting or adding home information themselves via the Web. The CSP noted, "*At other utilities, they encourage people to go to the Website, and an integral part of the program is the ability to self-mange the profile, but since PPL Electric is only working with paper reports, customers don't have that option.*"

The CSP and PPL Electric are discussing the possibility of incorporating additional educational materials, such as special inserts with the Reports, to explain how the neighbor comparisons are created and how to interpret them. The CSP noted that it recently added a module that numerically ranks customers according to their consumption among similar neighbors.

Low-Income Winter Relief Assistance Program

Executive Summary

The objectives of the Low-Income Winter Relief Assistance program (WRAP) are these: (1) Assist low-income customers with reducing their energy use and energy expenses; (2) maintain partnerships with social service agencies, community-based organizations (CBOs), and local contractors to ensure maximum and timely assistance; (3) provide a referral stream to other PPL Electric and state-sponsored low-income programs; and (4) obtain participation by 23,590 participants and reductions of 18,695 MWh/yr and 2,985 MW.

In PY2, the program met 77 percent of its participation goals and 118 percent of its MWh/yr target. The program does not have specific MWh/yr goals, but commits to a minimum contribution of savings towards the overall residential portfolio. The current commitment per calendar year is 5,000 MWh/yr.

This process report addresses WRAP delivery, status, goals, implementation, marketing, and quality assurance. The report findings are based on Cadmus's interview with the customer programs specialist and input from PPL Electric's management team.

Key Findings

- The Low-Income WRAP program is running smoothly and PPL Electric is committed to continuous improvement.
- Act 129 WRAP met 77 percent of its participation goals and exceeded its commitment to the residential savings portfolio.
- Universal Services Program (USP) and Act 129 WRAP leverage contacts from other programs, such as from Low-Income Home Energy Assistance Program (LIHEAP), and CARES, to expand the program outreach and other sources of funding, such as from the American Reinvestment and Recovery Act (ARRA).
- Offering a multifamily project involves a great deal of PPL Electric staff time and effort.
- Because of Low-Income WRAP, there is now a larger pool of contractors with specialized training to meet the requirements of ARRA and Act 129.
- Changing the method of calculating savings during PY1 helped streamline the EM&V process in PY2.
- Some accounts have multiple records in EEMIS due to delays in equipment procurement or job upgrades.

Conclusions

- The Act 129 WRAP delivery model successfully reached low-income customers and weatherized their homes.
- During PY1, an influx of ARRA funding allowed PPL Electric to increase services to its WRAP customers outside the boundaries of Act 129. Although ARRA funding will soon be exhausted, the program will benefit from some lasting effects on WRAP's operations and delivery, such as an enlarged pool of BPI-certified contractors, which provide a valuable resource for PPL Electric.
- The training required for BPI certification should improve the quality of audits and inspections and maximize savings for PPL Electric's customers.
- The extra time and effort needed to sign up multifamily projects increased program costs and delayed PPL Electric's ability to claim savings for these projects.
- In PY2, savings are deemed by job type rather than computed per measure installed, in accordance to the Custom Measure Protocol developed for PPL Electric's program. This

resulted in a more streamlined savings calculation process, but also lowered expected savings.

- Because savings were deemed by job, and some accounts appeared more than once in the PY2 data. This impacted the accuracy of reported *ex ante* savings slightly. The EM&V process accounted for the duplicate accounts and adjusted the *ex post* savings.

Recommendations

- For multifamily projects, consider determining the owner's intent to keep or sell the property before having the field representatives obtain tenant signatures.
- Capitalize on the expanded resource of BPI-certified contractors by revisiting previous WRAP participants to identify potentially overlooked or ineligible inefficiencies and implement deeper savings measures.
- Add HPWHs as a WRAP measure to capture the additional savings. Because savings from this measure far exceed those from standard high-efficiency water heaters, savings from HPWHs could be added to the savings deemed by job type, i.e., baseload, low-cost, and full-cost jobs.

Program Overview

The Act 129 Low-Income WRAP supplements and operates in tandem with PPL Electric's USP Low-Income WRAP. The USP WRAP targets low-income residential customers with incomes at or below 200 percent of the federal poverty level. The Act 129 WRAP operates in largely the same manner, but targets low-income customers with incomes at or below 150 percent of the federal poverty level and seeks to reach:

- New participants;
- PPL Electric customers who received WRAP assistance in the past and may be in need of further WRAP services; and
- Customers who may not have been eligible for low-income assistance in the past due to eligibility rules, such as requiring at least one year of pre-participation kWh usage data.

The program was available to customers in existing single family homes and multifamily housing (with three or more dwelling units) where 50 percent or more of the tenants are low-income qualified.

The WRAP programs were designed to operate seamlessly, so that customers are not aware of whether they are receiving services through USP WRAP or Act 129 WRAP. PPL Electric tracked funding sources, budgets, and expenditures for the two WRAP programs separately. The program was delivered by community based organizations (CBOs), who managed program operations, verified participant eligibility, conducted audits, and installed recommended measures.

Program Implementation

Program Status

PPL Electric completed 4,415 Act 129 WRAP projects in PY2. Act 129 WRAP committed to providing a minimum of 5,000 MWh/yr per calendar year to PPL Electric's residential savings targets. The program exceeded that commitment in PY2 by delivering 5,431 MWh/yr toward the residential portfolio.

There were no changes to program administration or implementation approach in PY2. Program administration at PPL Electric runs smoothly due to the additional staff members added during PY1 and the history of their experience operating the USP WRAP program.

It was challenging for the CBOs to keep up with the new administrative and scheduling rules required by Act 129 and ARRA. (This issue is typical for program launches.) Also, initially there was competition for contractors, but after a few months, the CBOs rose to the challenges, and the program is now running smoothly. PPL Electric feels that despite the challenges, the majority of CBOs are excited to perform the work and to work with PPL Electric.

In addition, some agencies working with both WRAP and the ARRA programs coordinated their services to low-income customers. For example, if a customer is receiving a gas furnace through ARRA funding, the agency might coordinate with the PPL Electric program to provide electricity-saving measures. The reverse is also true: the CBOs also refer WRAP customers to ARRA for non-electric needs.

As a result of the influx of ARRA funding in PY1, there is now a larger pool of BPI-certified contractors to support the program. When ARRA funding is exhausted, it is likely that these contractors will look to the USP and Act 129 WRAP programs for work. The availability of many highly-trained contractors provides PPL Electric with a valuable resource for WRAP and future program offerings.

The Company has been working with many of the Low-Income WRAP contractors since 1988, and while contractors do not hesitate to bring up issues they have with program processes, they also understand that there are aspects of the program that PPL Electric is unable to change.

PPL Electric continuously looked for ways to improve the Low-Income WRAP. As part of this effort, effective in 2011, any contractor providing services under Act 129 or USP WRAP must have BPI-Analyst I certification. This is true for all contractors providing inspections, full-cost audits, and low-cost audits under the program. Contractors providing baseload audits are exempt from this requirement, but many of them also perform inspections for WRAP and have the certification already. The training required for the BPI certification could improve audit and inspection quality and maximize savings for PPL Electric's low-income customers.

As recommended in the PY1 process evaluation and stipulated by the SWE and PUC, PPL Electric changed the way it calculates savings in PY2. Savings were deemed by job type: baseload, low-cost, and full-cost, rather than by measures installed. This change greatly simplified savings calculations, but it has also resulted in lower than expected savings. The deemed savings values come from the 2008 Annual Report of PPL Electric's *Low Income Usage*

Reduction Program.[13] These values will be updated during PY3 using the 2009 report filed with the Commission and with a billing analysis of PY1 participants.

Finally, during PY2, PPL Electric added HPWHs, which provide greater savings than a standard water heater, to the list of approved measures for low-income WRAP projects. PPL Electric has determined the additional HPWH savings should be added over and above the kWh/yr savings deemed by job type until such time as the billing analysis (to determine Act 129-specific deemed savings by job type) reflects jobs with HPWHs installed during the previous program years.

Program Processes

PPL Electric adapts program standards to comply with national guidelines. Accordingly, he there will be some minor changes to the program in PY3, including updates to the WRAP field standards for contractors, effective June 2011, and to the health and safety testing standards. PPL Electric is currently modifying its phone survey database to make it is easier for field representatives to follow up with contractors if there are questions. The program experienced a challenge related to signing up multifamily projects. Several times, PPL Electric's field representatives reached agreements with building owners to weatherize multifamily buildings. The field representatives subsequently conducted the time-consuming process of getting signed applications from every building resident, only to have the building change ownership. At that point, the field representative began negotiations with the new building owner, and returned for more tenant signatures because of the high turnover in rental units. The process for multifamily buildings involves a great deal of time and effort, which is costly and delays PPL Electric's ability to claim savings from the program.

Another challenge in PY2 involved a temporary supply issue with window air conditioners. In the summer of 2010, there was an extended period of high heat, so the demand for window air conditioners outstripped their availability. Because these units were supply-constrained, WRAP contractors were unable to install them at the same time as the rest of the measures, and had to install them at a later date.

PPL Electric is working with the contractors to purchase proactively and avoid similar supply issues. However, the fact that contractors installed window air conditioners later than the rest of the measures generated a problem regarding when to close the record and claim the savings. PPL Electric generated two records for these customers, one for the primary job and one for the air conditioners.

Marketing

PPL Electric markets the program each year with an article in customer bill inserts, which generates approximately 600 referrals to the program. In addition to these referrals, PPL Electric receives referrals through multiple sources, including the LIHEAP, On-Track, and Customer Assistance Program (CAP).

[13] PPL Electric Utilities. *Low Income Usage Reduction Program.* 2008 Annual Report. April 29, 2010.

Forms and Rebates

All of the forms associated with Act 129 WRAP are filled out by contractors, not customers. There are no rebates associated with Act 129 WRAP because all services are provided free of charge. In PY2, PPL Electric added a line to the *Measures Summary All* report, produced by PPL Electric for inspectors to use when verifying installed measures during post-installation inspections. This update to the report allowed inspectors to verify measures installed with a check mark. Inspectors still used the Inspection Action form in electronic or hard copy format to record variances from the claimed installation. That form records measures that were claimed but not installed. PPL Electric revised the form at SWE's request so that it was easy to see which measures were verified as installed.

In PY3, participants will receive a customer satisfaction card to fill out and mail back to PPL Electric.

Quality Assurance and Quality Control

Customer Satisfaction

Cadmus did not conduct participant surveys for this program. PPL Electric conducts post-program participant surveys as a regular feature of the USP WRAP evaluation. The evaluation results are submitted to the Commission. PPL Electric reported that 90 percent of USP WRAP participant respondents rated the program with the highest possible rating (5 on a scale of 1 to 5).

Records Review

Cadmus reviewed 32 records from PY2. For records from Q1 and Q2, they were stratified by case type—baseload, low-cost, and full-cost—and sorted by the number of measures installed within each stratum. Cadmus distributed 10 sample points per quarter evenly across the three strata, with the extra sample point assigned to the full-cost stratum. For each case type, Cadmus selected the record with the greatest number of measures, and selected the remaining sample points via a simple random sample.

For the Q1 sample, one sample point was included in a sample the SWE chose for the desk review. Cadmus reviewed that record and also chose an additional sample point.

QA/QC Findings

Cadmus compared information on all supporting documents for each of the 32 participants, such as contractor reports, invoices, and PPL Electric summary reports, to values recorded in the EEMIS tracking database. They identified seven records where it appeared that the job type could be upgraded because full-cost services, such as blower door tests, had been conducted. However, after reviewing the records with PPL Electric, they found that these records had received additional services through the $200 allowance per job for comfort measures, such as caulking, weather-stripping, and blower door tests.

In addition, when Q1 through Q3 data were reviewed in aggregate, Cadmus noted that 20 accounts had entries in more than one quarter of tracking data, raising a concern that these 20

records were being counted twice in the savings calculations. Cadmus reviewed these records with PPL Electric and noted that accounts with records in multiple quarters are not common (less than one percent of PY2 records) and that they occur for different reasons, such as:

- A delay in procurement of a seasonal measure.
- The job was upgraded from baseload to low-cost or full-cost.

