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AEP Ohio Home Retrofit Program - Contractor Interview Guide

Name

Company

Interview Date

Phone

Email

Respondent Background

Thank you for talking with me today about AEP Ohio's Home Retrofit Program. The goal of this discussion is to talk more fully about the way this program was designed and is being implemented. All comments will remain confidential.

The areas I will be discussing are:

- Communication and coordination with AEP Ohio.
- Outreach to program participants.
- Tracking systems for activities, customer, measures, and other data.
- Effectiveness of Quality Assurance/Quality Control procedures.
- Customer satisfaction with the program.
- Overall effectiveness of program delivery.

First, I'd like to get a little better understanding of your roles and responsibilities regarding the Home Retrofit program.

1. What is your current title?

2. Could you describe your duties and responsibilities for AEP Ohio's Home Retrofit program?

Next, I'd like to discuss your views on how the program is being implemented.

Implementation Status

3. Can you give me an overview of the program? What is the primary objective? Discuss the types of audits and the direct install. What is the difference between an audit and assessment?

4. Can you provide some details on the history of the program through the program start-up period until now?

5. What challenges have occurred during the implementation planning phase and introduction of the program in PY1, and how were they overcome?

6. Were you involved in the program design? If so, has it changed from its initial design?

7. How have program performance goals changed based on the current implementation schedule? Could you share the current performance goals?

8. What is the status of program implementation efforts?

9. Have you developed a program implementation or operations plan? If so, could you provide this?

Communication and Coordination

10. Describe your communications with AEP Ohio staff. For what reasons do you communicate and how often?

11. Describe your communications with Columbia Gas staff. For what reasons do you communicate and how often?

12. Have you received any feedback from AEP Ohio?

Customer Participation

13. Can you please describe your strategy for marketing to customers and efforts to date?

14. Can you provide marketing materials? (verify materials already provided)

15. Are there any other outreach activities planned? If yes, probe for details.

16. Please describe each stage of the customer intake process for the In-Home Energy Assessment and the In-Home Energy Audit. How do customers apply, how are they processed, etc? Can you provide application forms and intake materials?

17. Is outreach to customers increasing awareness of the program opportunities?

Contractor Participation

18. Please describe each stage of the program participation process for the contractor.

19. Who will be conducting the Energy Assessments and Audits? Has the audit team been fully recruited and trained?

20. What efforts have been made to recruit and train installation contractors?

Training and Education

21. Did you deliver any training and education to participating builders?

Application Processing

22. Please describe your process for application and incentive processing. Do you have any documents describing this process?

23. How do you ensure prompt and accurate processing of applications and incentive checks?

24. How many rebates have you processed to-date? How long have these taken to process on average?

Tracking Systems

25. Could you explain your process for recording and tracking information?

26. Could you describe how data is recorded and tracked through each stage of the program process?

    a. Who tracks this info and how?

27. Are there any improvements that could be made to the system?

28. Could you explain the process you use to prepare and deliver monthly reports?

29. What quality control processes are in place to ensure that program tracking and reporting is accurate?

Quality Control

Now I would like to discuss quality control (QC) procedures used by your company.

30. Can you give me an overview of how your QA/QC Policies and Procedures Manual for the Home Retrofit program?

Participant Satisfaction

31. Do you plan to implement builder/customer satisfaction surveys?

Program Effectiveness

32. Do you expect the program to achieve its goals in 2011? If not, what suggestions do you have to improve the program? What ways should the program be changed to achieve its:

33. Do you have anything else you'd like to add?

Thank you again for taking the time to discuss this program.

Name _____

Date _____

Phone _____

Email _____

Utility _____

Introduction

Thank you for talking with me today about AEP Ohio's Home Retrofit Program. The goal of this discussion is to talk more fully about the way this program was designed and implemented. All comments will remain confidential.

The areas I will be discussing are

- Program design and development
- Whether program goals are being accomplished.
- Quality of program components.
- How well program activities are being implemented.
- Whether the target audience is being reached.
- How external factors are influencing program delivery.

First, I'd like to get a better understanding of your roles and responsibilities regarding the program.

Respondent Background

- What is your current title?
- Could you describe your general duties and responsibilities for AEP Ohio?
- What are your roles and responsibilities for the Home Retrofit program?

Now, I'd like to ask a few questions about your involvement in the design and development of the program.

Program Design and Development

- Can you provide some details on the history of the program?
- Were you involved in program design?
- Were you involved in program development? If yes probe for details.
- How has the program changed from its initial design?

Next, I'd like to discuss your views on how the program is being implemented in 2010.

Program Implementation

- Overall, how effective is the program in terms of the following:
  a. Reaching customers
  b. Overcoming barriers to participation
  c. Educating customers
  d. Achieving its savings goals
  e. Coordinating with other agencies
  f. Other? Probe
- What appear to be the most successful program components so far?
- How successful has the program been in tracking information?
  a. Are there any difficulties with obtaining information?
  b. Have the contractor and subcontractor roles changed?
  c. How frequently is the information tracked by the contractor? Is this sufficient?
  d. How can the tracking be improved/updated/changed?

Next, I'd like to discuss your role in helping to deliver the program in 2010.

Program Administration

- Approximately what percentage of your time is spent on program duties?
    - Was this what you anticipated?
    - How did your duties/responsibilities change during the course of the program?
    - What are the most time-consuming aspects for this program?
- How much interaction do you have with the implementation contractor?
    - What are your roles and responsibilities with the contractor?
    - What works best?
    - What needs to be improved regarding the contractor activities?
    - What type of feedback have you received from the contractor?
- Is participation in the program simple and streamlined for builders and homeowners?
- What is the expectation of the builders and are they fulfilling that role?
- Is the application process onerous?

Now let's move to program delivery.

Program Delivery

- What aspects of the program work well? What aspects of the program do not work well? How might the program be improved?
- What challenges have occurred during the implementation planning phase and introduction of the program in PY1, and how were they overcome?
- Are program-tracking data being used to both assess program effectiveness in meeting the program savings goals, and inform adjustments to program delivery?

- Are program activities being documented? Do program-tracking protocols facilitate effective evaluation?

- Is the program efficient and well managed? How are problems resolved?

- How are program changes handled?

- How does program administration and delivery influence participation? What could be done to improve program administration and delivery?

Let's move to discussion of how the market is made aware of the program.

Marketing and Outreach

- How is the program marketed to customers?

- How is the program marketed to builders?

- Are program marketing efforts contributing to achieving program goals?

- Is outreach to customers and trade allies increasing awareness of the program opportunities?

    - What outreach mechanisms (i.e., email, phone, TV, print, events) are most effective?
        - Are the outreach messages clear and actionable?

    - How effective are the various channels that are marketing the program?
        - Which performed the best?

- What type of feedback have you received from customers about this program?
    - What did they like?
    - What did they not like?

- What has been the feedback from trade allies working with the program?

Lastly, let's discuss program effectiveness in overcoming barriers.

Program Effectiveness and Barriers

- What are the barriers to customer and customer participation?
    - Are these barriers being addressed by the program?
    - If not, how might barriers be removed?
    - Are incentive levels adequate to remove barriers?

- What areas could be refined or enhanced to improve the participation process for customers and/or builders?

- How could the program be improved? Probe specifically on the following elements (if not addressed previously):
    - Achieving the program's energy savings goals
    - Educating customers to make equipment changes
    - Educating customers to make behavioral changes
    - Soliciting participants
    - Customer participation
    - Trade allies' roles and responsibilities
    - Ways in which the program results are tracked and reported
    - Anything else?

- Are participants satisfied with this program? Probe for reasons why & why not – Incentives, Communications, etc.

- Are trade allies satisfied with this program? Probe for reasons as above.

These are all my questions.

- Do you have anything else you'd like to add?

Thank you again for taking the time to discuss this program.

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AEP Ohio
Energy Efficiency/Demand Response Plan
Year 2 (1/1/2010-12/31/2010)

Program Year 2010 Evaluation Report: Low Income Program

Presented to:

AEP OHIO®

A unit of American Electric Power

March 7, 2011

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Section E. Executive Summary

This document presents a summary of the findings and results from the evaluation of the 2010 Low Income Program implemented by AEP Ohio for the program year January 1, 2010 through December 31, 2010 (PY 2010).[1]

The purpose of the Low Income Program is to reduce energy use for residential low-income customers by installing a range of cost-effective weatherization upgrades and other energy efficiency measures in eligible dwellings.

The second objective is to enhance services available to low-income customers in AEP Ohio service territory through a coordinated effort with local weatherization providers in order to provide comprehensive assistance at lower administration costs than can be found under a non-coordinated model.

The Low Income Program is marketed, administered, and delivered in both the Columbus Southern Power (CSP) and Ohio Power Company (OPCo) service territories by an implementation contractor, Ohio Partners for Affordable Energy (OPAE), through its member agencies.

E.1 Evaluation Objectives

The three major objectives of the evaluation are to: (1) quantify verified gross energy savings and summer peak demand reduction from the program during PY 2010, (2) determine key process-related program strengths and weaknesses and identify ways in which the program can be improved, and (3) provide data to determine program cost-effectiveness.

E.2 Evaluation Methods

The data collected for evaluation of the PY 2010 Low Income Program was gathered through a number of activities, including in-depth phone interviews with program managers and the implementation contractor (OPAE), tracking system data review, and review of savings estimates for measures implemented by the program. Program participation was sparse until the end of the year so customer surveys were not conducted. Table E-1provides a summary of these data collection activities, including the targeted population, the sample frame, and timing in which the data collection occurred.

[1] For the Low Income Program, Program Year 2010 (PY 2010) began July 1, 2010 and ended December 31, 2010.

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Table E-1. Data Collection Activities for PY 2010 Evaluation

Data Collection Activity	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data Analysis	2010 OPAE audit results submitted to AEP by 12/31/2010	AEP Ohio Tracking Database	-	All	January through February 2011
In-depth Interviews	Program staff at AEP Ohio and the implementation Contractor	Contacts from AEP Ohio	-	3 Interviews; 2 utility and 2 OPAE staff	November-December 2010 January 2011 check-in
Review of Engineering Estimates	Measures installed in the 2010 Program	TRM, Program Design documents, other Navigant sources	-	-	January-February 2011

E.3 Key Findings and Recommendations

The savings impact results for the PY 2010 Low Income Program are shown in Table E-2.

Table E-2. Ex-Post Gross Savings Estimates for the PY 2010 Low Income Program

Program	Ex-Ante Claimed Savings		Verified Gross Savings		Ex-Post Gross Savings	
	Gross kWh	Gross kW	Gross kWh	Gross kW	Gross kWh	Gross kW
CSP	649,322	-	647,914	48	647,914	48
OPCo	222,975	-	227,983	23	227,983	23
Total	**872,296**	**-**	**875,897**	**71**	**875,897**	**71**

For OPCo, the realization rate (defined as verified gross (ex post) savings/ex-ante claimed savings) is 0.998 for gross energy savings and for CSP the realization rate is 1.02 for gross energy savings. Overall the realization rate for energy savings is 1.0.

Key Impact Recommendations

1. AEP Ohio's implementation contractor, OPAE, should develop a method to capture field results into a single monthly summary spreadsheet to allow easier monthly

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reporting, analysis and program evaluation. This could be done by adding a summary worksheet to the member agencies spreadsheets as illustrated in Table E-3 below.

Table E-3. Proposed Summary Worksheet for Data Files

OPAE Agency	Participant Name	Account #	Phone #	Measure	Heating Fuel	Water Heating Fuel	# installed	Service Territory
Impact	John Doe	123456	xxx-xxx-xxx	15 W CFL	Gas	Electric	6	OPC
				9 W CFL	Gas	Electric	12	CSP

2. AEP Ohio should create and maintain documentation for measures funded by the program, including assumptions, sources, calculations, issues, etc.

Key Process Recommendations

1. AEP Ohio & OPAE should work together to provide guidelines to OPAE member agencies, including how to ramp-up participation. AEP Ohio might also want to increase other interactions with OPAE member agencies to improve the understanding of the program, measures, and help the auditors reach more customers and install more measures. Member agencies could share best practices with each other.

2. AEP Ohio should improve the documentation for the program—program design, measure savings estimates, process flow, etc. As part of this effort, AEP Ohio should provide guidelines for reporting for the OPAE member agencies along with instructions about spreadsheet formats.

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Section 1. Introduction and Purpose of the Study

The purpose of the Low Income Program is to reduce energy use for residential low-income customers by installing a range of cost-effective weatherization upgrades and other energy efficiency measures in eligible dwellings.

The second objective is to enhance services available to low-income customers in AEP Ohio service territory through a coordinated effort with local weatherization providers in order to provide comprehensive assistance at lower administration costs than can be found under a non-coordinated model.

For PY 2010, AEP Ohio planned to target low income customers earning less than 200 percent of the federal poverty level (FPL). Recognizing the need for effective integration with existing services for the low-income customers, the program is piggybacking on the existing infrastructure that delivers weatherization (Wx) programs to low income customers in Ohio.

Effective April 1, 2010, AEP Ohio engaged Ohio Partners for Affordable Energy (OPAE) to install energy efficient measures in eligible homes participating in Weatherization programs delivered by Community Action Program (CAP) agencies.[2] OPAE already delivers the federally funded, state administered Heating Weatherization Assistance Program (HWAP) and the statewide Energy Partnership Program (EPP) program in Ohio. The major program treatments for EPP, (on which the AEP Ohio program is modeled), were primarily refrigerator and freezer replacements (or removals), lighting replacements, and electric hot water measures.

The program launched for Columbus Southern Power (CSP) and Ohio Power Company (OPCo) in summer 2010 and took until November for savings from program participation to reach a significant level (and only for CSP). According to OPAE, resources were constrained by competition from American Recovery and Reinvestment Act (ARRA)-funded projects.

1.1 Evaluation Overview

The three major objectives of the evaluation are to: (1) quantify verified gross energy savings and summer peak demand reduction from the program during PY 2010, (2) determine key process-related program strengths and weaknesses and identify ways in which the program can be improved, and (3) provide data to determine program cost-effectiveness.

The evaluation will seek to answer the following key research questions.

[2] OPAE, AEP Ohio Low Income Agreement, June 2010.

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1.1.1. Impact Questions

- What are the impacts from this program?
- Did the program meet the energy and demand savings goals? If not, why not?
- Did the Partnership with Ohio funds contribute significantly to improving residences and allowing the installation of energy efficiency measures?
- What are the benefits and costs and cost effectiveness of this program?

The PY 2010 evaluation provides separate quantitative results for CSP and OPCo for each of these impact questions.

1.1.2 Process Questions

1. Has the program met its customer participation objectives?
2. Is the marketing approach and materials effective?
3. Were customers satisfied with the program?
4. How effective is the customer education component?
5. How easy is it for customers to participate?
6. What are the barriers to participation?
7. Is the program administration running as expected?
8. Are there any problems with delivery?
9. Are program tracking systems adequate? Are they consistently maintained? Do they contain all data required to support program tracking and evaluation?

The PY 2010 evaluation presents findings for some of these process questions. Questions 3 through 6 were not addressed. Program participation was sparse until the end of the year so customer surveys were not conducted. These questions would be addressed through surveys for program year 2011.

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Section 2. Description of Program

The primary objective of the Low Income Program is to reduce energy use for residential low-income customers by installing a range of cost-effective weatherization upgrades and other energy efficiency measures in eligible dwellings.

The second objective is to enhance services available to low-income customers in AEP Ohio service territory through a coordinated effort with local weatherization providers in order to provide comprehensive assistance at lower administration costs than can be found under a non-coordinated model.

2.1 Program Description

The Low Income Program targets moderate and high use customers with total annual household income at or below 200 percent of federal poverty guidelines who receive electric service from AEP Ohio (eligible customers). Recognizing the need for effective integration with existing services for the low-income customers, the program has the following components, modeled after existing services:

- **High Use Baseload** (HUB) service is targeted to eligible customers with high electric baseload (non heating/cooling)—greater than 8,000 kilowatt hour (kWh)/yr. Measures include extensive lighting retrofits, replacing inefficient refrigerators and freezers, electric hot water reduction measures, and energy education.
- **Moderate Use Baseload** (MUB) service is targeted to eligible customers with annual baseload between 4,000 and 8,000 kWh, and includes the same measures as the HUB service, but allows for a more streamlined energy audit process.
- **Targeted Energy Efficiency** (TEE) service is aimed at eligible customers with moderate or high electric heating and cooling loads greater than 6,000 kWh/year in heating or cooling. In addition to baseload measures, TEE provides building shell weatherization including insulation and air sealing.

For PY 2010, AEP Ohio planned to target low income earning less than 200 percent of FPL.

AEP Ohio launched the Low Income Program in summer 2010. The major program treatments are primarily refrigerator and freezer replacements (or removals), lighting replacements, and electric hot water measures.

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Implementation Strategy

Recognizing the need for effective integration with existing services for the low-income customers, the program is piggybacking on the existing infrastructure that delivers Weatherization programs to low income customers. Effective April 1, 2010 AEP Ohio engaged OPAE to install energy efficient measures in eligible homes participating in Weatherization programs delivered by Community Action Program agencies.[3] OPAE already delivers the federally funded, state administered HWAP and the statewide EPP program in Ohio. The program is implemented by OPAE through its network of subcontractors. Training, outreach and marketing are included in OPAE delivery requirements.

The State of Ohio maintains a central database of customers applying for low income programs. Participants use the same application form for all Ohio programs. OPAE draws from this database to determine eligible participants for the AEP Ohio program. Participants must be customers of CSP or OPCo and be approved for one of the following programs: the Ohio HWAP, the Percentage of Income Payment Plan (PIPP) or HEAP.

HWAP is a no-cost energy assistance program funded by the U.S. Department of Energy for consumers with annual household income at or below 200 percent of the federal poverty guidelines. Ohio's HWAP is administered through the Ohio Department of Development's Community Development Division (CDD) and its Office of Community Services (OCS). As provided in the federal regulations, Ohio's HWAP is carried out by Community Action Agencies and other public and nonprofit entities. Applicants complete the Combined Energy Assistance Application (HEAP application), contact the local weatherization provider, and notify the provider of interest in the weatherization services. The waiting list for assistance (after eligibility has been determined) varies from provider to provider and, in some cases, could be months.

2.2 *Program Year 2010 Low Income Program Participation*

Monthly spreadsheets provided by the OPAE member agencies, which conducted the audits and implemented measures, include measure participation. All data was tracked separately for CSP and OPCo. For the 2010 year, 781 households participated from CSP, and 273 households from OPCo. Figure 2-1 shows monthly participation by utility.

[3] OPAE, AEP Ohio Low Income Agreement, April 2010.

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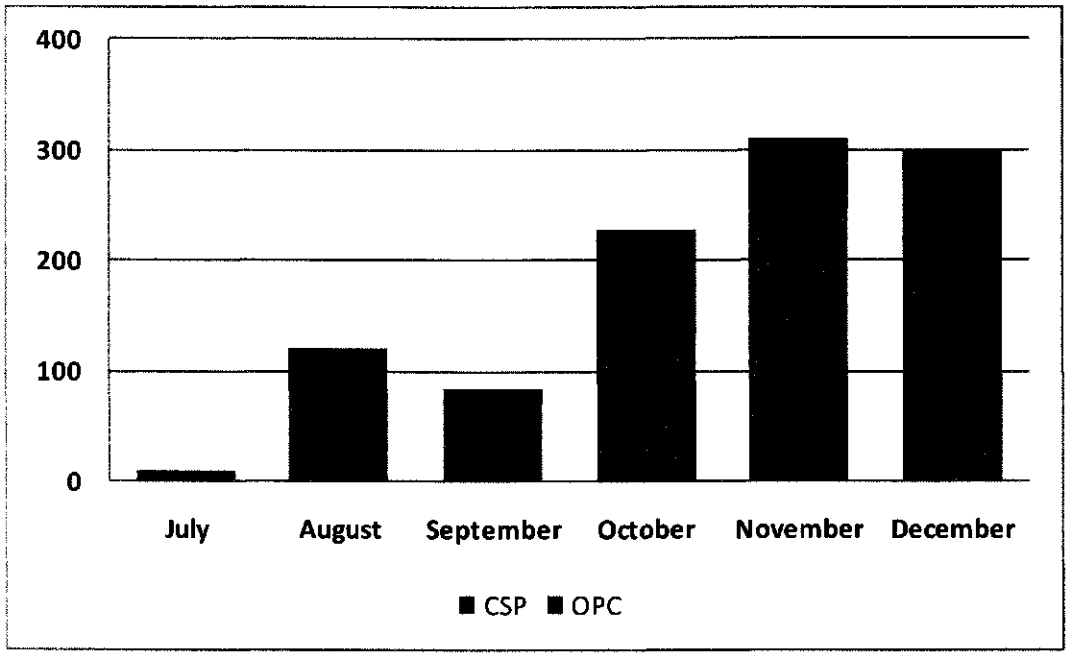
Figure 2-1. Participation by Month and Utility



For CSP 84 percent of measure savings were from lighting and 16 percent from refrigeration measures, but for OPCo 69 percent of measure savings were from lighting, 11 percent from refrigeration, and 18 percent were from electric hot water measures. Table 2-1shows participation for CSP and OPCo by measure type and measure.

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Table 2-1. Participation by Measure and Utility

Type of Measure	Measure	Number of measures		
		CSP	OPCo	Total
Lighting	9 W CFL	8	-	**8**
	11W CFL	206	28	**234**
	15W CFL	5,738	1,762	**7,500**
	20 W CFL	2,421	593	**3,014**
	23W CFL	355	-	**355**
	24 W CFL	1,632	187	**1,819**
	Globes/Candelabras	157	250	**407**
	Specialty CFLs	35	143	**178**
	Outdoor Lighting	700	235	**935**
	LED Nightlight	-	183	**183**
Refrigerator & Freezer	Refrigerator	201	56	**257**
	Upright Freezer	17	5	**22**
	Chest Freezer	56	3	**59**
Hot Water Measures	Replace Water Heater	-	1	**1**
	Temp Setback	-	73	**73**
	Pipe Insulation	-	75	**75**
	Tank Insulation	-	1	**1**
	Showerhead	11	93	**104**
	Aerator	21	159	**170**
HVAC	Room A/C	6	7	**13**
	Central A/C	2	1	**3**
Weatherization	Duct Sealing	-	17	**17**
	Floor Insulation		1	**1**
TOTAL		**11,558**	**3,955**	**15,313**

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Section 3. Methodology

This section presents the key questions to be addressed by the evaluation and presents an overview of the analytic methods, with additional detail provided for the methods used in this first year evaluation. This section also provides details on the data collection activities implemented for PY 2010, including the data sources used as a base for these data collection activities.

3.1 Analytical Methods

3.1.1 Impact Evaluation

The impact evaluation for the Low Income Program was performed by first obtaining the program tracking data for the program to determine what measures were installed by month in each service territory. The next step was to determine what energy and demand savings estimates to use for each measure from the following sources:

- Draft Technical Reference Manual (TRM) for Ohio Senate Bill 221 Energy Efficiency and Conservation Program, Oct 15, 2010
- Navigant spreadsheet developed as part of the AEP Ohio 2009-2011 EE/PDR Plan – filename: AEP APCo Res Master Measure v11 – Summer_Peak.xlsx (Measure List)
- AEP Ohio, Energy Efficiency/Demand Response Plan. Evaluation Report: Low Income Energy Savings and Weatherization Kits, March 9, 2010 (PY 2009 Report)
- Navigant study for Regional Technical Forum on energy and demand savings for specialty CFLs (Navigant Study)
- Michael Blasnik & Associates, Electric Partnership Program Impact Evaluation, prepared for the Ohio Department Of Development Office of Community Services, June 2009 (EPP Evaluation)
- PY2010 AEP Ohio Efficient Products Program Evaluation Report
- PY2010 AEP Ohio Recycling Program Evaluation Report

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Table 3-1 shows what sources were used for each ex-post measure by measure type.

Table 3-1. Sources for Ex-Post Measure Estimates of Energy and Demand Savings

Data Source	Measure Type	Measures
TRM	Lighting	CFLs, Indoor, Outdoor, Torchiere, Nightlights
	Refrigerators & Freezers	Replace Freezers, Remove Fridge
	HVAC	Room Air Conditioners, Central Air Conditioners
	Hot Water Measures	Tank Insulation, Replace Water Heater
Measures List	Weatherization	Duct Sealing
	Hot Water Measures	Pipe Insulation, Faucet Aerators
PY2009 Report	Hot Water Measures	Efficient Showerhead, Temperature Setback
Navigant Studies	Lighting	Specialty CFL lamps
EPP Evaluation	Refrigerators & Freezers	Replace Refrigerators
PY2010 Efficient Products Evaluation	Lighting	Hours of Use, System Coincidence Factor
PY2010 Appliance Recycling Evaluation	Refrigerators & Freezers	Remove Fridge

The evaluation team then applied the respective energy and demand savings parameter estimates to installed measures to determine ex-post gross program energy and demand savings.

3.1.2 Process Evaluation

The purpose of the process evaluation is to assess the effect of the program structure and program implementation on program performance. The evaluation team's process efforts provide insights and recommendations to support the continued success of the Low Income Program.

Central to the process evaluation for the Low Income Program were interviews with the program manager and implementation staffs, and review of relevant program tracking databases, documents, and other materials such as websites for Ohio low income programs.

The evaluation team used senior staff members to conduct these in-depth qualitative interviews. Senior staff were flexible in their approach to the discussion, allowing the respondent to talk about his/her experience or perspective while still shaping the discussion

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toward the most important, relevant and necessary information. The team conducted the interviews by telephone in order to complete the interviews quickly and to be flexible to the respondents' schedule. Interview guides were developed to be open-ended and to allow for a free-flowing discussion between interviewer and respondent and real time interviewing flexibility. The team developed guides which highlighted the key issues, but did not require being read verbatim to offer the interviewer the flexibility to delve deeply into pertinent issues based on the respondents' knowledge of and experience with the program. The evaluation team took detailed notes during each in-depth interview and/or taped the discussion to ensure thorough documentation of each interview

3.2 *Data Sources*

The data collected for evaluation of the PY 2010 Low Income Program was gathered during a number of activities, including in-depth phone interviews with program managers and the implementation contractor (OPAE), tracking system data review, and review of engineering estimates for measures implemented by the program. Appendix A provides the interview guide for the Implementation Contractor.

Table 3-2 provides a summary of these data collection activities including the targeted population, the sample frame, and timing in which the data collection occurred.

Table 3-2. Data Collection Activities for PY 2010 Evaluation

Data Collection Activity	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data Analysis	2010 OPAE audit results submitted to AEP by 12/31/2010	AEP Ohio Tracking Database	-	All	January through February 2011
In-depth Interviews	Program staff at AEP Ohio and the implementation Contractor	Contacts from AEP Ohio	-	3 Interviews; 2 utility and 2 OPAE staff	November-December 2010 January 2011 check-in
Review of Engineering Estimates	Measures installed in the 2010 Program	TRM, Program Design documents, PY2010 Evaluation Reports, other Navigant sources	-	-	January-February 2011

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Section 4. Detailed Evaluation Findings

This section provides the results of the impact and process evaluation of PY 2010.

4.1 Impact Evaluation Results

This section presents the results of the Low Income Program impact evaluation.

4.1 Program Impact Parameter Estimates

This section discusses the estimates that were used to calculate and report savings for PY 2010.

As part of the development of the evaluation plan, each measure installed was assigned an expected savings value for energy and demand. AEP Ohio used this source and others for energy savings estimates; demand savings were not estimated. Table 4-1 shows the ex-ante estimates of energy savings by measure, along with the sources for these estimates, followed by a discussion of measure savings estimates.

Table 4-1.Gross Ex Ante Parameter Estimates for Program Measures

Measures	Ex Ante kWh/unit
CFL	40.0
Refrigerators	976.0
Freezers	68.0
Window AC	73.8
Fridge Removal	848.0
Replace Water Heater	288.0
Central AC	180.0
Insulation	96.0
Duct Sealing	186.0
Temperature Setback	45.0
Pipe Insulation	228.5
Tank Insulation	79.0
Showerhead	51.3
Faucet Aerator	24.5

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Table 4-2 shows the ex-post estimates of energy and demand savings for each measure.

Table 4-2. Gross Ex Post Parameter Estimates for Program Measures

Type of Measure	Measure	Energy Savings (kWh)	Demand Savings (kW)
Lighting	9W CFL	21	0.00086
	11W CFL	25	0.00157
	15W CFL	38	0.00243
	20 W CFL	47	0.00297
	23 W CFL	44	0.00281
	24W CFL	44	0.00275
	Candelabra/Globe	42	0.00263
	Outdoor Lighting	156	0.0
	Specialty CFLs	26	0.0
	Nightlight	14	0.0
Refrigerator & Freezers	Replace Refrigerator	475	0.095
	Upright Freezer	80	0.016
	Chest Freezer	52	0.0104
	Remove Refrigerator	1,534	0.201
Hot Water	Efficient Water Heater	375	0.0317
	Temperature setback	45	0.0
	Pipe Insulation	153	0.01683
	Tank Insulation	79	0.0013
	Showerhead	51	0.005
	Faucet Aerator	89	0.0098
HVAC	Room A/C	74	0.1018
	Central A/C	180	0.1018
Weatherization	Duct Sealing	189	0.390

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Lighting Measures

Ex-ante savings were based on assuming a fixed value for all measures. Ex-post savings were calculated by applying savings estimates for individual lighting measures.

Energy and demand savings for compact fluorescent lamps (CFL) are based on reduced wattage requirements by replacing incandescent bulbs with more efficient CFLs (11 watt (W), 15W, 20W, 23W and 24W CFL)[4]. Other indoor bulbs (candelabras, globes, torchieres) were replaced with energy saving fixtures with savings calculated based on fixed wattage savings. Assumptions for these lighting options include gas heating, and average hours of use of 2.34 hours per day and system coincidence factor of 5.4 percent.[5]

Energy savings for specialty CFLs such as dimmable torchieres and three-way lights were derived from a Navigant study for the Regional Technical Forum. No demand savings are expected from dimming lighting.

Outdoor lighting (including floodlights) was replaced with specialty CFLs. Wattage savings are fixed and hours of use are assumed to be 4.5 hours per day. There are no demand savings for outdoor lighting which are not assumed to be on during the AEP Ohio system peak.

