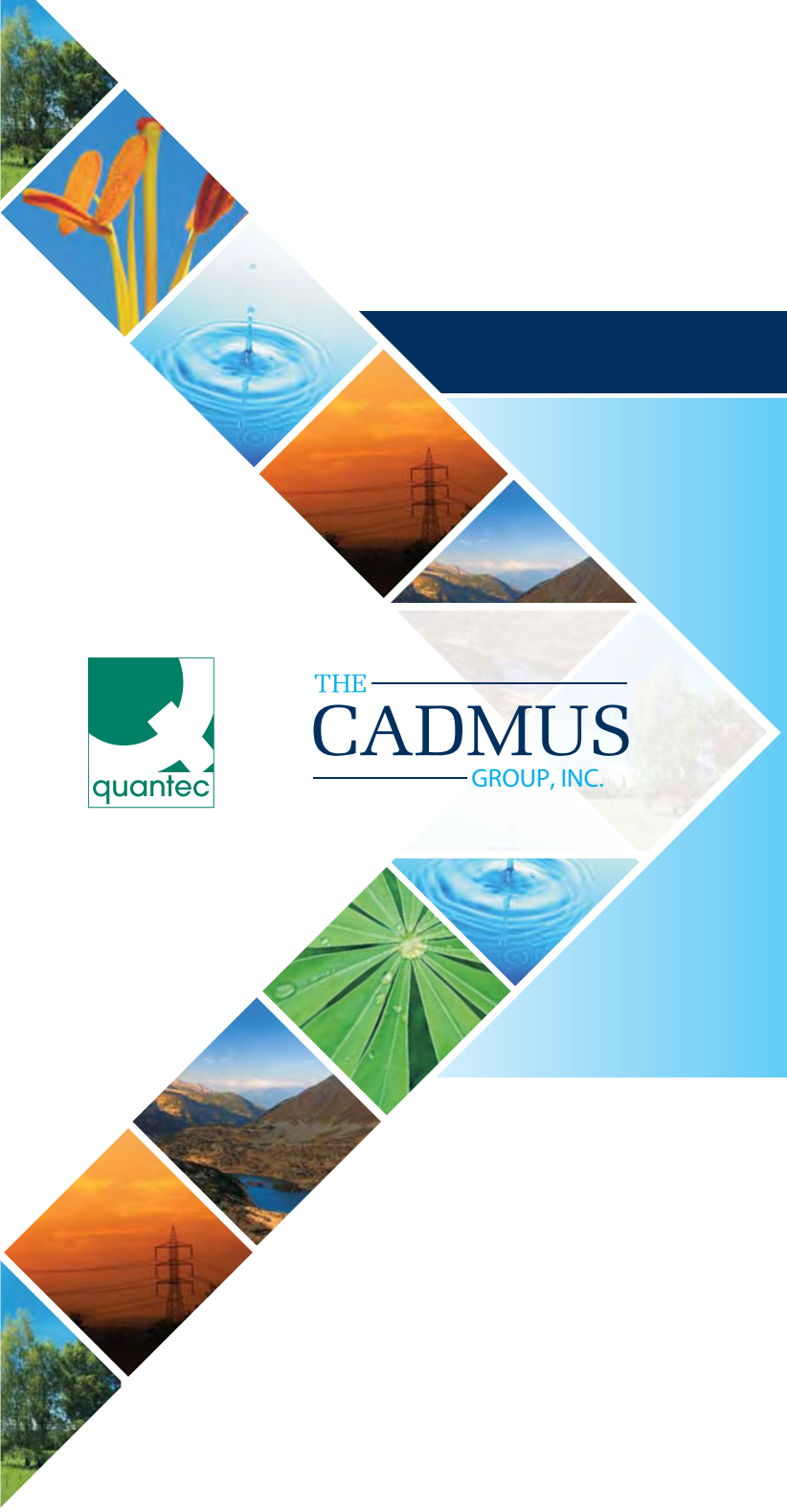

Residential Program Portfolio: PY1

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FINAL REPORT

Prepared by:

The Cadmus Group, Inc.
720 SW Washington Street
Suite 400
Portland, OR 97205
(503) 228.2992

With Team Members:

Carol Mulholland
Jane Colby

Prepared for:

Ameren Illinois Utilities

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1. Executive Summary

Ameren Illinois Utilities' (AIU) began implementation of its residential portfolio of programs in June 2008 and ended its first program year (PY1) on May 31, 2009. Four programs were implemented for a sufficient period of time to be evaluated as part of the portfolio's PY1:

- **Residential Lighting and Appliance Program (L&A Program).** This program encourages the purchase of high-efficiency lighting products, such as CFLs, ENERGY STAR-rated lighting fixtures, and appliances. The L&A Program is primarily implemented through upstream markdowns to manufacturers and is marketed both through retail stores at the customer's point-of-purchase (POP) and through an online store that also sells discounted CFLs.

- **Appliance Recycling Program (AR Program).** This program removes and disposes of operable but inefficient secondary refrigerators and freezers, preventing units from remaining active at the participant's premise or being sold in used appliance markets.

- **Residential Multifamily Program (Multifamily Program).** The Multifamily Program offers multiple services to privately-owned multifamily buildings with three or more units. The buildings may receive energy audits, CFLs, water conservation measures, and incentives for custom measures.