Because Act 129 deemed savings by the type of job, it is important to ensure the program got full credit for the complete package of upgrades made to a home. The following resolutions ensured full credit was applied:

- When a seasonal measure will be installed, PPL Electric keeps that job open until the additional seasonal measure is installed;
- When a job is upgraded, both jobs are recorded as Act 129 jobs in EEMIS. PPL Electric sends a report to Cadmus each quarter identifying the accounts where this has happened. Cadmus corrects for the double-counting with the realization rate adjustment, and attributes savings to the job upgrade.

EM&V

Because the savings per job are determined by job type rather than by the number of measures installed, the program focused on completing as many jobs as possible, while still providing high-quality service and comfort to the customers. EM&V efforts focused on detailed records reviews. No customer surveys or site visits were conducted for Act 129 WRAP. This is because the USP WRAP has a rigorous schedule of process and impact evaluations, including site visits. The results of these evaluations are reviewed and approved by the Commission.

Low-Income E-PowerWise

Executive Summary

The objectives of the E-PowerWise program are these: (1) Provide quality energy conservation and efficiency education to low-income customers; (2) provide information about low-cost/no-cost energy-efficiency strategies that low-income customers can use in their homes; (3) provide low-income customers with energy-efficiency measures in free take-home energy-efficiency kits; and (4) obtain participation by 7,200 customers and reduction of 1,080 MWh/yr and 150 kW.

The E-PowerWise program ramped up significantly during PY2 and exceeded its program goals for participation, number of kits distributed, and energy and demand savings. At the end of PY2, the CSP had recruited 22 CBOs, exceeding the goal of 20 participating agencies. It had also distributed nearly 4,050 kits, ahead of the program's PY2 target of 3,100 kits.

The E-PowerWise process evaluation entailed interviews, surveys, and a review of records and databases.

- Interviews were conducted with the customer programs specialist, the program CSP (Resource Action Program), and three CBOs;
- Reviews were performed of completed enrollment forms and participant paper surveys (851);
- Telephone surveys were conducted with 143 participating customers; and
- A review and comparison were performed of the CSP's and EEMIS program databases.

Key Findings

The following are key findings from the process evaluation.

- PPL Electric resolved many of the challenges reported in PY1, including the program's slow ramp up and reliance on workshops as the only method of program delivery.
- The program was on track to meet or exceed PY2 goals, with some of this success attributable to the newly introduced one-on-one delivery option.
- Regular communications helped to facilitate close coordination between PPL Electric and the CSP, and allowed them to identify and address issues as they arose.
- Participating customers were very satisfied with the program, educational sessions, and Easy Savings Kits. The majority reported they learned a lot about saving energy and money from the program.
- Despite initial concerns, the differences in eligibility requirements between the low-income programs have not resulted in confusion among CBOs or customer participants.
- CBO response to the E-PowerWise program was very positive, including the train-the-trainer sessions, the Easy Savings Kits, and customer feedback survey.
- One or more of the training materials provided to CBOs were not discussed in the train-the-trainer sessions.
- Some CBOs have not distributed all of their kits to clients. PPL Electric plans to follow up to determine the reasons for this, ask about their plans to disseminate the kits, and offer to help if needed.
- The CBOs reported difficulty verifying customer eligibility off-site, and the potential for database errors from transcribing poor handwriting.
- Participants received energy education and Easy Savings Kit by one of three methods: group workshops; one-on-one at the CBO office; or in their homes. The program delivery mechanism for individual participants was not tracked in the CSP's database or in EEMIS.
- Additions to energy kits could help recruit additional participants, including additional CFLs and printing program materials in a larger font.
- The CSP enhanced its database to capture kit numbers as well as key energy use and demographic data from the enrollment forms.

- Multiple kits were distributed to a small number of participants. As a result of the duplicate records, the realization rate was 99 percent.
- The records review revealed that data were missing from EEMIS fields in many records, values in the CBO ID field were not accurate, and that there were several other insignificant data inconsistencies.
- Not all data necessary to determine energy savings were collected in customer feedback surveys.

Conclusions

- The E-PowerWise program's success in PY2 was largely attributable to the efficiency of the CSP and its effective, regular communication with PPL Electric, as well as to the temporary increase in the per-kit incentive provided to CBOs in late PY1/early PY2 (from $10 to $15 per kit distributed).
- Allowing CBOs to deliver the program in accordance with their customer's needs—via group sessions, one-on-one meetings, or in-home session—results in increased program participation and provides better service to customers.
- CBOs that did not promptly distribute the energy kits imposed an additional administrative burden on PPL Electric and led to unrealized savings potential from the program. PPL Electric must discern why the kits were not distributed and coordinate with the CBOs on a plan for their distribution.
- If needed, there is potential to increase program savings by including additional CFLs in the kits or with coupons included in the kits, since many customers expressed interest in obtaining additional CFLs.
- Because CBOs were not trained on all the E-PowerWise materials, they were not fully prepared to educate their customers, who in turn were not installing or were not correctly installing the measures in the kit. This resulted in unrealized program savings.
- The E-PowerWise energy kits and educational sessions were both venues through which PPL Electric could cross-market its other energy-efficiency program offerings.
- While some customers received multiple kits, the overall impact of this on program savings was negligible.
- The CSP database did not capture many of the participants' phone numbers: the absence of a significant number of participant phone numbers limits and may bias the customer phone survey sample.
- Because CBOs are very familiar with the program's day-to-day operations, they offered valuable suggestions about how to enhance the program's overall success.

Recommendations

- Follow up, as planned, with inactive CBOs that have undistributed kits to determine the reasons for their inactivity, how the CBOs intend to disseminate the kits, and how PPL Electric can help if necessary.

- Establish a process (if not already in place) whereby a specified number of kits are shipped to each CBO, and no additional kits are shipped until the CSP receives enrollment forms verifying that the first set of kits (or a large proportion of the kits—to avoid start-stop kit distribution) have been distributed to eligible customers. If the CSP does not receive confirmation that a CBO's kits were distributed within a specified timeframe, the CSP should follow up with the CBO to determine why kits were not disseminated and establish a plan and schedule for dissemination. CBOs that repeatedly fail to disseminate kits in a timely fashion should be required to return the kits and be dropped from the program.
- Develop an online database to allow CBOs to enter participant information while in the field. Electronic entry of participant information would streamline documentation procedures, reduce the distribution of multiple kits per account, and reduce transcription issues.
- If participation begins to lag in PY3 or PY4, consider including an additional CFL or a coupon for a CFL in the energy kits. Alternatively, consider raising the CBO incentive level to $15 per kit until participation increases again. These tools should be used only as needed to maintain target participation and savings levels in the program.
- Include information about other PPL Electric energy-efficiency offerings in the energy kits and educational sessions.
- Prepare and provide CBOs with copies of the program materials in a larger font for CBOs to disseminate on an as-needed basis.
- Ensure that train-the-trainer sessions cover all measures included in the energy kits (e.g., plumbing tape).
- To inform future program design refinements, add fields in the CSP database and EEMIS to track whether participants received a kit at a group workshop, through a one-on-one session in the CBO's office, or at an in-home session.
- Upload missing data into EEMIS (home phone number, heating system fuel, hot water heating fuel, and presence of a dishwasher in home). Create a data table in EEMIS with participating agencies, and update EEMIS records so that values in the CBO ID field are accurate.

Program Overview

The E-PowerWise program aimed to provide low-income customers with energy-efficiency education to enable them to make informed energy-use choices. The program targeted PPL Electric customers with incomes at or below 150 percent of the federal poverty level. It was available to customers in single family and multifamily housing where 50 percent or more of the tenants qualify as low-income.

The E-PowerWise program consisted of four main components:

- ***Trainer training:*** The program CSP trained CBO staff and others identified by the CSP on how to provide energy workshops to their low-income customers.

- ***Energy education:*** CBO staff provided customers with educational training sessions at locations convenient to the targeted customer segment, either through workshops or one-on-one sessions, both at the agencies' offices and at participant homes.
- ***Energy kits:*** During the workshops or one-on-one sessions, customers received an Easy Savings Kit. Each kit included multiple energy-saving measures, a Quick Start Guide, and a (paper) customer feedback survey. Workshops and one-on-one interactions included education about energy-efficient behaviors and the measures in the kit, and instructions for their proper installation.
- ***Surveys and reporting:*** Customers who attended a session were asked to complete a feedback survey (included in each Easy Savings Kit); survey results were used to evaluate the program.

Program Implementation

Program Status

The E-PowerWise program ramped up significantly during PY2 and exceeded its program goals for the number of CBO participants, number of kits distributed to customers, and energy and demand savings. At the end of PY2, the CSP had recruited 22 participating CBOs, exceeding the program's long-term goal of 20 participating agencies. Also, by the end of PY2, participating CBOs had distributed close to 4,050 kits, more than the program target of 3,100 kits.

Program Processes

PPL Electric continues to be very satisfied with the implementation CSP, noting that the CSP works efficiently and regularly communicates with PPL Electric. The CSP had a staffing change midway through PY2; from PPL Electric's perspective, the transition was smooth and the new staff members are working well.

Eligibility for the E-PowerWise program is limited to customers with a household income at or below 150 percent of the federal poverty level. In contrast, customers at or below 200 percent of the federal poverty level are eligible to participate in PPL Electric's Low-Income WRAP.

In PY1, PPL Electric expressed concern that the different eligibility requirements could cause confusion among CBOs and customers. In PY2, however, no one interviewed for the process evaluation mentioned concerns about the difference in program eligibility rules. Nonetheless, the implantation CSP and one of the CBOs were concerned that the E-PowerWise 150 percent poverty eligibility requirement was limiting. PPL Electric suggested adjusting this parameter to match the Low-Income WRAP threshold would enable more people to benefit from the program and would be more consistent with the eligibility requirements of other programs offered by the CBOs.

Due to the program's slow ramp up in PY1, PPL Electric increased the payment to CBOs from $10 to $15 per kit distributed. The additional incentive resulted in an increase in kit distribution, and the payment returned to $10 per kit after two months. PPL Electric found it difficult to anticipate the level of customer participation in PY3: since the program is no longer new, participation could taper off; however, there are a large numbers of low-income customers served by PPL Electric who could benefit from the program.

The majority of phone survey respondents said they participated in the energy education workshop or one-on-one training to reduce their energy costs (45 percent) or to save energy (32 percent).[14] Less common reasons given for participation included: because it was required/recommended/ provided by the CBO (7 percent), to learn more about energy in their home (7 percent), to get the energy-efficiency kit (6 percent), and to reduce their maintenance and operational costs (6 percent).

Response to Easy Savings Kits

Overall, the CBOs thought participants liked the kit items; they especially liked the night light and CFLs. This was confirmed by participants themselves through the telephone survey, which revealed that 86 percent were very satisfied with the items in the kit.

Customers did, however, have some suggestions to improve energy-saving measures provided in the Easy Savings Kits. Of the 22 respondents who offered suggestions, 10 said to include more CFLs, two said to provide more aerators, two said to provide more (unspecified) items in the kit, two said *not* including magnets or stickers, and two said to distribute the kits more frequently. Additional suggestions included providing more written instruction. Respondents also suggested surveying participants about the items they need and are interested in to determine those most appropriate items to include in their personalized kit.

One CBO mentioned that the low-flow showerheads were difficult for some people to install. The customer phone survey corroborated this finding: eight survey respondents reported finding the low-flow showerheads difficult to install—two said the low-flow showerhead did not fit, two said they were not able to remove their existing showerhead, two needed further instructions, and one said the new device leaked.

In addition, nine respondents reported that the bathroom faucet aerator was difficult to install, and eight stated that the kitchen faucet aerator was difficult to install. Of the customers who experienced difficulty installing aerators, eight said the aerator did not fit or was incompatible with their faucet, three said they did not know how to install the aerator or could not remove their existing aerator, two said the aerator leaked, and one said they did not like its quality.

Another CBO mentioned initially being confused by the roll of white tape included in the kits, but later learned this was plumbing tape for use installing the showerhead and aerators. Cadmus is uncertain whether the tape is covered in the train-the-trainer sessions; if it is not, the training materials should be amended to include a short discussion of the plumbing tape and its purpose. One CBO also suggested including brochures or flyers in the kits that provide information about the E-PowerWise program kit items (e.g., information about how to wrap hot water pipes). Another CBO suggested including coupons for additional CFLs at a reduced price.