Efficient LED night lights replaced existing night lights with savings achieved through reduced wattage, from 5W for the existing night light to 0.33W for the LED light. Hours of use are assumed to be 2,920 hours in a year (8 hours/day).

For all CFLs the in-service factor is assumed to be 100 percent and the interaction factor is 1.0.

Refrigerators & Freezers Measures

Old, inefficient refrigerators and freezers (both chest and upright) are replaced with new, high efficiency ENERGY STAR® appliances. Assumptions include: the new energy savings appliance is currently installed and in use; for freezers that are upright, automatic defrost is assumed; and chest and upright freezers provide different savings.

Ex-ante energy savings of 976 kWh for refrigerators were taken from the draft TRM and metered results from OPAE audits. Ex-post energy savings for refrigerators were based on estimates for refrigerator savings of 475 kWh from the most recent EPP evaluation and the metered results. The EPP evaluation used regression analysis to assess measure savings for high use and moderate use consumers; the ex-post estimate was based on the results from the

[4] Technical Reference Manual (TRM) for Ohio Senate Bill 221 Energy Efficiency and Conservation Program and 09-512-GE-*UNC*. Ohio Electric Utilities. 2009, page 56, Table 42.
[5] PY 2010 Efficient Products Evaluation

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high use group as the evaluators expressed concerns about bias for the estimate for moderate use customers. The energy savings for the metered results was much lower than even the EPP findings, approximately 110 kWh per refrigerator.

Ex-ante energy savings for freezers did not differentiate between chest and upright freezers. Ex-post energy and demand savings for chest and upright freezers were taken from the draft TRM. One refrigerator was removed. Ex-ante savings were taken from program plan documents and ex-post energy and demand savings were taken from the PY2010 Appliance Recycling Program Evaluation Report.

Demand savings were estimated by dividing energy savings by 5,000 hours of operation (as per the TRM).

Hot Water Savings Measures

Several measures can save energy by reducing the need for hot water, including:

- **Installing more efficient hot water tanks.** Ex-ante energy savings were taken from the demand side management (DSM) plan whereas ex post energy and demand savings were based on the draft TRM.
- **Using temperature gauges to determine water heater temperature and then reducing the temperature.** Both ex-ante and ex-post energy and demand savings were based on the PY 2009 evaluation report.
- **Insulating water heater tanks and pipes.** Tank insulation energy savings (ex-ante and ex-post) are from the draft TRM as are ex-post demand savings. Pipe insulation ex-ante savings were based on specific assumptions which are not confirmed, so ex-post energy and demand savings were taken from the measures list.
- **Installing more efficient faucet aerators in bathroom and kitchen sinks.** The source for ex-ante energy savings is not clear. Ex-post energy and demand savings were based on assumptions in the measures list.
- **Installing energy efficient showerheads.** Energy and demand savings were documented in the PY 2009 Low Income Evaluation. Ex-ante and ex-post energy savings estimates did not differ.

All measures are assumed to have a 100 percent in-service rate.

Air Conditioning Measures

Old, inefficient room air conditioners are replaced with new energy saving appliances. Savings were taken from the Draft TRM and assume an in-service rate of 100 percent, and 828 full load

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hours. Whole house central air conditioners may also be replaced under this program. Energy savings were based on default inputs to the Draft Ohio TRM 'Central Air Conditioning (Early Replacement). Demand savings for room air conditioners were taken from the draft TRM and used for central air conditioning as well; this is a conservative estimate.

Weatherization Measures

Savings for electrically heated homes are achieved through increasing insulation in walls and ceilings, as well as sealing air leaks and ducts. One insulation measure was reported for floor insulation. As no estimates are available for this measure (only wall, ceiling, and basement insulation are program measures), it was not included in the ex-post savings.

Ex-ante energy savings for duct sealing was derived from the AEP Ohio DSM plan while ex-ante energy and demand savings came from the measures list. Ex-ante and ex-post energy savings were virtually identical.

4.2 Program Impact Results

The ex-ante energy savings are summarized in Table 4-3. Demand savings were not estimated.

Table 4-3. Ex-Ante Energy Savings by Utility and Measure

Measures	CSP	OPCo	Total
CFLs	445,520	131,360	576,880
Refrigerators	196,176	51,182	247,358
Freezers	4,896	544	5440
Window AC	443	517	959
Fridge Removal	848	0	848
Replace Water Heater	0	288	288
Central AC	360	180	540
Insulation	0	96	96
Duct Sealing	0	3,162	3,162
Temperature Setback	0	3,285	3,285
Pipe Insulation	0	17,138	17,138
Tank Insulation	0	6,557	6,557
Showerhead	564	4,771	5,335
Faucet Aerator	515	3,896	4,410
Total	**649,322**	**222,975**	**872,296**

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The ex-post energy savings and peak demand savings from the program are summarized in Table 4-4 by measures and service territory (CSP, OPCo).

Table 4-4. Ex-Post Energy and Demand Savings by Utility and Measure

Type of Measure	Measure	Energy Savings (kWh)			Demand Savings (kW)		
		CSP	OPCo	Total	CSP	OPCo	Total
Lighting	9W CFL	168	-	168	0.01	-	0.01
	11W CFL	5,109	694	5,803	0.32	0.04	0.37
	15W CFL	220,339	67,661	288,000	13.94	4.28	18.23
	20 W CFL	113,787	27,871	141,658	7.19	1.76	8.95
	23W CFL	15,762	-	15,762	1.00	0.00	1.00
	24 W CFL	71,808	8,228	80,036	4.49	0.51	5.01
	Globe/Candelabra	6,531	10,400	16,931	0.41	0.66	1.07
	Outdoor Lights	109,200	36,660	145,860	0.00	0.00	0.00
	Specialty CFLs	910	3,718	4,628	0.00	0.00	0.00
	Nightlight	-	2,562	2,562	0.00	0.00	0.00
Refrigeration	Replace Refrigerators	95,475	25,130	120,605	19.10	5.32	24.42
	Replace Freezers	4,220	556	4,776	0.80	0.10	0.90
	Remove Refrigerator	1,534	-	1,534	0.20	-	0.20
Hot Water	Replace Water Heaters	-	375	375	0.00	0.03	0.03
	Pipe Insulation	-	11,475	11,475	0.00	0.00	0.00
	Tank Wrap	-	6,557	6,557	0.00	0.11	0.11
	Temperature Setback	-	3,285	3,285	0.00	0.00	0.00
	Showerhead	561	4,743	5,304	0.06	0.47	0.50
	Faucet Aerators	1,869	14,151	16,020	0.20	1.60	1.80
Air Condition	Room AC	449	524	972	0.06	0.07	0.13
	Central AC	360	180	540	0.02	0.01	0.03
Weatherization	Duct Sealing	-	3,213	3,213	-	6.60	6.6
Total		**647,914**	**227,983**	**875,897**	**48**	**23**	**71**

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CSP achieved savings from lighting and replacement of refrigerators and freezers, whereas OPCo achieved savings through a variety of measures. Figure 4-1and Figure 4-2 show energy and demand savings by measure for CSP. Figure 4-3 and Figure 4-4 show this data for OPCo.

Figure 4-1. CSP Energy Savings by Measure

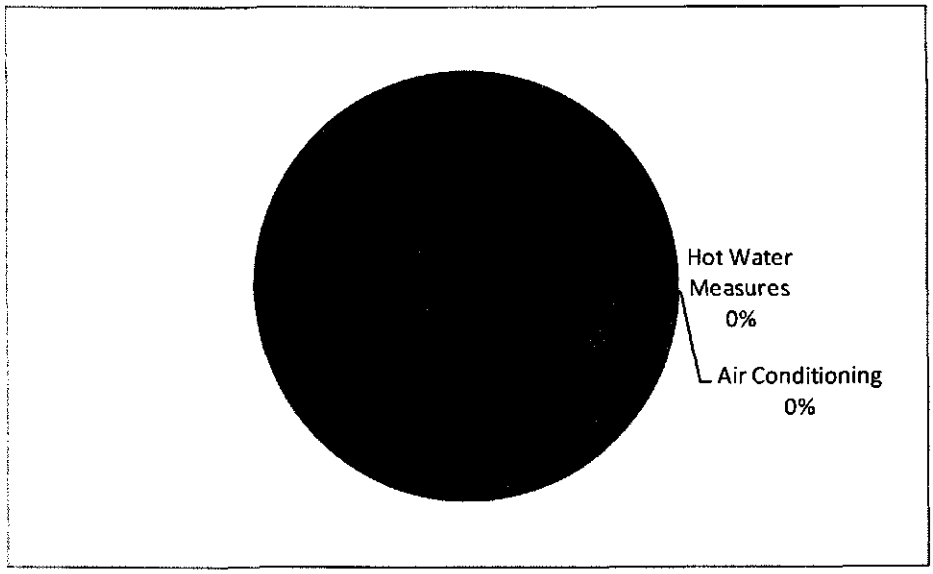

Figure 4-2. CSP Demand Savings by Measure

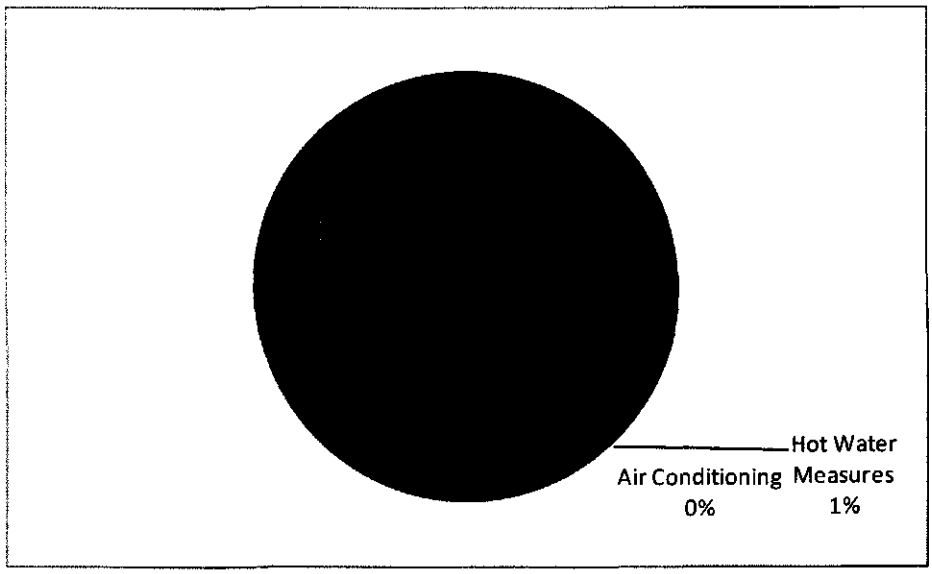

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Figure 4-3. OPCo Energy Savings by Measure

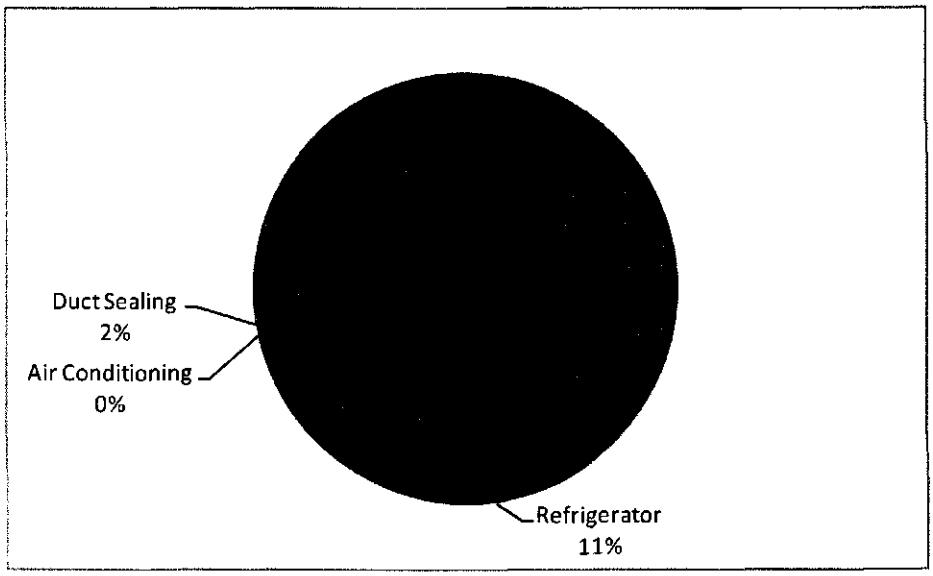
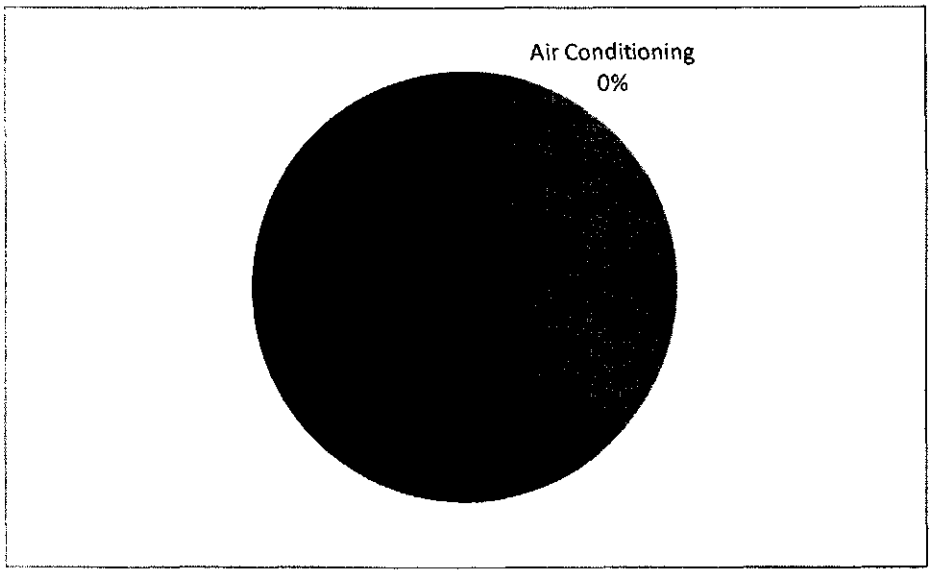


Figure 4-4. OPCo Demand Savings by Measure



Based on the impact parameter estimates described in the previous section, the evaluation team estimated the program impacts resulting from the PY 2010 Low Income Program for each service territory. The results are provided in Table 4-5.

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Table 4-5. Energy and Demand Savings

Territory	Energy(kWh)	Peak Demand (kW)
CSP	647,914	48
OPCo	227,983	23
Total	**875,897**	**71**

4.3 Cost Effectiveness Review

This section addresses the cost effectiveness of the Low Income Program. Cost effectiveness is assessed through the use of the Total Resource Cost (TRC) test. AEP Ohio provided the costs, the participants and savings are described in previous sections, and Effective Useful Life (EUL) is calculated for each service territory as a weighted average by savings. Table 4-6 shows EUL for the various measures.

Table 4-6. Effective Useful Life for Low Income Measures

Indoor CFLs	6.6
Outdoor/Floodlight	8.8
Nightlight	16.0
Refrigerator/Freezer	11.0
Water Tanks	15.0
Temp Setback	1.0
Pipe Insulation	15.0
Tank Insulation	7.0
Showerhead	10.0
Aerator	10.0
Room A/C	9.0

Table 4-7 summarizes the unique inputs used in the TRC test.

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Table 4-7. Inputs to Cost-Effectiveness Model for Low Income Program

Item	CSP	OPCo	Combined
Measure Life	7.8	8.2	**N/A**
Participants	781	273	**1,054**
Annual Energy Savings	647,914	227,983	**875,987**
Coincident Peak Savings	48	23	**71**
Third Party Implementation Costs	$279,453	$237,630	**$517,083**
Utility Administration Costs	$5,151	$5,677	**$10,828**
Utility Incentive Costs	$407,650	$131,826	**$539,476**
Participant Contribution to Incremental Measure Costs	$0	$0	**$0**

Based on these inputs, the TRC ratio for CSP is 0.8 and 0.4 for OPCo. The benefit-cost ratio for CSP is much higher than for OPCo since both demand and savings were so much higher for CSP—just over double for demand savings and about three times higher for energy savings. Costs for CSP were also higher than for OPCo but only twice as high.

Table 4-8 summarizes the results of the cost-effectiveness tests. Results are presented for the Total Resource Cost test, the Ratepayer Impact test, and the Utility Cost test. Since the participants did not contribute to costs, the Participant Cost test is not applicable.

Table 4-8. Cost Effectiveness Results for Low Income Programs

Test Results for PY2010	CSP	OPCo
Total Resource Cost	0.8	0.4
Participant Cost Test	N/A	N/A
Ratepayer Impact Measure	0.2	0.2
Utility Cost Test	0.3	0.2

At this time, additional benefits related to reduction of greenhouse gas emissions have not been quantified in the calculation of the TRC. These additional benefits would increase the given TRC benefit/cost ratio.

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4.2 *Process Evaluation Results*

This section provides a summary of the process-related findings for PY 2010.

4.2.1 Program Theory

The objective of the Low Income Program is to provide long-term savings for low income consumers by funding the installation of energy efficiency measures. These include lighting, refrigeration, hot water and weatherization measures installed as part of the weatherization audits in eligible homes.

The rationale of the program is to install energy efficient measures for consumers who would not be able to afford these measures. The program will lead to long-term energy savings, for customers as well as increased comfort and cost savings and decreased energy use in AEP Ohio's service territory.

4.2.2 Process Themes

There are many themes to explore during a process evaluation. The evaluation conducted in-depth interviews with staff of AEP Ohio and OPAE to explore process evaluation issues. Following are some common themes that emerged.

Customer Participation

Participation is much lower than expected. OPAE has expressed disappointment with the slow ramp-up and rated the program success as seven on a scale of 1 to 10. Both the late start for the program and ARRA-funded projects are competing for resources. Participation will likely increase when ARRA funding ends in June. OPAE should provide guidelines to OPAE member agencies about how to ramp-up program participation including increased marketing and outreach activities. Member agencies are also responsible for marketing and outreach but usually use the HEAP applications to find participants.

Quality Assurance and Quality Control

Audit implementation standards and training for contractors are reasonable and well documented.

OPAE and its members use Ohio's Weatherization Program Standards, Eleventh Edition, 2008 established by the Office of Community Services to guide how the audits are conducted and measured installed. The Ohio Weatherization Training Center (OWTC), which has been operating since 1980, trains all field staff in state-of-the-art techniques for HWAP. The training center offers many different levels of skills training: basic energy auditing; installation skills;

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conservation theory; advanced blower door diagnostics; combustion appliance testing, repair, and replacement; indoor air quality concerns; consumer education; training on the Model Energy Code and ASHRAE 90.1 for local code officials, design professionals, and builders; and services such as program design and implementation, program evaluation and research, and customized curriculum and manual design.[6]

Program Tracking Systems

The program tracking system is not working well and does not provide all the data needed for evaluation, nor does it facilitate quality assurance, reporting, and analysis.

Auditors track data in hard copy (provided in Appendix B) and then input data into spreadsheets. These data files are the same spreadsheets used for three Ohio low income programs. OPAE provides the spreadsheets and guidelines to member agencies to input the information. Each member agency tracks monthly results (participation by measure) in the spreadsheet. The results are then sent to OPAE who calculates and sends the invoice and spreadsheets to AEP Ohio.

The AEP Ohio Compliance Manager reviews the spreadsheets and invoices to ensure that only eligible measures are invoiced. This is a very time consuming process and the Compliance Manager has uncovered several errors in the spreadsheets. The evaluation team found many problems with these spreadsheets as well, including missing information (such as customer phone numbers), locked cells in some spreadsheets, no specific fields to capture certain measures (e.g., hot water measures) individually, lack of summary data by utility for measures or savings, energy savings not calculated, and awkwardness in determining measure savings without a summary calculation worksheet.

OPAE has plans to customize a web-based tracking system (used by First Energy in Pennsylvania) for First Energy in Ohio, AEP Ohio, and Duquesne Lighting in Ohio. Implementation of the system has been delayed; roll out for First Energy and AEP Ohio was due in the fall of 2010. The new system may be able to handle the current tracking issues but that is not certain.

Monthly reporting requirements for OPAE include a report detailing the expenditures and measures installed as well as the energy savings (kWh). OPAE does not provide a summary report but rather individual spreadsheets from member agencies along with an invoice. The AEP Ohio Compliance Manager checks the invoices to ensure only eligible measures are included. OPAE noted that it receives member agencies' reports at the end of each month and claims to have only two to three days to provide an invoice: however, AEP Ohio would be

[6] Source: http://www.development.ohio.gov/community/ocs/hwap.htm

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willing to wait a few more days to ensure better reporting. Reports are provided to AEP Ohio in the form of spreadsheets containing individual worksheets for data measures installed. Energy and demand savings are not calculated; OPAE claims to be waiting for the approved TRM to add savings estimate values. However, adding these savings values for each of the many measures to the worksheets is probably not the best approach, as each measure for each spreadsheet would need to be checked to ensure all the savings estimates are correct.

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Section 5. Conclusions and Recommendations

This section highlights the findings and recommendations from the evaluation of the Low Income program delivered by OPAE. The primary objectives of this evaluation were to quantify the energy and demand impacts resulting from energy saving measures implemented as part of weatherization programs. Following are the key conclusions and recommendations.

5.1 Conclusions

5.1.1 Program Impacts

Table 5-1 compares the planned results with the actual results achieved. The program did not meet either participation or savings targets; participation was 5 percent of Plan and energy saved was 3 percent of Plan. There were several reasons for this result, including the fact that the program was not launched until mid-year and there was competition from ARRA-funded projects for program delivery agents.

Table 5-1. Program Year 2010 Impacts for Low Income

Results	Plan	Actual	% Achieved
# of Participants	N/A	1,054	N/A
MWh Savings	17,640	876	5%
MW Savings	2.1	.071	3%
Costs ($)	$5,485,211	$1,067,387	27%

5.1.2 Program Processes

1. **Results tracking and reporting is not running smoothly.** The spreadsheet is designed to cover several programs and spreadsheets submitted by member agencies are inconsistent both in structure and content. Turnaround time for monthly reporting is very tight and there seems little time for quality assurance. Summaries are not available by contractor, measure, service territory, or participants.

2. **There is no central database of results and some key data is not yet tracked.** Participation by contractor, measure, service territory, and household would be easy to QA and analyze if it were in a central database. Two key pieces of data are missing—customer contact information and energy consumption. Supporting data for some measures, such as Central Air Conditioner replacement, are not included.

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3. Consumption data would allow findings to be compared to the EPP Impact findings, however, EPP categorizes the participants in terms of consumption (HUB, MUB, and TEE). OPAE spreadsheets do not calculate savings and are not yet set up to do so. OPAE could add consumption data from the state wide database or AEP Ohio could add this information from its customer databases.

4. **OPAE member agencies which are on the front line may be an underused resource.** Agencies are often the largest employers in rural areas and recruit from previous clients. It is considered a family-oriented industry, with pride in the services provided. These staff are generally well trained and experienced, but are dealing with multiple reporting requirements.

5. **Participation levels and measures implemented vary by service territory.** Two measures (lighting and refrigerator/freezer replacement) contributed virtually all savings in CSP territory which also represented the most participation and savings for AEP Ohio as a whole.

5.2 *Recommendations*

5.2.1 Impact Recommendations

1. AEP Ohio's implementation contractor, OPAE, should develop a method to capture field results into a single monthly summary spreadsheet to allow easier monthly reporting, analysis and program evaluation. This could be done by adding a summary worksheet to the member agencies spreadsheets as illustrated in Table 5-2 below.

Table 5-2. Proposed Summary Worksheet for Data Files

OPAE Agency	Participant Name	Account #	Phone #	Measure	Heating Fuel	Water Heating Fuel	# installed	Service Territory
Impact	John Doe	123456	xxx-xxx-xxx	15 W CFL	Gas	Electric	6	OPC
				9 W CFL	Gas	Electric	12	CSP

2. AEP Ohio should create and maintain documentation for measures funded by the program, including assumptions, sources, calculations, issues, etc.

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5.2.2 Process Recommendations

1. AEP Ohio & OPAE should work together to provide guidelines to OPAE member agencies, including how to ramp-up participation. AEP Ohio might also want to increase other interactions with OPAE member agencies to improve the understanding of the program, measures, and help the auditors reach more customers and install more measures. Member agencies could share best practices with each other.

2. AEP Ohio should improve the documentation for the program—program design, measure savings estimates, process flow, etc. As part of this effort, AEP Ohio should provide guidelines for reporting for the OPAE member agencies along with instructions about spreadsheet formats.

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Section 6. Appendices

6.1 *Appendix A: Interview Guide for Staff and Implementation Contractors*

6.1.1 Low Income Program Staff Interview Guide

Low Income Program
Staff Interview Guide

6.1.2 AEP Ohio Low Income Contractor Interview Guide

AEP Ohio Low
Income Contractor In

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6.2 *Appendix B: Contractor Data Entry Form*

FOR AGENCY FILE **Attachment C-4**

AEP Ohio Low Income Program
Energy Efficiency, Health, Safety, and Education Programs
Customer Information

Reporting Period: _____

Homeowner: _____ **Tenant:** _____

Name, Address, and Phone of customer		Name, Address, and Phone of Agency	
Name:		Name:	
Address:		Address:	
Phone #:		Phone #:	
Account #:		Account #:	NA
Heating Fuel:	Water Heating Fuel:		

American Electric Power
Inspector's Signature/Code: _____

Customer Signature: _____ **Date:** _____

QTY	Description	Price	Description	QTY	Price	Old Usage
	11 W CFL BULB		9-15 cu ft upright freezer			kWh
	15 W CFL BULB		16-18 cu ft upright freezer			kWh
	20 W CFL BULB		19-21 cu ft upright freezer			kWh
	24 W CFL BULB		5-10 cu ft chest freezer			kWh
	7W Candelabra		11-15 cu ft chest freezer			kWh
	9W Candelabra		16-20 cu ft chest freezer			kWh
	15W Globe		14-16 cu ft Refrigerator Top Freezer			kWh
	15W Outdoor		17-19 cu ft Refrigerator Top Freezer			kWh
	23W Outdoor		20-22 cu ft Refrigerator Top Freezer			kWh
	12-23-29W Three-Way		19-22 cu ft Refrigerator Bottom Freez			kWh
	13W Dimmable Torchiere		20-23 cu ft Refrigerator side by side			kWh
	16W-24W Floodlight		24-26 cu ft Refrigerator side by side			kWh
	Other		Stove: repair or replace			
	WATERBED COVER		Electric repairs			
	CONSUMER ED.		Roof repairs/Replacement			

Other Funds Expended on this Project

HWAP	EPP	Housewarming	Warm Choice	Other (Please list source)
$	$	$	$	$
$	$	$	$	$

AEP Service Total: $ _____ **Admin Total:** $ _____

Final Total Cost: $ _____

Annual kWh Consumption from electric bill: _____

Annual kWh Savings: 0

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6.3 *Appendix C: Required Savings Tables*

Table C-1. Verified Energy Savings (kWh)

Gross	Audited	Verified
Ex-Ante	**Gross Savings**	**Gross Savings**
872,296	875,897	875,897

Table C-2. Low Income Program Participation Summary

Measure	Participation Count	Ex-Ante per Unit kWh Savings	Ex-Ante Gross kWh Savings
CFLs	14,442	40.0	576,880
Refrigerators	257	976.0	247,358
Freezers	80	68.0	5,440
Window AC	13	73.8	959
Fridge Removal	1	848.0	848
Replace Water Heater	1	288.0	288
Central AC	3	180.0	540
Insulation	1	96.0	96
Duct Sealing	17	186.0	3,162
Temperature Setback	73	45.0	3,285
Pipe Insulation	75	228.5	17,138
Tank Insulation	83	79.0	6,557
Showerhead	104	51.3	5,335
Faucet Aerator	180	24.5	4,410
Total	**15,309**		**872,296**

AEP-Ohio Evaluation for the Low Income Program
Program Implementer In-Depth Interview Guide

November 22, 2010

Name of Interviewee: _____ Date: _____

Title: _____ Company: _____

[Note to Reviewer] The Interview Guide is a tool to guide process evaluation interviews with utility staff and implementation contractors. The guide helps to ensure the interviews include questions concerning the most important issues being investigated in this study. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. The depth of the exploration with any particular respondent will be guided by the role that individual played in the program's design and operation, i.e., where they have significant experiences for meaningful responses. The interviews will be audio taped and transcribed.

Introduction

Hi, may I please speak with [NAME]?

My name is ___ and I'm calling from Navigant Consulting, we are part of the team hired to conduct an evaluation of AEP Ohio's Low Income program. We're conducting interviews with program managers and key staff in order to improve our understanding of AEP Ohio's programs. At this time we are interested in asking you some questions about the Low Income program. The questions will only take about an hour. Is this a good time to talk? [IF NOT, SCHEDULE A CALL BACK.]

Ok, great. If you don't mind, I would like to do a voice recording our conversation to speed up the note taking. Is that OK? I'm going to switch you to speaker phone. I am in an enclosed, private office.

Respondent Background

Thank you for talking with me today about AEP-Ohio's low income energy efficiency program (Low Income). The goal of this discussion is to talk more fully about the way this program was designed and is being implemented. All comments will remain confidential.

The areas I will be discussing are:

- Communication and coordination with AEP Ohio and other agencies.

- How well the target audience is being reached.
- Tracking systems for activities, customer, measures, and other data.
- Effectiveness of Quality Assurance/Quality Control procedures.
- Customer satisfaction with the program.
- Overall effectiveness of program delivery.

Roles and Responsibilities

First, I'd like to get a little better understanding of your roles and responsibilities regarding the Low Income Program.

1. What is your current title?

2. Could you describe your duties and responsibilities for AEP Ohio's Low Income program?

3. Please describe the services your organization provides for AEP Ohio's Low Income program.

Next, I'd like to discuss your views on how the program is being implemented in 2010.

Communication and Coordination

4. What are your roles and responsibilities in terms of AEP Ohio staff?

    a. What works best in the relationship?

    b. What could be improved?

5. What are your roles and responsibilities in terms of agencies?

    a. What works best in the relationship?

    b. What could be improved?