- **Home Energy Performance Program (HEP Program).** The HEP Program offers home diagnostics and improvement services to AIU's residential customers for a $25 fee. Auditors install faucet aerators, low-flow showerheads, water heater pipe insulation, and CFLs, then assess the home for potential shell measures (air sealing and insulation) and HVAC upgrades using the HomeCheck software. Participants receive a customized report with identified recommendations for shell and HVAC measures, plus a list of certified contractors (HEP Insulation and HVAC Program Allies).

The programs launched at different times during PY1. AIU hired Conservation Services Group (CSG) as the lead implementer for all residential portfolio programs. CSG further subcontracted certain aspects of program implementation to other companies.

Three other residential programs—New Homes HVAC, HVAC Diagnostics and Tune Up, and Direct Load Control —will be implemented in PY2. During PY1, the New Homes HVAC Program incurred some initial costs (for start-up) prior to realizing savings and the HVAC Diagnostics and Tune Up Program has neither incurred any costs nor realized any savings.

AIU hired the Cadmus Group Team (Cadmus, PA Consulting) to conduct the residential portfolio impact and process evaluations. Cadmus developed the portfolio evaluation plan in February 2009. The evaluation team reviewed program documents, designed data collection instruments and processes, and began collecting data in April 2009.

The impact evaluation found the PY1 residential portfolio programs saved 36,660 MWh at a total cost of $2,645,100. Compared to the PY1 residential portfolio goal of 16,906 MWh in

energy savings and a budget of $3,227,404, AIU achieved 217% more energy savings at 18% less cost than originally planned. Table 1 compares planned kW and MWh impacts to ex-post net kW and MWh impacts for the residential portfolio.

Table 1. PY1 Residential Portfolio Planned vs. Net Impacts

Program	PY1 Planned Impacts*		PY1 Ex Post Net Impacts	
	kW[1]	MWh	kW	MWh
L&A Program	178	10,086	1,840	32,631
Appliance Recycling Program	374	2,426	375	3,011
Multifamily Program	481	2,792	82	817
HEP Program	57	995	12	201
New HVAC	89	343	0	0
HVAC Diagnostics & Tune-Up	0	0	0	0
Direct Load Control	2,936	264	0	0
Total Portfolio	4,115	16,906	2,309	36,660

*** From Energy Efficiency and Demand-Response Plan (AIU) November 15, 2007, Table 12**

The process evaluation found that, overall, residential portfolio implementation had gone well to date, and AIU, CSG, and subcontractor staff work well together. After reviewing the results, holding discussions with staff, and analyzing data collected through the evaluation, we offer the following recommendations for future program improvements:

Web-Based Tracking Database. Current tracking systems are maintained by CSG and other subcontractors on their own computer systems. To access information, AIU must request a specific report or download from the database, and have it prepared for them by CSG, which can result in delays and miscommunication. Allowing AIU program managers' real-time access to data will enhance their knowledge of program results and allow more rapid program changes or required database updates.

Define AIU Staff Roles and Responsibilities. AIU program staff is responsible for managing contracts with CSG and other subcontractors. In practice, CSG reported some program staff were heavily involved in actual program implementation during PY1, while others were not. On one hand, the extra involvement by AIU staff enabled them to gain valuable experience, yet it may have come at a price in terms of the time CSG needed to spend directly managing the programs. Clearer definitions of levels of involvement, roles, and responsibilities for AIU staff would assist both CSG and AIU staff in meeting expectations.

Involve AIU's Strategic Initiative Group in Portfolio Progress. AIU's organization includes a holding company, Ameren Utilities, which provides strategic services to the distribution companies of Ameren Illinois Utilities and Ameren Missouri Utilities. The Ameren Utilities Strategic Initiative Group, which is part of the holding company, planned, analyzed, and designed programs for the November 2007 Energy Efficiency Plan filing that formed the basis

[1] Planned kW impacts were based on the peak hour of the year while ex-post net kW impacts are based on the peak period (3-7 p.m. weekdays, June-Augst) and therefore are not directly comparable to each other.

for the residential portfolio. This group will also prepare the next three-year plan, to be filed in the fall of 2010. Cadmus believes both AIU's implementation team and the Strategic Initiatives Group will be best served if the two groups meet to discuss program and portfolio progress on a regular basis.

Incorporate Ongoing Customer Satisfaction Measurement. While Cadmus was able to draw some conclusions from our limited surveys and interviews, AIU has no formal customer feedback mechanism in place for its residential portfolio programs. Cadmus recommends AIU implement several approaches to gather ongoing customer feedback. For instance, both the HEP and Multifamily Programs could incorporate customer satisfaction questions in a follow-up call to assess interest in the programs and remind customers of available incentives for more complex measures. Another opportunity to gauge the more widely advertised L&A and AR Programs is to incorporate questions regarding customers' knowledge of and satisfaction with the programs in AIUI's regular customer satisfaction surveys.

Measure and Track Marketing and Advertising Effectiveness. Overall, marketing effectiveness was high, as evidenced by AIU exceeding its overall goals; yet little is known regarding individual impacts of different approaches and messages used. Cadmus recommends AIU develop approaches to measure the impact of its individual marketing efforts and test the advertising messages to improve overall cost-effectiveness of promotion.

2. Introduction to Portfolio and Programs

AIU filed its Energy Efficiency Plan on November 15, 2007. The Plan outlined proposed programs, kWh and kW savings goals, and cost estimates. Table 2 summarizes the proposed residential portfolio and its estimated costs and energy savings in PY1.