Based on PY1 process evaluation recommendations, PPL Electric considered adding measures to the E-PowerWise Easy Savings Kit in PY2, but decided against doing so because the kits was already assembled. New measures may be considered and added when the next program cycle begins.

[14] This question allowed for multiple responses, so the total percentages exceed 100 percent.

Program Enrollment

An E-PowerWise customer was counted as a participant when a fully completed enrollment card—indicating that the customer was educated and received a kit—was mailed by the CBO and received by the CSP.

Some CBOs had kits in their inventory that were not getting distributed to clients; PPL Electric planned to contact those CBOs to determine why they are not disseminating the kits. Specifically, they will inquire whether a staffing change caused the slow-down (which historically caused distribution slow-downs), whether CBO staff needed re-training, what the CBOs planned for kit distribution, and what PPL Electric could do to help ensure the kits got distributed to qualified customers. If, after working with the individual CBOs, they still failed to distribute the kits, PPL Electric will request the kits be returned. PPL Electric may identify new CBO participants.

In response to the CBOs' reported difficulty attracting customers to the E-PowerWise energy training workshops in PY1, PPL Electric suggested offering energy trainings one-on-one with customers during individual counseling sessions. Many CBOs concurred this would be a good approach, and conducted one-on-one trainings in PY2. Some CBOs continued to offer workshops, others offered one-on-one trainings in addition to group workshops, and others switched primarily to the one-on-one trainings.

During the one-on-one sessions, the CBOs presented a condensed version of the energy workshop materials to participants, including a discussion of each of kit item and the educational materials. Additionally, some CBOs offered in-home trainings to participants through the Head Start program. According to telephone survey respondents, 49 percent of participants attended energy education workshops and 45 percent received training in their home or elsewhere (e.g., a CBO office). However, the program delivery mechanism for each participant was not tracked in the CSP's database or in EEMIS.

Marketing

The CSP was responsible for marketing and outreach to CBOs. The CSP explained that because the CBOs comprise a niche market, mass marketing techniques were not appropriate. Instead, the CSP reaches CBOs primarily through telephone calls and e-mail. Also, because the CBOs know one another, referrals occurred word-of-mouth; in fact, the CSP received a number of inquiries from CBOs interested in participating in E-PowerWise based on recommendations from other CBOs. After receiving an inquiry, PPL Electric, or someone on the CSP's staff, visits the interested agency to explain the contents of the Easy Savings Kit.

The CBOs reported that they marketed the program to their clients through print media (e.g., posters displayed at CBO offices and materials published in CBO newsletters), community outreach, word-of-mouth, and in-agency referrals. One CBO said its agency also discussed the program at speaking engagements (e.g., forums for the elderly). PPL Electric marketed the program to customers through the *Connect* newsletter, the residential customer Website and program Website, and through PPL Electric's customer service department.

To assess whether program information from these sources reached customers, Cadmus asked participants how they heard about the CBOs' education on saving energy and distributing the

energy kits. Of the 149 participants who responded to this survey question, 27 percent learned about the program from a CBO. Another 19 percent learned of the program from a friend, relative, or colleague, and nine percent learned about it from a print advertisement, article, or flyer. A breakdown of respondents' reported sources of program information is provided in Table 13.

Table 13. How Participants Learned About E-PowerWise Energy-Saving Information and Energy Kits

Information Source	Percent
CBO	27%
Friend, relative, or colleague	19%
Print advertisement/article/flyer	9%
Head Start program	8%
PPL Electric employee, account rep, or customer service rep	8%
School/daycare/child's teacher	8%
PPL Electric bill insert, newsletter, Connect, or E-Power link	6%
Other	5%
Senior center	4%
On track program	3%
Applying for a reduced rate, help with bill	3%
PPL Electric Website	2%
Food bank	2%
Total	104%*

* Total is greater than 100 percent; multiple responses being allowed.

Participants who completed the take-home feedback survey included in the kit were entered into a monthly drawing for a $100 gift card offered by PPL Electric. Winners of the drawing were included on promotional materials developed by the CSP, which were posted in the CBOs' offices each month.

Although PPL Electric anticipated they would include brochures describing PPL Electric's other energy-efficiency programs within the Easy Savings Kit, no brochures were included in the kits in PY1 or PY2. Only the Appliance Recycling program was mentioned in the E-PowerWise educational sessions, although information about the other programs was available on PPL Electric's Website.

PPL Electric noted they are developing a more formal marketing plan for PY3.

Customer Feedback Survey and Quick Start Guide

Each energy kit contains a customer feedback survey and a Quick Start Guide educational pamphlet. The CBOs reported that the Quick Start Guide was easy to understand and useful in educating participants. The vast majority of participants who responded to the telephone survey (87 percent, see Table 14) were also very satisfied with the Quick Start Guide. Further, 82 percent of participants who completed the paper survey said the Quick Start Guide was very helpful; another 14 percent said the guide was somewhat helpful, and the remaining four percent said they did not use the guide. Eighty-four percent of paper survey respondents said they

learned a lot about saving energy and money from the Quick Step Guide; 16 percent said they learned a little. No changes to the Quick Start Guide and the kit's paper survey were made during PY2.

One CBO developed a separate form which customers completed to help the CBO track kit numbers. The agency suggested the E-PowerWise program provide a mechanism to better track kit numbers as part of the program process at the agency level.

Quality Assurance and Quality Control

Customer Satisfaction

Cadmus asked a series of questions in the participant telephone survey to assess satisfaction with the E-PowerWise program. Survey responses indicated that participants were very satisfied with the program: of the 143 survey respondents, 82 percent were very satisfied with the overall program, and 16 percent were moderately satisfied. Table 14 shows customer satisfaction with several aspects of the E-PowerWise program.

Table 14. Participant Satisfaction With E-PowerWise

Program Component	Very Satisfied	Moderately Satisfied	Not Satisfied
Overall (n=141)	82%	16%	1%
Scheduling of informational workshop or in-home training session (n=133)	89%	11%	1%
Workshop or in-home training session sign-up (n=135)	87%	12%	1%
Information provided during workshop or in-home training session (n=142)	89%	9%	1%
Energy-saving measures provided in the kit (n=141)	86%	13%	1%
Quick Start Guide provided in the kit (n=135)	87%	11%	1%

* Total may not add to 100 percent due to rounding.

Of the few respondents who said they were dissatisfied with some aspect of E-PowerWise, two said they did not receive enough information or were missing proper instruction, one said he was unable to use the information provided by the program, and one reported that when *"Auditors for the home visit came, they were very disrespectful of my things and my property."* It is unclear if the respondent was referring to in-home energy education, or if they received an audit through another program.

When asked specifically whether they had suggestions for improving the energy education workshops or in-home training visits, there were six suggestions for including more items/better quality items, six for promoting or advertising the program more, and two for providing additional verbal instruction. Additional suggestions included providing more written instruction, printing the information in a larger font (to make it easier for older people or those with vision problems to read), having more professionals visit the home, and providing information about solar energy.

The customer survey elicited 10 suggestions for improving the enrollment process. Four respondents mentioned promoting or advertising the program more, and other suggestions mentioned twice each included holding classes at additional locations and providing more

information in advance. One respondent suggested streamlining the paperwork to make the process progress more quickly.

Trade Ally Satisfaction

Cadmus selected three CBOs to interview for this evaluation: two that delivered the greatest number of kits to participants, and one that delivered relatively few kits to participants. All three CBOs interviewed had participated in E-PowerWise since at least April 2010.

All three CBOs reported high levels of satisfaction with the program. The CBOs did not find differences between E-PowerWise and their other programs to be an issue. The interviewees also said that the program's administrative requirements were reasonable, not burdensome. None of the CBOs found the program eligibility requirements confusing. However, one agency reported difficulty *verifying* customer eligibility when customers are unsure of their electric utility provider. Additionally, utility charges can be included in tenants' rent—so customers may not know who provides their electricity. This CBO now requires now requires customers to bring a copy of their electricity bill to the training session to establish their eligibility for E-PowerWise.

All the CBOs interviewed provided favorable feedback about their experiences with the train-the-trainer sessions: they said the sessions were useful, relevant, easy to understand, adequately prepared them to deliver training sessions to customers, and that they were not too time consuming. The CBOs concurred that the kits were well-designed and informative. All three CBOs reported that the E-PowerWise program complemented their other program offerings.

The CBOs made suggestions for administrative changes to the program. First, one mentioned it would be useful to have a way to verify customer eligibility while in the field. Another CBO suggested that PPL Electric or the CSP provide CBOs with an electronic (Excel or other) template containing fields for all of the data to be collected that they could fill out with the participants' enrollment information. Such a tool would simplify the process, help ensure CBOs wouldn't miss any critical data while enrolling customers in the field, reduce errors made when transcribing information from enrollment forms, and enable consistent formatting between CBOs.

The three CBOs stated they received consistently positive feedback, and that participants seemed receptive to the information and kit items. When asked to identify participation barriers they thought customers might encounter, one CBO suggested participants may be hesitant to install the measures or adjust their behaviors due to a general resistance to change. Another CBO thought the program's income guidelines were a barrier for its clients who make just above 150 percent of the federal poverty level. The third CBO, who offers workshops as well as one-on-one trainings, mentioned that a general unwillingness to be a "joiner" (i.e., to participate in group activities) seemed to be the primary barrier to participation. This agency suggested offering clients a small gift card to increase E-PowerWise participation, with funding from the monies that were used at the beginning of PY2 to (temporarily) increase the CBO per-kit incentives.

Records Review

In December 2010, Cadmus conducted the program's first records and database review, covering PY2 Q1 E-PowerWise participants. A key finding of this review was that multiple kits were distributed to a small number of participants, despite program rules limiting each qualifying PPL Electric customer to a single kit. PPL Electric and the CSP subsequently reminded the CBOs of the limit. However, strict reinforcement of this policy is not practical; program eligibility requires only that participants be PPL Electric customers and fall within specified income guidelines. During PY2, there were no protocols under development to ensure the one-kit-per-customer rule is being followed, and the implementation CSP does not track or follow up with customers who received two kits. Cadmus will continue to monitor this issue in future QA/QC record reviews.

QA/QC Findings

Through the PY2 Q1 records and database review, Cadmus also found:

- The CSP database did not include kit numbers or customer responses to the feedback survey's energy usage and demographic questions.
- The CSP database was missing phone numbers for over 50 percent of the records, although phone numbers were provided on the hand-written enrollment forms.
- Data were missing from several EEMIS fields, including: home phone number (even for records where the corresponding CSP record included home phone numbers), heating system fuel, hot water heating fuel, presence of a dishwasher in home, and meter number. Values for all fields except "meter number" were needed for the E-PowerWise impact evaluation.
- EEMIS was accurately capturing measure savings from the updated TRM algorithms.
- EEMIS values for the CBO ID field did not accurately document the participating agencies. Cadmus suggested that PPL Electric provide a key code to ensure that agencies are coded correctly.

Cadmus conducted a second records review—covering PY2 Q2 and PY2 Q3 E-PowerWise participants—toward the end of the second program year. The most notable findings from this review were these:

- A small number of duplicate records existed in both EEMIS and the CSP's database. As a result, the 3,253 kits recorded in EEMIS for PY2 Q1 through PY 2Q3 were reduced to 3,212 to account for duplicate account numbers. The realization rate was therefore 99 percent.
- The CSP database started including kit numbers and customer responses to the feedback survey's energy usage and demographic questions.
- The CSP database was not capturing participant phone numbers for over 50 percent of the records, and many of the phone numbers in the CSP database are missing in EEMIS. Of

the 140 records reviewed, 88 (63 percent) were missing phone numbers in enrollment data, though these numbers were on the hand-written enrollment forms. Cadmus needs participant phone numbers to conduct telephone surveys as part of the evaluation; the absence of a significant number of participant phone numbers limits and may bias the customer phone survey sample.