6. Do you coordinate/interact with other agencies? If yes, probe for details.

7. What type of feedback have you received from AEP Ohio?

Program Participation

8. Can you please describe the process to reach program participants?

9. What works best in this process?

10. Can you suggest improvements to increase participation?

11. How is the program marketed (advertising, word of mouth, etc.)?

12. Can you provide marketing materials?

13. Are there any other outreach activities? If yes, probe for details.

Tracking Systems

14. How does OPAE track information (databases, forms, PDAs, hard copies, etc.)? Probe for details about the flow of the tracing system.

15. Do you have any materials that describe what is captured, how it is captured, where it is stored, etc.?

16. At what point in time is the information recorded (e.g. during program application, during home inspection, etc.)?

17. How effective is the tracking system?

    a. Ease of capturing data

    b. Ease of reporting

    c. Flexibility

    d. Etc.

18. Are there any changes you might suggest to improve the system?

Quality Control

Now I would like to discuss quality control (QC) procedures used by your company.

19. Does your company implement QC policies and procedures?

    a. If yes, probe for details and copies.

    b. If no, ask why not?

20. Are there any specific QC procedure for subcontractors or other agencies?

    a. If so, please describe, If not, why not?

Customer Satisfaction

21. Do you implement customer satisfaction surveys?

22. If yes, ask if any customer satisfaction surveys have been completed to date.

    a. If yes, could you please provide the results?

23. Overall, what do the customers seem to like best?

24. What do the customers seem to have problems with or dislike about the program?

25. Did you relay these concerns back to the AEP Ohio staff?

26. Do you track satisfaction of other agencies with the program? If yes, probe for details.

Program Effectiveness

27. How do you measure success from your perspective?

28. Overall, how successful has the Low Income Program been in 2010?

29. What areas need improvement, going forward?

10. What suggestions do you have to improve the program? What ways should the program be changed to achieve its:

    a. Goals for energy use reduction

    b. Educational goals for customers

c. Timing of marketing messages (if applicable)

d. Customer participation

e. Approach to program delivery

f. Types of program "deliverables"

g. The ways in which the program results are tracked and reported

11. Do you have anything else you'd like to add?

Thank you very much for taking the time in assisting us with this evaluation. Your contribution is a very important part of the process.

We might follow-up with you by phone later, if additional questions arise.

Name _____

Date _____

Phone _____

Email _____

Utility _____

Introduction

Thank you for talking with me today about AEP Ohio's Low Income Energy Efficiency Program (Low Income Program). The goal of this discussion is to talk more fully about the way this program was designed and implemented. All comments will remain confidential.

The areas I will be discussing are

- Whether program goals are being accomplished.
- Quality of program components.
- How well program activities are being implemented.
- Whether the target audience is being reached.
- How external factors are influencing program delivery.

First, I'd like to get a better understanding of your roles and responsibilities regarding the Low Income Program.

Respondent Background

- What is your current title?

- Could you describe your general duties and responsibilities for AEP Ohio?

- What are your roles and responsibilities for the Low Income Program?

Now, I'd like to ask a few questions about your involvement in the design and development of the Low Income Program.

Program Design and Development

1. Can you provide some details on the history of the program?

    a. Was the design based on an existing program? If yes, probe for details about how it is the same and how different.

    b. Was the program an extension of an existing program? If yes, probe for details as above.

    c. If new program, ask for details on the design, who and how.

2. Were you involved in program design?

3. Were you involved in program development? If yes probe for details.

Next, I'd like to discuss your views on how the program is being implemented in 2010.

Program Implementation

- Overall, how effective is the Low Income Program in terms of the following:

    a. Reaching the target market

    b. Overcoming barriers to participation

    c. Educating the target market

    d. Achieving its savings goals

    e. Coordinating with other agencies

    f. Other? Probe

- What appear to be the most successful program components so far?

- How successful has the Low Income Program been in tracking information?

  a. Are there any difficulties with obtaining information?

  b. Have the contractor and subcontractor roles changed?

  c. How frequently is the information tracked by the contractor? Is this sufficient?

  d. How can the tracking be improved/updated/changed?

Next, I'd like to discuss your role in helping to deliver the Low Income Program in 2010.

Program Administration

- Approximately what percentage of your time is spent on program duties?

  - Was this what you anticipated?

  - How did your duties/responsibilities change during the course of the program?

  - What are the most time-consuming aspects for this program?

- How much interaction do you have with the implementation contractor?

  - What are your roles and responsibilities with the contractor?

- What works best?

- What needs to be improved regarding the contractor activities?

- What type of feedback have you received from the contractor?

- Is participation in the program simple and streamlined for builders and homeowners?

- What is the expectation of the builders and are they fulfilling that role?

- Is the application process onerous?

Now let's move to program delivery.

Program Delivery

- What aspects of the program work well? What aspects of the program do not work well? How might the program be improved?

- What challenges have occurred during the implementation planning phase and introduction of the program in PY2, and how were they overcome?

- Are program-tracking data being used to both assess program effectiveness in meeting the program savings goals, and inform adjustments to program delivery?

- Are program activities being documented? Do program-tracking protocols facilitate effective evaluation?

- Is the program efficient and well managed? How are problems resolved?

- How are program changes handled?

- How does program administration and delivery influence participation? What could be done to improve program administration and delivery?

Let's move to discussion of how the market is made aware of the program.

Marketing and Outreach

- Is the Low Income Program marketed to customers? If so, how is this done?

- Are program marketing efforts contributing to achieving program goals?

- Is outreach to customers and vendors increasing awareness of the program opportunities?

  - What outreach mechanisms (i.e., email, phone, TV, print, events) are most effective?

    - Are the outreach messages clear and actionable?

  - How effective are the various channels that are marketing the program?

    - Which performed the best?

- What type of feedback have you received from customers about this program?
    - What did they like?
    - What did they not like?
- What has been the feedback from other market players working with the program?

Lastly, let's discuss program effectiveness in overcoming barriers.

Program Effectiveness and Barriers

- What are the barriers to customer and builder participation?
    - Are these barriers being addressed by the program?
    - If not, how might barriers be removed?
    - Are incentive levels adequate to remove barriers?
- What areas could be refined or enhanced to improve the participation process for customers and/or builders?

- How could the Low Income Program be improved? Probe specifically on the following elements (if not addressed previously):
    - Achieving the program's energy savings goals
    - Educating customers to make equipment changes
    - Educating customers to make behavioural changes
    - Soliciting participants
    - Customer participation
    - Vendor's roles and responsibilities
    - Ways in which the program results are tracked and reported
    - Anything else?
- Are participants and satisfied with this program? Probe for reasons why & why not – Incentives, Communications, etc.
- Are trade allies satisfied with this program? Probe for reasons as above.
- What is your impression regarding likely program free ridership? Why do you say that?

These are all my questions.

- Do you have anything else you'd like to add?

Thank you again for taking the time to discuss this program.

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AEP Ohio
Energy Efficiency/Demand Response Plan
Year 2 (1/1/2010-12/31/2010)

Program Year 2010 Evaluation Report:
New Construction Program

Presented to

AEP OHIO®

A unit of American Electric Power

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Section E. Executive Summary

This report presents a summary of the findings and results from the evaluation of AEP Ohio's New Construction Program known to the public as the ENERGY STAR® New Homes Program in Program Year 2010 (PY 2010). The main goal of the ENERGY STAR® New Homes Program is to produce long-term electric energy savings in the consumer sector by affecting the construction of single-family homes and duplexes that meet the ENERGY STAR® National Performance Path efficiency standard. The first-year goal of the ENERGY STAR® New Homes Program was to produce 628 megawatt-hours of electrical energy savings and 0.134 megawatt of peak demand reduction. The first year of the program was focused primarily on program start-up activities related to marketing and outreach to generate builder participation.

E.1 Evaluation Objectives

Residential new construction programs require a period of time to develop a trade ally network, aggressively market new offerings, and gain "traction" in the marketplace. Due to low participation levels during program "ramp-up," the PY 2010 evaluation focuses on key issues related to program start-up. The major objective of the evaluation is to determine key process-related program strengths and weaknesses, in order to identify ways in which the program can be improved. Impact-related evaluation activities are limited to review of the program tracking system.

E.2 Evaluation Methods

Program process research was based upon program material review, secondary research, and in-depth interviews with program staff involved in the delivery of this program. Table E-1 provides a summary of the primary data collection activities conducted to support the process evaluation. As shown, the primary data collection activities for the evaluation were limited to in-depth telephone interviews with program administrators from AEP Ohio and implementation contractor staff.

Table E-1. Data Collection Activities

[illegible]	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
In-Depth Phone Interviews	AEP Ohio Program Staff	Contacts from AEP Ohio	New Homes Program Coordinator	1	Feb. 2011
	Staff of Program Implementer	Contacts from MaGrann Associates	Program Manager, Program Director	2	Feb. 2011

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E.3 Key Findings and Recommendations

The process portion of the evaluation reveals several notable findings. Overall, AEP Ohio staff, the implementation contractor, and participating contractors in the program are satisfied with the program to date.

Key recommendations from the process evaluation are as follows:

1. The AEP Ohio website, gridsmartohio.com, currently only contains a small reference to the ENERGY STAR® New Homes Program and should be updated with current, relevant information. The website should contain information encouraging builders to participate and provide materials describing how to participate, along with contact information for program staff and program applications.
2. The program is planning to provide extensive training and orientation to builders in 2011 on program requirements, as well as the transition to ENERGY STAR® Version 3 guidelines, and these efforts should continue to be a focus of program activity. Nearly all homes that participated in the program in 2010 were Program Level 1 homes. The transition to ENERGY STAR® Version 3.0 could be difficult for some builders and additional training and guidance will be needed. The 2011 evaluation will assess the effectiveness of these activities.
3. Program tracking efforts should focus on obtaining complete information about every site enrolled in the program. Capturing homebuyer contact information will be important for ongoing evaluation. The tracking system data extract should also be modified to record the particular ENERGY STAR® Version (2.0, 2.5, or 3.0) attained by each project.
4. Attention should be paid to ensuring that new builders are fully oriented to program processes and protocols to prevent data collection and reporting issues.
5. Data entry processes should be made fully electronic and automated. Currently, site data is manually entered into the Site Submittal Form by the builder/rater and then manually transcribed from the form into the tracking system by program staff. This approach creates an extra point of possible data entry error. If possible, data should be directly entered by the builder into the tracking system. Data manually entered by the builder in the Site Submittal Form should be exported directly from the form into a spreadsheet, where it is then uploaded into the tracking system along with a copy of the form.
6. Currently, tracking data must be manually entered into the monthly report template by program staff, because Vision does not currently export reports in the required format. If possible, Vision should be customized so that data can be exported in a format that can be transferred into the monthly report.
7. Program marketing primarily targets home builders. The program should consider expanding marketing efforts to reach prospective homebuyers as well to help build demand for high-efficiency homes.

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Section 1. Introduction to the Program

This section provides an overview of the AEP Ohio ENERGY STAR® New Homes Program. The section begins with a brief description, followed by a summary of various aspects of the implementation strategy and marketing.

1.1 Program Description

The purpose of the ENERGY STAR® New Homes Program is to increase market penetration of ENERGY STAR®-qualified homes in AEP Ohio's service territory and to move builders to even higher levels of energy savings through additional prescriptive requirements that go beyond base ENERGY STAR®. The program establishes energy efficiency thresholds or ratings achievable through adoption of combinations of building practices, materials, and appliances, going beyond basic building codes. Incremental levels of technical requirements through program years 2010–2011 are designed to support participation in the U.S. Environmental Protection Agency's transition to an updated and more rigorous standard for labeling new homes (Versions 2.5 and 3.0) and to drive increasing levels of energy savings over time. Homes become certified at different efficiency levels through a home energy rating system (HERS) rating process, carried out by HERS raters who inspect homes during construction at the pre-drywall phase and upon completion.

The program recruits and educates participating builders and their trades on the benefits associated with ENERGY STAR® homes as well as building practices designed to improve upon baseline efficiency. Builders are provided with financial incentives to meet and exceed the ENERGY STAR® standards and to go beyond by applying additional prescriptive requirements. The program targets all builders in the AEP Ohio service territory. Builders who participate in the program receive cash-back incentives designed to reimburse up to 30–50 percent of the cost to upgrade and certify each home. In addition, builders are provided with personalized training on marketing ENERGY STAR® to customers, the ENERGY STAR® building standards, and building practices designed to meet these standards.

AEP Ohio selected MaGrann Associates (MaGrann) in spring 2010 to implement the ENERGY STAR® New Homes Program. MaGrann worked with AEP Ohio staff through September of 2010 to design and develop the program, based on refinements of the original program design. Program start-up activities were focused on determining technical requirements, incentive levels, program processes, and on designing and implementing a builder outreach and marketing plan.

The program was officially rolled out on September 21, 2010, through a "soft-launch" process. AEP Ohio and the implementation contractor held an event for builders, HERS raters, and other industry professionals, presenting an overview of the program requirements and processes. The following three months of program activity involved conducting a series of presentations and face-to-face meetings with building companies and trade associations to raise awareness of the

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program and encourage participation. These efforts resulted in the enrollment of 12 HERS rating companies and 18 building companies during the last three months of 2010.

The program enrolled 18 single-family building projects in November and 101 projects in December, 2010. By the end of December, 39 of these projects were complete; however, the Quality Assurance (QA) process had not been entirely completed by year-end so the projects will be counted in 2011. As a result, energy and demand savings are not reported for 2010.

Due to extensive efforts required in the early stages of the ENERGY STAR® New Homes Program to develop program materials, conduct outreach, recruit builders, and guide builders and raters through the program process, projects were not completed in time to report savings in 2010.

1.1.1 Implementation Strategy

Program Delivery Mechanisms and Marketing Strategy

The delivery strategy for AEP Ohio's ENERGY STAR® New Homes Program focuses on: 1) offering education, financial incentives, and cooperative advertising efforts to participating home builders; 2) offering technical and sales training to home builders and HERS raters; and 3) educating the general public and homebuyers on benefits of ENERGY STAR® construction.

The target market consists of two major groups:

- Home builders
- HERS raters

Key elements of the implementation strategy include:

- Builder and rater recruitment, outreach, and orientation, including home builder associations, professional associations, and other trade ally groups
- Rater or rating company enrollment (Raters must show evidence of certification by a Residential Energy Services Network [RESNET]-accredited rating provider.)
- Builder enrollment
- Registration and tracking of committed homes, including all pertinent site data and contact information
- Review, approval, and tracking of rebate applications for completed sites, including all necessary supporting documentation (such as rating files and rater invoices)
- Rebate processing, including fund management, check issuance, reconciliation, and reporting
- Marketing and collaterals development and deployment (consumer and builder targeted)
- Participant communications and update meetings

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- Education sessions for builders, raters, and the broader construction community
- A technical and procedural QA monitoring program for both field and rating activities
- Goal tracking, progress reporting, budgeting, and accrual processes

The program's marketing strategy focuses on builder and rater outreach, recruitment, and orientation. Marketing efforts in 2010 relied on face-to-face meetings with builders and trade allies through events and one-on-one meetings between program staff and selected building companies.

Role of AEP Ohio Staff

The AEP Ohio staff member who oversees program administration is the Consumer Programs Coordinator. The AEP Ohio Consumer Programs Coordinator is responsible for management of both the ENERGY STAR® New Home and the Home Retrofit Programs. The AEP Ohio Consumer Programs Manager is responsible for management of all consumer programs. The Consumer Programs Coordinator is responsible for day-to-day program management for the utility, including weekly communication with the program implementer, program tracking and reporting, and assisting with development of program marketing materials. The program is delivered and managed primarily by the staff of MaGrann, an implementation contractor.

Roles of the Implementation Contractor

AEP Ohio selected MaGrann to implement the ENERGY STAR® New Homes Program. MaGrann is directly responsible for day-to-day operations of the program, which include: 1) delivery of marketing and outreach efforts to encourage builder and rater participation; 2) coordinating training and events for builders and raters; 3) processing of applications, rebates, and project completion forms; 4) program data tracking and reporting, which includes progress toward goals and participant databases; and 5) provide QA activities and reporting to ensure program compliance.

1.1.2 Measures and Incentives

The program is performance-based, and builders are not required to install a list of prescriptive measures, but instead are expected to meet one of three performance levels, which are detailed in Table 1-1. Each program level is based on specific technical requirements targeted to advance specific construction practices in the AEP Ohio service territory. Various levels of participation are determined primarily by the homes' performance as measured by the HERS rating process, which is carried out by HERS raters who inspect homes throughout the building process and upon completion. Anecdotal information suggests that builders are satisfied with current incentive levels. This topic will be explored further in subsequent data collection efforts conducted by the evaluation team.

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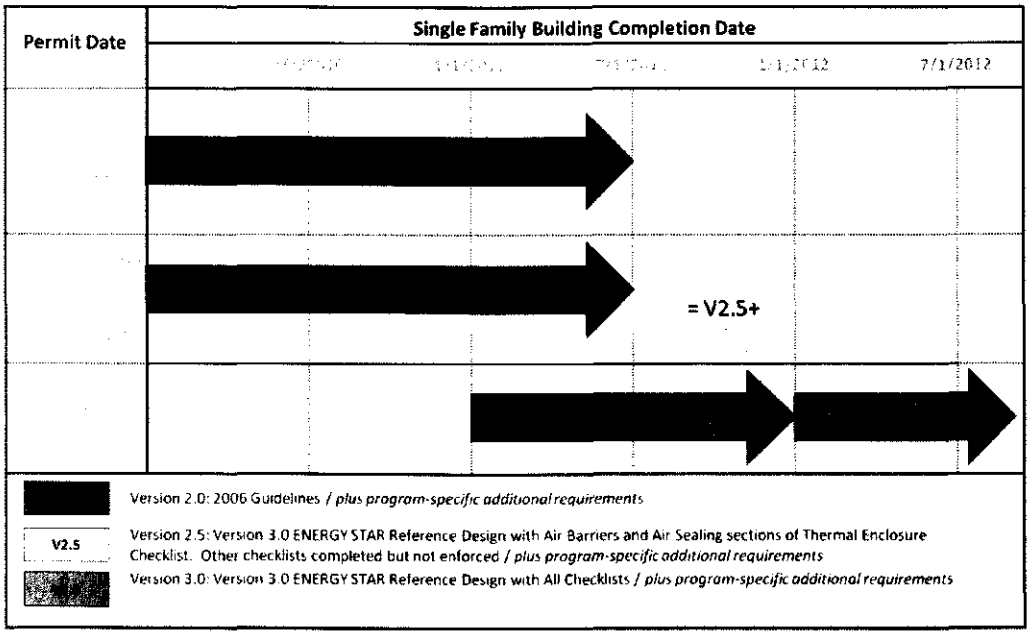
Table 1-1. AEP Ohio ENERGY STAR® New Homes Participation Levels and Incentives

Performance Level	Level 1	Level 2	Level 3
AEP Ohio / All Electric	$750	$1,200	$1,600
AEP Ohio / Other Heat Fuel	$500	$900	$1,200

The preceding performance and incentive levels listed are designed to allow for a transition into ENERGY STAR® Version 3.0 through 2011, which has significantly different requirements from previous versions. Planning for this transition presented a design challenge during the start-up phase of the program. Figure 1-1 shows MaGrann's time line for program-level participation. The Level 1 incentive will sunset when ENERGY STAR® version 2.0 ends.

Figure 1-1. AEP Ohio ENERGY STAR® Transition Time Line



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Section 2. Evaluation Methods

This section describes the analytic methods and data collection activities implemented as part of the PY 2010 process evaluation of the ENERGY STAR® New Homes Program, including an overview of data collection activities and analysis.

2.1 Evaluation Questions

The evaluation sought to answer the following key research questions. Each of these questions is addressed in the remainder of the evaluation report.

Marketing and Participation

1. Is the marketing effort sufficient to meet current and future program participation goals?
2. How will participating builders become aware of the program? What marketing strategies could be used to boost program awareness?
3. Will the program outreach to participating builders and customers be effective in increasing awareness of the program opportunities?
    a. What is the format of the outreach?
    b. How often will the outreach occur?
    c. Are the outreach messages clear and actionable?

Administration and Delivery

1. Has the program as implemented changed from the original plan? If so, how, why, and was this an advantageous change?
2. Is program administration being documented and program tracking being conducted in a way that allows the program to be evaluated?
3. Is the program efficient and well managed? How are problems resolved?

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2.2 *Process Evaluation Analytical Methods*

Program process research was based upon program material review, secondary research, and in-depth interviews with program staff involved in the delivery of the ENERGY STAR® New Homes Program.

2.2.1 .Program Material Review and Secondary Research

The evaluation team has reviewed all program materials provided by AEP Ohio to date, as well as, a review of best practices for implementing residential new construction programs. A summary list of program materials reviewed to date for this report follows.

- Program tracking data
- Program impact algorithms and assumptions
- Program marketing materials/collateral
- Utility websites
- Industry best practices
- Program design and implementation plans

2.2.2 Program Staff Interviews

Program staff members were interviewed by phone in February 2011. Each interview lasted one to two hours and covered program design and implementation, marketing and promotion, and perceived barriers to participation. Table 2-1 provides a summary of the data collection activities conducted to support the process evaluation.

Table 2-1. Data Collection Activities

	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
In-Depth Phone Interviews	AEP Ohio Program Staff	Contacts from AEP Ohio	New Homes Program Coordinator	1	Feb. 2011
	Staff of Program Implementer	Contacts from MaGrann Associates	Program Manager, Program Director	2	Feb. 2011

Interview guides were developed based on the research issues and metrics identified in the background review for each program. The purpose of the guides was to solicit information from those who implement the program. Interview guides were developed to be open-ended and to allow for a free-flowing discussion between interviewer and respondent and real-time interviewing flexibility. The questions in the guides were primarily focused on the following topics:

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- Program Contact and Roles
- Program Goals and Objectives
- Program Design and Participation
- Marketing and Outreach
- Program Tracking
- Quality Assurance and Quality Control
- Staffing and Communication

Separate interviews were conducted with AEP Ohio staff and the implementation contractor to encourage candor and help identify any potential issues regarding the relationships between the two parties. Notes were taken and interviews were recorded to facilitate the capture of information. These materials were consulted in the preparation of this report but are not made available outside of the evaluation team. Consistent with standard market research procedure, the confidentiality of each person interviewed was guaranteed, and comments are not attributed to any one individual; rather, the evaluation focuses on trends and issues that arose from a variety of perspectives.

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Section 3. Program-Level Results

This section presents detailed findings of the process evaluation of the ENERGY STAR® New Homes Program.

3.1 Process Evaluation Observations

The process evaluation of the ENERGY STAR® New Homes Program focused on reviewing activities related to program start-up in 2010 in order to document key program operations and delivery strategies and identify any potential process-related issues. Data sources for the process evaluation included in-depth interviews with program staff, including the AEP Ohio Consumer Programs Coordinator, and both the MaGrann Program Manager and Program Director.

3.1.1 Program Participation

Participation in the ENERGY STAR® New Homes Program in 2010 was significantly below target in relation to the original forecast. This is largely due to the slow rebound of the construction industry in Ohio following the economic recession. Program cost recovery was approved by the Public Utilities Commission of Ohio (PUCO) in mid-2010. AEP Ohio could not launch the program until September of 2010 due to the upfront cost and effort required developing program materials and administrative processes, and to recruit and train builders and HERS raters. This ramp-up is typical of residential new construction programs, for which builders must be identified, recruited, and trained before they can begin enrolling new homes as participants.

The program was officially rolled out on September 21, 2010. Initial marketing efforts resulted in the enrollment of 12 HERS rating companies and 18 building companies during 2010. The program enrolled 18 single-family building projects in November and 101 projects in December 2010. By the end of December, 39 of these projects were constructed; however, the entire process of QA was not completed, so as a result, savings calculations and incentive processing were not completed in December. The energy and demand savings will be reported in the 2011 filing.

Figure 3-1 illustrates how quickly program activity picked up in the fourth quarter of 2010 as marketing and outreach activities began to yield program enrollment. The number of new builders and raters enrolled in the program did not vary significantly during this time period. However, November marks the point where the program enrolled several key production builders in the area, which contributed to the sharp increase in new projects enrolled.

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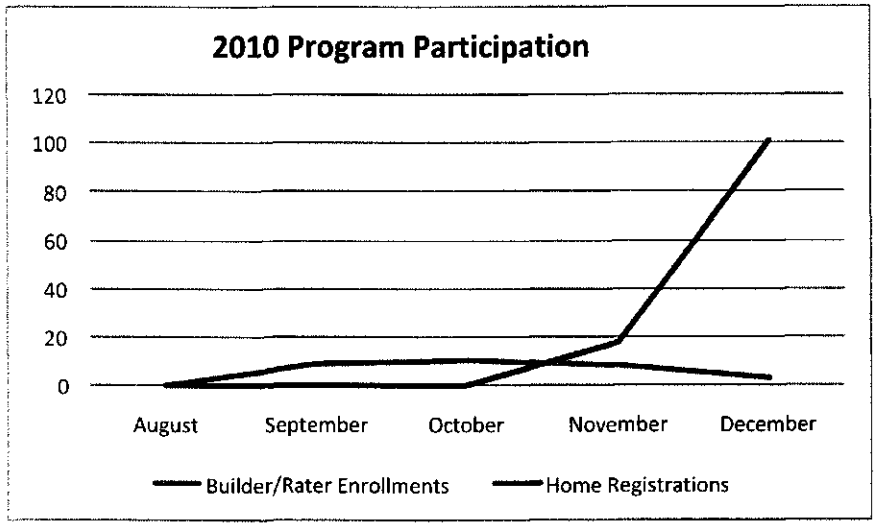
Figure 3-1. 2010 AEP Ohio ENERGY STAR® New Homes Program Participation



3.1.2 Program Marketing and Outreach

MaGrann has drafted an operations manual for the AEP Ohio ENERGY STAR® New Homes Program; however, that plan was not complete at the time of this evaluation. Marketing and outreach conducted to-date has relied on face-to-face communications with builders and HERS raters. Outreach has involved presentations for local Building Industry Associations and Home Builder Associations, along with one-on-one outreach to builders and raters in their offices. The ENERGY STAR® New Homes Program has also relied on leveraging the relationships that HERS raters have with their existing client base to spread information about the program.

AEP Ohio's gridsmartohio.com website only contains a small narrative regarding the ENERGY STAR® New Homes Program on a webpage called *Incentive Programs for Residents*, which includes links to various residential programs in the menu on the left side of the screen. There is no link, however, to the ENERGY STAR® New Homes Program in the menu, and the *ENERGY STAR® New Homes Program* link embedded within the narrative in the body of the webpage is broken and needs to be repaired.

The Columbia Gas website contains a page for the AEP Ohio/Columbia Gas ENERGY STAR® New Homes Program, which includes a narrative on program benefits and contact information for MaGrann, as well as the following documents:

- Builder Participation Guidelines
- Rating Company Participation Guidelines
- Participation Levels
- Diagram Fact Sheet
- Implementation Schedule

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3.1.3 Implementation Challenges

Other than the economic downturn, which is beyond the control of program designers and implementers, the program has faced few significant implementation challenges. Processes are working well, participation by builders is increasing, and the foundation is being set for an effective market infrastructure to support program activities.

More stringent thresholds will be implemented in 2011 to reflect higher efficiency levels required under ENERGY STAR® Homes guidelines, and builders are already being trained by the program to accommodate these changes. Some concern exists as to how the market will react to these higher efficiency levels since the majority of units completed to date by AEP Ohio are at ENERGY STAR® Version 2.0. Assistance will be needed to help builders in the transition to ENERGY STAR® Version 3.0.

3.1.4 Application and Payment Processing

When submitting an application to MaGrann for project enrollment and review, builders must complete the top portion ("Site Registration") of the Site Submittal Form for each site they register in the program. The form is a PDF document that allows information to be entered directly and saved digitally. Builders may submit sites up to 60 days before construction start or within 15 days after the thermal bypass inspection to submit the form. Completed forms are e-mailed to MaGrann, who then records the information in the Vision tracking system (an enterprise data system) and notes the project as pending. The builder also sends the Site Submittal Form to their rating company.

Once the HERS rater completes the final inspection of the home, the bottom portion of the form ("Incentive Application") is completed and sent to MaGrann, along with the final REM/Rate) file. MaGrann manually enters data from the Site Submittal Form into the Vision system. A digital copy of the form is also attached to the project file in the Vision system for record-keeping purposes. Once the forms have been reviewed and approved by program staff and utility representatives, the incentive is processed and sent to the builder within four to six weeks.

Overall, the application processing system appears to be working well. Key data needed for evaluation and monitoring program performance is being tracked and reported. Data submitted is reviewed at several different levels. All information is entered by participants on a single digital form, which has several benefits, including: 1) reducing the number of forms that must be filled out, reviewed, filed, and tracked; 2) enabling quick access to forms for review; and 3) providing an extra layer of quality control as raters review information submitted by builders on the form.

Electronic mail is being used successfully to expedite the data reporting process. However, there was some initial confusion about the process among one building company in particular that attempted to register 80 homes by faxing handwritten copies of the Site Submittal Form to

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MaGrann. The process relies on having digital copies of the forms, so the building company was asked to transcribe the original copies into the PDF document and resubmit each form.

3.1.5 Quality Assurance/Quality Control

A Quality Assurance/Quality Control process has been established for the AEP Ohio ENERGY STAR® New Homes Program and is functioning well so far. MaGrann has hired a regional QA resource that will be responsible for the program in 2011. Each Site Submittal Form receives an administrative review and attached REM files are cross-checked against information entered in the Site Submittal Form. Additionally, QA staff conducts a more thorough review of applications and REM files on a portion of files submitted.

In addition to administrative review of all site submittals, QA staff also conduct project "shadow" and "blind" project reviews on-site. Project shadowing involves following the rating company on-site to verify work conduct during the rating. The process is conducted for approximately five percent of a new rater's projects. QA activities may exceed five percent initially to establish baselines and verify program comprehension and compliance. QA staff will then conduct occasional "blind" project reviews involving a site visit before and/or after the rater company to compare results with those submitted by the rater. A more detailed description of the QA process has been developed for the Program Implementation Plan; however, that plan was not available for review during this evaluation.

The QA process is explained to raters during the initial orientation process. Raters are made aware that if reviews are conducted without incident, the frequency of reviews will decrease; however, if consistent issues are reported, QA activities will increase until resolved. Three registered projects were inspected in December and were found to be largely compliant, with some technical issues that are being addressed.

3.1.6 Tracking and Reporting

A final End-of-Year Data Extract was provided in support of this evaluation by AEP Ohio in January of 2011. This data was exported from the Vision tracking system and contained 113 rows, with a unique row for each customer. Table 3-1 below shows the contents of the data extract, along with a description of each field and notes on the contents of the extract.