Table 2. PY1 Residential Portfolio Planned Savings and Cost Estimates

Program	MWh Savings	kW Reduction	Total Costs
L & A Program	10,086	178	$1,164,261
AR Program	2,426	374	$787,500
Multifamily Program	2,792	481	$262,684
HEP Program	995	57	$249,968
New HVAC	343	89	$125,665
HVAC Diagnostics and Tune-Up	0	0	0
Direct Load Control	265	2,936	$637,326
Total Residential Portfolio	16,906	4,115	$3,227,404

Four of the seven programs were implemented and evaluated in PY1. Each of these four programs is described in more detail below.

L&A Program

The L&A Program encourages the purchase of high-efficiency lighting products, such as compact fluorescent lamps (CFLs), ENERGY STAR-rated lighting fixtures, and appliances. During its first year (PY1), the program focused exclusively on lighting; appliances have been added for PY2. The L&A Program is implemented primarily through upstream markdowns to manufacturers, and is marketed both through retail stores at the customer's point-of-purchase (POP) and through an online store that also sells discounted CFLs. The L&A Program offers discounts for a variety of lights (an average of $1.00 for standard, twister-type CFLs and $1.53 for specialty bulbs such as flood lights, candle lights, three-way bulbs, etc.).

AIU launched the L&A Program in August 2008 through 19 retail stores, and expanded to 122 stores in October 2008. AIU advertised the L&A Program through branded POP materials, customer and retailer education materials, in-store customer educational events, training for retail sales staff at retail sites, and general advertising using billboards, television and radio ads, and bill stuffers.

AIU's prime implementation contractor, CSG, subcontracted the L&A Program's implementation to Applied Proactive Technologies (APT) and Energy Federation Incorporated (EFI). Their responsibilities have included: program fieldwork with retailers, Internet order fulfillments, program tracking, and incentives payments.

AR Program

The Appliance Recycling Program (AR Program) removes and disposes of operable but inefficient secondary refrigerators and freezers, preventing units from remaining active at the

participant's premise or elsewhere through a second hand market. Secondary refrigerators and standalone freezers tend to be older, less-efficient units, continuously plugged in yet infrequently used, partially full, and located in unconditioned areas of homes (e.g., garages), where they must work harder to keep food cool. In addition to reducing energy consumption at both the household and utility levels, the program decommissions participating appliances in an environmentally sound manner through Appliance Recycling Centers of America (ARCA).[2]

To qualify for the AR Program, appliances must be operational, a household secondary unit, located on account premises, sized between 10 and 27 cubic feet, and manufactured before 1993. AIU pays participants a $35 incentive in addition to the free removal and disposal of the unit.

Multifamily Program

The Multifamily Program began delivery in November 2008. PY1 ended in May 2009. The Multifamily program is offered to privately-owned multifamily buildings (three or more units). All qualifying buildings are offered the following services:

- A free, walkthrough lighting assessment.
- Incentives for installation of energy-efficient lighting in common areas.
- Free CFLs and water conservation measures for installation in resident units, along with an informational brochure on measures installed for residents.
- Energy audits for installation of HVAC and more complex measures.
- Incentives for custom measures (windows, replacement of roof-top air conditioning [AC] units) subject to an energy audit to validate cost-effectiveness and establish incentive levels.

HEP Program

The HEP Program is a home diagnostic and improvement service offered to AIU's residential customers for a $25 fee. This program is the newest of the four residential programs started in PY1, with initial audits beginning in early 2009. The HEP Program works as follows:

- CSG sends targeted mailers to residences in AIU's service territory.
- Potential participants call the CSG office and schedule an HEP audit with one of three auditors.

[2] Environmentally-sound disposal of this equipment includes proper disposal of oils, PCBs, mercury, and CFC-11 foam, and recycling of CFC-12, HFC-134a, plastic, glass, steel, and aluminum.

- During the HEP audit, a CSG auditor conducts a 10-minute interview with the program participant, installs domestic hot water (DHW) and lighting instant savings measures (ISMs), including faucet aerators, low-flow showerheads, water heater pipe insulation, and CFLs, and assesses potential shell measures (air sealing, wall, attic, and basement insulation) and HVAC replacement savings using CSG's proprietary software, HomeCheck.

- After the HEP audit, program participants receive a customized report with recommendations for additional shell and HVAC measures, and a list of certified contractors (HEP Insulation Program Allies and HVAC Program Allies).

Marketing and Public Relations

The marketing approach for AIU's energy-efficiency programs combined an energy-efficiency awareness campaign with program marketing under the branding umbrella of Act On Energy™. Tactics included: a large employee internal communications plan; targeted marketing materials using bill inserts and other paid media; a mass multimedia campaign using television and radio spots; interactive media of the Act On Energy™ Web site and YouTube videos; and a public relations-grass roots campaign, including a speakers bureau, press releases, and partnerships with allies. The program goals were: increase awareness of energy-efficiency programs; take action on energy; decrease energy costs; reduce energy consumption; improve the environment; associate energy savings with AIU and support programs; and drive people to join the programs.