- For most records, data were still missing from EEMIS fields, including: home phone number (even for records corresponding to CSP records that included home phone numbers), heating system fuel, hot water heating fuel, and the presence of a dishwasher in the home.
- EEMIS values for the CBO ID field did not accurately document the participating agencies. Some CBO ID values were used for multiple agencies, and some agencies had multiple CBO ID values. However, CBO names were provided in the "Agency" text field of the CSP database and could easily be used to populate the CBO ID field in EEMIS.

EM&V

In PY2, Cadmus adjusted the reported *ex ante* savings to match the TRM methodologies for calculating savings. These TRM *ex ante* adjustments will continue in PY3.

Commercial and Industrial Custom Incentive Program

Executive Summary

The objectives of the Custom Incentive program are to: (1) encourage the installation of high-efficiency equipment that is not included in PPL Electric's Efficient Equipment Incentive program; (2) encourage equipment repairs and optimization and operational or process changes that reduce electricity consumption and peak demand; (3) encourage a whole facility approach to energy efficiency; (4) increase customer awareness of the features and benefits of energy-efficient equipment; (5) increase the market penetration of energy-efficient equipment; (6) support emerging technologies and non-typical solutions in cost-effective applications; and (7) obtain participation of 400 customers and a reduction of 140,460 MWh/yr and 27 MW.

In PY2, PPL Electric had more than 120,000 MWh/yr of savings in various stages of the program. Of this, 74,000 is for the large commercial sector. This value exceeds PPL Electric's large commercial sector targets for the entire plan period, which will likely necessitate shutting down large C&I sector programs in early PY3. However, because development timelines for large C&I projects are generally long and savings are not attributed to the program until the project is completed and savings are verified, by the end of PY2, the Custom Incentive program had only 16,700 MWh/yr of reported verified savings. These savings are heavily skewed toward the large C&I sector. Penetration among small and mid-sized commercial customers, as well as government and institutional customers, is well behind target.

For the Custom Incentive program process evaluation for PY2, Cadmus conducted interviews with the customer programs specialist, the program CSP (E-Power Solutions or EPS), and management staff, including the manager of energy-efficiency programs; the manager of energy-

efficiency evaluation and performance, the manager of major accounts, and the director of customer programs and services.

PPL Electric's QA/QC CSP provide insights into program processes and M&V protocols. For the process evaluation, Cadmus also conducted a telephone survey of 19 program participants to gauge their satisfaction with the program and better understand their particular challenges.

Key Findings

The following are key findings from the process evaluation.

- The Custom Incentive program was on track in PY2 with savings and budget targets. PPL Electric's management and program teams considered the program to be successful.
- Customer surveys indicated that customers are generally very satisfied with the program.
- The Custom Incentive program evolved during PY2, and several beneficial changes improved customer satisfaction and helped streamline the program from an operational, communications, and delivery standpoint. Program changes include:
  - In mid-PY2, the SWE reduced its level of involvement in custom projects and changed the protocols for approving projects and custom measures. These changes helped streamline and simplify the project development process.
  - PPL Electric reduced customer requirements around commissioning plans and documentation to support the development of site-specific M&V plans (SSMVPs).
  - PPL Electric implemented portions of its change management process and adjusted communications protocols between customers and KAMs to reduce confusion and streamline the project development process. This alleviated the need for frequent updates to program materials and application forms.
  - PPL Electric's new implementation CSP adjusted program applications to better streamline the process and reduce administrative requirements.
- Despite several improvements, the Custom Incentive program was still complicated due to project-specific analysis and approval requirements. Program complexity represented one of the most common complaints reported by Custom Incentive program participants.
  - Five of 21 (24 percent) customers surveyed found the commissioning requirements to be excessive or problematic and felt they should be reduced. On the other hand, one respondent found it "*refreshing and surprising to see that PPL isn't just fast-tracking money to organizations*" and noted that he was pleased with the "*robust M&V efforts.*"
  - Four of 21 (19 percent) customers surveyed reported that there was an excessive paperwork burden for program participation. This issue was most common for small projects, such as lighting and variable speed drive motor control retrofits.
  - Three of 21 (14 percent) customers surveyed felt that the required paperwork was difficult to understand, including application forms, commissioning plan forms, and commissioning plan guidelines.
- The Custom Incentive program nearly achieved its savings and budget targets for large C&I customers, and PPL Electric will most likely close the program for this sector early

in PY3. However, the program was well behind its PY2 goals for the small C&I and GNI sectors.

- Both the small C&I and GNI sectors present barriers that are difficult to mitigate as previously discussed in other sections.
- PPL Electric contracted with an implementation CSP, EPS, whose goal was to ramp up participation in the small commercial and GNI sectors to meet the EE&C targets. With the addition of this C&I implementation CSP, PPL Electric expected participation in the small C&I sectors to improve over time.
- To facilitate penetration to the small C&I and GNI sectors, and to reduce opportunities for gaming, PPL Electric adjusted the technical study reimbursement criteria and incentive calculation methodology to fully reimburse technical studies that included both prescriptive and custom measures.
- Six of 21 (29 percent) customers surveyed felt that long turn-around time was an issue for the program. Customers cited long project approval, commissioning plan approval, and incentive payment turn-around time, as well as a long time taken by PPL Electric between receiving customer applications and data submittals and responding with requests for clarification or additional data.
- Customers are generally very happy with the performance of their KAMs. A typical quote is *"[My KAM] is fantastic... She/he does a great job."*

Conclusions

- With healthy savings in the pipeline within the expected budget allocation, and high rate of customer satisfaction, PPL Electric's Custom Incentive program is largely a success.
- PPL Electric continued to be proactive in identifying challenges early and worked to find and implement solutions to resolve them. Several changes to the program during PY2 helped streamline the Custom Incentive program and improved program efficiency:
  - Less burdensome customer requirements around commissioning plans and documentation to support development of SSMVPs.
  - Decreased program involvement by the SWE including less burdensome review and approval requirements for projects and custom measure protocols;
  - Implementation of a change management protocol, which requires that program changes are only made twice per year.
  - Eliminating the need for KAMs to coordinate communications between large customers and the implementation CSP.
  - Changing program applications to better streamline the application process and reduce administrative requirements. (While these factors have been helpful in establishing a more streamlined, sustainable program and keeping it on track to meeting its goals, continued challenges associated with the program's complicated applications, commissioning process and documentation requirements, complex CMPs, and burdensome M&V requirements may never be fully mitigated.

- The tremendous response from large C&I customers resulted in the need to close the program to the large C&I sector early in PY3. This will impact program continuity, budget allocations, and potentially, customer satisfaction.
- PPL Electric has taken steps to address lagging participation in the small C&I and GNI sectors, including:
  - Adding a C&I sector implementation CSP to support outreach and improve participation;
  - Changing the technical study reimbursement criteria and incentive calculation methodology to allow full reimbursement for technical studies that include both prescriptive and custom measures.

  PPL Electric anticipates that these changes will help increase participation in the small C&I and GNI sectors over time; however, the custom program will continue to face challenges related to identifying institutional sector customers, reaching small C&I customers with appropriate and compelling marketing, and identifying custom efficiency measures that are appropriate for smaller customers.
- *With the addition of a new C&I-focused CSP, PPL Electric has taken on additional costs;* when combined with less abundant project savings expected from smaller C&I projects going forward, program cost-effectiveness may be impacted. PPL Electric will continue to carefully monitor program cost-effectiveness.

Recommendations

- Consider shifting the projected savings from the small C&I to other sectors, as previously discussed, to achieve the overall portfolio compliance target, since this program contributes significant savings.
- Increase participation among its small C&I and GNI customers. Although PPL Electric has taken a major step in addressing the savings shortfalls in these two sectors by hiring a C&I-focused implementation CSP, the Company will need to continue to work to overcome barriers in these sectors, support the CSP's efforts to the greatest extent possible, carefully monitor progress, and implement creative solutions to reach its targets. Specific recommendations include:
  - To target GNI customers, PPL Electric should use identifying criteria based on SIC codes, cross-referenced with information in its customer database, to create targeted customer lists for the CSP's outreach efforts.
  - The CSP's planned outreach to ESCOs should be continued, as ESCOs are traditionally a primary delivery mechanism for energy services to GNI customers, particularly for the municipal, university, schools, and hospitals market sector.
  - The CSP should continue to expand its focus on outreach to trade allies who primarily serve the small commercial and GNI sectors.
  - EPS should identify a list of custom energy-efficiency measures that are appropriate for small C&I facilities. The implementation CSP should, with PPL Electric's support, research appropriate technologies for small commercial customers that may not be offered under the prescriptive program, and actively promote those

technologies to targeted customers. These could include new, cutting edge technologies such as LEDs and smart lighting systems, marginally cost-effective measures such as windows and retro-commissioning, or measures targeted to specific customer segments such as agriculture/farms or data centers.

  - PPL Electric should continue its market segmentation analysis and leverage this work to target potential customer segments that are most likely to benefit from the Custom Incentive program. Consider using the insights gained from the resulting knowledge platform to implement a social marketing campaign to supplement PPL Electric's targeted messaging and media optimization approaches.

- Carefully monitor program progress and cost-effectiveness and may need to adjust program operations to reduce costs if needed. Recommendations include:
  - Consider reevaluating the reimbursement policy for technical studies if a reasonable portion of those studies do not eventually result in custom incentives. Few technical studies to date have resulted in custom incentive projects. It may be too early to judge success, since the time between the audit and installation of the recommended measures can be substantial.
- Assess the effectiveness of TRC screening at the project level. PPL currently estimates the TRC for each project based on *ex ante* cost and savings estimates. To be eligible, projects are generally required to have a TRC of 1.0 or greater. This process provides a clear and defensible rule for rejecting projects that are not cost-effective. However, it is not a requirement of the PUC or the SWE and is not necessary. PPL Electric should consider the tradeoff between lower participation and lower program cost-effectiveness.
- Attempt to reduce turn-around time as much as possible through the entire Custom Incentive program process. Additionally, PPL Electric should make it clear to customers as projects begin that the process may span over multiple months from initial application to rebate check payment. EPS should proceed with its plans to develop an online program dashboard to allow customers to see the progress of their projects through the application process. Participants will be less likely to be dissatisfied over the turn-around time if they enter the program with the knowledge that, in the words of one program participant, "[the Custom Incentive program process] is not instantaneous."
- Leverage the experience of working with relatively simple technologies (such as lighting retrofits and variable speed drive motor control projects) to develop a streamlined approach for these simpler projects. This would help small C&I and some GNI participants with smaller facilities to more easily navigate the program and complete projects.
- Standardize the M&V approach for simple projects to ease the M&V burden on participants.

Program Overview

The C&I Custom Incentive program provided a delivery channel and financial incentives to customers interested in installing cost-effective equipment measures or systems not covered under other PPL Electric programs.

The program offered implementation incentives based on avoided or reduced kWh resulting from the project. Implementation incentives were subject to an annual cap for each project and for each participating customer. Incentives were also capped at 50 percent of the incremental cost of the project. PPL Electric reimbursed customers for up to 50 percent of the cost of a technical study conducted by a qualified provider, and may have provided additional reimbursement following the successful implementation of a cost-effective project.

In general terms, the PY2 program ran fairly smoothly. It has received several applications for large projects leading to quite a bit of MWh/yr savings in the project pipeline. By the close of PY2, the Custom Incentive program exceeded savings targets for large C&I customers; however, the program was well behind its goals for the small C&I.

PPL Electric experienced a range of programmatic challenges through PY1 related to a complex delivery structure; burdensome data review and approval requirements; heavy involvement in program operations by the SWE; and a lack of sufficient customer support for all but the large C&I sector. Throughout PY2, the program underwent several beneficial changes, both internally and externally. Overall, operations and delivery improved over the last half of PY2 due to improved operations at the SWE and decreasing limitations around Custom Measure Protocols (CMPs); the addition of outreach and delivery capacity; streamlining of some participation procedures; and increasing comfort levels with the program rules, application process, and project requirements among PPL Electric staff, trade allies, and customers.

Additionally, PPL Electric noted that the program appeared to provide measureable value to its customers. Several customers reported that without the program, they would not have been able to install their projects. PPL Electric also noted that even though the program is complicated and project cycles can be long, the Company has done a good job providing customers with the customized support they needed and the program was beneficial for them. Customers surveyed by Cadmus for this process evaluation echoed this response, and stated that the program enabled them to complete projects that likely would not have been possible without program incentives.