The information being collected in the tracking system is fairly comprehensive and, as long as all data is collected, the tracking system should provide a solid foundation on which to build the impact and process analyses for 2011. It should be noted that capturing the homebuyer contact information, as well as the site location, will be important for future evaluation cycles. Historically, other residential new construction programs often miss this important data element since the home is considered the "participant," and builders most often consider their role as effectively ended with the completion and transfer of the home. It would also be useful for evaluation and reporting purposes, if the tracking system data extract reported the particular ENERGY STAR® Version (2.0, 2.5, 3.0) attained by the project.

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Detailed monthly reports are prepared by MaGrann, which are clear, comprehensive, and delivered in a timely fashion. The monthly report provides a well-organized summary narrative of program activities conducted during the month. The report contains data required by program staff to monitor program progress and make course corrections, if necessary.

Most program tracking and reporting processes have become fully electronic, which reduces data entry errors (replacing former processes that required transferring data from paper application forms), and significantly reduces program processing time. However, the system data entry processes have not yet been made fully electronic and automated. Although the Site Submittal Form used by contractors to record and report project data is an electronic PDF file, the data must be manually entered by MaGrann staff into the Vision tracking system. This creates a point of possible data entry error. Additionally, data provided in the monthly reports must be manually entered into the monthly report template by program staff because Vision does not currently export reports in the format required.

Table 3-1. Tracking System Content Summary

Tracking ID	Unique identifier for each measure	MA ID#	Unique number assigned for each project
Program ID	Program ID from program applicability table	AEP to provide	No values entered **
Strategy	Strategy type (choose) from Strategy applicability table	NC	NC (New Construction) entered for each entry
Delivery Method	Measure delivery method/mechanism/channel	ResNew	ResNew entered for each entry
EndUseCd	End Use code from EndUse applicability table	WB	WB (whole building) entered for each entry
Meter_nb	One per application (address)	Meter number	43 meter numbers entered
Customer Name	Customer name, should be looked up from AEP-provided table		Left blank **
Address	Service address, should be looked up from AEP-provided table		Left blank **
Phone	Site contact phone number		Left blank **
Project Name	Name given to project	Optional; if subdivision name provided	Unique name assigned to each project
Project Completion Date	Date project is completed	Sign-off date on rebate request form	43 projects contained "00:00.0", the rest left blank
Estimated Project Completion Date	Estimated project completion date	Optional; if available on registration form	Left blank – OPTIONAL FIELD
Project Status	Current status of project, see applicability table	Unit Status field	64 pending; 41 certified; 8 left blank
Contractor Name		Rating Company/Rater info	Blank **
Contractor Contact Information			Blank **
Building Type	Building Type Code from applicability table	SF/MS/MF	105 single family; 8 left blank
Building Vintage	Building Vintage Code from applicability table	N	N (New) entered for each project
Building HVAC	Building HVAC Code from applicability table	Need to determine how to track and gather info	Left blank **
Deemed Flag	"=1 if savings are deemed, 0 if custom calculation...custom means site-specific info was used"		0 entered for each project
CalcMeth	Calculation methodology	REM	REM entered for each project

Field Name	Description	Unit	Value
BldgSqFt	Estimated building square footage	Unit sqft	45 values entered, averaging 3,915 square feet
SavkW	Gross coincident kW saved associated with each record	kW	Left blank
SavkWh	Gross first-year kWh savings associated with each record	kWh	Left blank
SavTherms	Gross first-year Therm savings associated with each record (can be negative for HVAC interactive effects)	Therms	Left blank
TotCustCost	Total Customer Cost for the line item		Left blank
TotIncentive	Total incentive paid for the line item, after caps are applied	Rebate	$0 entered for 72 projects; $360 for 36 projects; $390 for 5 projects
ApplApprovalDate	Date application was approved	Rebate approval date	Left blank
IncentivePaidDate	Date incentive was paid	Rebate distribution date	Left blank
IncentiveCheckNum	Number of incentive check	Rebate check number	Left blank
InvoiceDate	Date AEP was invoiced for measure	Incentive + admin	Left blank
InvoiceNumber	Specific invoice number for measure	0	Left blank
Payee Name	Payee name	Rebate recipient	M/I Homes - 90 projects; P&D Builders - 8 projects; Maronda Homes of Ohio - 5 projects; Columbus Compact - 8 projects; Habitat for Humanity - 2 projects
Payee Contact Information	Payee primary phone		Left blank **
WaterHeatTypeID	Type of water heat	Gas/electric	Electric - 93 projects; Gas - 19 projects; Other - 1 project
EnergyStarFlag	=1 if measure is labeled "EnergyStar", 0 otherwise	1 unless unit cancels	1 entered for all projects

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3.1.7 Program Theory

This section contains the program theory, logic model, and performance indicators of the ENERGY STAR® New Homes Program.

The theory underlying the program design is that builders must be engaged and trained in new construction techniques and technologies that significantly improve the home's energy performance in order to increase the efficiency level of new housing stock. Since most builders typically do not concern themselves with building operating costs, but are focused on the costs of construction, the program simultaneously tries to build consumer awareness of the value of energy-efficient homes to help drive demand for these products. ENERGY STAR® has been at the forefront of efforts to establish standards for what constitutes an energy-efficient home, and the program being implemented by AEP Ohio takes full advantage of the concepts and tools developed by ENERGY STAR®. Since the ENERGY STAR® New Homes Program is a market transformation program, the program will periodically shift toward higher requirements to achieve increased efficiency over time.

Creation of the Logic Model

Best practices for energy efficiency programs indicate that all programs should have a sound program plan and clearly articulated program theory. Figure 3-2 shows the program logic model drafted by the evaluation team, following program documentation review and program staff interviews. The goal of creating the logic model was to show the main programmatic activities AEP Ohio has in place, and the anticipated market outputs and outcomes. More importantly, the logic model identifies the key performance indicators appropriate for the ENERGY STAR® New Homes Program.

The logic model can be linked to key performance indicators to provide ongoing feedback to program management. The model flows from top to bottom and left to right, and is organized according to five basic categories:

- Resources (Inputs)
- Activities
- Outputs
- Outcomes
- Key Performance Indicators

Stepping across the activities enumerated in the logic model indicates an approximate "flow" in the sequence of activities. The logic model starts with the program resources that support program activities that are expected to yield immediate outputs, and the short-term and long-term outcomes that are expected to have a series of impacts, including direct energy savings, and key performance indicators. The program theory links market and program outputs causally with the expected market and program short-term and long-term outcomes.

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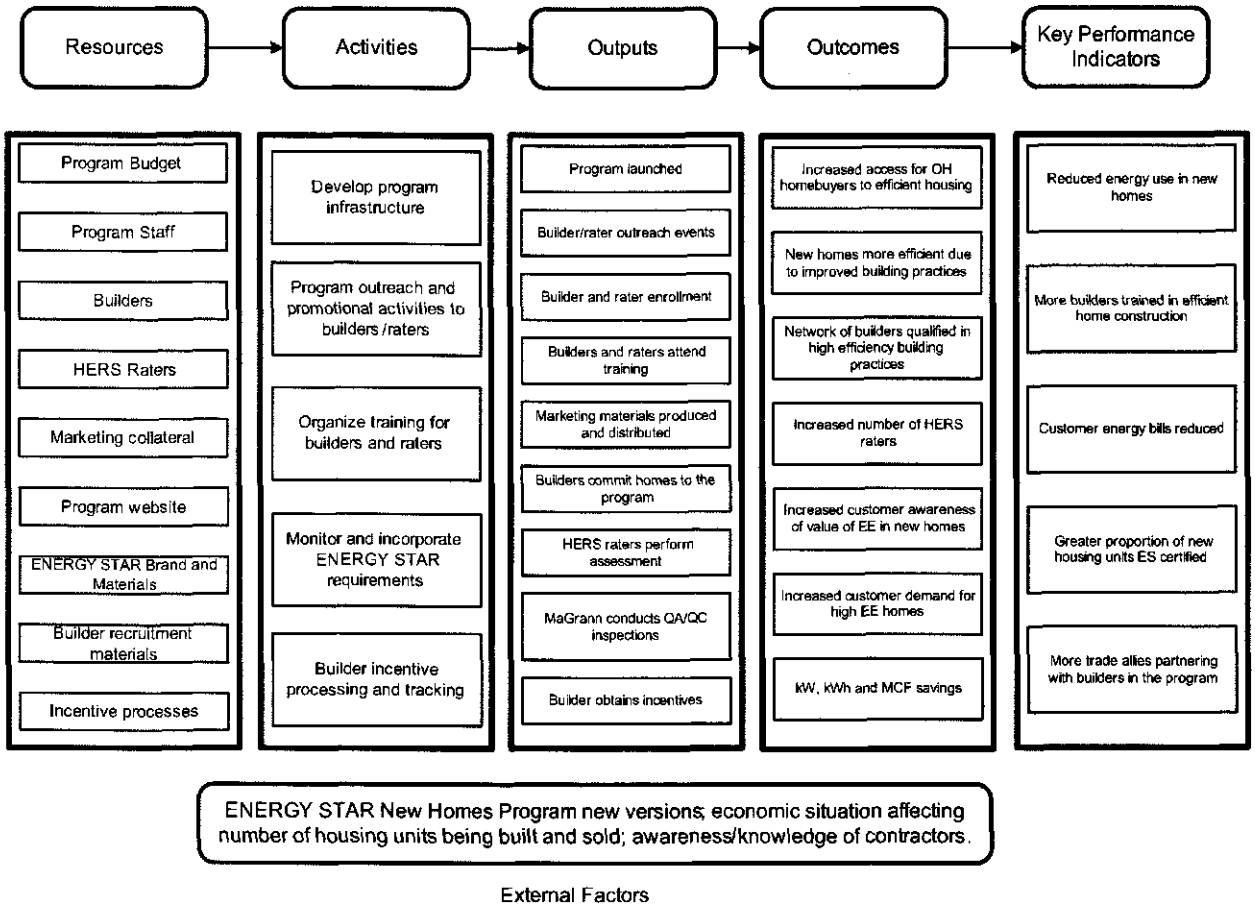
Figure 3-2. AEP Ohio ENERGY STAR® New Homes Logic Model



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Section 4. Conclusions and Recommendations

This section highlights the findings and recommendations from the process evaluation of the ENERGY STAR® New Homes Program delivered by MaGrann.

4.1 Process Findings

1. The AEP Ohio ENERGY STAR® New Homes Program is a well-run program and compares well with similar programs across the country.
2. The program has not been successful in reaching its savings goals for 2010. This result is due to a downturn in the construction industry and the fact that the program did not launch until September of 2010. In addition, the Public Utilities Commission of Ohio did not approve cost recovery until mid-year.
3. Marketing and outreach conducted to-date has relied on face-to-face communications with builders and HERS raters.
4. The only information found about the program on the AEP Ohio website was a broken link embedded within narrative on customer incentive programs. The only information found about the AEP Ohio ENERGY STAR® New Homes Program on the Internet was through the Columbia Gas website.
5. The application processing system appears to be working well. Key data needed for evaluation and monitoring program performance is being tracked and reported.
6. A QA/Quality Control process has been established for the AEP Ohio ENERGY STAR® New Homes Program and is functioning well so far. Three registered projects were inspected in December and were found to be largely compliant, with some technical issues that have been addressed.
7. The information being collected in the tracking system is fairly comprehensive and, as long as all data is collected, the tracking system should provide a solid foundation on which to build the impact and process analyses for 2011.

4.2 Process Recommendations

1. The AEP Ohio website, gridsmartohio.com, should be updated with current, relevant information about the program. The website should contain information encouraging builders to participate and provide materials describing how to participate, along with contact information for program staff and program applications.
2. The program is planning to provide extensive training and orientation to builders in 2011 on program requirements as well as the transition to ENERGY STAR® Version 3

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guidelines, and these efforts should continue to be a focus of program activity. Nearly all homes that participated in the program in 2010 were Program Level 1 homes. The transition to ENERGY STAR® Version 3.0 could be difficult for some builders and additional training and guidance will be needed.

3. Program tracking efforts should focus on obtaining complete information about every site enrolled in the program. Capturing homebuyer contact information will be important for ongoing evaluation. The tracking system data extract should also be modified to record the particular ENERGY STAR® Version 2.0, 2.5, or 3.0 attained by each project.
4. Attention should be paid to ensuring that new builders are fully oriented to program processes and protocols to minimize further data collection and reporting issues.
5. Data entry processes should be made fully electronic and automated. Currently, site data is manually entered into the Site Submittal Form by the builder/rater and then manually transcribed from the form into the tracking system by program staff. This approach creates an extra point of possible data entry error. If possible, data should be directly entered by the builder into the tracking system. Data manually entered by the builder into the Site Submittal Form should be exported directly from the form into a spreadsheet, where it is then uploaded into the tracking system along with a copy of the form.
6. Currently, tracking data must be manually entered into the monthly report template by program staff because Vision does not currently export reports in the format required. If possible, Vision should be customized so that data can be exported in a format that can be transferred into the monthly report.
7. Program marketing primarily targets home builders; however, the program should consider expanding marketing efforts to reach prospective homebuyers as well to help build demand for high-efficiency homes.

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Section 5. Appendix: Data Collection Instruments

The following guides were used to conduct the in-depth surveys.

5.1 *AEP Ohio RNC Implementation Contractor Interview Guide (Imbedded)*

AEP Ohio RNC
Implementation Conti

5.2 *AEP Ohio RNC Program Staff Interview Guide (Imbedded)*

AEP Ohio RNC
Program Staff Intervi

AEP Ohio New Construction Program - Contractor Interview Guide

Name

Company

Interview Date

Phone

Email

Respondent Background

Thank you for talking with me today about AEP Ohio's New Construction Program. The goal of this discussion is to talk more fully about the way this program was designed and is being implemented. All comments will remain confidential.

The areas I will be discussing are:

- Communication and coordination with AEP Ohio.
- Outreach to program participants.
- Tracking systems for activities, customer, measures, and other data.
- Effectiveness of Quality Assurance/Quality Control procedures.
- Customer satisfaction with the program.
- Overall effectiveness of program delivery.

First, I'd like to get a little better understanding of your roles and responsibilities regarding the New Construction program.

1. What is your current title?

2. Could you describe your duties and responsibilities for AEP Ohio's New Construction program?

Next, I'd like to discuss your views on how the program is being implemented.

Implementation Status

3. What is the status of program implementation efforts?

4. Jim Miller mentioned that you've finished a program operations plan? If so, could you provide this?

5. How have program performance goals changed based on the current implementation schedule? Could you share the current performance goals?

6. Can you give me an overview of the primary objective of the program?

7. Can you give me an overview of the different ENERGY STAR program offerings?

8. Can you provide some details on the history of the program?

9. Were you involved in the program design? If so, has it changed from its initial design?

Communication and Coordination

10. Describe your communications with AEP Ohio staff. For what reasons do you communicate and how often?

11. How do you coordinate program administration between the two utilities? (reporting, tracking, coordination, marketing, etc).

12. What type of feedback have you received from AEP Ohio?

Builder Participation

13. Can you please describe your strategy to recruiting builders, and your efforts to date? How is the program be marketed (advertising, word of mouth, etc.)? What strategies are working best/worst?

14. Are there any other outreach activities planned? If yes, probe for details.

15. Please describe each stage of the program participation process for the builder, from enrollment to completion of project and rebate.

16. Is outreach to builders and trade allies increasing awareness of the program opportunities?

17. Have builders or raters been calling into the customer service line? If so, for what reasons?

Rater Participation

18. Can you please describe the process you intend to use to recruit raters, and your efforts to date? How will the program be marketed (advertising, word of mouth, etc.)? What strategies are working best/worst?

19. Are there any other outreach activities planned? If yes, probe for details.

20. Please describe each stage of the program participation process for the rater.

Training and Education

21. Describe your strategy for delivering training and education to participating builders and efforts to date.

Application Processing

22. Please describe your process for application and incentive processing.

23. How do you ensure prompt and accurate processing of applications and incentive checks?

24. How many rebates have you processed to-date? How long have these taken to process on average?

Tracking Systems

25. Could you explain your process for recording and tracking information?

26. Could you describe how data is recorded and tracked through each stage of the program process?

    a. Who tracks this info and how?

27. Are there any improvements that need to be made to the system?

28. Could you explain the process you use to prepare and deliver monthly reports?

29. What quality control processes are in place to ensure that program tracking and reporting is accurate?

Quality Control

Now I would like to discuss quality control (QC) procedures used by your company.

30. Could you explain the QC procedures you're using to verify site work?

31. Jim mentioned a technical issue that you had with Ryan Homes. Could you describe this issue?

32. I understand you are following RESNET standards for conducting rater assessments, applying a grade (A-D) to projects reviewed, correct?

    a. How many REM/Rate files have you received to-date?
    b. How many of these have you reviewed?
    c. Have any issues been identified to-date? Describe the process for handling issues that arise.
    d. Have any field reviews been conducted to-date? Describe your strategy for conducting field reviews? Frequency of shadow reviews and full blind reviews?
    e. Are you planning to provide reports to AEP Ohio on this?
    f. Have you had any communications with Rating Providers regarding the results of your reviews to-date?

Builder Satisfaction

33. Are you implementing builder satisfaction surveys?

34. If yes, how do you intend to make use of the results?

35. Do you plan to relay these results back to the AEP Ohio staff? (if applicable)

Program Effectiveness

36. Do you expect the program to achieve its goals in 2011? If not, what suggestions do you have to improve the program? What ways should the program be changed to achieve its:

    a. Goals for energy use reduction
    b. Educational goals for customers
    c. Timing of marketing messages (if applicable)
    d. Customer participation
    e. Contractor participation
    f. Approach to program delivery
    g. Types of program "deliverables"
    h. The ways in which the program results are tracked and reported

37. Do you have anything else you'd like to add?

Thank you again for taking the time to discuss this program.

Residential New Construction Program Staff Interview Guide

Name

Date

Phone

Email

Utility

Introduction

Thank you for talking with me today about AEP Ohio's Residential New Construction Program. The goal of this discussion is to talk more fully about the way this program was designed and implemented. All comments will remain confidential.

The areas I will be discussing are

- Program design and development
- Whether program goals are being accomplished.
- Quality of program components.
- How well program activities are being implemented.
- Whether the target audience is being reached.
- How external factors are influencing program delivery.

First, I'd like to get a better understanding of your roles and responsibilities regarding the program.

Respondent Background

1. What is your current title?

2. Could you describe your general duties and responsibilities for AEP Ohio?

3. What are your roles and responsibilities for the RNC program?

Program Design and Development

4. Could you tell me, in your own words, what the primary objective of the program is?

5. Can you provide some details on the history of the program?

6. Could you please describe the various components of the program?

7. What is the status of program implementation efforts?

8. What was the focus of the first year program activities?

9. How have program performance goals changed based on the current implementation schedule? Could you share the current performance goals?

10. Were you involved in program design?

11. Were you involved in program development? If yes probe for details.

12. How has the program changed from its initial design?

Program Administration

13. Approximately what percentage of your time is spent on program duties?

    a. Was this what you anticipated?

    b. What are the most time-consuming aspects of this program?

Program Implementation

14. Please describe the role of the implementation contractor in this program.

15. How are rebates processed?

16. How much interaction do you have with the implementation contractor?

    - What are your roles and responsibilities with the contractor?
    - What works best?

- What needs to be improved regarding the contractor activities?

17. What type of feedback have you received from the contractor?

Marketing and Outreach

18. How is the program marketed to builders?

19. How is the program marketed to raters?

20. How often does each activity occur?

21. Is there a marketing plan or marketing log that you could provide me?

22. Is outreach to builders and trade allies increasing awareness of the program opportunities?

    a. What outreach mechanisms (i.e., email, phone, TV, print, events) are most effective?

23. Describe the strategy for delivering training and education to participating builders and efforts to date.

24. What type of feedback have you received from builders about this program?
    - What did they like?
    - What did they not like?

Program Delivery

25. Please describe each stage of the program participation process for the builder, from enrollment to completion of project and rebate.

26. Do you believe this program is on track to meet participation and savings goals for 2011?

27. Are you satisfied with their participation in terms of numbers? In terms of participation/enthusiasm for the program?

28. What challenges have occurred during the implementation planning phase and introduction of the program in PY1, and how were they overcome?

Program Tracking

29. Verify most recent version of tracking database and reports.

30. Could you describe how data is recorded and tracked through each stage of the program process?

    a. Who tracks this info and how?

    b. Are there any difficulties with obtaining information?

    c. How frequently is the information tracked by the contractor? Is this sufficient?

    d. What types of reports are you given from the contractor?

        a. Do these reports provide enough information for you to determine whether or not you're meeting your goals, and make adjustments if not?
        b. Is there information that you would like to see added to these reports?
        c. Are these reports accurate and current?
        d. What quality control processes are in place to ensure the program tracking database is accurate?
        e. How can the tracking be improved/updated/changed?

Program Effectiveness and Barriers

31. Is the program efficient and well managed? How are problems resolved?

32. How might the program be improved?

33. How could the program be improved? Probe specifically on the following elements (if not addressed previously):
    - Achieving the program's energy savings goals

- Soliciting participants
- Training and education
- Ways in which the program results are tracked and reported
- Anything else?

These are all my questions.

- Do you have anything else you'd like to add?

Thank you again for taking the time to discuss this program.

e³SMART Year 2 (2010-2011)
End of 2010 Interim Report

The e³SMART program begins it second year with optimistic results:

•All 15,960 student kits purchased from Niagara Conservation for year two of the program have been distributed to teachers for student & family use and installation. The full 15,960 kits ordered were dedicated to family installation because the 191 teacher kits needed for training and instruction were kits stored by Ohio Energy Project from teachers who opted out of the program last year. An additional 209 kits were supplied to teachers from the same source. (The Ohio Energy Project retrieved kits from teachers who did not use them last year.) The total number of kits supplied to teachers for use in year two is 16,360.

Students with new e³SMART bags used to carry home items for installation after each lesson.

•Improvements were made in the years for year two. The *Energy Savers* booklet used as the text for the curriculum was included in the kit, replacing the Energy Wheel. The refrigerator thermometer was changed to a dial style with scales for both the freezer and the refrigerator making it easier to read and dual purpose. A plastic e^{3}SMART/AEP Ohio logo bag was added to the kit so that students could easily transport items home after each lesson. And, items were shipped in bulb to teachers, instead of as an entire assembled kit. This last change was in response to teacher suggestions about improving the ease of using each item in the classroom.

•190 teachers are participating in the full e^{3}SMART program for the 2010-2011 school year.

•Teacher training for year two was done in two formats: dinners and all day workshops.

•Most returning teachers (95) attended the dinner, where they learned about the success of last year's program in a presentation, and also learned about the changes and improvements for this year's program. The power point presentation included pictures of students using the program and number data detailing the percentages of items installed. Strong points and weak points of the program were discussed. Teachers were also given the new curriculum and a new teacher kit with equipment. Changes were demonstrated and discussed. At the dinner, they also registered tentatively for the number of kits they needed to teach the e^{3}SMART program again. (Numbers were tentative since final enrollments in classes would not be available until after Labor Day.) Dinners were held in Worthington on August 2, in Lima on August 3, in Canton on August 5, in Athens on August 8, in Heath on August 10, and on the east side of Columbus on August 11, 2010. The dinners were very well received. The teachers loved seeing the number results and the many pictures of students using the kits items.

"The dinner this summer was awesome. Not only was the food delicious and conference site very nice, the opportunity to talk with colleagues from other schools across the state was invaluable. The new kit was displayed for us to look at and our table talked a little about the best way to execute several of the activities. The biggest hurdle I encountered was more organizational than presentation of content. I learned that I didn't need to create individual folders for each student, but to create a project with very detailed guidelines and have the students submit a project folder instead. This will also eliminate the need for extra credit when it comes time to create the scrapbook for each class, as part of the assignment is to create a page of the scrapbook in their project.... Jennifer also had the same ideas and designed a project template for us to us...great biology partner! It was fun listening to the teachers describe their experience and you can tell that there is a great deal of passion in the educators as they used this project to instruct such important information. I appreciate the opportunity to work with this project another year and look forward to working with our kids on the activities and year two of our high school- 2nd grader energy fair in January! Many thanks to OEP and the Central Ohio bunch especially Becky Grimm who sets

the bar high and motivates us to do this extraordinary activity with kids. Everyone benefits and I am proud to be a part of this special learning initiative. Thanks a million. See you at the energy fair preparation day and Otterbein Energy Fair!!!!!!!!!!" Scott Logsdon

"First of all, the meal and dessert was excellent. Very nice accommodations for us. Secondly, it was great to see and hear about the products that we would receive again. The new binder with the Science indicators was a benefit for me as a teacher. It is very organized and a great help. I find the binder so easy to use. The extra on the CD-Rom are very helpful too, but I find that I cannot open many of them.' I was very excited to get a t-shirt. I have been wanting one of them. All in all it was a great meal, meeting, and well worth the drive. Deb Breidenbach and I had a great time. We even did a little shopping.
Carla

"It was nice to see so many familiar faces. It seems over the years I have met many great teachers from the OEP workshops. I was excited to see they offered another year of the e³smart program. I have had parents and students tell me what a difference they have seen with the energy efficient devices they installed.
The extras include in the kits will be helpful; for example, the lamp bases for demonstration use to show energy transformation. I do agree that shipping the supplies in bulk will be easier to hand out items, especially since there are bags included. I was bringing in my own grocery bags to hand out items last year. It also gets the kids to learn to reuse the bags.
Many thanks again to AEP and OEP for the opportunity." Jennifer Messerly

"The Ohio Energy Project never has ceased to amaze me with it's organized and useful lessons. We met as a group in Columbus just before the start of school to discuss how our first year has gone in regards to the e3Smart program. Everyone took turns in discussing how each school experiences has gone and shared resources that could be of use to each other. Mrs. Grimm also had put together a display with all of our press releases and items to be viewed as a whole to show our wide impact on Ohio and she also had put together a slide presentation that really ties everything together. We went over the next year's agenda and went through a list of new things to look at. Mrs. Grimm puts together very interactive lessons that engage the entire group.
We followed our discussions with a very nice meal. We then picked up our materials and socialized with each other. What a nice organized meeting with a purpose." Dennis Foreman

•Teachers new to the program (87, 46%) plus 8 returning teachers who wanted a refresher course, attended an all-day professional development workshop. Workshops were held in the Worthington Education Center on August 2, in the AEP Ohio Service Center in Canton on August 6, in the AEP Ohio Service Center in Athens on August 9, in the AEP Ohio Service Center in Heath on August 11, and in the Worthington Education Center on October 5. The workshops were divided into two parts. In the morning session, "Energy 101" demonstrations, games, and activities were conducted to illustrate the basic energy concepts in science education. Teachers were actively involved in all the activities and provided materials to conduct these in their own classrooms. After lunch, the afternoon session included stations where all teachers actively worked through each of the experiments related to the items in the kit. Data collection was also discussed. Teachers again tentatively registered for the number of kits they required for the school year. (Note: every teacher was invited to opt out if they felt at all uncomfortable with the purposes and requirements of the program.) All the workshops were extremely well received. On a Likert Scale of 1 (low) to 7 (high), 100% of the teachers reported their overall satisfaction with the program at 6 or

7. Summary evaluations, including scores on the pre and post-tests are attached at the end of this report.

"I want to personally thank you for a great training session yesterday-- it was absolutely one of the best I have attended." Stacey Peters

"I attended the E3 Smart workshop on Wednesday, August 11th and was amazed by the presenters and awesome FREE supplies. It was great to go through the program as a class by playing several of the games and conducting the experiments for each unit. I am definitely a hands-on learner, therefore, this was an extremely valuable experience to work through the experiments and discuss results and misconceptions as a class.

As we worked through each activity I was able to gauge how the lessons will fit into my science and health standards. I have already planned when I will be conducting each of the activities as a supplement to my current curriculum and unit outline. One of the things I will need to change this year is flipping two of my units to get the E3 Smart program completely finished before the April deadline. After looking at my OAA scores from last year, I think this switch will benefit the students in many areas.

The E3 Smart program is a great opportunity for my students. I feel honored to be a part of such an amazing experience!" Kelly S. Syroka, Freedom Trail Elementary

"The workshop experience was wonderful! I learned a great deal of factual information on energy I did not know before. It was helpful to have the information on the mercury as well. Many people have questioned me on the mercury in the bulbs and I did not have a good scientific answer for them with the facts. That was very helpful, as I am sure the question will come up again as we implement this unit. I think this unit will be very informative to my students and their families. It should also help them conserve their energy consumption, therefore, helping the electric company that helped supply the materials as well. It is a win- win situation for everyone involved!" Connie Fullen

"The e3smart workshop was very enlightening to me as a fifth grade science teacher. I found that the activities were great-especially the kilowatt and the insulation activities I found that these activities were fun and easy to do. I believe the students will really gain a lot of knowledge from these activities. They especially bring the concepts of energy use and conservation to life. I liked playing the games-the coal train and the energy board game were especially applicable to whole class or small class sessions. I really appreciated getting all of the materials for my classroom use-the concepts of through different forms of energy are hard to reproduce on a fifth grade level-but with the items that were provided through the workshop like the solar grasshopper and the glow sticks will make this lesson so much more effective.

I am looking forward to sending the energy materials home to my students this school year-I hope that I can educate not only the child but the parents on responsible energy use and conservation." Leslie Kastnor

"I am very excited to be a part of the e3smart program. I thoroughly enjoyed my time spent learning about our energy resources and what we can do to help become a more energy efficient society. My pre-poll showed that I had a good deal to learn about energy. I only answered 11 questions correctly. Many of the questions I missed were about energy expenses in my home. I enjoyed playing the games as it made me recognize I needed to refresh myself on energy resources. I liked how the games and activities incorporated finding your partner or team into the students' learning. This will help my students find new partners without any social drama. I thought these were appropriate for my fifth graders and loved that you gave us the games ready to play. Your demonstrations were very cool and impressive! I loved the overhead demo! My kids would go crazy over seeing the paper burn from the overhead light. I am very impressed with the teaching guide and lesson plans provided. They are detailed and user friendly. I find the samples very helpful as a guide. I usually teach energy and conservation separately. This year and with this program, I will combine my units. I think the home activities will boost my students' understanding of energy and conservation as they can directly apply it to their daily lives and maybe even save some money for their families! I couldn't believe how fast the day went and my post-poll showed that I had been attentive and focused as I answer all questions correctly. Thank you and I look forward to working with you as I share my lessons and results using the e3smart program!" Meghan Carey

•Each teacher, at both the dinners and the workshops, was provided with a new teacher kit that included the entire curriculum, equipment to help implement the curriculum, and ancillary materials to support the curriculum. Additions to the kit included lamp bases, fully assembled and laminated games and activities, a t-shirt (very popular!), and energy transformation demos. Returning teachers received replacement items including a kilowatthour meter and a new furnace filter for demonstration.