Evaluation Questions

The Residential Portfolio evaluation sought to answer the following key questions:

Impact Questions

1. What are the portfolio's gross impacts?

2. What are the portfolio's net impacts?

3. Did the portfolio meet its energy goals within its budget? If not, why not?

4. Are default savings estimates reasonable?

Process Questions

1. Has the portfolio design changed from the plan filed in 2007? If so, how and why, and were changes advantageous?

2. Is implementation on track and meeting goals?

3. How effective were implementation, design and processes, and marketing efforts?

4. What were program staff and trade ally experiences and satisfaction with portfolio implementation?

5. Were program participants satisfied with their experience?

6. What changes can be made to the programs to improve their effectiveness?

3. Evaluation Methods

Cadmus developed an evaluation work plan for each program in the residential portfolio. Methods employed consisted of a combination of surveys, secondary research, audit results, program database and other information reviews, and staff interviews. Table 3 summarizes evaluation tasks for each program.

Table 3. Summary of Evaluation Tasks

Program/Action	Impact	Process	Details
Lighting & Appliance			
CFL User Survey	✓	✓	Calculated net-to-gross (NTG), market effects and customer satisfaction with CFLs. (n=302)
Stakeholder Interviews		✓	Provided insight into program design and delivery. (n=6)
Document Review		✓	
Review Tracking Database	✓	✓	Analyzed purchase patterns and calculate gross savings.
Appliance Recycling			
Participant Survey	✓	✓	Calculated NTG and assessed program implementation. (n=93)
Stakeholder Interviews		✓	Provided insight into program design and delivery. (n=5)
Secondary Research		✓	Reviewed results of recent appliance recycling evaluations.
Secondary Data Analysis	✓		Determined per unit savings based on age and size. (Census)
Multifamily			
Document Review	✓		Reviewed applications and all verification documentation on a sample of buildings enrolled in the program. (n=10)
Stakeholder Interviews		✓	Provided insight into program design and delivery. (n=5).
Program Database Review	✓	✓	Ensured appropriate data were collected to inform the evaluation, particularly the impact work. Reviewed savings assumptions.
Home Energy Performance			
Document Review	✓		Reviewed site-specific savings estimated through participant audits. (n=152)
Secondary Research	✓		Reviewed similar programs for deemed savings data and typical NTG ratios.
Stakeholder Interviews		✓	Provided insight into program design and delivery.

CFL User Survey

The Cadmus Team conducted a CFL User Survey to estimate market penetration for AIU's residential customers, compared to customers in a comparison area of states without CFL programs. The survey contacted a random sample of all AIU residential customers, regardless of L&A Program participation.

Stakeholder Interviews

The Cadmus Team conducted stakeholder interviews with program staff for each of the four programs as well as with AIU and CSG management staff responsible for all residential programs. The interviews focused on assessing program and portfolio delivery.

Program Document Review

The Cadmus Team reviewed all program documents, including: records of marketing and outreach efforts; marketing materials; subcontractor progress reports; and audit and verification documents for applicable programs. The review provided information on the programs' launch, operations, where audits were performed, and site-specific savings estimates.

Program Tracking Database

CSG provided Cadmus with detailed tracking reports for all transactions in all programs. These files tied payment requests to identified transactions and default savings estimates. The databases tracked program activity by product, product family, or other identified components.

Participant Surveys

The team surveyed ARP participants to inform NTG calculations and to assess customer satisfaction.

Secondary Research

Cadmus' secondary research included reviewing other programs similar to the Appliance Recycling and HEP programs to assess typical NTG ratios, default savings estimates, and other program design issues.

4. Portfolio Level Results and Recommendations

Impact Results

Gross and Net MWh Savings

Cadmus' impact evaluations calculated gross and net impacts for each of the four programs and for the portfolio overall as shown in Table 4, below.

Table 4. PY1 Residential Portfolio Gross and Net MWh Savings

Program	Gross MWh Savings	Net MWh Savings	NTG Ratio
L&A Program	32,631	32,631	1.00
AR Program	5,555	3,011	0.54
Multifamily Program	1,073	817	0.76
HEP Program	265	201	0.76
Total Portfolio Actuals	39,494	36,660	0.93

Budget

Overall, the residential portfolio met its goal of achieving at least 16,906 MWh of energy savings at a cost of less than $3,227,404. AIU spent only $2,590,078, a savings of $637,326 while saving 19,574 more MWh than planned.

Default Savings Estimates

The Cadmus Team performed reasonableness checks on the default gross MWh savings assumed in the program plans. L&A Program estimates were found to be reasonable and consistent with other utility programs. The Multifamily program's measures were all found to be reasonable, except for "water heating pipe insulation," which Cadmus recommends be modified from 215 kWh per home per year to 65.4 kWh per home per year. The AR and HEP Programs both used site-specific engineering estimates to determine gross MWh savings, and a number of these estimates varied from default savings assumed in program plans.

Process Results

Portfolio Design Changes

AIU's residential portfolio contains seven programs to be implemented over three years. During PY1, AIU accepted CSG's recommendation that it launch four programs on a staggered basis in PY1, then launch the remaining three (Residential New HVAC and Residential HVAC Diagnostics & Tune-Up, and Residential Direct Load Control) for PY2. This decision allowed AIU and CSG to better manage the rollout and budgets, and assess customer participation rates.

Implementation on Track to Meet Goals

Legislative requirements to meet annual portfolio goals within annual budgets were a key consideration for AIU in both program design and management. This requirement, which is unique to Illinois, created challenges for AIU in managing short-term program response. Both the L&A and AR Programs could have exceeded program goals had staff not consciously slowed momentum by reducing the number of bulbs discounted and putting appliance recycling requests received late in PY1 on a waiting list. Overall, AIU managed this process effectively and essentially achieved both its savings and budgetary goals.