Program Implementation

Program Status

The Custom Incentive program experienced several challenges in the months following its launch, primarily related to its complicated implementation strategy; shifting participation rules and delivery protocols; a lack of familiarity with the program rules among PPL Electric staff, trade allies, and customers; bottlenecks resulting from SWE review and approval; and uncertainty regarding SWE's requirements for documentation, reporting, and verification. Over PY2, many of these complexities and operational difficulties have been or are being addressed. By year end, the program was running more efficiently, and internal project review and approvals were faster. PPL Electric staff have gained good familiarity with the program details, communications have improved, and customers seem largely satisfied with the program.

The Custom Incentive program ramped up quickly in PY2, particularly among large C&I customers. The Company continued to receive program applications throughout the implementation period and by late PY2, PPL Electric had more than 60,000 MWh/yr of savings in various stages of the program. This level of savings exceeded PPL Electric's large commercial

sector targets for the entire plan period, and will likely necessitate closing the program to large C&I customers in early PY3. By the close of PY2, and as indicated by the EPS operations manager, PPL Electric had implemented a wait list for large C&I custom projects. This situation, while positive in terms of meeting overall goals, was a significant concern to the executive management team at PPL Electric. The Company evaluated ways to facilitate an orderly shutdown of all large C&I sector programs, both from a regulatory and an operational standpoint. Some stakeholders among the large C&I sector do not support continuing the program and may attempt to opt out of Act 129 requirements in the event they are extended beyond 2013.

Perhaps the most notable issue identified during the PY1 process evaluation was a lack of active outreach to small and mid-sized C&I customers, because these customers do not receive the level of support that KAMs provide to larger C&I customers. During PY2, the program continued to struggle with participation in these sectors. It is important to note that PPL Electric is not unique in finding it difficult to reach these sectors; the barriers are well documented in DSM efforts around the country. These sectors are extremely difficult to reach through traditional marketing channels and continue to struggle in the current economic environment. The investment required for capital improvement projects—even those with a one-year payback—is considered discretionary spending, which small commercial customers may not be able to afford under current economic conditions. Additionally, small commercial customers frequently occupy rented space and have little incentive to invest in facility upgrades.

In addition, the institutional customers are difficult to identify; PPL Electric typically identifies customers according to their rate class, and institutional sector customers span all rate classes. Projects for larger institutional customers often have long planning and construction cycles that do not integrate readily with these customers' budgeting and approval constraints.

In mid-PY2 PPL Electric realized that they were not able to reach these sectors with the current resources and delivery mechanisms. To address the small C&I and GNI sectors, PPL Electric contracted with an implementation CSP midway through PY2. The CSP brings more "*boots on the ground*," experience implementing C&I sector programs, deep technical and engineering capabilities to help customers identify projects and work through the participation process, and the ability to recruit trade allies faster than PPL Electric can with its internal resources. PPL Electric's objectives for its C&I CSP are to accelerate participation significantly among the small C&I and GNI sectors in both the Custom Incentive and the non-residential Efficient Equipment Incentive programs.

PY2 program changes and current operating structures are discussed in greater detail in the sections below.

Program Processes

All of the PPL Electric program and management staff interviewed by Cadmus for this evaluation echoed similar overall views of the Custom Incentive program: that operations and delivery ran more smoothly than in PY1; that the program overall was successful with many projects in the pipeline, especially for the large C&I sector; and that the small C&I and GNI sectors have been more challenging.

The addition of an implementation CSP and an analyst to assist with program tracking, and reduced involvement from the SWE have all helped the program evolve into a more sustainable phase. Additionally, increased comfort with the program among KAMs, trade allies, and customers contributed to the program's rapid ramp up over the past six months.

However, despite these relative improvements in the Custom Incentive program's overall operations, the program is still challenging, simply because every project is different and entails a case-by-case review, analysis, and approval process. There are a lot of "hand-offs" personnel among various program players, and getting access to timely information can be difficult. The multiple steps, required approvals, and different variables associated with custom projects make the program difficult to manage and administer. One result appeared to be long delays for customers to obtain feedback on their project applications and to receive their rebates. PPL Electric hopes that the addition of an implementation CSP for the commercial sector will alleviate some of these challenges, particularly on the customer side; however, nearly all of the PPL Electric staff interviewed acknowledged that the custom program was complicated by its very nature, so completely eliminating these challenges may be difficult.

Program complexity represented one of the most common complaints reported by Custom Incentive program participants.

- Five of 21 (24 percent) customers surveyed found the commissioning requirements to be excessive or problematic and felt they should be reduced. On the other hand, one respondent found it "*refreshing and surprising to see that PPL isn't just fast-tracking money to organizations*" and noted that he was pleased with the "*robust M&V efforts.*"
- Four of 21 (19 percent) customers surveyed reported that there was an excessive paperwork burden for program participation. This issue was most common for small projects, such as lighting and variable speed drive motor control retrofits.
- Three of 21 (14 percent) customers surveyed felt that the required paperwork was difficult to understand, including application forms, commissioning plan forms, and commissioning plan guidelines.

The following sections highlight changes to the Custom Incentive program over PY2 and current challenges by topic area.

Large C&I Sector Shutdown

There is considerable uncertainty associated with the overall implications of reaching large C&I savings targets well before the end of the four-year EE&C program cycle, and with how terminating programs for this sector will impact PPL Electric's DSM efforts.

PPL Electric will need to shut down the Custom Incentive program for large C&I customers in early PY3; requiring them to ensure that verified savings meet the program targets. Because there is typically a long period between documenting reported savings and verifying savings, there is inherent uncertainty associated with actually achieving the targets required in PPL Electric's EE&C Plan and the appropriate timing for closing programs. This is reflected in PPL Electric's current Custom Incentive program pipeline – reported savings far exceed verified savings. This uncertainty presents a difficulty for PPL Electric in determining when to close the program, because they must rely on an assumed realization rate for project savings and they must

determine the opportune time when the program is certain to meet, but not dramatically exceed, its targets.

PPL Electric indicated that closing the program to the large C&I sector earlier than expected (well before the end of PY4) could result in significant disruptions for customers, staff, and trade allies Closing the program to this sector now, they pointed out, would mean abandoning the significant gains and momentum PPL Electric had achieved with CSPs, trade allies, and retail partners. To re-launch the program for the large C&I sector in 2014 under a new EE&C Plan would then require recreating and reestablishing all of the relationships, infrastructure, and momentum.

Closing the program to large C&I customers was also a concern to the key account team. Key account managers consider the Custom Incentive program as a beneficial tool to provide good customer service and help their customers offset electric rate increases. To close the program as it is gaining momentum would be disruptive to large C&I customers and to the KAMs ability to serve them.

C&I Sector Implementation CSP

PPL Electric had some difficulty reaching and attracting participants from the small C&I and GNI sectors. To address the shortfall, PPL Electric hired a non-residential CSP to handle program implementation and to facilitate greater penetration of the small C&I and GNI customer sectors. EPS is taking over full implementation of program delivery for the C&I sector, including:

- Educating and conducting outreach to customers and trade allies and customers to increase program participation.
- Custom Incentive Program application intake.
- Initial application screening to determine eligibility for the Custom Incentive program or the Efficient Equipment Incentive program.
- Assisting customers with application requirements.
- Reviewing all projects and trade ally site visits.
- Conducting metering when necessary for calculating claimed savings and when the customer is unable to conduct the metering.

The CSP will likely to take over responsibility for baseline verification since they are responsible for assisting customers to determine *ex ante* savings. This will give PPL Electric better certainty that customers' reported savings represent the conditions evaluators find in the field, and that the estimated *ex ante* savings will be close to the *ex post* verified savings. Cadmus will coordinate with the C&I CSP to verify baseline conditions for large custom projects.

PPL Electric feels that hiring EPS helped the program considerably in terms of supporting trade allies, providing technical guidance to customers, identifying systems and processes to improve the efficiency of program delivery, and identifying program improvements to better align with customer preferences. Overall the CSP is considered a valuable technical resource and PPL

Electric is optimistic that the CSP will provide the support needed to increase penetration among large GNI customers.

EPS has rapidly transitioned into its implementation management role, and despite some initial resource constraints, this process has gone smoothly. The CSP inherited a considerable project backlog and spent considerable time working with PPL Electric's QA/QC CSP to divide projects and responsibilities. However, at this early stage, it has been difficult for the CSP to keep up with the volume of work, which has resulted in some delays for custom projects. The response time between application submittal and approval has been longer than anticipated; however, the CSP is in the process of allocating more resources to the program and getting new staff up to speed. The CSP plans to develop an online program dashboard during PY3 that will allow customers to view their projects; progress through the application process.

Furthermore, PPL Electric expects that because energy-efficiency measures most appropriate for small C&I facilities are available through the prescriptive Efficient Equipment Incentive program, identifying applicable technologies for this sector will continue to be challenging.

SWE Requirements and Program Rules

The SWE implemented process changes in PY2 that significantly improved the custom measure process. The changes reduced the complexity of EM&V requirements and streamlined custom project approval and EM&V.

Technical Studies

According to PPL Electric's QA/QC CSP, few technical studies resulted in custom incentive projects. It may be too early to judge success, since there can be a significant time lag between the audit and installation of recommended measures. However, technical study reimbursement was a significant expenditure and studies alone do not produce savings, which affects the program's overall cost-effectiveness.

PPL Electric's implementation CSP is interested in changing to a more formulaic calculation methodology for technical study reimbursements. Prior to this change, reimbursement for comprehensive studies that resulted in a mix of custom and prescriptive measures were prorated based on the number of project measures that were eligible under the custom program. Under the new methodology, rather than paying a standard rate of 50 percent of the study cost following the technical study and the other 50 percent following program installation, PPL Electric would sum the estimated annual savings of the measures analyzed in the report and pay two cents per kWh.

The criteria would allow studies resulting in both custom and prescriptive measures to be fully reimbursed. ESCO audits for schools, for example, would be eligible for full reimbursement under the new criteria. PPL Electric hopes this change will facilitate penetration to the small C&I sectors, while also reducing the opportunities for gaming.

M&V Requirements

During the PY1 process evaluation, several interviewees indicated that the M&V requirements were complicated and difficult for customers to understand and meet. PPL Electric's QA/QC CSP reported that the program was designed under the assumption that Site Specific

Measurement and Verification Plans (SSMVPs) would be developed for all large projects and a sample of small projects. Near the end of PY1, however, the Commission and SWE dictated that SSMVPs were required for all projects (not a sample) regardless of size, and that these SSMVPs were to be based on a CMP. Customers were required to submit project-specific commissioning plans, a significant undertaking, which were used to develop the SSMVP. The SWE reviewed every CMP, a cumbersome process that resulted in a bottleneck for project implementation.

In early 2011, new guidance provided by the SWE and the Commission allowed PPL Electric to adjust this procedure, which simplified the process for customers. Customers were no longer responsible for submitting a formal commissioning plan; rather, they provide as much information as possible on the initial application, which the implementation CSP reviewed and then collaborated with Cadmus (the EM&V CSP) to develop a formal SSMVP for large projects. The SSMVP was attached to the customer's incentive agreement.

This process was intended to ensure that all necessary data re collected to establish a robust estimate of verified savings. For small projects, a formal SSMVP is not normally prepared. Instead, claimed savings are determined at the discretion of the implementation CSP, based on a review of the application, site visits, supporting data submitted by the customer, and the CSP's professional judgment.

The SWE issued guidance on the required level of detail for custom savings calculations, including metering or other data necessary to support a custom incentive application, but they no longer required a consensus (across EDCs, the SWE, and EM&V CSPs for all the EDCs) to obtain a consistent statewide methodology for each measure. This process has been much easier for customers and has streamlined and shortened the project timeline considerably.

Program Cost-Effectiveness

Although the Custom Incentive program was on track with its budget expenditure targets in PY2, the addition of the new C&I CSP will add considerable costs to the program. Additionally, while many of the early program participants in the large C&I sector implemented large projects with significant savings, as the Company achieves greater penetration among small C&I customers, project-level savings will decrease because savings for smaller projects tend to be more marginal. The energy-efficiency measures that are most appropriate for small C&I facilities are largely available through the prescriptive Efficient Equipment Incentive program; and most project applications have been for energy management systems (EMS), which produce relatively small savings. PPL Electric will need to monitor how these costs and project savings impact the program's overall cost-effectiveness over time.