•Teachers have been trained in 41 counties including Allen, Athens, Belmont, Carroll, Coshocton, Crawford, Delaware, Fairfield, Franklin, Gallia, Guernsey, Hancock, Hardin, Harrison, Highland, Hocking, Jackson, Jefferson, Knox, Lawrence, Licking, Marion, Meigs, Morrow, Muskingum, Nobel, Paulding, Perry, Pickaway, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Stark, Tuscarawas, Van Wert, Vinton, Washington, and Wayne. (Twenty-one of these counties are in Appalachia.)

•110 (58%) of the teachers trained work in schools in Columbus Southern Power territory. Eighty (42%) work in Ohio Power Company territory.

•65 (34%) of the trained teachers work in school districts located in Appalachia.

•79 (42%) of the teachers work in schools with 50% or greater free and reduced lunch. Multiple schools provide free breakfast and free lunch to their entire student body daily.

•Teachers from a wide variety of schools participated in the workshops including urban, rural, suburban, private, charter, parochial, elementary, middle, high school, joint vocational, and career centers.

•101 (53%) teachers reported by December 1, the completion of the Lighting Lesson and the installation of the 4 CFL bulbs and the LED nightlight by their students. Teachers reported the installation of 32,501 CFLs by their students and families. Many of these teachers asked students to participate in the Change A Light Energy Star web pledge campaign and to select AEP Ohio as their referring agency. Already, AEP Ohio is at 166% of its goal for the Change A Light web pledge.

•15 (8%) teachers have completed the entire e^3SMART program and returned all their evaluation data early. (Evaluation data is not "due" until spring, 2011.)

•Stipends of $100 have been sent to each teacher returning their evaluation data.

•Letters of recognition have been mailed to the superintendent and the principal of each teacher returning the evaluation data, and cross-copied to the teacher.

•25 teachers (13%) are registered for the Energy Efficiency Education graduate course through Ashland University.

•The e^3SMART program has attracted the attention of the media. Articles highlighting teachers using the e^3SMART program in their classrooms have been published in multiple local papers including *the Newark Advocate, the Times Reporter.com, the Chillicothe Gazette, the Coshocton Tribune, the Newcomerstown News,* and, *the Daily Sentinel, the Fostoria Focus,* and *the Findlay Now Magazine.* The project has also been highlighted on school, district, teacher, and team websites.

•Multiple teachers in the e^{3}SMART program participated in other Ohio Energy Project programs with their students. Teachers brought students to the Youth Energy Summit for high school students, and in energy workshops and fairs across the state.

•In a new initiative for year two, a CFL-only version of e^{3}SMART is being offered internally to Columbus Public School science teachers, grades 5-12. Working through the science education department of Columbus Public Schools, the first workshop was held at the Northgate Career Center on November 6. An all day workshop was provided for twenty teachers. The format is similar to the e3SMART workshop except that only the lessons on energy audits, lighting, and appliances are provided. Teachers signed up for 4,328 CFLs to provide to their students. A second workshop is planned for mid-January.

•In another novel approach, Gahanna Jefferson Elementary, and the Columbus School for Girls were provided CFLs for a one-for-one exchange (turn in IL and receive CFL) event. Gahanna Jefferson Elementary School has an energy efficiency club that is sponsoring this for parent-teacher conferences. They have 300 CFLs to distribute. Columbus School for Girls is doing a major energy blitz event and has 1200 CFLs for the event.

COLUMBUS SOUTHERN POWER COMPANY AND
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2010 PORTFOLIO STATUS REPORT OF ENERGY EFFICIENCY AND PEAK DEMAND RESPONSE PROGRAMS

VOLUME II

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AEP Ohio
Energy Efficiency/Demand Response Plan
Year 2 (1/1/2010-12/31/2010)

Program Year 2010 Evaluation Report:
Home Energy Report Program Pilot

Presented to

AEP OHIO®

A unit of American Electric Power

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Section E. Executive Summary

This report presents a summary of the findings and results from the process evaluation of AEP Ohio's Behavior Modification Program, the Home Energy Report (HER) Program pilot of 2010. The HER works to encourage customer action to improve household energy efficiency by providing information and comparisons about customers' energy use. OPOWER was the implementation contractor selected to provide the Home Energy Report.

Participants in the pilot were selected based on whether they were considered high energy users (125,000) or were customers who received payment assistance through a State of Ohio program. (25,000).

Arriving in the mail independently of the utility bill, the two-page (single sheet, front and back) HER, provided by AEP Ohio's implementation contractor, OPOWER, informs the customer about trends in his/her recent electricity use as well as comparing the household electricity use to similar homes in the region. Supportive information is offered to the customers through an Internet site.

Each HER also advises a different set of actions that the customer can take to reduce the electric bill and make the household more energy efficient. However, although the HER reports electricity used for a certain period, it should not be confused with a billing statement; bills with "amount due" and "due date" come to customers by a separate mailing.

E.1 Evaluation Objectives

The Process Evaluation provides the basis for analysis and interpretation of the eventual Impact Evaluation based on a billing analysis. The Process Evaluation collects information on customer understanding, motivation and behavior regarding household energy conservation. In other words, the Process Evaluation helps determine whether the customer perceives that the HER provides value to the Participant. It also seeks to identify areas of improvement from the customer's perspective.

The Process Evaluation supplies verification that the HERs were received, read and understood. In addition, the evaluation team sought to determine whether customers found the information believable, helpful and frequent enough to be useful self-monitoring energy information for the customer.

Additional research objectives include examination of the usefulness of the HER for lower-than-average income households, and determining whether there were differences in customer response between Ohio Power (OPCo) and Columbus Southern Power (CSP).

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E.2 Evaluation Methods

The primary method for obtaining customer views on the HER pilot was a wave of telephone interviews conducted with more than 200 participating residential customers and a control group of about 70 residential non-participating customers. The process evaluation drew upon OPOWER program materials, website materials, published literature by OPOWER principals, advisers and academic affiliates. Additional secondary research was done through interviews with past Navigant evaluators of OPOWER programs at Sacramento Metropolitan Utility District (SMUD), and Commonwealth Edison (ComEd). In addition, information was gathered on theory and field experimentation involving lifestyle-change efforts similar to OPOWER. The process evaluation was informed by a December web-based teleconference involving AEP Ohio and OPOWER staff, including questions and answers, and a more in-depth March interview with the AEP Ohio program coordinator.

Table E-1 provides a summary of the primary data collection activities conducted to support the process evaluation. As shown, the primary customer impact data collection came from computer-assisted telephone interviews (CATI) by a third-party survey house using an interview guide.

Table E-1. Data Collection Activities

Data Collection Type	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
In-Depth Phone Interviews	AEP Ohio and OPOWER Program Staff	Arranged by AEP Ohio	Evaluation Consultant	9	Nov.2010-Mar 2011
	AEP Ohio Program Coordinator		Evaluation Consultant	1	March 2011
	Participating and Non-Participant group customers	Roster of Participant and Non-Participant populations	Random sample of each sub-population as fielded by the Blackstone Survey Group	Participant= 215 Non-Participant=72	Feb. 2011

E.3 Key Findings and Recommendations

Getting the Report to Designated Participants

» A verification section in the phone survey found that 89 percent of intended Participants reported that they did receive one or more HERs since September 2010.

Getting Participants to Read and Discuss the HER

» About 93 percent of customers who recall getting the HER said that they read it.

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Recalling the Neighborhood Comparison

- About 71 percent of Participants who recall receiving the HER r also recalled the section comparing their household electricity use with "neighbors" in similar homes.
- Some 63 percent of those who recalled the neighbor comparison also reported discussing the comparisons with household members, neighbors, relatives and/or people at work or school.

Getting Readers to have Confidence in the Report's Comparison

- About 50 percent of readers who recalled the "neighbor comparison" section said they had confidence that the comparison of their home with others was accurate.
- However, 34 percent said they did not have confidence that the HER's comparison to neighbors was accurate.
- Another 18 percent reported mixed feelings or "some doubts" about the comparisons of their home's electricity use with others.

Getting Participants to Take Action

- Some customers took action in response to HER tips about home energy conservation during the first five months of mailings
- Among higher-than-average use (EE) customers, about 27 percent reported taking action on one or more recommendations made in the HERs while among lower-income customers, 42 percent reported action.
- Customers who took action were asked what they specifically did, and their responses spread across a wide set of actions including installing CFL bulbs, unplugging appliances to reduce phantom power load, and getting rid of second refrigerators.

Participant Interest in Continuance of the HER Mailings

- About 75 percent of participants said they wanted to continue getting the mailed reports.
- About 24 percent of participants said they would rather not continue getting the reports. The survey did not probe the customer's specific reasons for wanting discontinuance, but other questions in the survey do show concerns with the accuracy of neighborhood comparisons.

According to AEP Ohio, actual requests to discontinue mailing the HER are very few (less than one percent of the 150,000 customers being mailed the unsolicited HER.)

Recommendations

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1. Before expanding the number of customers participating in the HER, consider assessing opportunities for publicity and education prior to mailing reports.
2. Consider stating explicitly that the intent is to alert the customer of opportunities to save money and improve personal household management, and not to embarrass.
3. Consider offering a field-tested explanation of some type regarding how one home might be considered comparable to others cited in the HER "neighbors section."
4. Consider holding HER advisory workshops composed largely of employees staffing AEP Ohio call centers and field offices. Input would go to OPOWER and management staff of AEP Ohio.
5. In future evaluations, after additional experience with the program has been realized, consider investigating the effects of the different frequency of mailings on customer satisfaction with the program, as well as self-reported number of energy savings actions taken.

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Section 1. Introduction and Purpose of the Study

This section provides an overview of the Process Evaluation of the AEP Ohio Home Energy Report (HER) pilot program. The section describes this program, which provides a free information service that encourages residential customers to adopt technology and behaviors that reduce annual energy and modify peak electricity demand. Also described are the program implementation strategy and marketing.

1.1 Program Introduction

The purpose of the HER pilot program is to foster changes in residential energy use through customer adoption of behavioral change. Named "the HERs program" by AEP Ohio, this information-and-persuasion program is provided by the implementation contractor selected, OPOWER. The OPOWER program is based on social normative psychology. Through regular non-billing mailings, residential customers are informed of how their levels of electricity use compare to others, with the implicit message that they accept suggestions to conform to the "social norm" in their community.

Somewhat like a school report card, the mailing informs the customer how his/her household's use of electricity compares to an anonymous set of neighbors with similar homes. The two-page color HER presents quick-glance graphics that are intended to motivate customers to reduce their own usage.

1.2 Purpose of Study

This report describes a Process Evaluation of the HER pilot. It uses interviews with customers to probe conscious decision making affecting electricity use, and to identify changes in the number of household members that may have affected electric use.

Behavioral change, as the term is used here and by OPOWER, incorporates both changes in lifestyle (e.g., adjusting the thermostat, increasing the number of occupants) and in technology (e.g., replacing incandescent light bulbs with CFLs.) However, technology change that involves participation in other AEP Ohio programs must be netted out of the impacts obtained in the HER pilot to determine the true behavioral change impacts.

Aside from the primary question are questions about secondary details of customer behavioral responses, values, attitudes, perceptions and desires/needs. Information from answering these questions will inform AEP Ohio marketing plans and management. Following are some of these questions, as identified in mid-2010 in the Program Evaluation Plan.

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Process Questions

1.3.1 Awareness and Participation

1. Are all adult members of participating households aware of the HER reports and their frequency? What strategies could be used to boost program awareness?

2. Are the messages within the reports clear and actionable?

3. Do the participants report taking energy savings actions in response to the reports? Do those actions vary by season? Are the actions changes in behavior? Are the behavioral changes temporary or persistent? Do the actions include investments in new energy efficiency measures (persistent)?

Program Characteristics and Barriers

4. How do participants perceive the reports?

a. What is their perception of the purpose of the reports?

b. Are customers satisfied with the number of reports and the information presented?

c. Are there particular program characteristics that could be changed to improve customer satisfaction while maintaining program effectiveness?

5. What are key barriers to understanding and/or responding to the information in the reports?

6. Do perceptions change over time? Is there a difference in reaction to the first report vs. later reports?

7. If energy savings actions were taken, does the participant feel it was reflected accurately in the later reports they received? In other words, if the customer made a change did it show up in their next report as they expected?

8. Would participants like to continue receiving the reports? What is the preferred frequency?

Implementation Strategy

Program Delivery Mechanisms and Marketing Strategy

The delivery strategy for AEP Ohio's HER pilot was designed and managed in consultation with OPOWER. It included mailing of customer communications by OPOWER starting in late summer 2010 to 150,000 participating residential customers.

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AEP Ohio's call center has a team of staff trained in the Home Energy Report to handle customer inquiries. The AEP Ohio website addresses common questions" at <www.aepohio.com/account/usage/HomeEnergyReports/FAQs.aspx>. Letters, emails and complex questions about the HER are handled by AEP Ohio's Consumer Program Coordinator for the Home Energy Reports.

Residential customers were chosen to receive the HER and were mailed it without prior solicitation for participation. However, when customers objected to the delivery of the HER, recognition was made that such customers had *de facto* "opted-out," and their names were removed from OPOWER's mailing lists for future months.

The target market consists of two major segments:

1. Residential customers with higher-than-average daily electricity use. The average was calculated separately for two sub-populations of AEP Ohio's residential sector. That is, an average was calculated for customers served by OPCo and a second average was calculated for CSP.
2. Residential customers whose accounts were listed on Ohio's Percentage of Income Payment Plan (PIPP) database at the start of August 2010.

Key elements of the implementation strategy include:

» Introducing the HER program to AEP Ohio customer contact personnel and marketing/advertising staff.

» Ensuring news media and regulatory officials are aware of the program and adequately informed.

Role of AEP Ohio Staff

The AEP Ohio the Consumer Program Coordinator for the HER program is to provide day-to-day operations management of the program and to respond to all customer inquiries. AEP Service Company provides daily extracts of the billing data to the contractor.

Roles of the Implementation Contractor

OPOWER staff are implementing the HER program including maintaining changes to the customer mailing lists, receiving billing data from the AEP Service Company to update personalized customer reports, extracting local weather data to adjust reports for weather-related use, and handling inquiries from AEP Ohio customers participating in the program.

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Section 2. Description of Program

The HER pilot program works to foster changes in residential electricity use by customer adoption of electrical energy-reducing behaviors and technologies.

Named the Home Energy Report Program by AEP Ohio, this information-and-persuasion program is provided by the implementation contractor selected, OPOWER. The OPOWER system is based on social normative psychology. Through regular non-billing mailings, residential customers are given informed how their levels of electricity use compare to others, with the implicit message that they accept suggestions to conform to the "social norm" in their community.

Somewhat like a school report card, the mailing informs the customer how their household use of electricity compares to an anonymous set of neighbors with similar homes. The two-page color HER presents quick-glance graphics that are intended to motivate customers to reduce their own usage.

The Participant group had two subgroups distinguished by the frequency and types of messages in the HER:

- Group 1 is defined as "OPOWER web access and reports six times a year".
- Group 2 is defined as "OPOWER web access and reports six times a year plus two peak seasonal reports."

2.1 *Basis for creation of the Logic Model*

This section describes the program theory for the HER pilot. A logic model is under development and will be included in the final report deliverable that will also include the Impact Evaluation results.

Best practices for energy efficiency programs require that all programs have a sound program plan and clearly articulated program theory. The HER is a different category from traditional utility energy efficiency programs that directly promote a specific technology like high efficiency refrigerators. Rather, it attempts to use education and communication to influence customer behavior. It puts people at the center. The goal is to help consumers do what they already want to do: control their electricity bills.

Education programs have long been part of a utility's portfolio, but only recently have such programs been systematized and implemented with ongoing monitoring of effectiveness through experimental testing of program details.

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The essence of the HER Program design is that people respond to perceived social norms (neighbors "keep up with the Joneses" according to their observations and inner projections of norms expected by their neighbors). Marketing has long tapped the need to compete and emulate to build markets.

Much of OPOWER's HER service is considered proprietary by the developers. However, substantial public literature documents that the OPOWER strategy evolved from social science research on consumer energy behavior. Such research started with the first "energy crisis" of the early 1970s. It was recognized that changes were needed in both technology and in human behavior.[1] Not only must a homeowner install technologies such as building shell insulation, but also properly adjust the thermostat and turn off unneeded appliances.

OPOWER describes its service in this way:

> *"Before we deploy our Home Energy Reporting program in a new region, we randomly divide household into two groups with statistically equivalent demographic profiles and past consumption patterns. Both groups are exposed to the same local weather, energy prices, and economic environment. The only statistically meaningful difference between the groups is that the test group receives HERs while the control group does not."*[2]

The handy starting model for evaluation draws from educational assessment. Were the messages heard, properly understood, and acted upon? Did the actions produce results? Measurement of results includes both customer actions (e.g., installed higher efficiency refrigerator) and customer electricity use (as measured by utility billing data in the Impact Evaluation.)

Consider just the front-end of the HER process, the process of verification. When HERs are sent by mail to an address, there are at least six possibilities:

- It is received, opened and remembered.
- It is received, but recycled without opening.
- It is received and opened, but not given serious inspection (perhaps because it looks "like another ad").
- It is received and read by the primary bill handler, but forgotten.

[1][1] Hayes, S.C. and Cone, J.D., "Reducing residential electricity use: Payments, information and feedback." Journal of Applied Behavioral Analysis, 1977, 10, 425-435; Seligman, C. and Darley, J.M., "Feedback as a means of decreasing residential energy consumption," Journal of Applied Psychology, 1977, 62, 363-368.

[2] From OPOWER website, March 2011. <http://www.opower.com/Results/MVMethod.aspx>.

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» It is received at the household and read by others in the household, perhaps in addition to the person who normally handles the bill.

» It is "lost in the mail" due to incorrect labeling, loss or theft.

The HER pilot has a program logic requiring the customer (including household members) to accomplish at least six tasks:

1. Receive the HER and open the envelope.
2. Read the HER.
3. Understand/comprehend, often through discussion with others.
4. Accept analysis and recommendations as reasonable, actionable.
5. Persuasion of reader/decision maker that they undertake behavioral or technology changes.
6. Taking effective action and avoiding ineffective action.

Each of the aforementioned steps is addressed in the Process Evaluation survey reported here.

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Section 3 Methodology

The process evaluation used customer data gathered by a computer-assisted telephone interview (CATI) of a sample of AEP Ohio residential customers. The survey was conducted by reaching 287 residential customers of AEP Ohio. Timing for the survey the week of February 7-14, 2011, approximately five months after the pilot was launched. The telephone interviews were managed by a subcontractor to the evaluation team.

The interviews used a survey developed by the evaluation team with reviews and editing by AEP Ohio. Suggestions by the survey house were adopted to improve the flow and computer collection of data. Each customer interview lasted an average of 10-20 minutes.

In early February 2011, 287 AEP Ohio customers were interviewed. The survey included a verification question asking whether the HER reports were indeed being received at the participating households (see discussion on following pages.)

Response data was supplied electronically to the evaluation team for statistical analysis and is reported below. Summary statistics, crosstabs and T-tests were used to validate the sampling assumptions and conduct exploration of the dataset.

Some important factors potentially influencing the respondents to the survey were discovered late in the survey process and could not be controlled for by statistical methods. This should be recognized by those interpreting the results. These influences are discussed below.

3.1 Comparability of Participants and Non-Participants

Prior to data analysis and any comparison of sub-populations, the process evaluation must address a fundamental question:

» Is the Participant group (households receiving the HER) different in any substantive way from the Non-Participant group (households not receiving the HER)?

For the Process Evaluation survey, this comparability analysis was conducted by comparing proportional and mean responses to several structural items. No bias was detected, and the two groups were judged comparable.

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3.2 *Demonstration of Participant Effect by Comparing Actions of Participants and Non-Participants*

While the main Participant effect on kilowatt-hour usage is not known at this time, there is evidence from the process evaluation that customers in the Participant group did behave differently from customers in the Non-Participant group.

A random sample of 4,200 residential customers was selected by the evaluation team from a copy of the customer database supplied in January 2011 by staff of AEP Ohio. From this list, 287 customers responded to the survey. The sampling frame was extracted to represent four populations:

- Participant- OPCo
- Participant - CSP
- Non-Participant – OPCo
- Non-Participant – CSP

Other group comparisons were made based on this foundation. Table 3-1 shows a high-level quantitative summary of Participant vs. Non-Participant numbers.

Table 3-1. Survey respondents, Feb 2011, Participant vs. Non-Participant

Status- Home Energy Report	Frequency	Percent
Non-Participant (not enrolled, was not sent HER reports)	72	25%
Participant (was sent HERs)	215	75%
Total	**287**	**100%**

As shown in Table 3-2, the 287 survey respondents include 215 households that were mailed the HER, as well as 72 that were not mailed the reports, yet were interviewed as controls to measure biases and develop adjustment factors.

3.3 *Participant Sub-Populations*

The 215 surveyed participants had many overlapping memberships outside of receiving the HER. Some were participants in the PIPP program. Some belonged to a group of higher-than-average electricity users. Some received HER mailings bi-monthly while the low income group received additional heating/cooling season mailings.

- One special category is labeled "PI" and represents households with annual income less than 150 percent of federal poverty limit as of August 2010.

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» The other special category is labeled "EE" and represents customers with higher-than-average electricity use in the 24 month period July 2008-June 2010.

Table 3-2. Respondent Numbers by Category

Special category of residential customer	Number	Percent
Higher than average electricity use	144	67%
PI=Household income below 150% FPL (federal poverty level)	71	33%
Total	**215**	**100%**

The Participant group had members of each category (higher-than-average electricity use and household income lower than 150 percent FPL.) In contrast, the Non-Participant group had members of only one special category. All Non-Participant respondents were EE (higher than average electric use.) Therefore, the PI (low-income) group does not have a "control" reference. The Participant group also had two subsets distinguished by the frequency and types of messages in the HER.

» Group 1 is defined as "OPOWER web access and reports six times a year".

» Group 2 is defined as "OPOWER web access and reports six times a year plus two peak seasonal."

The AEP Ohio coordinator for the HER program explained that for the first five months of the program, the difference between Group 1and Group 2 was restricted to a single extra mailer about heating uses of electricity in December 2010.

Table 3-3. Respondent Numbers by Number and Frequency of Mailings

Delivery regime	Number	Percent
Group 1	144	67%
Group 2	71	33%
Total	**215**	**100%**

3.4 *Nested Comparison of AEP Operating Companies*

AEP Ohio is composed of two operating companies: OPCo and CSP. The surveyed customers from OPCo are compared with the respondents served by CSP. Of the HER participants completing surveys, 106 were customers of OPCo and 109 were customers of CSP. Of the 72 Non-Participant completes, 37 were customers of OPCo and 35 were CSP customers.

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Table 3-4. Participant Respondent Numbers by Operating Companies of AEP Ohio

Service Territory	Number	Percent
OPCo	106	49%
CSP	109	51%
Total	**215**	**100%**

3.5 *Respondent Screening*

All 287 respondents answered yes to the following screening question:

Are you the person in your house most involved with your utility bill?

It was assumed that the person most involved with the utility bill would have the highest probability of seeing/reading the HER. However, separate questions were asked about who else in the household read the HER.

3.5.1 Response Rate

The evaluation team supplied the survey house with a sampling frame 4,200 names and phone numbers of customers (700 for each of six customer categories.) Of these 4,200, a portion were called, but many could not be reached because of answering machines, unanswered phones because of customer screening of caller ID, etc. The refusal rate by customers contacted was low (customers who answered the phone but were unwilling to discuss the HER.) Some 287 persons answering the phone were screened, qualified and answered enough questions to be considered "completes." Customer response to the phone requests was comparable to other surveys.

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Section 4 Detailed Evaluation Findings

4.1 *Program Processes*

Looking at the key steps of the HER communications process, following are the results of the February 2011 survey.

Getting the Report to Designated Participants

» A verification section in the phone survey found that 89 percent (189 of 215) of intended Participants reported that they did receive one or more HERs since September 2010.

Getting Participants to Read and Discuss the HER

» About 93 percent of customers who recall getting the HER said that they read it.

Recalling the neighborhood comparison

» About 71 percent of Participants who recall receiving the HER report also recalled the section comparing their household electricity use with "neighbors" in similar homes.

» Some 63 percent of those who recalled the neighbor comparison also reported discussing the comparisons with household members, neighbors, relatives and/or people at work or school.

Getting readers to have confidence in the report's comparison

» About 50 percent of readers who recalled the "neighbor comparison" section said they had confidence that the comparison of their home with others was accurate.

» However, 35 percent said they did not have confidence that the HER's comparison to neighbors was accurate.

» Another 18 percent reported mixed feelings or "some doubts" about the comparisons of their electricity use with others.

Getting Participants to Take Action

» Some customers took action in response to HER tips about home energy conservation during the first five months of mailings. Among higher-than-average use (EE) customers, about 27 percent reported taking action on one or more recommendations made in the HERs while among lower-income customers, 42 percent (22 of 53) reported action.

» Customers who took action were asked what they specifically did, and their responses spread across a wide set of actions including installing CFL bulbs, unplugging appliances to reduce phantom power load, and getting rid of second refrigerators.

Participant Interest in Continuance of the HER Mailings

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- About 75 percent of participants said they wanted to continue getting the mailed reports.
- About 24 percent of participants said they would rather not continue getting the reports. The survey did not probe the customer's specific reasons for wanting discontinuance, but other questions in the survey doe show concerns with the accuracy of neighborhood comparisons.
- According to AEP Ohio, actual requests to discontinue mailing the HER are relatively few (less than one percent of the 150,000 customers being mailed the unsolicited HER.)

4.2 *Customer Self-Report on Importance of Reducing Electricity Use*

Before customers take action on home energy use, the customers must view the expected results as important. An initial question was asked at the start of the survey, before customers were quizzed about the mailed HERs. The question was stated:

> *How important is it to your household to reduce electricity use and thereby to reduce your bills? On a scale of 0 to 10 where 0=not important at all and 10=extremely important, how would you rate the importance of reducing your household's electricity use?*

Table 4-1 shows the distribution of customer ratings about the importance of reducing their electric bill. Ratings were comparable between customers of the two operating companies. The top four "boxes" on the importance scale was 87 percent for OPCo and 81 percent for CSP.

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Table 4-1. Customer Ratings of Importance of Electricity Conservation for Budget Reasons

Importance of reducing electricity use	OPCo	CSP
0-Not important at all	1%	1%
1	--	1%
2	--	1%
3	2%	1%
4	--	3%
5	5%	6%
6	2%	2%
7	8%	5%
8	17%	20%
9	7%	5%
10	55%	55%

4.3 Space Heating Characteristics of Participant Group

Customers were asked in the survey what their primary space heating fuel was. The survey question read:

> *Thinking of your home's heating system. What is the main energy source or fuel used to heat your home? The main energy source is the one that is used most.*

Roughly one in three survey respondents reported that their primary space-heating fuel was electricity. The self-report statements have not been verified by the evaluation team; however, it is not unreasonable to accept the self-reports as accurate, especially given the selection process for participation by OPOWER. Most HER participants and most participants surveyed had electricity use "above average." In those households where electricity is the main heating source, it is likely that electric space heating is the largest single end use of electricity. If customers want to reduce their electricity use (changing their behavior regarding the thermostat) it is important that customers are aware of that fact.

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Table 4-2Home Heating Fuel

To help us classify your response, I'd like to ask you two questions about your home. {br} Thinking of your home's heating system... What is the main energy source or fuel used to heat your home?

Value Label	*Frequency*	*Percent of customers contacted*	*Valid Percent of those who offered knowledge of the main heating energy source*
Electricity	71	33%	42%
Natural Gas	75	35%	44%
Propane	8	4%	5%
Oil	6	3%	4%
Wood	4	2%	2%
Other [Specify]	4	2%	2%
Don't Know	1	1%	1%
No response/Not asked	46	21%	Missing
Total	**215**	**100%**	**100%**

4.4 *Energy Used to Heat Water in Household*

More than 56 percent of customers who reported the energy source used to heat water in their home said "electricity" while 40 percent said "natural gas." What is significant is that a large percentage (23 percent) could not answer the question about the fuel heating their household water, since the electric water heater is most often the largest single user of electricity in most homes that do not use electric space heating. If behavioral changes are to have an impact on a household's electricity use, the residents of the home need to be aware of this fact.

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Table 4-3. Water Heating Energy Source

What energy source does heat the hot water supply? [DO NOT READ LIST]			
Value Label	*Frequency*	*Percent includes non-response*	*Percent of respondents*
Electricity	94	44%	56%
Natural Gas	67	31%	40%
Propane	3	1%	2%
Other (Specify)	1	1%	1%
Don't Know	4	2%	2%
Refused/Skipped	46	21%	Missing
Total	**215**	**100%**	**100%**

4.5 *Verification of Delivery of HERs*

Respondents were asked to verify whether mailed reports were received by the following verification:

> *Starting in September 2010, a report that AEP Ohio calls the Home Energy Report is mailed monthly to your home. You may have received two or three of these since September. Do you recall whether your household received one of these HERs?*

Verification is important for energy efficiency programs whether it's verification of technology installation or verification of communications effectiveness. Communications evaluation is a complex undertaking. Verification can fail for many reasons. When mail is sent to an address, there are six likely possibilities:

- It is received, opened and remembered.
- It is received, but recycled without opening.
- It is received and opened, but not given serious inspection (perhaps because it looks "like another ad").
- It is received and read by the primary bill handler, but forgotten.
- It is received at the household and read by others in the household, perhaps in addition to the person who normally handles the bill.
- It is "lost in the mail" due to incorrect labeling, loss or theft.