Marketing Effectiveness

AIU provided fairly constant evaluation and marketing messaging/tactic adjustments based on participation progress and results, and was cognizant of attaining its goals. Marketing and advertising were performed with expectations to achieve participation. PY1 results were very positive, and energy savings goals were achieved. Behavior change is an incremental process that must start with customers' realities, and suggested behaviors must be relevant to their lives.

Staff Experience and Satisfaction with Portfolio Implementation

Overall, AIU staff is pleased with portfolio implementation progress. AIU staff spoke positively about CSG's knowledge and experience and their ability to achieve program results in the short time period allotted. AIU staff are pleased CSG has been willing to spend time to help educate them about program implementation. Many CSG staff actually worked from AIU's offices to facilitate quick and easy communication between the two companies.

Participant Satisfaction

The AR Program was the only program for which formal participant surveys were conducted; results were very positive.

Cadmus collected other indicators of participant satisfaction, based on feedback about field interactions. For instance, APT, one of the L&A Program implementation subcontractors, tracked anecdotal field reports from representatives leading lighting clinics and training retail store employees. APT staff reported hearing positive feedback from those retailers and customers who attended clinics.

The HEP Program generated many of its program participants through word-of-mouth from earlier participants, which indicates early participants were satisfied with program results.

Portfolio Recommendations

Cadmus has several portfolio-level recommendations for improving overall program delivery. (The following section of this report summarizes individual program recommendations, which are detailed in the full program reports in the appendices.)

Web-Based Tracking Database. Current tracking systems are maintained by CSG and other subcontractors on their own computer systems. To access information, AIU must request a specific report or download from the database, and have it prepared for them by CSG, which can result in delays and miscommunication. Allowing AIU program managers' real-time access to data will enhance their knowledge of program results and allow more rapid program changes or required database updates.

Define AIU Staff Roles and Responsibilities. AIU program staff is responsible for managing contracts with CSG and other subcontractors. In practice, CSG reported some program staff were heavily involved in actual program implementation during PY1, while others were not. On one hand, the extra involvement by AIU staff enabled them to gain valuable experience, yet it may have come at a price in terms of the time CSG needed to spend directly managing the programs. Clearer definitions of levels of involvement, roles, and responsibilities for AIU staff would assist both CSG and AIU staff in meeting expectations.

Involve AIU's Strategic Initiative Group in Portfolio Progress. AIU's organization includes a holding company, Ameren Utilities, which provides strategic services to the distribution companies of Ameren Illinois Utilities and Ameren Missouri Utilities. The Ameren Utilities Strategic Initiative Group, which is part of the holding company, planned, analyzed, and designed programs for the November 2007 Energy Efficiency Plan filing that formed the basis for the residential portfolio. This group will also prepare the next three-year plan, to be filed in the fall of 2010. Cadmus believes both AIU's implementation team and the Strategic Initiatives Group will be best served if the two groups meet to discuss program and portfolio progress on a regular basis.

Incorporate Ongoing Customer Satisfaction Measurement. While Cadmus was able to draw some conclusions from our limited surveys and interviews, AIU has no formal customer feedback mechanism in place for its residential portfolio programs. Cadmus recommends AIU implement several approaches to gather ongoing customer feedback. For instance, both the HEP and Multifamily Programs could incorporate customer satisfaction questions in a follow-up call to assess interest in the programs and remind customers of available incentives for more complex measures. Another opportunity to gauge the more widely advertised L&A and AR Programs is to incorporate questions regarding customers' knowledge of and satisfaction with the programs in AIUI's regular customer satisfaction surveys.

Measure and Track Marketing and Advertising Effectiveness. Overall, marketing effectiveness was high, as evidenced by AIU exceeding its overall goals; yet little is known regarding individual impacts of different approaches and messages used. Cadmus recommends AIU develop approaches to measure the impact of its individual marketing efforts and test advertising messages to improve the overall cost-effectiveness of promotion.

5. Program Level Results and Recommendations

L&A Program

Impact Results

Cadmus calculated L&A Program gross impacts based on the number of eligible CFLs sold by retailers during the program period, as tracked in the program database, then multiplied by default savings estimates for each type of CFL sold. Table 5 summarizes the number of CFLs sold, incentives paid, and gross MWh saved.

Table 5. CFLs Sold, Incentives Paid, and Gross MWh Saved

Store	Qty Sold	Incentives $	MWh
Ace Hardware	30,420	32,963	1,158
Affiliated Home Center	102	137	5
CVS	3,273	3,273	131
Home Depot	448,508	539,512	17,567
Kerr Home Center Inc.	189	189	8
Kull Lumber Company Inc	258	258	10
Lowes	21,874	24,900	1,032
Menards	89,692	98,661	3,434
Petersburg Hardware/Service Co	347	432	15
Sam's Club	173,298	143,334	6,817
Web-Store	47,442	80,162	2,241
Total	815,403	926,925	32,631

Cadmus calculated net impacts by comparing CFL purchase rates during the program period in AIU's service territory to purchase rates in the Comparison Area (Kansas, Georgia, and Pennsylvania—states without active CFL promotions). Based on this method, it appears program spillover balance out possible freeridership. Table 6 summarizes NTG analysis results by comparing CFL purchase rates.