Communications

To address communications difficulties stemming from rapid program roll out and changing program rules in PY1, PPL Electric implemented procedures to better manage program changes. PPL Electric's new change management policy required that program changes are only made two times each year, and customer program specialists are required to maintain a log of program changes. No changes can be made without an analysis to identify the ramifications of the change on all aspects of the program and formal management approval. PPL Electric also instituted a formal process for controlling and documenting changes in EEMIS.

Communications with the major accounts staff have improved significantly over the last year. Many of the difficulties that arose from frequent program changes early in the program's launch have smoothed out and the change management process has been effective in limiting significant program changes to twice per year. However, internal communications can be slow, which impacts customer project development cycles. Customers don't understand why PPL Electric's review and approval processes entail a significant time lag.

Most direct customer communications occur through KAMs; however, going forward the implementation CSP will have a larger role in direct customer communications. Through 2010, communications between large C&I customers and PPL Electric representatives (program staff or evaluation CSP staff) were arranged through the KAMs. For nearly every project, evaluation CSP staff conducted a conference call with the customer—arranged by the KAM—to discuss the project in order to create the SSMVP.

Although this approach maintained KAMs' relationships with customers, it required more administrative time on the part of the KAMs, PPL Electric program staff, and EM&V CSP staff. Going forward, PPL Electric and the CSP will use a less formal and more flexible communication protocol whereby the KAM may make an initial introduction between the customer and the CSP, but thereafter the CSP will contact the customer directly. This streamlined approach is better for all parties, as it keeps projects moving through the process and the implementation CSP maintains regular contact with the KAM to ensure they are kept up-to-date on project activities.

Marketing

Marketing of the Custom Incentive program was largely conducted through direct outreach, with some supporting collateral such as case studies by KAMs and trade allies. As noted in the PY1 process evaluation report, PPL Electric provided training and issued participation targets for its KAMs, and has also held several training workshops with trade allies to jumpstart the program in the C&I sector. This strategy proved extremely effective at attracting large C&I customers to the program.

KAMs were much more comfortable with the program rules and were better able to explain the program to customers as the program year progressed. KAMs were on track to meet their participation targets for the large C&I sector, and while the GNI sector was more challenging, PPL Electric is optimistic the targets will be reached.

In addition, PPL Electric's business account specialists have made outbound calls to mid-sized C&I customers. To date, only a few trade allies appear to be active in the program, and vendors may not have a widespread understanding of how the program works. Going forward, the implementation CSP plans to increase outreach and, recently, the CSP conducted a series of training workshops for trade allies.

The Company began working with its marketing CSP on business segmentation to develop insights about specific market segments using external data sources, intelligence from the key accounts group, and analysis from customer surveys conducted by PPL Electric's marketing research group. The Company will synthesize this information to create a segmentation platform for targeted marketing messages and an optimized media strategy.

Forms and Rebates

The program includes three application forms, one for each phase of the program:

- ***The Technical Study Scope Application.*** Participants must submit this form to obtain pre-approval for a study.
- ***The Technical Study Reimbursement Application.*** This application details the technical study results and is required for reimbursement of technical study costs.
- ***Custom Incentive Application.*** This form includes detailed information to support the development of SSMVPs and an incentive agreement. It must be approved prior to project installation. The form asks customers to provide detailed calculations and attach supporting information to the form.

The implementation CSP now has responsibility to review each of the required applications. The implementation CSP also facilitated the application process and provided technical support to customers, as needed, to help them accurately and completely fill out the required applications. The implementation CSP forwards only the large projects to the QA/QC CSP to conduct the QAQC review, coordinating with EPS to ensure there will be accurate reported savings for these large projects.

Before hiring the implementation CSP, PPL Electric used an incentive agreement that was separate from the project application. The CSP, with PPL Electric's permission, added contract language to the application so that a separate document is no longer used, reducing administrative burden on program staff. The CSP also changed the application forms to a format similar to that used in other jurisdictions, which helped streamline the process for customers.

Eventually, the implementation CSP will take over all program tracking and enter project data into EEMIS. Tracking will be maintained in the CSP's tracking system with batch uploads into EEMIS. Rebate processing, conducted by PPL Electric's finance department, worked very well in PY2 and rebate processing time was reduced to 10 days following PPL Electric's approval for payment.

Quality Assurance and Quality Control

Customer Satisfaction

Customers have responded positively to the Custom Incentive program, and most are happy that PPL Electric took the initiative on energy issues. The results of the program participant survey showed overall program satisfaction from approximately eight out of every 10 participants. However, many customers are more interested in the Efficient Equipment Incentive program because the process is easier. Some customers abandoned their custom projects because the forms and the process were too complicated. Survey respondents reported that filling out the Custom Incentive Application Form and preparing the commissioning plan for approval were often the most difficult steps in the Custom Incentive program process. Most survey respondents reported that completing the commissioning (after the commissioning plan was approved) was reasonably easy.

Although four of 19 survey respondents reported that complying with the M&V requirements was difficult, the majority did not have significant difficulty. In two cases, participants expressed their satisfaction with the thorough nature of the M&V efforts undertaken by PPL Electric and the QA/QC CSP.

Survey respondents most frequently expressed concern over long turn-around times throughout the program participation process, including r project approval, approval of the commissioning plan, and incentive payment, as well as the time between receiving customer applications and data submittals and responding with requests for clarification or additional data.

Trade Ally Satisfaction

Although very few trade allies actively participate in the Custom Incentive program, PPL Electric noted that they expressed frustration, particularly early in the program year with SWE documentation requirements and the slow review and approval process. More recently, trade allies seemed to respond better to the program and those that were active appeared to have a good understanding of how the program worked. More recently, as the program achieved greater consistency, trade allies were more pleased with the program.

QA/QC Findings

The QA/QC CSP's role in the Custom program was somewhat reduced in the second half of PY2, following the addition of the implementation CSP. For the second half of the year, and going forward, the implementation CSP supported PPL Electric in reviewing custom incentive applications and supporting documentation; confirming savings and cost-effectiveness calculations, methods, and assumptions; calculating expected incentives and recommending approval; and conducting pre- and post-installation site visits. The QA/QC CSP's role includes weekly phone calls with the implementation CSP and PPL Electric program staff. These calls provided an opportunity for the QA/QC CSP to offer feedback on methodological approaches to compute savings and technical issues encountered by PPL Electric or the implementation CSP.

The original program design envisioned separate but integrated commissioning plans and SSMVPs for each large project. The commissioning plan was meant to describe the data that customers or their contractor were required to submit following measure installation. This might include metering and monitoring specifications, as well as required production data. The SSMVP was meant to include many of the same elements, with the addition of calculation algorithms to be used to determine the final savings, which would be reviewed and approved by the SWE. During PY2, PPL Electric program staff decided to combine these two documents into a single SSMVP attached to the incentive agreement.

A significant number of customers submitted their project applications after installing the measures, making it difficult to accurately establish the baseline conditions in some cases. This also raised concerns with the accuracy of program net-to-gross calculations. Program staff members raised this issue with the KAMs, who were instructed to work with their customers to submit project applications as early as possible.

The implementation CSP is doing a good job identifying when projects can follow the prescribed savings methodologies in the TRM and when they must be treated as custom. The implementation CSP and the QA/QC CSP worked together to make these determinations.

The EEMIS database tracked relatively few fields for each project. For example, project cost and project incremental cost are not tracked in EEMIS. The implementation CSPs tracking database will include many more fields that are useful for program implementation and evaluation. However, it has taken longer than expected, and the implementation CSP's database was not fully functional at the close of PY2.

PPL Electric is reviewing several cogeneration or combined heat and power measures. While such measures have the opportunity to provide significant savings, they typically struggle to meet the TRC test. PPL Electric may want to consider developing separate rules, or a separate program, for such measures.

HVAC Tune-Up Program

Executive Summary

The objectives of the HVAC Tune-Up program are to: (1) optimize HVAC unit performance; (2) assist commercial customers in lowering their energy bills and operating costs; and (3) obtain participation by 5,770 customers and reduce energy use by 22,180 MWh/yr and 115 MW.

The HVAC Tune-Up program claimed savings for the first time in PY2 Q2. Program launch timing and its seasonal nature significantly affected the program's ability to meet its projected goals. The interim goal through the end of PY2 was 6,804 implemented measures. By the close of PY2, 300 units were serviced and 531 measures were rebated. The measures rebated included the following:

- 146 initial diagnostic test-in rebates (There were a total of 300 diagnostic tests but not all received rebates.)
- 227 economizer initial test incentives (Only 11 of the economizers tested required repair work.)
- 141 refrigerant repair incentives
- 17 thermostat incentives

This process report addresses HVAC Tune Up program delivery, status, goals, implementation, marketing, and quality assurance. The report findings are based on Cadmus's analysis of interviews with the HVAC Tune-Up customer programs specialist, the implementation CSP, 10 trade ally/contractor participants, and four contractor nonparticipants.

Key Findings

The following are key findings from the process evaluation.

- The program launch timing in April 2010 created challenges for meeting targets in PY1 and most of PY2, but PPL Electric and the implementation CSP put significant effort towards contractor marketing and site recruitment in the spring of 2011. The CSP

successfully recruited several contractors and trained them to use the Service Assistant tool.

- Contractors have a limited window of opportunity to participate because the HVAC tune-up service offered through this program is weather-dependent. The diagnostic tool can only be used when outside air temperature is at least 55° F, so contractors cannot usually implement measures in the winter. During summer months, emergency calls are a priority, leaving contractors with approximately two spring months and two fall months for participation.
- Contractors encountered a learning curve in understanding how to use the tool and input data, and some experienced technical difficulties downloading and saving data. The implementation CSP responded by increasing training and field support.
- Site recruitment has been a challenge for contractors, some of whom expected that PPL Electric would provide potential participant leads. PPL Electric offered leads through some of its past programs; however, this is not a current business practice, so contractors are responsible for recruiting participants.
- The implementation CSP and PPL Electric are also trying to recruit national companies to take advantage of multiple locations and HVAC units.
- Some contractors were not able to convince their existing customers to pay extra for the measures offered through this program. The difficult economic situation has made many building owners reluctant to pay for a service from which they do not receive an immediate, tangible benefit. However, the implementation CSP and PPL Electric are working to overcome these barriers by helping contractors market their services.
- Extensive data collection is required from the technicians and, for the most part, was complete, with only minor issues.

Conclusions

- The implementation CSP may have difficulty achieving measure implementation goals: the program is currently far behind these goals, and contractors have a limited window of opportunity for participation because the service is weather-dependent.
- The program is not cost-effective and is far behind target, it is unlikely to meet its goals or become cost-effective in future years. However, many contractors have already invested in the tool, training, and marketing the program, so ending the program would likely alienate those contractors. PPL Electric should consider other options to revitalize the program.
- On-site training should provide the support contractors need to correctly use the tool.
- Although the program struggled to get off the ground, the CSP and PPL Electric have taken the initiative to address barriers and improve the program's accessibility to contractors, striving for a successful program.
- PPL Electric and the CSP may be able to increase program participation by recruiting national companies with many eligible sites and by continuing to help contractors market the program to their existing and prospective customers.

- The implementation CSP has collected and reported high-quality data; the EEMIS uploads have few errors.

Recommendations

- If this program does not get back on track by PY3, PPL Electric should consider dropping it.
- The implementation CSP and PPL Electric should continue helping contractors market the program to their existing and prospective customers to increase participation.
- The implementation CSP should continue training contractors on-site to ensure they understand how to properly implement measures using the Service Assistant tool.
- Instead of charging contractors up front for the complete cost of the tool, PPL Electric should consider waiving or reimbursing the cost of the tool based on contractors conducting a certain number of measure installations (or units serviced); or consider leasing the tool to contractors, with an option for them to purchase it at the end of the program. So as not to alienate contractors who already purchased the tool, offer an additional/equivalent rebate per installed measure to reimburse the tool's cost over time.
- The implementation CSP should encourage contractors to consider keeping the program free to end users, that is, not pass the cost of the service to end users. If this is too expensive for contractors, PPL Electric could consider providing contractors additional incentives to cover their labor costs.
- The implementation CSP could focus on attracting national accounts, which could provide multiple opportunities for program sites in PPL Electric's service territory.
- Encourage contractors to focus on marketing to their larger customers with many locations.