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The HER pilot has a program logic requiring the customer (including household members) to pass at least six hurdles:

1. Receive the HER and open the envelope.
2. Read the HER.
3. Understand/comprehend, often through discussion with others.
4. Accept analysis and recommendations as reasonable, actionable.
5. Persuasion of value to person from behavioral or technology changes.
6. Taking effective action and avoiding ineffective action.

From a high level, the survey shows acceptable results (80 percent) at the first hurdle measure for AEP Ohio's HER pilot, at least in terms of delivery being recalled. Four of five Participants said they received at least one mailing over the previous four months. Recalling the mailing is important because a great deal of mail is tossed or recycled without opening. Direct mailers know that a large proportion of delivered mail—even if it is opened by the intended Participant-- is not seriously inspected.

4.6 Reading of HER Within Household

4.6.1. Readership Rates

If the goal is to increase the spread of energy efficiency practices in Ohio households, then it will be important to reach more than the person paying the bill.

Unless a household has only one member, the household's electricity use is not under the control of one person. Roughly 70 percent of Ohio households have more than one occupant, and every occupant makes decisions affecting electricity use. The number of electricity-using "switches"[3] in the average U.S. household is estimated at greater than 80 individual on/off controls. In addition, the opening and closing of doors and windows affects electricity use.

The survey attempted to gauge how far the message of the HER went after reaching the person paying the bill. The survey did not find evidence that the HER is read by most other household members, although respondents did report verbal discussion of a section of the report with "others" such as household members. This section describes how much the household uses in comparison to similar homes.

According to the survey, 94 percent of the households where the HER was opened and reviewed, the only reader is the bill payer. In other questions in the survey, respondents were probed about their spouse, partner, children and others. In nearly all cases where there were

[3] "Switches" as the term is used here, includes water faucets for hot water, light switches, plug-in cell phone transformers, fans on warm air furnaces, etc.

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others in the house, the bill payer (survey respondent) said he/she was not aware of others reading it. Table 4-4 lists who in the household read the home energy report.

Table 4-4. Readership of the HER within the Household

Question: OK, so you have been receiving the Home Energy Reports: Who in your household has looked at it (HER) even once?

Response	Number of respondents	Percent of respondents
I personally read it	139	94%
Others in my household looked at it	2	1%
It got tossed and no one looked at it with more than a glance	6	4%
Don't know	1	1%

4.7 *Customer perception of the Home Energy Report*

One question involved customer perception of the HER. To address this, the survey asked about customer ratings of value, about the reasonableness of action recommendations, and about customer confidence in comparisons of electricity use among similar homes in the neighborhood.

4.7.1 Value Rating of Home Energy Report by Customers

Customers who recalled receiving the HER were asked to rate it for value on a scale of 0 to 10 with 0=almost no value and 10=extremely valuable. Table 4-5 shows the distribution of ratings from 169 customers who read the report and felt able to rate.

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Table 4-5. Customer ratings of value of Home Energy Report

Value of the Home Energy Report	Low-income Households N=71	Higher-than-average electricity users N=115
0-Almost no value	0%	8%
1	0%	1%
2	4%	4%
3	0%	4%
4	4%	4%
5	13%	17%
6	8%	3%
7	9%	14%
8	17%	17%
9	4%	5%
10-Extremely valuable	38%	15%

Combining the high and low values into two categories provided the information in Table 4-6. The satisfaction rating (combining respondents giving high ratings of 7, 8, 9, and10) for higher-than-average use customers is 63 percent is considered a "good score" when compared to value surveys of residential customers of other utilities on a range of utility services. Likewise, the Top-4 box rating for PIPP customers is 68 percent, considered a "very good score."

Another perspective can be gained by comparing a balancing measure-- the percent of Participant/readers who said the reports had low-to-no value (ratings of 0,1,2,3). Viewed from this reverse perspective, 22 percent rated the HERs of small value for "EE-high use customers" and four percent for "low-income PIPP" customers.

Table 4-6. Ratings of Home Energy Report by Special Categories in pilot

Special Category	Top-4 Box (pleased)	Bottom-4 Box (irritated)
Higher-than-average electricity user	53%	22%
PIPP	68%	4%

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4.8 Actions Taken by Households

Surveyed customers who reported that they took action on one or more tips in the HER were asked for examples of what they did specifically. The results showed a broad variety of acts.

Table 4-7. Some Actions Taken as Result of HER

Verbatim comments by Participants of the HER, February 2011 survey	Customer perception of effect on electricity bill/use
» Turned down the furnace. » Turn off appliances more often. » Installed energy efficient windows. » Changed to more energy efficient light bulbs. » Educate kids more. » We got rid of an old deep freezer we had downstairs, well, we unplugged it and stopped using it. » My nephew stays here when his mother's out of town. I've been racking down on him when he leaves his room to turn off lights his TV his DVD player. Just doing that reduced it by 20 percent. I was really shocked.	Things that customers reported as showing an impact on their bill
» Turning lights off and not having them run all the time, lower temperature on the thermostat. » High efficiency CFL bulbs. » Light bulbs low watt. » Unplugging lights and things that are not in use. We need another weather strip under the front door. » We don't burn the lights as much as we used to. » Putting in surge protectors and heat wraps for the heater.	Things that customers said they did, but have not observed a reduction in their electric bill

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Section 5 Process Recommendations

The following are potential improvements recommended for discussion with AEP Ohio staff. They are proposed to address the weaker points identified in the customer survey of February 2011.

1. Before expanding the number of customers participating in the HER, consider assessing opportunities for publicity and education prior to mailing reports.
2. Consider stating explicitly that the intent is to alert the customer of opportunities to save money and improve personal household management, and not to embarrass.
3. Consider offering a field-tested explanation of some type regarding how one home might be considered comparable to others cited in the HER "neighbors section."
4. In future evaluations, after additional experience with the program has been obtained, consider investigating the effects of the different frequency of mailings on customer satisfaction with the program, as well as self-reported number of energy savings actions taken.

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Section 6 Appendices

6.1 HER mailed version (sample).

6. 2 Telephone survey questionnaire for Participants/non-Participants.

6. 3 Telephone survey questionnaire for AEP Ohio program staff.

6. 4 Description of PIPP-Sampling frame from which low-income households drawn.

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6.1 *HER Mailed Version (Sample of What Customer Received)*

gridSMART™
from AEP OHIO

Home Energy Report
Account number: 0123456789
Report period: 07/03/10 - 08/03/10

We are pleased to provide this personalized report to you as part of a pilot program.

The purpose of this report is to:
- **Provide information**
- **Track your progress**
- **Share energy efficiency tips**

JOHN DOE

This information and much more available at gridSMARTohio.com/go/reports

Last Month Neighbor Comparison | You used **82% MORE** electricity than your neighbors.

* kWh: A 100-Watt bulb burning for 10 hours uses 1 kilowatt-hour.

How you're doing
You used more than average
Turn over for ways to save →

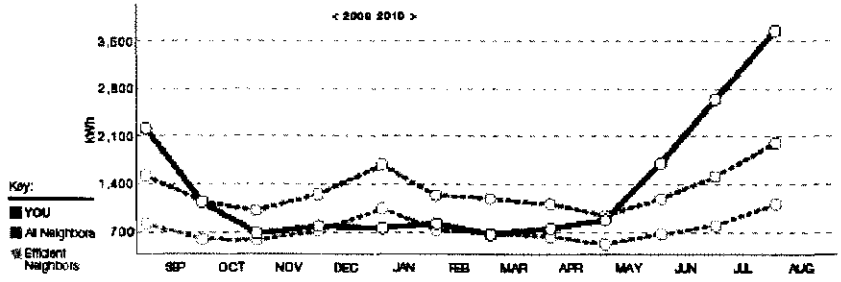
Who are your Neighbors?

All Neighbors
Approximately 100 occupied nearby homes that are similar in size to yours (avg 2,808 sq ft) and have gas heat

Efficient Neighbors
The most efficient 20 percent from the "All Neighbors" group

Last 12 Months Neighbor Comparison

You used **87% MORE** electricity than your efficient neighbors.
This costs you about **$656 EXTRA** per year.



Turn over for savings →

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6.2 Staff Interview Guide

AEP Ohio HER
Program Staff Eval Sc

6.3 Phone Survey Interview Guide

AEP Ohio HER
Program Evaluation P

6.4 Sampling Frame from Which "Low-Income Group" Sample of AEP Ohio Customers was Selected

Customer lists from AEP Ohio were transmitted with a variable marked PIPP, an acronym for "Percentage of Income Payment Plan". PIPP is described as follows, from an Ohio Public Utilities Commission fact sheet:

> *"First implemented in 1983, based on an order of the Public Utilities Commission of Ohio, Ohio's PIPP is the largest and oldest state-mandated PIPP in the country, serving over 200,000 households during FY 2008 under separate gas and electric components. It requires customers with incomes up to 150 percent of federal poverty guidelines to pay a percent of their monthly household incomes to the utility or utilities providing their primary and secondary heating service. There are several different PIPP plans, but the maximum PIPP payment is 15 percent of the household's income. If customers remain current on their PIPP payments, they cannot be shut off at any time regardless of the amount of their arrears. The amount of the bill not covered by a combination of the customer's PIPP payment, the LIHEAP payment, and any other energy assistance the customer may receive, is recovered through riders or surcharges on gas and electricity bills."*

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Table 6-1 below shows that 33 percent of Participant survey respondents were households on the PIPP list in July 2010 provided by AEP Ohio.

Table 6-1. Distribution of Participant Customers According to Special Categories of Interest

	Program Participants	
Type of customer	Number	Percent
EE (Higher than average electric use)	144	67%
PI (lower than 150% of Federal Poverty Limit)	71	33%
Totals	215	100%

Name

Date

Phone

Email

Introduction

Thank you for talking with me today about AEP Ohio's Home Energy Report Program. The goal of this discussion is to talk more fully about the way this program was designed and implemented. All comments will remain confidential.

The areas I will be discussing are

- Whether program goals are being accomplished.
- Quality of program components.
- How well program activities are being implemented.
- Whether the target audience is being reached.
- How external factors are influencing program delivery.

First, I'd like to get a better understanding of your roles and responsibilities regarding HER.

Respondent Background

- What is your current title?
- Could you describe your general duties and responsibilities for AEP Ohio?
- What are your roles and responsibilities for HER?

Now, I'd like to ask a few questions about your involvement in the design and development of HER.

Program Design and Development

1. Can you provide some details on the history of the program?
    a. Was the design based on an existing program? If yes, probe for details about how it is the same and how different.

b. Was the program an extension of an existing program. If yes, probe for details as above.

c. If new program, ask for details on the design, who and how.

2. Were you involved in program design? ongoing

3. Were you involved in program development? If yes probe for details.

Next, I'd like to discuss your views on how the program is being implemented in 2010.

Program Implementation

- Overall, how effective is HER in terms of the following:
  a. Reaching the target market
  b. Overcoming barriers to participation
  c. Educating the target market
  d. Achieving its savings goals
  e. Coordinating with other agencies
  f. Other? Probe

- What appear to be the most successful program components so far?
- Other? Probe
- How successful has HER been in tracking information?

  a. Are there any difficulties with obtaining information?
  b. Have the contractor roles changed?
  c. How frequently is the information tracked by the contractor? Is this sufficient?
  d. How can the tracking be improved/updated/changed?

Next, I'd like to discuss your role in helping to deliver HER in 2010.

Program Administration

- Approximately what percentage of your time is spent on program duties?
  - Was this what you anticipated?
  - How did your duties/responsibilities change during the course of the program?
- What are the most time-consuming aspects for this program? How much interaction do you have with the vendor OPOWER?
- What are your roles and responsibilities with OPOWER?
- What works best?
- What needs to be improved regarding the OPOWER activities?
- What type of feedback have you received from OPOWER?

Is participation in the program simple and streamlined for homeowners?

Now let's move to program delivery.

Program Delivery

- What aspects of the program work well? What aspects of the program do not work well? How might the program be improved?
- What challenges have occurred during the implementation planning phase and introduction of the program in PY2, and how were they overcome?
- Are program-tracking data being used to both assess program effectiveness in meeting the program savings goals, and inform adjustments to program delivery?
- Are program activities being documented? Do program-tracking protocols facilitate effective evaluation?
- Is the program efficient and well managed? How are problems resolved?
- How are program changes handled?
- How does program administration and delivery influence participation? What could be done to improve program administration and delivery?

Let's move to discussion of how the market is made aware of the program.

Marketing and Outreach

- Is outreach to customers increasing awareness of the program opportunities?
- What type of feedback have you received from customers about this program?
    - What did they like?
    - What did they not like?
- What has been the feedback from other market players working with the program?

Lastly, let's discuss program effectiveness in overcoming barriers.

Program Effectiveness and Barriers

- What are the barriers to customer participation?
- What areas could be refined or enhanced to improve the participation process for customers?

- How could HER be improved? Probe specifically on the following elements (if not addressed previously):
    - Achieving the program's energy savings goals
    - Educating customers to make behavioral changes
    - Customer participation
    - OPOWER's roles and responsibilities
    - Ways in which the program results are tracked and reported
    - Anything else?
- Are participants satisfied with this program? Probe for reasons why & why not – Communications, etc.
- What is your impression regarding likely program free ridership? Why do you say that?

These are all my questions.

- Do you have anything else you'd like to add?

- *Thank you again for taking the time to discuss this program.*

AEP OHIO HOME ENERGY REPORT PROGRAM
EVALUATION SURVEY 2011

Treatment Households

Telephone Survey Instrument

Questionnaire

Interviewer Instructions

Call is to be placed asking to speak to the individual named under the Contact Name column obtained from program records.

The purpose of the introductory script and associated questions is to identify the person opening and handling the utility bill. Since the Home Energy Report format under evaluation is a direct mail printed item, the person who handles the utility bill is considered the object of study

INTRODUCTION

INTRO 0 Hello, may I speak with **[CONTACT NAME]?**

INTRO1 *ASK TO SPEAK TO CONTACT NAME. IF NOT HOME, ASK TO SPEAK TO OTHER HEAD OF HOUSEHOLD*

SCHEDULE A CALLBACK IF NEITHER PERSON IS AVAILABLE.

Hello, I'm _____ of the Blackstone Group, calling on behalf of AEP Ohio. I have just a few questions about the mailings you may have received from AEP in the past few months. Your feedback is important and will help AEP Ohio fine tune the information it sends you. We are only gathering information about your experience and will not attempt to sell you anything. Your name and opinions will be held strictly confidential. This survey will take only a few minutes. Would you be willing to participate?

INTRO 1A. Are you the person in the household who typically reviews your home's AEP electric bill? **[DO NOT READ LIST]**

YES	**1 [CONTINUE]**
NO	**2 [ASK FOR PERSON MOST FAMILIAR. IF NOT AVAILABLE, SCHEDULE CALLBACK]**
LANGUAGE BARRIER	**3 [TERMINATE]**
CUSTOMER SAYS THEY ARE "TOO OLD"	**4 [TERMINATE]**
CUSTOMER SAYS THEY TOSS ANYTHING IN THE MAIL EXCEPT FOR THE BILL	**5**
SCHEDULE CALLBACK	**6**
GENERAL CALLBACK	**7**
REFUSAL	**TERMINATE, RECORD DETAILS**

INTRO 2 [As I said,] we are helping your electric provider, AEP Ohio, determine the value of mailings-- in addition to your monthly bill-- that have recently been sent to your home.

Your candid advice would be extremely helpful to us. AEP Ohio needs to know if these reports are useful to customers or not, and your response will help guide them. The survey will only take about 10 minutes and your answers will be kept confidential and will be combined with responses by other AEP Ohio customers to protect your privacy.

INTRO Q1. Are you the person in your house most involved with your utility bill? **[DO NOT READ LIST]**

1 YES **[CONTINUE]**

2 NO [ASK TO SPEAK TO PERSON MOST INVOLVED WITH THE UTILITY BILL; RETURN TO INTRO 2]

8 DON'T KNOW [THANK AND TERM]

9 REFUSED [THANK AND TERM]

INTRO Q2. How important is it to your household to reduce electricity use and thereby to reduce your bills? On a scale of 0 to 10 where 0=not important at all and 10=extremely important, how would you rate the importance of reducing your household's electricity use?

1 RATING = _____

2 REFUSED/NO RATING

A. AWARENESS AND USE OF THE REPORT

Starting in September 2010, a report that AEP Ohio calls the "Home Energy Report" is mailed monthly to your home. You may have received two or three of these since September.

A1. Do you recall whether your household received one of these Home Energy Reports? **[DO NOT READ LIST]**

1 YES **[CONTINUE to SECTION A2]**

2 DID NOT RECEIVE **[SKIP TO SECTION X]**

8 DO NOT RECALL/DON'T KNOW **[SKIP TO SECTION X]**

A2. OK, so you have been receiving the Home Energy Reports. Who in your household has looked at it (Home Energy Report) even once? [READ ALL, CHECK ALL THAT APPLY]

1 I PERSONALLY READ IT
2 OTHERS IN MY HOUSEHOLD LOOKED AT IT **[SKIP TO SECTION C IF CODE 1 NOT SELECTED]**
3 IT GOT TOSSED OUT AND NO ONE LOOKED AT IT WITH MORE THAN A GLANCE. (IT WAS CONSIDERED JUNK MAIL.)
[MAKE MUTUALLY EXCLUSIVE TO CODES 1 AND 2]
[SKIP TO SECTION X]
8 DON'T KNOW; [MAKE MUTUALLY EXCLUSIVE TO CODES 1 AND 2]
9 REFUSED [MAKE MUTUALLY EXCLUSIVE TO CODES 1 AND 2]
[CONTINUE TO SECTION B ONLY IF A2=1.]

B. QUESTIONS FOR CUSTOMERS WHO READ THE REPORTS

B1. To the best of your recollection, when was the last time you reviewed one of the Home Energy Reports? **[DO NOT READ LIST]**

1 Never reviewed one myself, but others in the house did **[SKIP TO SECTION C]**

2 Within the past week **[CONTINUE TO ITEM B2]**

3 More than a week ago, but within the past month **[CONTINUE TO ITEM B2]**

4 More than a month ago, but sometime since the end of summer/ Labor Day **[CONTINUE TO ITEM B2]**

5 Don't know (GO TO Section X)

6 Refused (GO TO Section X)

B2. Most people are very busy, and I won't assume that you had lots of time to read the report in detail. Based on your memory, roughly how much time did you spend on the report? Did you spend more than 20 minutes reading and thinking about it? 10 minutes? Five minutes? Two minutes? **[DO NOT READ LIST]**

1 More than 20 minutes personally

2 More than 10 minutes personally

3 More than 5 minutes personally

4 Two minutes or less personally

5 Don't recall

B3. In your opinion, is the report... READ LIST

1. Very difficult to understand

2. Somewhat difficult to understand

3. Understandable, but neither difficult nor easy to understand

4. Somewhat easy to understand

5. Very easy to understand

8. DON'T KNOW

9. REFUSED

E. Literacy

To help us classify you in terms of prior energy knowledge, I'd like to ask you two questions about appliances in your home.

EL1.---Do you know what fuel or energy source heats your home ~~in your residence~~?

[DO NOT READ LIST]

a. Electric
b. Natural gas
c. Oil
d. Propane gas
e. Wood
f. Solar
g. NOT SURE
h. Other [SPECIFY]

EL2.---Do you know what fuel or energy source heats the "hot water" in your home?

[DO NOT READ LIST]

a. Electric
b. Natural gas
c. Oil
d. Propane gas
e. Wood
f. Solar
g. NOT SURE
h. Other [SPECIFY]

EL3—Is this residence a single-family building or is it part of a multi-unit complex?

[DO NOT READ LIST]

a. Single family residence
b. Apartment, duplex or condo
c. Other (trailer, seasonal cottage/cabin)

EL4.---Of the following four home activities using electricity, which typically uses the most electricity per month in your household? *(IF ASKED: IN TERMS OF KILOWATT-HOURS OR DOLLARS/CENTS)* **READ LIST**

a. Toaster
b. microwave oven
c. bedroom lighting
d. refrigerator
e. DK/REF

B4.1a Weather has a lot to do with how much electricity people use primarily because of home electric heaters. Ignoring electricity that you may have used for heating, did you change anything else in your home that either might increase or might decrease electricity use?

[DO NOT READ LIST]

1 Yes, we did some things that probably **increased** electric use

2 Yes, we did some things that probably **decreased** electric use

3 No, we didn't make changes that would have change electric use **[SKIP TO B4.2]**

4 Don't know **[SKIP TO B4.2]**

B4.1b What, specifically, do you recall doing to change your electricity use?

[OPEN END] _____

B4.2 Were you or others in your household able to take action on any recommendation or energy tip in your personalized report? **[DO NOT READ LIST]**

1 Yes, I (we) took action on one or more recommendations **[CONTINUE TO B4.2b]**

2 No, I (we) haven't done anything yet **[SKIP TO B4.3]**

B4.2b What, specifically, do you recall doing to change your electricity use?

[OPEN END] _____

B4.3 Did you see much change in your energy report (or electric bill) following your actions?

[DO NOT READ LIST]

1 Yes, electric use dropped

2 Yes, but electric use rose

3 No change observed

4 Don't know; wait and see

C. QUESTIONS ABOUT OTHERS IN HOUSEHOLD WHO READ REPORT

C1. To the best of your knowledge, including **yourself**, which members of your household looked at the Home Energy Report? For example, did a spouse, partner, child or roommate read it? [CHECK ALL THAT APPLY]

1 I read it

2 Read by spouse

3 Read by partner

4 Read by child

5 Read by roommate

6 Read by other [SPECIFY: _____]

7 Don't know

8 REFUSE

[CONTINUE TO SECTION D ONLY IF C1=1. SKIP TO SECTION X IF C1<>1]

D. BELIEVABILITY OF REPORT TO RESPONDENT AND OTHERS IN HOUSEHOLD

D1. To help customers control their electric bills, the Home Energy Reports suggest changes to how people use or select appliances, lighting and other equipment. Do you recall any specific suggestions or energy tips in your personalized report? **[DO NOT READ LIST]**

1 No, don't recall any specifics **[SKIP TO SECTION E]**

2 YES, SPECIFY [OPEN END]

D2. As best as you can, please rate the reasonableness of the recommendations on a scale of 0 to 10 where 0=completely unreasonable and 10=completely reasonable.

1 RATING = _____

2 REFUSED/DON'T KNOW

E. COMPARISONS TO OTHER SIMILARLY SIZED HOMES

E3 The Home Energy Report also provides information about how your home's electricity use compares to that of a group of **homes that are similar in size to yours**. It compares your home's energy use to all similar sized homes and to "efficient" similar sized homes.

E3.1 Do you recall the section in your Home Energy Report that told how your home compared to other homes? **[DO NOT READ LIST]**

1 YES
2 MAYBE
3 NO **[SKIP TO F]**
4 DON'T RECALL
5 REFUSE

E3.2 Did you discuss the comparisons with your family or household members, neighbors, relatives, or people at work/school?

1 YES
2 NO
3 DK/REF

E3.3 Do you have confidence in the report's comparisons—in other words, do you believe that your household is being accurately compared with similar homes?

1 YES
2 NO
3 MIXED FEELINGS; HAVE SOME DOUBTS
4 REFUSED/DK

E3.4 According to your copy of the report, which of the following statements best describes how your home's energy use compares to **all** similar sized homes? [NOTE: Read through items 1-3 before asking the respondent to choose the category] **[SINGLE PUNCH]**

1 We usually use more electricity than similar homes

2 We usually use about the same amount of electricity as similar homes

3 We usually use less electricity than similar homes

4 I don't know (don't recall) how our electricity use compares to similar homes (DO NOT READ)

E3.5 Which of the following statements best describes your home's electricity use compared to "**efficient**" similar sized homes? [NOTE: Read through items 1-3 before asking the respondent to choose the category] **[SINGLE PUNCH]**

1 We usually use more electricity than "efficient" similar sized homes

2 We usually use about the same amount of electricity as "efficient" similar sized homes

3 We usually use less electricity than "efficient" similar sized homes

4 I don't know how our electricity use compares to "efficient" similar sized homes (DO NOT READ)

SECTION X. QUESTIONS FOR CUSTOMERS WHO HAVE NEVER LOOKED AT THE REPORT

X1. Which of the following statements best describes how you think your household's electricity use since September 2010 compares to the same period last year, in 2009? This question refers to the physical volume of electricity your household used, not to the dollars you paid. [READ LIST. SINGLE PUNCH.]

1. We're using a lot more electricity than last year [CONTINUE to X1.1]
2. We're using somewhat more than last year [CONTINUE to X1.1]
3. We're using about the same as last year [SKIP TO F1]
4. We're using somewhat less than last year [SKIP to X1.2]
5. We're using a lot less than last year [SKIP to X1.2]
8. DON'T KNOW
9. REFUSED

X1.1. What might explain the increase in your electricity use compared to last year (check all that apply)? **[DO NOT READ LIST]**

1. SEPT-DEC WAS WARMER THIS YEAR
2. SEPT-DEC WAS COLDER THIS YEAR
3. SWITCHED TO ELECTRIC HEAT
4. INCREASE IN THE NUMBER OF FULL TIME HOUSEHOLD MEMBERS
5. ADDED ADDITIONAL ELECTRONIC OR COMPUTER EQUIPMENT
6. REMODEL/ADDITION PUT ON THE HOUSE
7. RATE INCREASES
8. OTHER (SPECIFY_____
9. DK/REF

[ANY ANSWER TO X1.1, SKIP TO F1]

X1.2 What explains the decrease in your electricity use compared to last year (check all that apply)? [DO NOT READ LIST]

1. SEPT-DEC WAS COOLER THIS YEAR
2. SEPT-DEC WAS WARMER THIS YEAR
3. SWITCHED TO GAS HEAT OR GAS WATER HEATING
4. PURCHASED ENERGY SAVING APPLIANCES/EQUIPMENT
5. DECREASE IN THE NUMBER OF FULL TIME HOUSEHOLD MEMBERS
6. CONSERVING MORE BECAUSE OF CURRENT ECONOMIC SITUATION
7. PURCHASED ENERGY SAVING APPLIANCES/EQUIPMENT
8. ADDED INSULATION/WEATHERIZED HOME
9. BEHAVIORAL CHANGES (TURN LIGHTS OFF MORE OFTEN, TURNED DOWN THERMOSTAT, ETC.)
10. DECREASE IN THE NUMBER OF FULL TIME HOUSEHOLD MEMBERS
11. CONSERVING MORE BECAUSE OF CURRENT ECONOMIC SITUATION
12. OTHER SPECIFY_____
13. DK/REF

F1. Please tell me how strongly you agree or disagree with the following statements using a scale that ranges from 0 to 10 where 0 means "Completely disagree", 10 means "Completely agree' and the midpoint of 5 means "Neither agree nor disagree". To repeat: on one end, zero means completely disagree and on the other end, 10 means completely agree. You can pick any number, with five being neutral: you neither agree nor disagree. (ROTATE THESE STATEMENTS) READ LIST, RECORD RATING FOR EACH

F1.1. The majority of people in my neighborhood are working to be more efficient in their use of electricity.

F1.2. The only good reason to reduce the amount of electricity one uses is to save money. If someone can afford it, there's no reason to worry about how much power someone uses.

F1.3 A majority of people in my neighborhood should be working harder to save electricity for the good of everyone.

F1.4 The U.S. economy always will be able to make as much electricity as everyone wants and at costs comparable to today, if not cheaper.

F1.5 I believe that some ways of making electricity may damage the environment, but the damage will never harm the well-being of humanity.

DEMOGRAPHICS

D1. Including yourself, how many people 18 years and older are currently living in your household? _ _**ALLOW 2 DIGIT RESPONSE**

88. Don't know
99. Refused

D2. How many people younger than 18 years old currently live in your household? _ _**ALLOW 2 DIGIT RESPONSE**

88. Don't know
99. Refused

D3a How many people younger than 18 moved into your household during 2009 or 2010? _ _**ALLOW 2 DIGIT RESPONSE**

88. Don't know
99. Refused

D3b How many people younger than 18 moved **out** of your household during 2009 or 2010? _ _**ALLOW 2 DIGIT RESPONSE**

88. Don't know
99. Refused

D4. How many people **older** than 18 moved **into** your household in 2009 or 2010? _ _**ALLOW 2 DIGIT RESPONSE**

88. Don't know
99. Refused

D4b How many people **older** than 18 moved **out** of your household during 2009 or 2010? _ _**ALLOW 2 DIGIT RESPONSE**

88. Don't know
99. Refused

D5. Which of the following best describes the highest level of education you have completed?
ALLOW ONE RESPONSE ONLY READ LIST

1 Less than high school
2 Graduated high school
3 Some university/college
4 Graduated (2-yr) Community/Technical College
5 Graduated (4-yr) University or College
6 Post Graduate work (beyond 4-yr degree)
88 Don't know
99 Refused

D7. Are you currently working: READ LIST

1 Full time
2 Working part time
3 Unemployed
4 Retired or disabled
5 Refused

Thank you for taking time to help with our survey and the helpful information you provided. Have a great day/evening.

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AEP Ohio
Energy Efficiency/Demand Response Plan
Year 2 (1/1/2010-12/31/2010)

Program Year 2010 Evaluation Report: Prescriptive Program

Presented to

AEP OHIO®

A unit of American Electric Power

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Section E. Executive Summary

This document presents a summary of the findings and results from the evaluation of the 2010 Prescriptive Program implemented by AEP Ohio for the program year January 1, 2010 through December 31, 2010 (PY 2010).[1]

The Prescriptive Program offers incentives to nonresidential customers who install eligible high-efficiency electric equipment. The program launched in mid-year 2009 as the Lighting Program in both the Ohio Power Company (OPCo) and Columbus Southern Power (CSP) service territories. The 2009 program targeted discrete new construction, retrofit, and replacement opportunities in lighting, and the application form was eligible for use in mid year 2009. In April 2010, AEP Ohio launched the 2010 Prescriptive Program and application form that expanded the program to additional end-uses such as HVAC and refrigeration systems, and increased the number of eligible lighting measures. Over 200 eligible measures are included in the 2010 program. The Prescriptive Program provides a streamlined incentive application and quality control process intended to facilitate ease of participation for nonresidential customers interested in purchasing efficient technologies from a pre-qualified list. Relationships with trade ally "Solution Providers" are a key strategy for promoting prescriptive incentive availability to customers.

The Prescriptive Program is marketed, administered, and delivered in both OPCo and CSP service territories as a single program under the gridSMART from AEP Ohio umbrella. The program is administered by an implementation contractor, KEMA Services Inc., in coordination with AEP Ohio.