Table 6. Summary of CFL NTG Calculations

(A)	(B)	(C)	(D)	(E)	(F)	(F)
CFL Sales/Month per Residential Customer			Total Induced CFL Sales over Six Months, per Customer(C*6)	Total Induced CFL Sales all Residential Customers (D*1.2 million)	Program CFL Sales	NTG (E/F)
AIU	Comparison Area Baseline	Program Induced Monthly Sales (A-B)				
0.5166	0.4	0.1166	0.6996	839,520	815,403	1.03

Although calculations point to a 1.03 NTG ratio, and earlier CFL programs in other states showed NTG ratios higher than 1.0, Cadmus does not recommend using a NTG ratio greater than 1.0, primarily because standard CFLs have become a fairly mature technology, with widespread awareness and substantial baseline sales throughout the U.S. While this Comparison State

approach has been implemented successfully in recent program evaluations in Iowa, Wisconsin, and Massachusetts, Cadmus recognizes the study's limitations, which include:

- Using different states without programs to represent AIU's service territory;
- The possible interdependence of retailers and manufacturers that operate in many states, regardless of utility programs;
- A lack of consideration of other factors affecting CFL sales (income, home size, education, energy rates, availability); and
- Slight differences in CFL survey questions between AIU and the Comparison Area.[3]

Market Effects. The CFL User Survey provided insights into the ways AIU's Program affected the market. The survey indicated AIU's L&A Program seems to have increased consumer CFL awareness and purchases compared to states without CFL programs (97% vs. 92%), and increased CFL purchases in the six months prior to the survey (by comparison). Seventy-six percent of respondents indicated they currently have CFLs installed in their homes.

Process Results

Stakeholder Satisfaction. All stakeholders interviewed showed high satisfaction levels with communication levels between parties.

Customer Satisfaction. Customers who purchased CFLs generally have been quite satisfied with them. While Cadmus did not directly measure customer satisfaction with the L&A Program itself, feedback from field representatives and retailers was positive, based on anecdotes about direct interactions with customers. AIU program staff also believes customers were aware of the program and pleased with it.

Deviations from Plan. The L&A Program design did not deviate from AIU's 2007 Energy Efficiency Plan, apart from the increased sales target. This advantageous change allowed the L&A Program to maintain its momentum and compensate for limited energy savings from other delayed programs. Program implementation was effective, and program marketing and outreach resulted in aggressive savings over a short period of time.

Recommendations

CFL Customer Education. The CFL User Survey pointed to several topics AIU can continue to include in its CFL educational information for customers. AIU customers have a relatively low

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[3] To more precisely control for a comprehensive set of factors impacting CFL sales, a regression model is currently being developed for multiple program states, including California, Massachusetts, New York, and Michigan. The model will also include approximately six control regions not currently running CFL programs. Cadmus recommends AIU also participate in this pooled data regression approach to control for these other factors.

level of concern about mercury or other CFL disposal issues (5%). Research in other regions has shown unrecovered mercury and CFL disposal are growing issues of concern. Some customers in other regions—confused about "mixed messages"—have stopped using CFLs. AIU can preempt such rebound effects by educating customers about the minimal amounts of mercury in CFLs (for instance, the mercury in one CFL is comparable to that in a bite of tuna) and by educating customers on simple disposal options. The CFL User Survey also indicated a significant portion of AIU customers (27%) use CFLs in dimmable or three-way fixtures, while only 44% of those use specialty CFLs designed for such fixtures (15% of total CFL users misuse the lights). Using standard CFLs in dimmable or three-way fixtures can significantly reduce the life of these bulbs and should be discouraged.

Considerations if Adding WalMart as a Retailer. Another important finding from the CFL User Survey was WalMart was the CFL purchase outlet most often identified by survey respondents (36%), even though it does not participate in the L&A Program. WalMart is a major force in the retail market. Should AIU include WalMart as a future retailer, a participation agreement between AIU and WalMart should be structured to account for the high level of CFLs already sold through WalMart. For example, incentives to WalMart's manufacturers could be based on the increase in sales over an agreed-upon baseline rather than on every CFL sold.

AR Program

Impact Results

To calculate energy consumption for early retirement of participating refrigerators and freezers, Cadmus utilized a database detailing consumption of over 30,000 specific refrigerator and freezer makes and models between 1979 and 1992.[4] Because the database contained annual energy consumption estimates from a metering study at the time of manufacture, and appliance performance degrades over time, annual degradation factors of 1.97% and 1.06% were applied to refrigerators and freezers, respectively, in the database to calculate the appliances' assumed energy consumption at the time of participation.[5] In addition, the evaluation team utilized Federal energy standards for each appliance and a best-fit trend analysis to estimate energy consumption of appliances newer and older, respectively, than those contained in the database.

Next, each appliance in the database was assigned to a configuration category (e.g., Top Freezer Refrigerator), age category (e.g., 16–18 years old), size category (e.g., 19–21 cubic feet) and defrost type (manual vs. automatic). Once assigned, the average estimated energy consumption at the time of retirement for every combination of configuration, age, size, and defrost type was determined. Results of this effort were aggregated into a database.