Program Overview

The HVAC Tune-Up program is offered to all commercial and small industrial customers with an existing split or packaged HVAC unit, with or without an economizer. It was designed to improve the operating performance of rooftop or split system HVAC units in light commercial buildings. Owners or tenants occupying an existing building are the primary recipients of program services, although incentives are paid to the contractors who perform the work.

Contractors are required to use the Service Assistant, a device used to diagnose unit performance issues and recommend solutions to increase unit efficiency. This device requires a number of inputs, including unit location, building type, HVAC nameplate data, and operating characteristics of the refrigerant cycle and economizer. Based on analysis of these inputs, the tool determines whether the unit is operating at optimal efficiency or whether additional servicing could improve efficiency. The technician then services the unit based on the tool's recommendations.

An implementation CSP, FDSI, administers and manages the program. HVAC contractors deliver services, install measures, and are paid the incentive; each contractor is both a trade ally and a participant. The measures performed through this program include enhanced maintenance

practices that take more time than standard maintenance procedures, often with an additional cost to implement.

Contractors provide the service as an added benefit for their existing customers and as a way to attract new customers. HVAC contractors have different agreement types with their customers. Some have regularly-scheduled maintenance contracts for a specific number of visits per year, and others provide service only when called for emergencies or on equipment failure.

The HVAC Tune-Up program claimed savings for the first time in PY2 Q2. The interim goal through the end of PY2 was 6,804 implemented measures. By the close of PY2, 300 units were serviced and 377 measures were rebated.

Program Implementation

Program Status

Although the program launched in April of PY1, it is essentially a new program in PY2. The timing of the launch was such that contractors did not have enough time to prepare or become involved in PY1. This program is seasonal, with contractors performing work in the spring and fall. Therefore, the spring of 2011 was the first season in which the program could fully realize energy savings.

The HVAC Tune-Up program faced difficult challenges, many of which stemmed from timing. The outside air temperature must be above 55° F for the Service Assistant diagnostic tool to work correctly. In the winter, contractors cannot implement measures because temperatures are too low to use the tool, and they dedicate summers to answering emergency calls. Therefore, contractors in PPL Electric's service territory are only able to perform preventive maintenance in the spring and fall; they implement this program's measures at the same time they perform planned maintenance.

The implementation CSP trained all contractors who purchased a Service Assistant tool. Each participating contractor attended a two-day class, and in the summer of 2010, the implementation CSP hosted frequent conference calls to address contractors' questions. They also provided a hotline number for service technicians to call from the field.

However, contractors had little time to learn to use the tool before their planned maintenance schedules in the spring of 2010. Although initial classroom training went smoothly, contractors reported difficulties using the Service Assistant tool in the field. Half of the ten survey respondents had issues with the tool—some with understanding how to use it, but most with technical problems. Two of the tools reportedly lost data, and another two gave incorrect readings, one that indicated a new unit needed replacement. Citing performance and accuracy issues with the tool, two servicing companies returned the Service Assistant tool and ceased participation in the program.

To increase contractor participation, the implementation CSP and PPL Electric have recruited contractors throughout the spring months, and a number of new contractors attended training in April 2011.

Program Processes

The implementation CSP provided ongoing training to ensure contractors were comfortable with the process and with the tool. Overall, contractors indicated that the implementation CSP was responsive to their needs. Most contractors did not have resources to devote to the program until the fall of 2010: an unusually hot summer resulted in many emergency calls that required all their technicians' time. When contractors returned to the program, many needed to relearn the tool. Contractors were allowed to repeat the in-person training at no cost. The CSP offered online training and sent contractors a bi-monthly newsletter with technical tips. The implementation CSP sent engineers into the field with contractors to provide technical support. This hands-on approach was well-received by contractors.

Many contractors cited the Service Assistant tool's significant $4,000 cost as a barrier to participation, especially the smaller companies. Another barrier cited was PPL Electric's mandatory insurance policy, which required higher liability coverage than most contractors typically carry. To address these barriers, PPL Electric reduced the contractors' liability insurance requirement, and in the fall of 2010 added a $50 incentive for every unit serviced to help offset the cost of the tool.

Nonparticipants were mostly deterred by the tool's cost. Three of four nonparticipant contractors interviewed by Cadmus cited the tool's cost was the major barrier to participation. Two would consider participating if they knew they could recoup that cost. The fourth nonparticipant reported that they only serve residential customers.

Marketing

This program consisted of two marketing components: the implementation CSP marketed the program to contractors to encourage them to participate, and, contractors promoted measure implementation to end-users. In PY2, the implementation CSP created extensive marketing materials and a marketing plan to attract contractors to participate and to help them sell the program to existing and new customers.

PPL Electric and the implementation CSP embarked on a major promotion and recruitment effort in the spring of 2011, to increase the program's visibility to contractors and to provide them with the tools they need to effectively market the program. This resulted in the enlistment of several new contractors. Half of the contractors surveyed had heard about the program from the implementation CSP, and the other half heard through a PPL Electric employee or newsletter. One respondent learned about the program at a conference.

For contractors, the program's selling points were:

- Growth of customer base and increased revenues.
- New technology (for younger contractors).
- Relieves some concern over losing clients by not staying current on new technologies (for older contractors).

The implementation CSP indicated that they were also working to enlist national accounts for companies with multiple locations, which would create a large pool of potential units to service.

These companies could opt to either train their own technicians or select a contractor from the participant list.

Contractors did not have much time to market the program to their customers when it launched in the spring of 2010; and again had only a short window of time after the busy 2010 summer season to recruit customers in the fall.

Most contractors cited the difficulty of recruiting building owners as their main challenge. They mentioned several reasons for this, including the current economic situation, differing recruitment expectations, and their lack of understanding how to sell the program. In response, the implementation CSP offered to match contractors' program advertising costs, up to $1,500. They also created marketing packets for contractors to hand out, which included an introduction letter and fact sheets highlighting program benefits; these materials were posted on the implementation CSP's program Web page.

However, contractors expected the implementer CSP to provide them with customer leads. Although PPL Electric offered similar support in the past, that is not a practice in this program.

Forms and Rebates

This program does not require participants to submit application or rebate forms; contractors input data into the Service Assistant tool, which sends the information wirelessly to an online database. The implementation CSP forwards relevant measure data to the administrative CSP to process rebates.

Six contractors provided feedback on the time it takes to get rebates; on average, they were very satisfied. One contractor indicated it was difficult to decipher the incentive checks because they gave only a total incentive amount and did not show which units were rebated. PPL Electric and the implementation CSP worked with the administrative CSP to develop a solution to this issue by providing more information on incentive checks.

Contractors choose whether or not to pass on program incentives to their customers, but many indicated that they opt to keep the incentives themselves in order to cover the additional labor cost this service requires. When initially promoting the program, many contractors found that customers were unwilling to pay extra for services without any immediate, tangible benefits. They also did not want to give customers the impression that these measures should have been part of standard preventive maintenance, raising questions about why they weren't already performing the service.

Quality Assurance and Quality Control

As part of the evaluation process, Cadmus conducted a review of program metrics, including customer satisfaction and data integrity.

Customer Satisfaction

Cadmus interviewed 10 program contractor participants to assess their satisfaction with the program overall and with specific program elements. The program scored above average in all areas, scoring best in the areas of measures incented by the program and ongoing support from, and communication with, the implementation CSP.

However, contractors rated their satisfaction with the program overall as the lowest of all areas covered during the interviews. Four rated their satisfaction as less than 5 out of 10 (on a scale of from 1 to 10), citing difficulties with the Service Assistant tool and marketing and recruitment. Comments included:

- "PPL said they'd market the program, and then later told the contractors it was up to them to market the program. The tool cost us jobs, time, and money."
- "Haven't gotten any participation from this program so can't recoup any of our cost."

Contractors were mostly satisfied with the incentive amounts for each type of measure. All contractors scored their satisfaction as at least a 5, except for one contractor, who scored the basic diagnostic test as a 2 and stated that the "*cost to do the tune up often doesn't outweigh the amount saved.*" This comment supported earlier findings that contractors were keeping incentives to offset their labor costs.

Records Review

Cadmus reviewed the census of 531 measures implemented in PY2 through April 21, 2011, as documented in EEMIS. Cadmus mapped each data field across: (1) the administrative CSP database, (2) the EEMIS database, and (3) the implementation CSP database. We reviewed data determined to be most important to identify participants and calculate energy savings, and document and tracked all data entry discrepancies. Cadmus also compared records in the EEMIS database to the same records in the implementation CSP's database.

QA/QC Findings

Most data review checks found accurate and complete records. Cadmus found that all units had complete data fields for key parameters, including: measure type, unit manufacturer year, equipment type, and unit make, model, and serial number. Cadmus compared each unit model number to its nominal capacity, and found that all capacities were entered correctly.

The EEMIS extract did not include incentive amounts. Incentive amounts were recorded for all measures in the implementation CSP's database, but the EEMIS extract provided to Cadmus was missing incentive amounts for four measures: economizer adjustment, economizer test-in, thermostat adjustment, and thermostat lockout. In a few cases, minor data were missing from both the CSP's database and the EEMIS extract, suggesting this data was not collected on the site. PPL Electric resolved this issue.

EM&V

As there is no savings methodology provided in the TRM for this measure, Cadmus developed a Custom Measure Protocol. The program implementation CSP estimates savings for refrigerant charge adjustment, economizer control repair or improvement, and/or thermostat adjustment measures. Engineering software is used to estimate savings based on specific measured inputs.

Cadmus reviewed the implementation CSP's savings estimation method in PY2 and conducted on-site inspections for a stratified, random sample of HVAC units before and after servicing (following the approved CMP). HVAC unit information collected by the service technicians and operational characteristics of systems were verified. The data collected by contractors is

sufficient. Cadmus does not recommend any adjustment to the savings calculation method or data collection effort. HVAC metering would be useful to verify savings, but it is not recommended because program participation is low, as is the program's contribution to the portfolio's savings.

Load Curtailment Program

Executive Summary

The objectives of the Load Curtailment program are to: (1) reduce peak demand by providing incentives for energy usage reduction during peak hours in the summer period; (2) provide value to customers with energy management tools and cost savings; and (3) obtain participation by approximately 300 customers and reduce capacity by 300 MW over 50 peak hours (equivalent to 150 MW over the 100 peak hours).

Preparation and planning for the Load Curtailment program was delayed until the Commission issued a procedure on how to determine the peak load reductions and 100 peak hours. By June 2011 (PY3), PPL Electric had executed a contract with an implementation CSP, Enernoc, for the Load Curtailment program. The program is expected to recruit participants in the summer of 2011.

For this process evaluation, Cadmus interviewed the PPL program manager and the CSP program manager.

Key Findings

The following are key findings from the process evaluation.

- The Load Curtailment program will launch in the summer of 2011. A contract with the implementation CSP was completed in early June 2011.
- After some uncertainties associated with impact measurement methodology, the SWE approved the use of PJM customer baseline protocols to measure curtailment impacts. This approval timeline delayed PPL Electric from finalizing its implementation CSP contract.
- Rather than attempting to forecast the top 100 hours of demand in June through September, PPL Electric will target the top 50 hours to provide more certainty.
- While the targets required for the Load Curtailment program are aggressive, PPL Electric and the CSP believe they are achievable.

Conclusions

- Because PPL Electric's curtailment CSP has relationships with many customers in the PPL Electric area (through its delivery of curtailment for PJM), and because these customers will be eligible for incentives under both the PPL Electric and PJM programs when PJM events coincide with Act 129 events, PPL Electric has high expectations that

they will be able to enroll the targeted capacity for the summer of 2011, leading to a successful compliance year in 2012.

- PPL Electric's greatest challenge will be to successfully forecast the top 100 peak hours. PPL's strategy to double the delivered capacity over the top 50 hours is expected to help mitigate this problem.