E.1 Evaluation Objectives

The three major objectives of the evaluation are to: (1) quantify verified gross energy savings and summer peak demand reduction[2] from the program during PY 2010; (2) determine key process-related program strengths and weaknesses and identify ways in which the program can be improved; and (3) provide data to determine program cost-effectiveness.

[1] Program Year 2010 (PY 2010) participation is based on an implementation contractor payment request date to AEP Ohio between January 1, 2010 and December 30, 2010. December 30, 2010 was the last day in 2010 that AEP Ohio could process a 2010 payment.

[2] The summer on-peak period for claiming demand reduction is defined as 3 pm through 6 pm, June through August.

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E.2 *Evaluation Methods*

The data collected for evaluation of the PY 2010 Prescriptive Program were gathered during a number of activities, including in-depth phone interviews with program managers and the implementation contractor (KEMA Services Inc.), in-depth phone interviews with trade ally "Solution Providers," a computer-aided telephone interview (CATI) survey with participating customers, tracking system data review, documentation technical review of a sample of projects, and on-site measurement and verification at customer sites for a subset of projects sampled for the application documentation technical review. Table E-1 provides a summary of these data collection activities including the targeted population, the sample frame, and timing in which the data collection occurred.

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Table E-1. Data Collection Activities for PY 2010 Evaluation

[illegible]	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data Analysis	Prescriptive Program projects approved for payment for the 2010 program year	AEP Ohio Tracking Database	-	All	May 2010 through February 2011
In-depth Interviews	AEP Ohio Program Staff	Contact from AEP Ohio	Business Programs Manager and Prescriptive Program Manager	2	February 2011
	Prescriptive Program Implementers	Contact from AEP Ohio	KEMA Program Implementation Staff	1	
In Depth Interviews	Prescriptive Program Solution Providers	Tracking database	Convenience sample of all Solution Providers	11	December 2010 to February 2011
CATI Survey	Prescriptive Program Participants	Tracking Database	Stratified Random Sample of Prescriptive Program Participants	123	January-February 2011
Project Application File Review	Projects in the 2010 Program	Tracking Database	Stratified Random Sample by Project-Level kWh (3 Strata)	47 (OPCo) 45 (CSP)	October 2010 to February 2011
On-site Measurement & Verification	Projects in the 2010 Program	Application Review Batch 1 Sample	Largest projects	9 (OPCo) 5 (CSP)	January-February 2011

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E.3 Key Findings and Recommendations

The impact results for the PY 2010 Prescriptive Program are shown in Table E-2.

Table E-2. Gross Savings Estimates for the PY 2010 Prescriptive Program

Program	Program Goals		Ex-Ante Claimed Savings		Verified Gross Savings		Adjusted Gross Savings	
	Gross MWh	Gross MW	Gross MWh	Gross MW	Gross MWh	Gross MW	Gross MWh	Gross MW
OPCo	67,304	20.529	64,690	11.556	66,997	12.113	66,997	12.113
CSP	56,474	18.215	81,455	13.446	93,665	13.693	93,665	13.693
Total	**123,778**	**38.744**	**146,146**	**25.002**	**160,661**	**25.807**	**160,661**	**25.807**

For OPCo, the realization rate (defined as verified gross savings / ex-ante claimed savings) is 1.04 for gross energy savings, and 1.05 for gross demand reduction. The relative precision at a 90% confidence level for the 2010 Prescriptive Program projects in the sample is ± 9% for the energy realization rate and ± 4% for the demand realization rate.

For CSP, the realization rate is 1.15 for gross energy savings, and 1.02 for gross demand reduction. The relative precision at a 90% confidence level for the 2010 Prescriptive Program projects in the sample is ± 9% for the energy realization rate and ± 7% for the demand realization rate.

Observations from the verification experience were that KEMA and AEP Ohio have a quality control approach that appears sufficient to prevent inaccuracies, ensure that energy savings are realized, processes applications in a fair and timely manner, and ensures that rebate payments are appropriate.

On-site verification found that quantities and types of measures installed closely matched project documentation, and did not uncover evidence of miscalculations. There were examples of substantial operating hour differences among site verified projects, with several sites having longer hours of operation than assumed by the default values used by AEP Ohio in calculating claimed savings.

For site verified projects, verified demand totaled 2.033 MW compared with claimed demand of 2.002 MW, a ratio of 1.02. For site verified projects, verified energy savings totaled 13,002 MWh compared with claimed energy savings of 11,404 MWh, a ratio of 1.14.

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Key Impact Recommendations

1. AEP Ohio and KEMA intend to expand outreach efforts to achieve greater non-lighting energy savings. The evaluation team suggests targeting HVAC variable speed drives and commercial refrigeration as two areas with good momentum from the 2010 program.
2. KEMA and AEP Ohio should increase the rigor of pre- and post-inspection process and documentation, which are currently sparse and contain minimal information to verify payment. Data collection should be more detailed and include hours of use and whether claiming the HVAC interactive credit is warranted.
3. Breaking out project submittals to multiple space types could be implemented for larger projects by KEMA after the customer submits an application.
4. If the Statewide TRM becomes required during 2011, AEP Ohio will again face a program year in which two TRMs and default savings methodologies are used to estimate ex-ante claimed gross savings. If a statewide TRM is used, AEP Ohio should implement a single TRM/claimed savings methodology and tracking approach for the entire year as soon as possible.
5. Monitor updates to current federal standards and state codes to ensure baselines are appropriate.
6. KEMA should screen participant supplied project cost data and add a field to the tracking system for estimated participant contribution to incremental measure cost.

Key Process Findings and Recommendations

1. Solution Providers support their customers by completing all the applications, communicating with AEP Ohio or KEMA as necessary, and installing the equipment. In general, Solution Providers are very pleased with the program because it increases their business.
2. Most Prescriptive Program participants also like the program. Over three – fourths of them are satisfied with the incentive and the program overall.
3. Timeliness of application and incentive processing was an area of lower participant satisfaction relative to other program aspects, and an area for recommended improvement in 2011.
4. The needs of the Solution Providers and AEP Ohio mesh. Solution Providers would like more marketing support. AEP Ohio would like to expand their marketing by targeting certain segments, such as companies with food services and schools.
5. Twin themes of increased marketing and communication run through the Prescriptive Program evaluation. Customers would like more general knowledge about the program and more specific knowledge about their project.
6. Customers also suggested that AEP Ohio make more use of more cutting edge electronic methods of filing the program application and receiving the program approvals. Email

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communications were preferred over regular mail. Improvements to the program website were also recommended.

7. The dual application for the Custom and Prescriptive Programs is efficient for KEMA and AEP Ohio, but customers and Solution Providers are not as accepting of its efficacy. Most Prescriptive Program participants completed the application or applications themselves. The evaluation team has no information from the study on how many customers did not participate because of the perception the application is too difficult to understand. In the PY 2011 report, the study should be expanded to include those customers who rejected the program in 2011.
8. AEP Ohio and KEMA would like increased communication within the program and more effective communication with customers. Currently, customers can call the AEP Ohio Call Center, the KEMA Call Center, the AEP Ohio Program Manager whose direct number is listed on the website, or the AEP Ohio customer service executive.
9. AEP Ohio and KEMA made important changes during the 2010 program year that improved the program. The Prescriptive and Custom application form was simplified and additional staff was hired or relocated to decrease processing time for the program applications and to develop the Solution Provider network.
10. A few changes are recommended for the PY3 Process Evaluation by the evaluation team.
    - First, the team suggests an evaluation of how the participation in the Prescriptive Program influences positive ratings of AEP Ohio.
    - Second, the team suggests that in PY3 near participants are surveyed to determine what factors prevent customer participation.
    - Last, the team suggests a survey with a statistically representative sample of Solution Providers rather than an in-depth interview of a small number of Solution Providers.

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Section 1. Introduction and Purpose of the Study

The Prescriptive Program offers incentives to nonresidential customers who install eligible high-efficiency electric equipment. The program launched in mid-year 2009 as the Lighting Program in both the Ohio Power Company (OPCo) and Columbus Southern Power (CSP) service territories. The 2009 program targeted discrete new construction, retrofit, and replacement opportunities in lighting, and the application form was eligible for use in mid year 2009. In April 2010, AEP Ohio launched the 2010 Prescriptive Program and expanded the application form to include additional end-uses such as HVAC and refrigeration systems, and increased the number of eligible lighting measures. Over 200 eligible measures are included in the 2010 program. The Prescriptive Program provides a streamlined incentive application and quality control process intended to facilitate ease of participation for nonresidential customers interested in purchasing efficient technologies from a pre-qualified list. Relationships with trade ally "Solution Providers" are a key strategy for promoting prescriptive incentive availability to customers.

The Prescriptive Program is marketed, administered, and delivered in both OPCo and CSP service territories as a single program under the gridSMART from AEP Ohio umbrella. The program is administered by an implementation contractor, KEMA Services Inc., in coordination with AEP Ohio.

1.1 Evaluation Overview

The three major objectives of the evaluation are to: (1) quantify energy savings and summer peak demand reduction from the program during PY 2010; (2) determine key process-related program strengths and weaknesses and identify ways in which the program can be improved; and (3) provide data to determine program cost-effectiveness.

The evaluation will seek to answer the following key research questions.

Impact Questions

1. Were the impacts reported by the program achieved?

2. What were the realization rates? (Defined as evaluation-verified (ex-post) savings divided by program-reported (ex-ante) savings.)

3. What are the benefits and costs and cost effectiveness of this program?

The PY 2010 evaluation provides separate quantitative results for Ohio Power Company and Columbus Southern Power for each of these three impact questions.

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Process Questions

Marketing and Participation

1. Is the program outreach to customers through the program and program Solution Providers effective in increasing awareness of the program opportunities?

2. How did customers become aware of the program? What marketing strategies could be used to boost program awareness?

Program Characteristics and Barriers

1. What areas could the program improve to create a more effective program for customers and Solution Providers partners and help increase the energy and demand savings impacts?

2. Is the application process efficient and easy for customers to navigate? Does the process present any barriers to program participation?

3. Are customers and program partners satisfied with the aspects of program implementation in which they have been involved?

Administration and Delivery

1. Are the program administrative and delivery processes effective for smoothly providing incentives to customers?

2. What were the early program satisfaction and customer service experiences?

3. What are the verification procedures for the program? Have they been implemented in a manner consistent with design? Do they present a barrier to participation or perceived undue burden on customers?

The PY 2010 evaluation presents findings for each of these process questions. Findings were combined for Ohio Power Company and Columbus Southern Power to be consistent with AEP Ohio's approach of delivering a single program statewide. Both utilities customers were represented in the samples.

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Section 2. Description of the Program

This evaluation report covers the Prescriptive Program element of the AEP Ohio gridSMART business energy efficiency and peak demand reduction programs.

2.1 Program Description

2.1.1 Business Sector Programs

Ohio passed comprehensive energy legislation in Senate Bill on May 1, 2008.[3] The law directs Ohio utilities to implement programs to help their customers use electricity more efficiently, and requires electric utilities to achieve, on an incremental year basis, energy savings of 22.2% of baseline electricity use by the end of 2025 through energy efficiency programs. Utilities must also implement programs to reduce peak energy demand one percent beginning in 2009, and an additional 0.75% per year through 2018, for a total of 7.75%.

In response to the new legislative requirements, AEP Ohio launched a set of Energy Efficiency/Peak Demand Reduction ("EE/PDR") programs for 2009-2011 under a three-year action plan approved by the Public Utilities Commission of Ohio. The 2010 Prescriptive Program was one of four program elements available to non-residential customers of AEP Ohio's two operating companies, Ohio Power Company and Columbus Southern Power during 2010:[4]

- The **Prescriptive Program** provides a streamlined incentive application and quality control process, and intended to facilitate ease of participation for nonresidential customers interested in purchasing efficient technologies from a pre-qualified list. Relationships with trade ally "Solution Providers" are a key strategy for promoting prescriptive incentive availability to customers. The 2009 program began in May 2009 and targeted discrete new construction, retrofit, and replacement opportunities in lighting, and the application form was eligible for use in mid year 2009. In April 2010, AEP Ohio launched the 2010 Prescriptive Program and expanded the application form to include additional end-uses such as HVAC and refrigeration systems, and increased the number of eligible lighting measures.
- The **Custom Program** offers incentives to customers for less common or more complex energy-saving measures installed in qualified retrofit and equipment replacement projects and processes.

[3] http://www.legislature.state.oh.us/bills.cfm?ID=127_SB_221

[4] A fourth business sector program, Express Install was initiated during the last quarter of 2010.

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- The **Self-Direct Program** rewards qualifying customers who submit previously installed projects through one of two energy efficiency credit options: an energy efficiency credit payment of 75% of the calculated incentive amount under the Prescriptive or Custom Programs; or an exemption from the Energy Efficiency/Peak Demand Reduction (EE/PDR) rider for a specified number of months. The 2010 program targeted projects installed after January 1, 2007 and prior to December 31, 2010.
- The **Express Install Program** provides one-stop turn-key service to small businesses (less than 200,000 kWh consumption per year) for lighting and refrigeration measure upgrades. Approved service providers recruit participants, identify savings opportunities, complete program paperwork and install measures for the program. The Express Install Program launched in November 2010 and has limited participation in Program Year 2010. Savings estimates are based on prescriptive formulas for simplicity and auditability.

The AEP Ohio gridSMART programs are funded on a 2009 to 2011 Plan basis. Funding in any given program is limited to the total Plan budgeted amount and, therefore, incentives are paid on a first-come, first-served basis until the Plan's incentive funds are exhausted. Funds may be shifted between the multiple business program elements based on participant response and approval of the Public Utilities Commission of Ohio.

AEP Ohio retained KEMA Services Inc. as its program administrator responsible for day-to-day operations of the Business Programs. AEP Ohio Prescriptive, Custom and Self-Direct Program Managers report to an overall Business Programs Manager. An AEP Ohio staff person supports outreach and marketing, and other AEP Ohio staff support planning, evaluation, education, and reporting. Customer Service staff at OPCo and CSP promote the business programs to their assigned customers. KEMA provides the project and measure tracking system while AEP Ohio maintains systems for program level tracking and reporting.

2.1.2 Prescriptive Program Description

According to the program manager, the goals of the Prescriptive Program in 2010 were to exceed the kWh targets in the Plan at or below the program budget, improve customer satisfaction with the program and overall, increase outreach to customers and internally involve customer service people more to promote the program to assigned customers. A summary of the important aspects of Prescriptive Program follows.

Incentive Caps. Incentives are subject to project caps and yearly caps that are set per each business entity and vary by customer tariff. The project cap is $300,000 and the yearly cap is $600,000 per year for General Service tariffs 1, 2, and 3 and $600,000 overall for 2009 through 2011 for General Service tariff 4.

Incentive Limits. Project incentives cannot exceed 50 percent of the total project cost.

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Preapproval and Final Applications. Customers must submit pre-applications and final applications. In PY 2010, lighting layouts, fixture counts, and calculation spreadsheets were required for permanent lamp removal, new T8/T5 fixture retrofits, lighting occupancy sensors, and new construction.

Pre-Review. KEMA reviews pre-approval applications for eligibility and completeness. KEMA contacts the customer or contractor to clarify details or obtain further information, to discuss the overall process and timelines, and to explain the process for inspections where they are required.

Pre-Inspection. Pre-inspections provide AEP Ohio with the opportunity to verify the existing conditions at the site. These site visits are performed as defined by quality assurance procedures based on the type of measures that the participant submits.

Reservation. The program reserves the project funds once the pre-inspection report and/or initial project review is approved. Projects that come in after funds are fully reserved are placed on a waiting list. In the event that a project is not completed within 90 days of the reservation and an extension has not been requested and granted, the project may be cancelled. Prior to cancellation, AEP Ohio will follow-up with the customer to work out an extension or confirm that the project should be cancelled.

Final Submittal. Final applications must be submitted within 60 days of project completion and include the appropriate back-up documentation to verify the project is complete and meets the program requirements. The program reviews final applications for eligibility and completeness.

Final Inspection. The program performs final inspections as defined by quality assurance/quality control (QA/QC) procedures to verify the measures installed.

Incentive Payment. Once the program accepts a project for payment, incentives are processed and delivered within 30 days.

Cancellation. When a project either does not meet the program guidelines or is cancelled by the customer, the project is moved to the cancelled status. The project details remain in the database, but the project no longer counts towards the active program goals.

Wait List. If project applications and related funding requests reach the point where AEP Ohio determines that further funding reservations can no longer be made, the program moves projects to a waiting list. Projects on the wait list will not be reserved or paid unless sufficient funding becomes available. Wait list projects are not included in the active program totals. A wait list was not been employed by the 2010 program.

Hold: Projects are placed on hold when there is poor or no documentation to process the application or when a customer with a reserved project decides not to move forward in the current program year and indicates that it may move forward with a project in the following year. Projects on hold are not included in the active program totals.

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Measures and Incentives for PY 2010

The PY 2009 and PY 2010 program application forms listing measures, eligibility criteria, and incentive levels are provided in an Appendix.

Solution Provider Participation

AEP Ohio and KEMA launched a Solution Provider (trade ally) network of contractors in April of 2010. This is a network of contractors that have been trained on the program, have applied to market the program, and are listed on the AEP Ohio website as a registered contractor for the business sector programs. Through 2010, about 120 Solution Providers have been trained or approved to market the AEP Ohio business sector programs. In addition, Solution Providers can participate in a program without registering with AEP Ohio.

2.2 *Program Year 2010 Prescriptive Program Participation*

The evaluation team was able to extract key program participation data from AEP Ohio's tracking database, which was provided in Excel spreadsheet format. Database spreadsheet tabs included a project level dataset with project total impacts, application submittal and status data, and internal approval information. Project data was linked by a unique project number to measure level information – one tab per measure category (Lighting, HVAC, Refrigeration, etc.). The technical basis for AEP Ohio's ex-ante claimed gross savings is described in Section 3.1.1.

All data was tracked separately between the two service territories, Ohio Power Company (OPCo) and Columbus Southern Power (CSP). Generally, evaluation results are shown separately for each service territory, except where summary tables combine program participation numbers. Table 2-1 and Table 2-2 provide a profile of PY 2010 Prescriptive Program participation at the project level, Table 2-3 and

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Table 2-4 provide participation at the end-use summary level, and Table 2-5 and Table 2-6 provide detailed measure level breakouts.

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Table 2-6
Out of the total of 1,035 projects with unique program ID's that had Prescriptive Program measures installed during the PY 2010 program year, there were 50 projects that had prescriptive and custom measures installed. For these combined measure type projects, the custom measures were removed from the Prescriptive Program ex-ante claimed gross savings. The custom measures are evaluated through the Custom program evaluation. Likewise, the Custom program evaluation has removed Prescriptive Program measure savings from combined measure type projects being evaluated. Customer contacts are coordinated between the two program evaluations.

For OPCo, participation is highest within light and heavy industry customers, which combined for 61% of claimed energy savings. Participation was also high within warehouses and retail customers, which had significant participation by businesses that submitted multiple projects for chain locations. Miscellaneous customer types accounted for was 17% of the project count and 7% of claimed energy savings. Miscellaneous included significant participation by projects in city and county government, including traffic signals.

For CSP, participation was highest in warehouse customers at 47% of claimed energy savings, while light and heavy industry customers were also significant contributors, combining for an additional 19% of claimed energy savings. The high participation by the warehouse business type for CSP was driven by one customer submitting multiple lighting retrofit projects that accounted for 27% of CSP's total Prescriptive Program claimed energy savings. Retail chains and office branch customers participated across the OPCo and CSP territories. The coding of Government/Municipal as Miscellaneous also occurred for CSP.

Table 2-1. PY 2010 OPCo Prescriptive Program Participation by Business Type

Business Type	Project Count		Ex-Ante Claimed Savings, Gross MWh		Ex-Ante Claimed Savings, Gross MW	
Heavy Industry	68	13%	25,849	40%	3.752	32%
Light Industry	65	13%	13,293	21%	2.689	23%
Warehouse	28	6%	5,533	9%	0.951	8%
Miscellaneous	88	17%	4,654	7%	0.872	8%
Retail/Service	92	18%	4,350	7%	0.964	8%
College/University	7	1%	2,934	5%	0.591	5%
Office	40	8%	2,783	4%	0.814	7%
School	59	12%	2,213	3%	0.530	5%
Medical	22	4%	1,556	2%	0.198	2%
Grocery	14	3%	840	1%	0.130	1%
Hotel/Motel	3	1%	553	1%	0.044	0%

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Business Type	Project Count		Ex-Ante Claimed Savings, Gross MWh		Ex-Ante Claimed Savings, Gross MW	
Restaurant	18	4%	131	0%	0.020	0%
Total	**504**	**100%**	**64,690**	**100%**	**11.556**	**100%**

Source: Evaluation analysis of tracking data from AEP Ohio database exports from January 7, 2011 and February 21, 2011.

Table 2-2. PY 2010 CSP Prescriptive Program Participation by Business Type

Business Type	Project Count		Ex-Ante Claimed Savings, Gross MWh		Ex-Ante Claimed Savings, Gross MW	
Warehouse	80	15%	38,520	47%	5.143	38%
Light Industry	38	7%	8,135	10%	1.518	11%
Heavy Industry	13	2%	7,443	9%	1.017	8%
Miscellaneous	120	23%	7,253	9%	1.323	10%
Retail/Service	104	20%	6,449	8%	1.410	10%
Office	85	16%	6,336	8%	1.945	14%
Medical	10	2%	4,065	5%	0.453	3%
School	34	6%	1,150	1%	0.285	2%
Grocery	11	2%	804	1%	0.129	1%
Restaurant	32	6%	651	1%	0.094	1%
College/University	3	1%	646	1%	0.127	1%
Hotel/Motel	1	0%	2	0%	0.002	0%
Total	**531**	**100%**	**81,455**	**100%**	**13.446**	**100%**

Source: Evaluation analysis of tracking data from AEP Ohio database exports from January 7, 2011 and February 21, 2011.

Table 2-3 and

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Table 2-4 show the program participation breakdown for each operating company between end-use components. For both service territories, lighting dominated the impacts with 99% of the ex-ante claimed savings. This is not unexpected, given that non-lighting end-uses were added in April 2010, and projects require time to work through the participation process. The largest non-lighting end-uses were HVAC and Refrigeration.

Table 2-3. PY 2010 OPCo Prescriptive Program Participation by End-Use Type

End Use Type	Ex-Ante Claimed Savings, Gross MWh		Ex-Ante Claimed Savings, Gross MW	
Lighting	63,998	99%	11.359	98%
HVAC	305	0%	0.138	1%
Refrigeration	377	1%	0.057	0%
Motors	5	0%	0.001	0%
Other	5	0%	0.001	0%
Total	**64,690**	**100%**	**11.556**	**100%**

Source: Evaluation analysis of tracking data from AEP Ohio database exports from January 7, 2011 and February 21, 2011.

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Table 2-4. PY 2010 CSP Prescriptive Program Participation by End-Use Type

End Use Type	Ex-Ante Claimed Savings, Gross MWh		Ex-Ante Claimed Savings, Gross MW	
Lighting	80,574	99%	13.306	99%
HVAC	203	0%	0.031	0%
Refrigeration	675	1%	0.108	1%
Motors	-	0%	-	0%
Other	4	0%	0.001	0%
Total	**81,455**	**100%**	**13.446**	**100%**

Source: Evaluation analysis of tracking data from AEP Ohio database exports from January 7, 2011 and February 21, 2011.

Among lighting measures, "New T8/T5 Fixtures" dominated the savings, mainly through high-bay fluorescent conversions in warehouses and industry, which were often combined with occupancy sensors, another top measure. Together, this combination provided over 70% of claimed savings for each operating company. High performance and reduced wattage T8 lighting and various conversions of T12 lighting to T8 were also major measures. Among non-lighting measures, variable frequency drives on HVAC fans and pumps and LED refrigerated case lighting were prominent.

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Table 2-5. PY 2010 OPCo Prescriptive Program Participation by Measure Type

End Use	Measure	Ex-Ante Claimed Savings, Gross MWh		Ex-Ante Claimed Savings, Gross MW	
Lighting	New T8/T5 Fixture	44,444	69%	7.596	66%
Lighting	HP or RW T8 - 4-ft Lamp and Ballast	5,517	9%	1.112	10%
Lighting	Lighting Occupancy Sensors	3,852	6%	0.824	7%
Lighting	Permanent Lamp Removal	2,698	4%	0.520	4%
Lighting	Compact Fluorescent Screw-in	2,692	4%	0.428	4%
Lighting	HP or RW T8 - 4-ft RW Lamp only	1,030	2%	0.217	2%
Lighting	RW T8 - 8-ft Lamp and Ballast	540	1%	0.121	1%
Lighting	LED Traffic Signals	457	1%	0.113	1%
Lighting	New Construction	456	1%	0.076	1%
Lighting	LED, T-1, or Electroluminescent Exit Signs	444	1%	0.054	0%
Lighting	LED/Cold Cathode/Induction Lamps	437	1%	0.074	1%
Lighting	2-ft, 3-ft &/or 4-ft U tube T12 to T8	388	1%	0.080	1%
Lighting	Interior Garage Lighting	310	0%	0.035	0%
Lighting	Pulse Start or Ceramic MH	257	0%	0.055	0%
Lighting	Exterior Lighting	229	0%	-	0%
Lighting	RW T8 - 8-ft Lamp only	162	0%	0.038	0%
Lighting	Hardwired Compact Fluor. Fixtures	83	0%	0.017	0%
Lighting	Daylight Sensor Controls	1	0%	0	0%
HVAC	HVAC VSD	224	0%	0.010	0%
HVAC	Chillers	64	0%	0.106	1%
HVAC	Unitary & Split AC and ASHP	17	0%	0.022	0%
Refrigeration	LED Refrigeration Case Lighting	302	0%	0.049	0%
Refrigeration	Refrigeration Other	75	0%	0.007	0%
Motors	Motors	5	0%	0.001	0%
Other	Food Service	5	0%	0.001	0%
Total	**Total**	**64,690**	**100%**	**11.556**	**100%**

Source: Evaluation analysis of tracking data from AEP Ohio database exports from January 7, 2011 and February 21, 2011.

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Table 2-6. PY 2010 CSP Prescriptive Program Participation by Measure Type

[redacted]	Measure	Ex-Ante Claimed Savings, Gross MWh		Ex-Ante Claimed Savings, Gross MW	
Lighting	New T8/T5 Fixture	50,439	62%	7.595	56%
Lighting	Lighting Occupancy Sensors	9,113	11%	1.508	11%
Lighting	HP or RW T8 - 4-ft Lamp and Ballast	7,383	9%	1.513	11%
Lighting	Permanent Lamp Removal	4,844	6%	1.058	8%
Lighting	Compact Fluorescent Screw-in	2,358	3%	0.436	3%
Lighting	New Construction	1,653	2%	0.330	2%
Lighting	HP or RW T8 - 4-ft RW Lamp only	1,597	2%	0.332	2%
Lighting	2-ft, 3-ft &/or 4-ft U tube T12 to T8	923	1%	0.167	1%
Lighting	LED, T-1, or Electroluminescent Exit Signs	734	1%	0.090	1%
Lighting	LED/Cold Cathode/Induction Lamps	438	1%	0.089	1%
Lighting	RW T8 - 8-ft Lamp and Ballast	437	1%	0.094	1%
Lighting	Hardwired Compact Fluor. Fixtures	308	0%	0.058	0%
Lighting	Exterior Lighting	163	0%	-	0%
Lighting	Daylight Sensor Controls	118	0%	0.024	0%
Lighting	Interior Garage Lighting	46	0%	0.005	0%
Lighting	Pulse Start or Ceramic MH	19	0%	0.005	0%
Lighting	LED Traffic Signals	-	0%	-	0%
Lighting	R T8 – 8-ft Lamp only	-	0%	-	0%
HVAC	HVAC VSD	191	0%	0.010	0%
HVAC	Chillers	-	0%	-	0%
HVAC	Unitary & Split AC and ASHP	12	0%	0.021	0%
Refrigeration	LED Refrigeration Case Lighting	641	1%	0.104	1%
Refrigeration	Refrigeration Other	34	0%	0.004	0%
Motors	Motors	-	0%	-	0%
Other	Food Service	5	0%	0.001	0%
Total	**Total**	**81,455**	**100%**	**13.446**	**100%**

Source: Evaluation analysis of tracking data from AEP Ohio database exports from January 7, 2011 and February 21, 2011.

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Section 3. Methodology

For Prescriptive Program participants, the evaluation team conducted impact and process evaluation activities following the methodologies outlined below.

3.1 *Analytical Methods*

3.1.1 Impact Evaluation Methods

The objective of this element of the impact evaluation is to verify or adjust the ex-ante claimed gross savings in the Prescriptive Program tracking system. Savings verification is conducted through a multi-step approach:

- **Tracking System Savings Review**, to identify potential adjustments to ex-ante claimed savings for measures due to outliers, missing information, or tracking system data entry or calculation errors. Evaluation adjustments identified through the Tracking System Savings review are made to all measures in the population where the adjustment is found to be applicable.
- **Default Measure Savings Assessment**, to identify potential adjustments to ex-ante claimed savings for prescriptive measures where the evaluation team recommends an alternative default value for a specific measure.
- **Application Documentation Technical Review**, to identify potential adjustments to ex-ante claimed savings for measures based on review of documentation, assumptions, and engineering analysis for a sample of projects. Sampling is discussed in the following Section 3.3.1.
- **Participating Customer Phone Interviews**. Customer responses to the CATI phone survey were used to inform adjustments to energy savings algorithms, but ***only*** for those projects that were sampled for Application Documentation Technical Review.
- **On-site Verification.** On-site verification was conducted by the evaluation team on a subset of projects selected from the Application Documentation Technical Review sample.
- **Other Adjustments to Savings**. Other adjustments to savings could include statistical or baseline adjustments to verified savings.

The basis for AEP Ohio's ex-ante claimed savings depends upon multiple factors. Measures may be submitted for the Prescriptive Program through the Prescriptive Program application process. If measures do not meet Prescriptive Program criteria, these may then be proposed as Custom Program measures. A single project may consist of both Prescriptive and Custom measures. Several common Prescriptive measures submitted on the 2010 application form were

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custom measures on 2009 applications which were accepted into the middle of 2010. Examples include LED refrigeration case lighting and various other lighting measures.