The database detailing savings specific to each configuration, age, size, and defrost type was then merged with Program records detailing the number of Program appliances with a similar set

[4] http://www.waptac.org/sp.asp?mc=techaids_refrigerator_energyuse

[5] The degradation factors applied were determined utilizing data from the 2004–2005 California Statewide Appliance Recycling Evaluation.

of characteristics. Once merged, a weighted average was used to determine annual energy savings generated by a refrigerator and freezer recycled through PY1.

Gross savings needed to be adjusted for units used for a portion of the year. To do so, Cadmus calculated and applied a part-use factor. Appliances not previously in operation or operated only part of the year were assigned a part-use factor to account for less than full-year savings.

After estimating gross savings using the above approach, the program-wide annual gross energy generated by AIU in PY1 is presented in Table 7.

Table 7. Appliance Recycling Gross Annual Energy Savings

Appliance	Gross Energy Savings (kWh/Year)	Participation	Total Program Gross Savings (kWh/Year)
Refrigerator	1,522	2,752	4,188,295
Freezer	1,247	1,096	1,366,870
Total		3,848	5,555,165

Net Energy Savings were determined by calculating the number of units that would have been kept and not used or independently disposed of, per questions asked on the participant survey. Table 8 illustrates the resulting NTG ratio and net energy savings. The resulting NTG ratio is consistent with those found in other appliance recycling programs.

Table 8. Appliance Recycling Gross and Net Annual Energy Savings

Appliance	Total Program Gross Savings (kWh/Year)	NTG	Total Program Net Savings (kWh/Year)
Refrigerator	4,188,295	0.51	2,142,985
Freezer	1,366,870	0.63	867,665
Total	5,555,165		3,010,650

Process Results

Satisfaction. Participants expressed significant satisfaction with the Program, with 95% rating the Program with an 8, 9, or 10, on a 10-point scale. In fact, only four of the 93 respondents rated their Program satisfaction less than a 7.

Incentives Influence. Almost half (48%) of surveyed participants stated the main reason they decided to recycle appliances with AIU was the free pick-up. Another 28% of respondents indicated the $35 incentive for each recycled appliance was the reason they went with AIU's program over other options. To explore this issue further, those who said the cash incentive was the main participation reason were asked if they still would have participated in the Program had the $35 per appliance incentive not been available. Seventy-four percent indicated they still would have participated in the Program without the incentive. The free pick-up clearly stood in respondents' minds more prevalently. They saw this service as a monetary benefit, as many would have had to pay to have the appliance recycled. It should be noted, however, that a monetary incentive is often necessary to capture the attention of potential participants.

Experienced Project Team. AIU's decision to higher CSG and partner with ARCA, an organization that focuses exclusively on appliance recycling and implements similar utility-funded programs nationally and internationally, provided AIU with a turnkey appliance recycling program capable of quickly launching and meeting its first-year targets.

Standardization of Program Design. AIU's program design was similar to that employed by many utilities. ARCA accepts incoming calls from prospective customers on behalf of AIU's Act On Energy™ initiative, schedules the pick-up appointment, picks up the appliance, recycles the appliance following environmental protocols, and provides the customer with an incentive on behalf of AIU. Early changes to the program design included adding freezers and room air conditioners to the list of eligible measures. Incentives were not provided for room air conditioners, and those were only picked up in conjunction with a refrigerator or freezer.

Focus on Secondary Units. One difference between AIU's AR Program and some (not all) other utility appliance recycling programs was limiting eligibility only to secondary appliances. Focusing on secondary appliances increases the likelihood of recycling older, less-efficient appliances, and reducing the overall stock of appliances active on the grid. Since identifying secondary appliances can be difficult, language was included in the initial call script regarding duration of use as a secondary appliance (not a recently replaced primary unit). Based on findings of the participant survey, these efforts appear to have been successful.

Regular Communication and Data Transparency. All stakeholders said communications between the three parties (AIU, CSG, and ARCA) were regular and effective. Specifically, stakeholders mentioned that, in addition to formal weekly project meetings, informal communication via e-mail or in-person meetings regarding project status and marketing was common. In addition, CSG's and AIU's ability to view ARCA's database via a Web portal increased Program transparency.

Effective Marketing Efforts. Program marketing utilized a number of efforts. First, in October 2008, AIU advertised the Program to approximately 42,000 customers via a "CFL Box" (included two free CFLs and information regarding the Program). In January 2009, AIU provided a bill insert to all residential customers (approximately 1.2 million). The substantial mailing appears to have contributed to the spike in participation experienced in the late winter and early spring of 2009. However, it should be noted appliance recycling programs typically experience a significant increase in participation during spring. In addition to bill inserts, the Program also benefitted from numerous media opportunities earned later in the Program cycle. According to ARCA's call center, 57% of participants cited the bill inserts as their impetus for participation, while 16% cited newspaper coverage of the Program. In general, these percentages were corroborated by the participant survey findings. Near the Program year's end, efforts began to develop truck wraps (advertising on trucks picking up appliances).

Achievable Program Targets. A target of 3,700 recycled appliances was set for the Program's first year. Implementation staff considered the target low, and efforts were made to restrain participation early in the program cycle to ensure funding would last throughout the Program year.

Demand Exceeded PY1 Program Budget. Despite efforts to regulate participation throughout the year, program funds were exhausted by early April. As a result, all prospective customers during the rest of the program year were placed on a waiting list until next year's program became available. Exhaustion of funds likely resulted from a relatively low appliance target and successful, large-scale marketing through bill inserts and earned media.