Recommendations

Because the Load Curtailment program had not fully launched by the close of PY2, not enough is known about the program, its delivery approach, or its performance to recommend adjustments to strategies or delivery protocols. The process evaluation will revisit the Load Curtailment program once the CSP has had sufficient time to sign customers up for the program. A key aspect to review at that time will be the ability of the program to target the top 50 peak hours.

Program Overview

The Load Curtailment program aims to reduce peak electricity use among large institutional and large C&I customers. The program's demand savings target is 150 MW, which must be achieved on average over the 100 hours of greatest electric demand between June 1, 2012 and September 30, 2012. Participants are notified of peak-hour events and requested to decrease their energy use during that period by shifting or eliminating load or using back-up or distributed generation that meets environmental regulations.

PPL Electric executed a contract with an implementation CSP, Enernoc. The CSP will recruit, contract with, and schedule load reductions with participants. In exchange for the curtailing load, the CSPs will pay an incentive to participants.

As directed by Act 129, load reduction targets apply only in the summer of 2012. The PA PUC will decide at a later date if load reduction targets will extend beyond 2012. No load reductions are expected from this program in the summer of 2011.

Program Implementation

Program Status

The process of executing a contract with an implementation CSP for the Load Curtailment program was delayed significantly until the Commission finalized an EM&V protocol that defined how to peak load reductions and the top 100 hours would be determined. With the release of the March 4, 2011, PUC Secretarial Letter containing the evaluation protocols, PPL Electric finalized its contracts with the selected CSP.

In June 2011, PPL Electric signed a contract with Enernoc to be the implementation CSP for the Load curtailment program. The program launched in the summer of 2011, recruiting participants.

Program Processes

The Load Curtailment CSP is responsible to recruit, enroll, implement, and support participants. PPL Electric is responsible for specifying approximately 50 peak hours (curtailment events), and the CSP can declare additional events. The contract also provides pricing for PPL Electric to declare additional events.

Marketing

As marketing for the Load Curtailment program had not begun at the time of this evaluation, it is too early to evaluate marketing strategies. The CSPs will handle customer contact and recruitment, and PPL Electric KAMs will help market the Load Curtailment program to eligible customers. Because existing PJM curtailment CSPs already have more than 200 MW of subscribed curtailment capability, PPL Electric anticipates this level of minimum participation in its program.

Forms and Rebates

The PPL Electric contracts with the CSP to deliver MW. The CSP contracts with the individual participants. CSPs will handle all incentive processing with minimal oversight from PPL Electric. These tasks will be conducted following contract execution with the program CSPs. The CSP will track contracted MW reductions as well as the achieved reductions.

Quality Assurance and Quality Control

As the program had not launched at the time of this evaluation, a QA/QC assessment was not conducted.

Time-of-Use Rates

Executive Summary

PPL Electric will drop this program from its EE&C Plan because pricing-type programs are not funded by Act 129 EE&C. The Commission does not allow TOU savings to count toward EE&C targets; rather, these savings are Default Supply. However, even if savings were allowed, they would likely be negligible, impossible to predict, and highly uncertain. Therefore, PPL could not rely on TOU to contribute to the compliance target.

Appendix A: Process Evaluation Methodology

The process evaluation methodology consisted of: (1) interviews with program managers and key stakeholders, (2) surveys with participants and nonparticipants, (3) site visits at participant sites, and (4) QA/QC reviews of data collected and tracked in EEMIS. A brief overview of Cadmus' evaluation methodologies is provided below.

Interview Methodology

To assess how well PPL Electric's internal delivery processes and interdepartmental integration were working, Cadmus conducted interviews with the customer programs specialists for every EE&C program; the managers overseeing all energy-efficiency programs and major support functions. Cadmus also conducted interviews with PPL Electric's implementation CSPs and its administrative CSP.

Each interview relied on a semi-structured, customized interview instrument; notes from these interviews informed our assessment of PPL Electric's portfolio and program progress. We covered a range of topics in these interviews, including implementation, processes, progress to date, internal and external communications and training, and integration among various PPL Electric departments. Table 15 provides an overview of interviews conducted to support the process evaluation.

Table 15. Summary of Process Evaluation Interviews

Program	PPL Electric Program Manager	CSP	Trade Allies
Efficient Equipment Incentive	YES (1 Residential & 1 Nonresidential)	KEMA	
CFL Lighting Campaign	YES	Ecos	
Appliance Recycling	YES	JACO	
Energy Assessment and Weatherization	YES	EIC Comfort Home	2 Energy Auditors
Energy-Efficiency Behavior and Education	YES	OPower	
Low Income WRAP	YES		
Low-Income E-PowerWise	YES	Resource Action Programs	2 Community Action Agencies
Renewable Energy	YES		
Custom Incentives	YES	EPS	
HVAC Tune-Up	YES	FDSI	10 HVAC Contractors
Time-of-Use Rates	YES		
Direct Load Control	YES	ComVerge	
Curtailment	YES		

Survey Methodology

For PY2, Cadmus completed telephone surveys with 1,572 participant and nonparticipant customers. Surveys were conducted to verify measure installation, and collect information regarding satisfaction and the participant's experience with the program, freeridership and spillover. We developed surveys for each program. The number of surveys conducted during the program year depended upon the complexity of the program, the program-specific issues identified, and the different types of measures offered through the program. Surveys were conducted with a representative sample of customers who participated in prior quarters. Figure 30 shows the PY2 survey schedule.

Figure 30. Survey Schedule: Gantt Chart

	PY2										PY3		
	Q1			Q2			Q3			Q4			Q1
	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August
Telephone Surveys															
Commercial Efficient Equipment Incentive Program					X										X
Residential Efficient Equipment Incentive Program					X										X
Appliance Recycling Program*					X			X			X				
Renewable Energy Program					X						X				
Residential Audit & Weatherization Program											X				
E-PowerWise Program											X				
CFL Campaign					X				X						
Behavior & Education Program									X						
HVAC Tune-Up Program									X						
Custom Incentive Program											X				

*The EM&V CSP fielded a participant survey for the Appliance Recycling program in October and again in April. A nonparticipant survey was fielded in February.

Key	
	Participation Occurred - 1st fielding
	Participation Occurred - 2nd fielding
X	Surveys conducted - 1st fielding
X	Surveys conducted - 2nd fielding

Cadmus and its subcontractor administered all surveys, and each survey was pre-tested and monitored twice. All interviewing staff members were trained before making any calls, and no calls were made on Sundays and holidays. On average, surveys took less than 15 minutes to complete.

All program participants were candidates to receive a survey and for most programs; Cadmus developed the sample frame from EEMIS records. A participant became a candidate for a specific survey based on two criteria: (1) the program(s) that they participated in; and (2) the purchased energy-efficiency measure with the largest energy savings. After assigning each

participant to a specific survey, we created survey samples by randomly selecting candidates into strata to meet specific sample size targets for each program by measure category (e.g., HVAC and appliances). Cadmus removed participants with a missing or invalid phone number, or who had completed another PPL Electric survey within the past 12 months. Additional details regarding the sampling method and process are included in the PY2 Annual Impact Evaluation Report, Appendix L. Sampling.

Cadmus also conducted surveys with PPL Electric customers who recycled appliances outside of the Appliance Recycling program (nonparticipants). Another survey was conducted to identify customers who purchased CFLs. We developed sample frames for these two surveys from PPL Electric's CSS database, randomly assigned customers to a survey from the sample frame, and removed individuals with a missing or invalid phone number, or who had completed another PPL Electric survey within the past 12 months. Cadmus analyzed survey results using SAS and Microsoft Excel®. Completed surveys were included in the analysis; partial completes (those who terminated the survey before completion) were not included in the analysis. We removed "Don't know" and "Refused" responses from analysis in all cases, except when representing a large portion of responses. In cases where multiple responses were allowed for a given question, we report the percent of respondents (not the percent of responses). As such, the total may exceed 100 percent. Responses that required a 1-10 scale rating were grouped into three categories: 1-3 (low), 4-7 (medium), and 8-10 (high).

Site Visit Methodology

Site visits provided valuable data for the impact evaluation and unique insights that informed the process evaluation. For PY2, Cadmus and its subcontractors completed site visits at nearly 350 participant sites, verifying over 500 measures.

All non-lighting site visits typically lasted under an hour, but the amount of time varied by measure type and the number of measures installed at each site. Cadmus selected only experienced field personnel to conduct on-site visits and required all staff to wear photo identification badges in the field.

Additional details regarding the sampling method and process are included in the PY2 Annual Impact Evaluation Report, Appendix L. Sampling.

Site Visit Processes

To ensure efficiency throughout the site visit processes, Cadmus and PPL Electric maintained ongoing communications to ensure Cadmus, our subcontractors, PPL Electric, and the SWE were informed of the status of site visits. Before scheduling site visits, Cadmus provided the sample to PPL Electric, along with the name of the customer's key account manager (KAM), if any. This allowed KAMs to contact their customers, explain the intent of the visit, and obtain scheduling preferences before Cadmus called to schedule a site visit. In addition, either Cadmus or the KAM or business account manager e-mailed a letter of introduction to each participants in the site visit sample. The letter further explained the intent of the visit and provided notice that a scheduler would arrange a visit.

During the site visit scheduling process, Cadmus provided daily e-mail updates of changes or additions. Also, a tracking spreadsheet located on the EM&V file transfer protocol (FTP) site was accessible to PPL Electric and the SWE at all times. The tracking sheet showed the scheduling disposition (scheduled, left voicemail, refused, site visit complete, etc.), the day and time of scheduled site visits, the last contact date, the date the customer was sent an introduction letter, and whether PPL Electric or the SWE planned a ride-along. This tracking spreadsheet was updated automatically at the end of each day to allow stakeholders to view updates at their convenience. Both the SWE and PPL Electric went on site visits for QA/QC purposes, and they notified Cadmus of their intent to be present for upcoming site visits. All communication regarding ride along visits and data requests were centralized through a single point of contact at Cadmus for tracking and convenience purposes.

Cadmus provided site specific data for any site the SWE or PPL Electric chose for a ride-along or independent site visit. Data included customer applications, data collected on site, a site visit summary form, photos taken on site, any spot measurement or metering data collected, and analysis of the data. Cadmus tracked these data details on the FTP site, which. Providing analysis and metered data typically took more time than providing other data; however, Cadmus prioritized the analysis of data for SWE ride along sites to ensure expediency.

Appendix B: 2011 TRM Updates

In November 2010, the PUC released the 2011 TRM Annual Update, reflecting additional measures, edits, clarifications, and improved functionality. The update added new interim TRM measures approved for inclusion by the SWE since the release of the 2010 TRM. The additional measures are provided in Table 16.

Table 16. New Measures in 2011 TRM Update

Residential	Commercial and Industrial
Ceiling and Wall Insulation	Anti-sweat Heater Controls
Residential Ductless Mini-Split Heat Pumps	High-efficiency Refrigerator/Freezer Cases
ENERGY STAR Televisions	ENERGY STAR Office Equipment
Refrigerator and Freezer Replacement (of equipment 10 years or older)	High-Efficiency Evaporator Fan Motors for Reach-in and Walk-in Refrigerator Cases
Programmable Thermostats	Smart-strip Plug Outlets
Smart-strip Plug Outlets	Beverage Machine Controls
Solar Water Heaters	High-efficiency Ice Machines
Heat Pump Water Heaters	Ceiling and Wall Insulation
Efficient Electric Water Heaters	
ENERGY STAR Office Equipment	
Low-flow Faucet Aerators and Showerheads	
Room Air Conditioners Replacement	
LED and Electroluminescent Nightlight	
Furnace Air Filter Whistle	

Additionally, PPL Electric submitted a list to the SWE of proposed TRM measure additions and accompanying savings algorithms for the 2012 TRM. The list included measures that PPL Electric is offering through its EE&C programs but that are not included in the 2011 TRM update:

- Residential LED Lighting
- Residential ENERGY STAR Appliances (update to previous protocol)
- Commercial Ductless Mini-Split Heat Pumps
- Commercial New Construction Exterior Lighting
- Commercial Ground Source Heat Pumps
- Commercial Programmable Thermostats
- Commercial Steam Cookers

Appendix C: PPL Electric Act 129 Organization Structure

Figure 31. Organizational Structure of PPL Electric's CP&S Group