Claimed savings for Prescriptive measures are based on a technical reference manual (TRM) developed by KEMA. Measures submitted on the 2009 application forms had ex-ante savings estimated and tracked using the PY 2009 version of the program TRM documented in Appendix A of KEMA's January 25, 2010 Operations Manual. An updated TRM was developed by KEMA for the PY 2010 program year, dated August 5, 2010, and used for measures submitted through the 2010 application form.

Sampling was conducted separately for OPCo and CSP. Application Documentation Technical Review was conducted on a sample of projects randomly selected from the operating company customer participant populations. For each selected project, an in-depth review of project documentation is performed to assess the engineering methods, parameters and assumptions used to generate all ex-ante claimed gross savings. When available, all measure specifications and quantities were verified by reviewing the accompanying inspection and specification documents as well as installation invoices.

For each measure in the sampled project, the evaluation team estimated verified gross savings based on the review of project documentation and engineering analysis. Adjustments to estimate verified savings were based on building-specific information, invoices, specifications sheets and other documentation to the extent it was judged more representative of the project than default measure savings assumptions.

Categories of changes to ex-ante claimed savings included the following:

- Building type
- Hours of use
- Coincidence factor
- Equipment quantities from invoices
- Space cooling HVAC interaction factor credit
- Baseline equipment specifications
- Post retrofit equipment specifications
- Other changes, such as analysis methodology
- Review and application (if appropriate) of participant phone survey impact data (reported hours of use, reported baseline equipment, installation in non-air-conditioned space) to projects in the Application Documentation sample
- Review and application of on-site collected data

When possible, measure quantities were verified by comparing them to invoices by lighting contractors or suppliers. If a post-inspection was carried out, measure quantities and

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specifications from the inspection were assumed to be correct. Where it was not possible to verify measure quantities from independent documents, it was assumed that the implementer quantities were correct. When baseline and/or new equipment specifications were not available (i.e. fixture wattages), default values from the Appendix A TRM were assumed, so long as these were appropriate for the site application. Energy reduction algorithms were followed to compute ex-post savings.

In addition to reviewing the inputs to savings estimates, the methodologies and results from the implementer were compared to outside sources from the literature when appropriate. For example, as part of the review process for sites involving LED traffic signals, the implementer results were compared to other TRMs.

On-site Data Collection

For each operating company, eight on-site surveys were planned, with sites selected from the application documentation review sample. During the scheduling process, three sites did not agree to a site visit during the time available, and an attempt was made to replace them with back-up sites selected from the application documentation review sample. The evaluation team was successful in completing two site visits with back-up sites. One other site that received a site visit was later dropped from the sample due to data collection problems. In the final count, 14 site visits were completed, and they were distributed 9 for OPCo and 5 for CSP.

An analysis plan is developed for each project scheduled for on-site data collection. Each plan explains the general gross impact approach used (including monitoring plans), provides an analysis of the current inputs (based on the application and other available sources at that time), and identifies sources that will be used to verify data or obtain newly identified inputs for the ex-post gross impact approach. For most projects on-site sources include interviews that are completed at the time of the on-site visit, visual inspection of the systems and equipment, spot measurements, and short-term monitoring (e.g., less than four weeks).

During the on-site audit, data identified in the analysis plan is collected, including monitoring records (such as instantaneous spot watt measurements for relevant equipment, data from equipment logs and EMS/SCADA system downloads), equipment nameplate data, system operation sequences and operating schedules, and a careful description of site conditions that might contribute to baseline selection.

All field technicians and engineers who conduct audits are trained and experienced in completing inspections for related types of projects. Each carries standardized data collection forms customized for AEP Ohio and all equipment required to conduct the planned activities. The auditors check in with the site contact upon arrival at the building, and check out with that same site contact, or a designated alternate, on departure. The on-site audit consists of a

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combination of interviewing and taking measurements. During the interview, the engineer meets with a building representative who is knowledgeable about the facility's equipment and operation, and asks a series of questions regarding operating schedules, location of equipment, and equipment operating practices.

Following the interview, the engineer makes a series of detailed observations and measurements of the building and equipment. If short-term monitoring was conducted, the data collection process was discussed with the site contact, and then the data gathering units were deployed. All information was recorded and checked for completeness before leaving the site.

After all of the field data is collected, including any monitoring data, annual energy and demand impacts are developed based on the on-site data, monitoring data, application information, and, in some cases, billing or interval data. Each project engineering analysis is based on calibrated engineering models that make use of hard copy application review and on-site gathered information surrounding the equipment installed through the program (and the operation of those systems). The summer on peak period for claiming demand reduction is defined as 3 pm through 6 pm, June through August.

Verification Results

Once the verified gross impacts were developed for each project in the sample, the results are reviewed by a senior engineer. Using verified gross savings results, the evaluation team estimated a verified gross realization rate (which is the ratio of the verified gross savings to ex-ante claimed gross savings) by stratum for each operating company. The stratum-level realization rates were then applied to the population of ex-ante claimed gross savings by strata, and summed up to the population using the strata weights. The result is an ex-post estimate of verified gross savings for the program for OPCo and CSP.

3.1.2 Process Evaluation Methods

The purpose of the process evaluation is to assess the effect of the program structure and program implementation on program performance and customer satisfaction. The evaluation team's process efforts provide insights and recommendations to support the continued success of the Prescriptive Program.

Central to the process evaluation for the Prescriptive Program were interviews with program managers and review of relevant program tracking databases, documents, and other materials to understand how the program has evolved from the previous year. In addition, the evaluation team conducted a large CATI survey with participating customers to better understand customer satisfaction and perceptions related to the program. Finally, the evaluation team

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conducted several interviews with Solution Providers to identify their perspectives on the program.

The evaluation team used senior staff members to conduct these in-depth qualitative interviews. Senior staff were flexible in their approach to the discussion, allowing the respondent to talk about his/her experience or perspective while still shaping the discussion toward the most important, relevant and necessary information. The team conducted the interviews by telephone in order to complete the interviews quickly and to be flexible to the respondents' schedule.

Interview guides were developed to be open-ended and to allow for a free-flowing discussion between interviewer and respondent and real time interviewing flexibility. The team developed guides which highlighted the key issues, but did not require being read verbatim to offer the interviewer the flexibility to delve deeply into pertinent issues based on the respondents' knowledge of and experience with the program.

The evaluation team took detailed notes during each in-depth interview and/or taped the discussion to ensure thorough documentation of each interview. For any quantitative questions, interviewers are trained to record and summarize responses to allow the evaluators to draw conclusions in the analysis.

3.2 *Data Sources*

The data collected for evaluation of the PY 2010 Prescriptive Program was gathered during a number of activities including in-depth phone interviews with program managers and the implementation contractor (KEMA Services Inc.), in-depth phone interviews with trade ally "Solution Providers," a computer-aided telephone interview (CATI) survey with participating customers, tracking system data review, documentation technical review of a sample of projects, and on-site measurement and verification at customer sites for a subset of projects sampled for the application documentation technical review. Table 3-1 provides a summary of these data collection activities including the targeted population, the sample frame, and the time frame in which the data collection occurred.

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Table 3-1. Data Collection Activities for PY 2010 Evaluation

Data Collection Activity	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data Analysis	Prescriptive Program projects approved for payment for the 2010 program year	AEP Ohio Tracking Database	-	All	May 2010 through February 2011
In-depth Interviews	AEP-Ohio Prescriptive Program Staff	Contact from AEP-Ohio	Business Programs Manager and Prescriptive Program Manager	2	February 2011
	Prescriptive Program Implementers	Contact from AEP-Ohio	KEMA Program Implementation Staff	1	
In Depth Interviews	Prescriptive Program Solution Providers	Tracking database	Convenience sample of all Solution Providers	11	December 2010 to February 2011
CATI Survey	Prescriptive Program Participants	Tracking Database	Stratified Random Sample of Prescriptive Program Participants	123	January-February 2011
Project Application File Review	Projects in the 2010 Program	Tracking Database	Stratified Random Sample by Project-Level kWh (3 Strata)	47 (OPCo) 45 (CSP)	October 2010 to February 2011
On-site Measurement & Verification	Projects in the 2010 Program	Project Application Review Batch 1 Sample	Largest projects	9 (OPCo) 5 (CSP)	January-February 2011

Tracking Data

The Prescriptive Program evaluation team was able to extract key program participation data from AEP Ohio's tracking database, which was provided in Excel spreadsheet format. The tracking data delivered for this evaluation was extracted from a program tracking database maintained by KEMA. Program samples for the Computer Assisted Telephone Interview (CATI) participating customer phone sample were drawn from a December 10, 2010 extract, while impact evaluation used extracts dated July 29, 2010, October 7, 2010 and January 7, 2011 and revised February 8 and February 21, 2011.

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Database spreadsheet tabs included a project level dataset with project total impacts, application submittal and status data, and internal approval information. Project data was linked by a unique project number to measure level information – one tab per measure category (Lighting, HVAC, Refrigeration, etc.). All data was tracked separately between the two service territories, Ohio Power Company (OPCo) and Columbus Southern Power (CSP).

The evaluation team conducted the tracking system review and sample design for application file review using database exports of the tracking system data from July 29, 2010 and January 7, 2011. Sample design and selection for the 2010 Prescriptive Program was done on a batch-wise basis, with one batch drawn in August 2010 from the July 29 2010 extract, and a second and final sample batch of roughly equal size drawn after the close of the program year, using the January 7, 2011 data.

The final tracking system review and ex-ante savings estimates were based on the final database version that incorporated updates to final claimed impacts dated February 21, 2011. The differences between the January 7 and February 21 versions related to treatment of ex-ante claimed gross savings for lighting measures submitted with the 2009 Prescriptive Program application form versus the 2010 Prescriptive Program application form. For the January 7 extract and earlier, prescriptive lighting measures submitted with the 2009 application form had ex-ante claimed savings based on an average per unit savings that was ***not*** business-type specific. Instead, KEMA recorded prescriptive lighting savings using per unit impacts that were an un-weighted average across all business types. The 2009 application form included check boxes for participants to provide their "Building Type."

For lighting measures submitted on the 2010 application form, KEMA's tracking system recorded claimed savings that were business-type specific, based on a "Business Type" check box on the application. In addition, the 2010 application had an optional check box for daily operating shift schedule (24 hours/day, 16 hours/day, and 8 hours/day). The 2010 application was released in April 2010, so the 2010 program contained a mix of 2009 and 2010 application forms.

After discussion with AEP Ohio, it was decided that KEMA should convert impacts on lighting measures submitted on 2009 application forms to business-type specific values so that there was a consistent basis for ex-ante claimed savings. This change was accomplished by KEMA and AEP Ohio by adjusting the ex-ante energy impacts of 2009 lighting measures using the 2010 values for default business specific hours of use and HVAC energy interaction factors, and adjusting the ex-ante demand reduction for business specific demand HVAC interaction and coincidence factors. This adjustment resulted in a "Corrected" set of ex-ante data that was made final on February 21, 2011. The corrected data contained the revised impacts for 2009 application form lighting measures and the corresponding project-level impacts.

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Project and Program Documentation

To support the engineering review, AEP Ohio provided project documentation in electronic format for each sampled project. Documentation included some or all of scanned files of hardcopy application forms and available supporting documentation from the applicant (invoices, measure specification sheets, vendor proposals), and KEMA calculation spreadsheets. This documentation was provided by uploading to a secure file transfer site.

The evaluation team also reviewed program materials developed by KEMA and AEP Ohio, including: two versions of the KEMA technical reference manual documenting prescriptive savings (Appendix A of the operations manual), application forms and checklists, and program materials available from the program website (www.gridsmartohio.com).

Program and Implementer Staff Interviews

Three in-depth staff interviews were conducted as part of this evaluation. Two of these interviews were conducted with AEP Ohio Business Programs Manager and the Prescriptive Program Manager. The third interview was conducted with a member of the KEMA implementation staff. These interviews were completed in December, 2010 and February 2011. The interviews with the Program Managers focused on program processes to better understand the goals of the program, how the program was implemented, the perceived effectiveness of the program, and also verified evaluation priorities. The interview with the implementation staff explored the implementation of the program in more detail and also covered areas of data tracking and quality assurance. The interview guides used for these interviews are included in the appendices.

Solution Providers In-Depth Interviews

Eleven in-depth interviews with participating Solution Providers were conducted as part of this evaluation to identify outreach effectiveness and barriers to participation. The Solution Providers were selected based on experience and willingness to answer questions from contact information provided on the application forms from the population of paid 2010 Prescriptive Program projects.

CATI Phone Survey

A computer-assisted telephone interview (CATI) was completed with 141 Prescriptive Program participants with paid projects in 2010. This survey focused on questions to estimate the program impacts and to support the process evaluation. All CATI interviews were completed in February 2011.

The CATI survey targeted a population of 511 unique customer contact names drawn from the tracking system for PY 2010 paid Prescriptive Program projects. The survey supported impact

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verification by collecting self reported data for end-use hours of operation and characterization of removed and installed equipment. Additional data was collected to support the process evaluation (such as questions concerning program design and implementation, program marketing and awareness, and customer satisfaction), and business demographics for the process component of the evaluation. The CATI survey instrument used for this evaluation is included in the appendices.

3.3 Sampling Plan

3.3.1 Impact Sample

The sample design and selection process was conducted separately for OPCo and CSP to achieve a relative precision of ±10% or better at a 90% level of confidence for each operating company. To inform sample design, the Prescriptive Program ex-ante claimed gross savings data from July 29, 2010 was analyzed by service territory, measure type, project size, and number of projects by individual companies. After analysis, the sample design selected for the Prescriptive Program evaluation was stratified by project size, where project size is defined as the sum of all ex-ante kWh for measures installed within an individual project (as defined by unique project IDs assigned by AEP Ohio; generally projects have unique premise ID's.) Projects were sorted from largest to smallest kWh savings and placed into one of three strata by equalizing the expected total standard deviation on the individual realization rates, weighted by size. Stratum 1 equates to projects with the largest claimed energy savings, stratum 2 to medium-sized projects, and stratum 3 to the smallest projects.

The sample for impact verification of the PY 2010 Prescriptive Program was selected in two batches. One batch was drawn in August 2010 from the July 29, 2010 extract, and a second and final sample batch of roughly equal size drawn after the close of the program year, using the January 7, 2011 data.

The Prescriptive Program sample was selected to estimate verified gross savings through application file review, from which a subset of projects would receive supplemental on-site verification to improve the estimate of savings. To achieve the relative precision and confidence target for the program for each operating company, samples of 48 OPCo projects and 48 CSP projects were selected. Of the 48 projects identified for each operating company, 8 were designated as the primary subset for on-site verification, with 4 projects serving as back-up sites. Preference for selecting projects for the on-site visits was given to larger projects from the first sample batch, to maximize the impacts field verified, and to allow time to collect data. Although 96 total sites were selected for verification, the back-up sites were drawn from the remaining file review sample, and refusals from the primary on-site group were dropped from the sample, which resulted in four fewer sample points.

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The required sample was achieved as follows for OPCo: 18 projects of 24 projects in stratum 1 were randomly selected, 15 of 70 projects in stratum 2 were randomly selected, and 14 of 410 projects in stratum 3 were randomly selected. The sample covered 43% of ex-ante claimed gross energy impacts with 47 projects. Of the 47 projects selected for the sample, 9 received on-site verification, 5 from stratum 1 and 4 from stratum 2. These 9 projects comprised 5,592 MWh of claimed savings, which was 9% of the population claimed savings. Three projects in the OPCo application review sample were contacted through the participant phone survey, and provided data on hours of use which was used to adjust impacts. These three projects comprised 1,287 MWh, which is 5% of the sample and 2% of the population claimed savings. In total, approximately 25% of the sampled savings and 10% of the population savings was verified through direct contact with participants.

The required sample was achieved as follows for CSP: 16 projects of 18 projects in stratum 1 were randomly selected, 13 of 78 projects in stratum 2 were randomly selected, and 16 of 435 projects in stratum 3 were randomly selected. The sample covered 53% of ex-ante claimed gross energy impacts with 45 projects. Of the 45 projects selected for the sample, 5 received on-site verification, 3 from stratum 1 and 2 from stratum 2. These 5 projects comprised 5,812 MWh of claimed savings, which was 7% of the population claimed savings. Four projects in the CSP application review sample were contacted through the participant phone survey, and provided data on hours of use which was used to adjust impacts. These four projects comprised 1,066 MWh, which is 2% of the sample and 1% of the population claimed savings. In total, approximately 16% of the sampled savings and 8% of the population savings was verified through direct contact with participants.

Profile of Application Review Sample

Table 3-2 and Table 3-3 provide a profile of the gross impact measurement and verification (M&V) sample in comparison with the populations for OPCo and CSP. Also shown are the ex-ante based MWh sample weights for each stratum.

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Table 3-2. Profile of the OPCo Gross Impact M&V Sample by Strata

Stratification Strata	Population Summary			Sample*		
	Number of Projects (N)	Ex-Ante Claimed Gross Savings, MWh	MWh Weights	n	Ex-Ante MWh	Sampled % of Population
1	24	28,022	0.433	18	21,857	78%
2	70	21,973	0.340	15	5,362	24%
3	410	14,695	0.227	14	832	6%
Total	**504**	**64,690**	**1.000**	**47**	**28,051**	**43%**

** For OPCo, on-site verification occurred in 9 of the 47 projects sampled, comprising 5,592 MWh, which is 20% of the sampled MWh and 9% of the population MWh. Phone verification occurred with 3 projects from the sample, comprising 1,287 MWh, which is 5% of the sample and 2% of the population savings.*

Table 3-3. Profile of the CSP Gross Impact M&V Sample by Strata

Stratification Strata	Population Summary			Sample*		
	Number of Projects (N)	Ex-Ante Claimed Gross Savings, MWh	MWh Weights	n	Ex-Ante MWh	Sampled % of Population
1	18	40,055	0.492	16	37,614	94%
2	78	24,489	0.301	13	4,279	17%
3	435	16,911	0.208	16	1,075	6%
Total	**531**	**81,455**	**1.000**	**45**	**42,968**	**53%**

** For CSP, on-site verification occurred in 5 of the 45 projects sampled, comprising 5,812 MWh, which is 14% of the sampled MWh and 7% of the population MWh. Phone verification occurred with 4 projects from the sample, comprising 1,066 MWh, which is 2% of the sample and 1% of the population claimed savings.*

3.3.2 Process Sample

The CATI survey attempted to reach 210 unique contact names with paid projects in the 2010 Prescriptive Program, or 105 per operating company. The phone survey targeted unique contact names to avoid a burden on the respondent of discussing multiple projects. Many businesses submitted projects for multiple locations (e.g., chain stores) and listed a single contact person for all projects. These duplicates had to be removed from the calling list.

Profile of Participating Customer Phone Survey Respondents

The quantitative telephone survey reached 141 participating customers although only 123 completed the survey. As shown in Figure 3-1, about two-thirds of survey respondents represent one of four business sectors: heavy (20%) and light (11%) industry, retail/service/wholesale (20%) or schools defined as K-12 and college (15%). This distribution is

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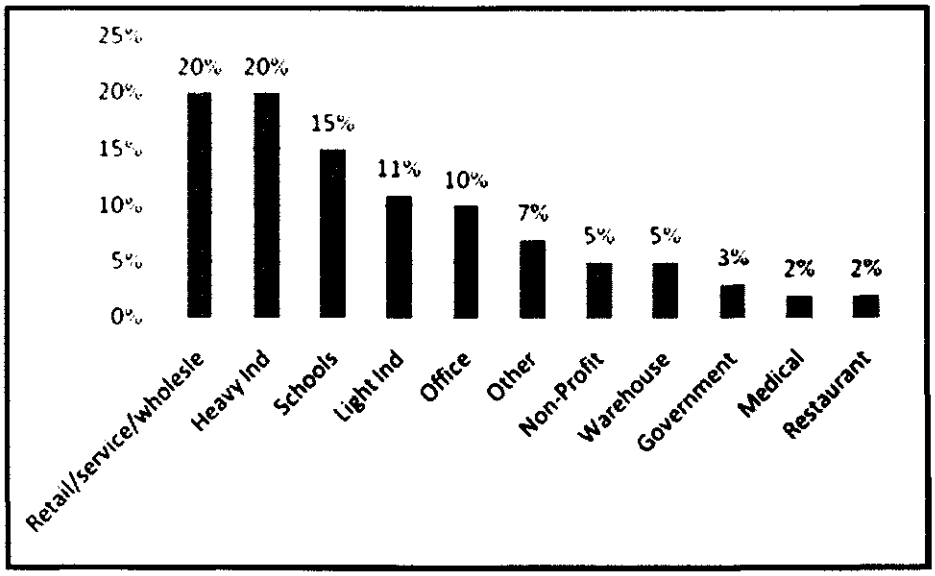
similar to that of all 511 company contacts that participated in the Prescriptive Program in PY 2010 except that Retail/Service and Heavy Industrial building types were over sampled and Warehouses were under sampled. A comparison of business sectors for survey respondents and the population of participants is provided in Table 3-4.

Seven out of ten respondents own and occupy their facility and employ an average of about 155 full and part-time employees. Almost all (94%) pay their own electric bill. Forty percent of the survey respondents have only one location, 37% of them have one of many locations and the remaining 12% of the respondents were in the headquarters location. The average facility is almost 40 years old.

Figure 3-1. PY 2010 Prescriptive Program Phone Survey Respondents by Business Type



Source: PY 2010 Participant Survey

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Table 3-4. Profile of Participating Customer Phone Survey Respondents

[redacted] Type	Number of Respondents (n=123)				Population of Unique Contacts (N=511)	
	Ohio Power Company	Columbus Southern Power	Total		Total	
Retail/Service	13%	29%	24	20%	64	13%
Heavy Industry	24%	14%	24	20%	48	9%
College/University / K-12	20%	10%	19	15%	60	11%
Light Industry	13%	10%	14	11%	81	16%
Office	6%	14%	12	10%	65	13%
Miscellaneous	7%	8%	9	7%	95	19%
Non-Profit	4%	6%	6	5%	-	-
Warehouse	4%	6%	6	5%	73	14%
Government	6%	-	4	3%	-	-
Medical	1%	4%	3	2%	18	4%
Restaurant	1%	2%	2	2%	7	1%
Total	-	-	**123**	**100%**	**511**	**100%**

Source: PY 2010 Participant Survey and December 10, 2010 tracking data extract. Business type of population based on tracking data. Business type of respondent based on designation provided by respondent during phone interview.

Profile of Solution Provider Interviews

Eleven in-depth interviews with Solution Providers were conducted as part of this evaluation. Following is a description of the eleven Solution Providers who completed the interview on the AEP Ohio Prescriptive Program:

- Sales representative for an energy systems supplier
- Salesperson for a lighting company focusing on commercial lighting
- Salesperson/engineer for a lighting engineering company serving mostly large factories and office buildings
- Owner of a commercial lighting company
- President of an energy solutions contractor
- Lighting Consultant with large electric distributor; the market is general commercial customers of all sizes
- Co Owner of a commercial/industrial lighting company
- Sales representative for a wholesale electrical distributor

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- Energy retrofits coordinator for a electrical lighting company
- Consultant and former owner for lighting and motor installation company; they are active in the residential, commercial and industrial markets
- Sales representative to lighting energy services company marketing mostly to manufacturers and warehouses.

The interviews focused on Solution Providers' reasons for participating in the program, customer and Solution Provider program awareness, satisfaction with the program, the attributes of the program and possible proposed improvements to the program.

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Section 4. Detailed Evaluation Findings

4.1 *Impact Results*

This section presents the results of the impact and process evaluations of the Prescriptive Program.

4.1.1 Findings from the Impact Verification Task

The evaluation team estimated verified gross program impacts based on application documentation review, on-site verification, and phone verification, following the methodology outlined in Section 3.1.1.

Observations from the verification experience were that KEMA and AEP Ohio have a quality control approach that appears sufficient to prevent inaccuracies, ensure that energy savings are realized, process applications in a fair and timely manner, and ensure that rebate payments are appropriate. The observations and recommendations are provided in Table 4-1.

Table 4-1. Verification Observations and Recommendations

PY 2010 Issue/Observation	PY 2010 Recommendation
Key documentation for payment verification (invoices and equipment specification sheets) was found to be complete and clearly labeled. Pre- and post-inspection documents were sparse and contained minimal information.	Consider increasing the rigor of pre- and post-inspection process and documentation.
On-site verification found instances of lighting equipment that was installed but not in an air-conditioned space, although default savings included credit for an HVAC interaction factor.	Consider adding a check box indicating if the space is conditioned or not, or removing the interaction factor based on post-inspection.
KEMA assigns one business type per project even if a project consists of multiple space usage types (office, manufacturing, etc. Business type assignment drives default hours of use, HVAC interaction factors, and coincidence factors.	Breaking out project submittals to multiple space types could be implemented for larger projects by KEMA after the customer submits an application, if multiple space types are involved.
Some customers other than warehouse, light industry, and heavy industry checked the "24/7" or "16/5" shift information box on the application form. Evaluation verification identified projects that had extended hours as indicated by the shift check box, which was a major	Consider applying the shift adjustment to business types other than warehouse and industrial.

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PY 2010 Issue/Observation	PY 2010 Recommendation
factor in the energy realization being greater than 1.0.	
The use of two different TRMs and methods of computing and tracking ex-ante claimed savings, which were then corrected to one method through post-processing of the tracking data after the year ended, resulted in delays and significant challenges for the evaluation team. This dual approach also introduces the potential for significant ex-post adjustments in the evaluation process, introducing uncertainty for program management.	If the Statewide TRM becomes required during 2011, AEP Ohio will again face a program year in which two TRMs and default savings methodologies are used to estimate ex-ante claimed gross savings. If a statewide TRM is used, AEP Ohio should implement a single TRM/claimed savings methodology and tracking approach for the entire year as soon as possible.
There were instances of projects submitted on 2009 application forms that were tracked as "24/7" in the database, even though the 2009 form did not collect shift information. If evaluator review of project information could not verify the 24/7 claim, then the 2009 hours of use default value was applied.	Use the pre- and post-inspection process to note hours of use as much as possible.
On-site verification found that quantities and types of measures installed closely matched project documentation, and did not uncover evidence of miscalculations. There were examples of substantial operating hour differences among site verified projects, with several sites having longer hours of operation than assumed by the default values used by AEP Ohio in calculating claimed savings. For site verified projects, verified demand totaled 2.033 MW compared with claimed demand of 2.002 MW, a ratio of 1.02. For site verified projects, verified energy savings totaled 13,002 MWh compared with claimed energy savings of 11,404 MWh, a ratio of 1.14.	Use the pre- and post-inspection process to note hours of use as much as possible.

Occupancy sensor off-rates are a noteworthy point of discussion. It appears that although the implementer adjusted savings estimates to account for the hours of use specific to the business type, occupancy sensor off-rates may still reflect an average of 28% across all business types for projects submitted under the 2009 application form. Part of the evaluation team's review process was to adjust occupancy sensor off-rates to the values listed in the Appendix A KEMA TRM (50% for warehouses and industrial, 20% for all other business types), all of which we judged to be appropriate for the building types listed. For industrial and warehouse sites in our sample, this resulted in significant adjustments to the savings estimates.

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Overall, the methodologies and savings estimates provided by the implementer for the measures were appropriate and accurate based on the data provided.

4.1.2 Program Impact Parameter Estimates

The statistical method of separate ratio estimation was used for combining individual realization rates from the sample projects into an estimate of verified gross energy savings for the population.[5] In the case of a separate ratio estimator, a separate gross energy savings realization rate is calculated for each stratum and then combined. The separate ratio estimation technique follows the steps outlined in the California Evaluation Framework.[6] These steps are matched to the stratified random sampling method that was used to create the sample for the program. The standard error was used to estimate the error bound around the estimate of verified gross energy savings and demand reduction. The results are summarized in Table 4-2 and Table 4-3 for OPCo and in Table 4-4 and Table 4-5 for CSP.

Table 4-2. OPCo Verified Gross Energy Realization Rates and Relative Precision

Sampling Strata	Relative Precision at 90% Level of Confidence ± %	Low	Mean	High
Stratum 1	6%	0.94	1.00	1.06
Stratum 2	23%	0.75	0.97	1.20
Stratum 3	16%	0.96	1.14	1.32
Total Energy RR	**9%**	**0.94**	**1.04**	**1.13**

[5] A full discussion of separate ratio estimation can be found in Sampling Techniques, Cochran, 1977, pp. 164-169.
[6] TecMarket Works Framework Team, The California Evaluation Framework, Prepared for the California Public Utilities Commission and the Project Advisory Group, June 2004.

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Table 4-3. OPCo Verified Gross Demand Realization Rates and Relative Precision

Sampling Strata	Relative Precision at 90% Level of Confidence ± %	Low	Mean	High
Stratum 1	3%	1.06	1.09	1.12
Stratum 2	6%	0.98	1.04	1.10
Stratum 3	11%	0.90	1.02	1.13
Total Demand RR	**4%**	**1.00**	**1.05**	**1.09**

Table 4-4. CSP Verified Gross Energy Realization Rates and Relative Precision

Sampling Strata	Relative Precision at 90% Level of Confidence ± %	Low	Mean	High
Stratum 1	1%	1.12	1.14	1.15
Stratum 2	17%	0.99	1.19	1.40
Stratum 3	26%	0.84	1.13	1.43
Total Energy RR	**9%**	**1.05**	**1.15**	**1.25**

Table 4-5. CSP Verified Gross Demand Realization Rates and Relative Precision

Sampling Strata	Relative Precision at 90% Level of Confidence ± %	Low	Mean	High
Stratum 1	1%	1.08	1.09	1.15
Stratum 2	5%	0.97	1.02	1.40
Stratum 3	16%	0.81	0.97	1.43
Total Demand RR	**7%**	**0.95**	**1.02**	**1.25**

For OPCo, the realization rate (defined as verified gross savings / ex-ante claimed savings) is 1.04 for gross energy savings, and 1.05 for gross demand reduction. The relative precision at a 90% confidence level for the 2010 Prescriptive Program projects in the sample is ± 9% for the energy realization rate and ± 4% for the demand realization rate.

For CSP, the realization rate is 1.15 for gross energy savings, and 1.02 for gross demand reduction. The relative precision at a 90% confidence level for the 2010 Prescriptive Program projects in the sample is ± 9% for the energy realization rate and ± 7% for the demand realization rate.