Nonresidential Prospects. The stakeholder interviewed at the call center noted approximately 10% of the received calls were from residential customers with an appliance that did not meet the current age eligibility requirement. In addition, the stakeholder estimated another 5% of calls were from nonresidential customers (schools, churches, government, and small commercial) operating residential-style appliances.

Recommendations

Trust Implementer Experience. Several stakeholders noted the levels of concern expressed by AIU and the Program implementers differed regarding low early participation numbers. Given the seasonality of appliance recycling programs and considerable experience of its implementation team, AIU should consult CSG and ARCA when deciding when and how to market the Program.

Consider Including a Limited Small Commercial Sector. Since many nonresidential customers operated older, inefficient, residential-style refrigerators, the AR Program should consider expanding eligibility to a limited portion of the small commercial sector. For example, the AR Program could limit small commercial participation to only appliances on the first floor (to alleviate transportation issues) or to a specific subsector (such as churches). While advertising a small commercial add-on element may lead to confusion and frustration regarding eligibility, the program could only enroll those qualifying nonresidential customers that contact the program through current marketing practices.

Multifamily Program

Impact Results

The Multifamily Program successfully achieved its targets by serving 69 facilities with a mix of installations. Overall results are summarized below in Table 9 with the mix of installations shown in Table 10.

Table 9. PY1 Multifamily Achievements

Metric	Actual
Net MWh	817
Participation (no. of units)	2,342
Incentives	$74,956

Table 10. Installation Distribution

Install Location	Number of Sites
Common Area Lighting Only	3
In-Unit Only	59
Both Common Area and In-Unit	7
Total Number of Facilities	69

Multifamily Program trends show common area installations were not as popular as in-unit installations. While the number of common area installations were relatively small, those measures were responsible for 17% of the Program's net savings. Table 11 and Table 12 detail measures installed in common areas and units, respectively.

Table 11. Common Area Measure Distribution

Measure	Quantity Installed	kWh Gross Savings	kWh Net Savings
4' T8 (32w lamps with electronic ballast and reflector)	491	32,879	24,988
4' T8 (32w lamps with electronic ballast)	94	8,234	6,258
Integral CFL (>13 watts screw-in)	174	49,854	37,889
LED Exit Sign (new fixture or LED retro-fit)	179	48,084	36,544
Modular CFL (<=18 watts pin based electronic ballast fixture)	29	20,831	15,832
Modular CFL (>18 watts pin based electronic ballast fixture)	51	21,500	16,340
Occupancy Sensor	5	-	-
Total	1,023	181,383	137,851

Table 12. In-Unit Measure Distribution and Savings

Measure	Quantity Installed	kWh Gross Savings	kWh Net Savings
15 watt CFL	9,368	359,731	273,546
20 watt CFL	274	12,878	9,782
23 watt CFL	207	13,621	10,350
Faucet Aerator	2,535	81,016	62,320
Pipe Insulation	886	48,165	36,605
Showerhead 2.0 gpm	1,937	376,300	286,200
Total	15,207	891,711	678,803

Savings were attributed to each measure based on default estimates, which were reviewed for reasonableness and only revised for pipe insulation (from 215 kWh to 65.4 kWh for units with electric water heat).

A review of program documentation showed the program, in many locations, installed up to 12 and 13 CFLs in a single apartment, even though program requirements limit the number of CFLs installed in any one apartment to four. For the nine properties performing in-unit installations, 104 units received CFLs; of those, 56 units received more than four CFLs. Installation of this number of CFLs can be cost-effective if fixtures operate, on average, at least an hour a day.

Savings, however, may not be as high as the 38 to 66 kWh per CFL estimated, and could impact overall program savings. However, based on program documents, each unit received an average of 5.7 CFLs. Cadmus believes it is reasonable to assume those CFLs operate for 2.3 hours per day; therefore, they have not downgraded CFL savings this year.

Process Results

Program Changes. Shortly after the Program began, AIU and CSG staff realized several changes needed to be made to the Program's design: allowing common area lighting retrofits to be installed by participating maintenance staff instead of requiring certified electric contractors; eliminating the requirement for facilities to participate in common or custom measures as well as in-unit measures; and delaying the more complex custom measures to PY2.

Marketing. CSG staff marketed the Program mostly by conducting cold calls on properties and engaging the 69 properties that had participated in the Program by the end of PY1. Marketing and informational materials were also easily accessed and understandable.

Increased Customer Knowledge. Overall, CSG account managers found staff at participating properties lacked knowledge about energy efficiency, energy-saving measures, and benefits associated with upgrading their equipment. Therefore, the program has provided a significant benefit by educating property managers and customers about energy efficiency.

In Unit vs. Common Area Measures. More projects focused on in-unit measures rather than common area measures. Participant interviewees cited several reasons for this: in-unit measures were free, and installation could be completed by facility staff; budgets for larger properties were set in advance, and upgrading measures had to be worked into expenses at a future date; property owners were looking to future tax liabilities and wanted to wait to invest in their property when it could provide a tax advantage. In spite of this, property owners were reported to be very interested in common area measures because of short payback periods and AIU incentives.

Changes for Program Year 2. Planned program changes for PY2 allow for inclusion of more complex (and HVAC) measures in program offerings. These preparations also include CSG account managers receiving training on new measures, outreach to program allies able to conduct an energy analysis and recommend more complex measures to multifamily property staff, and account managers recommending these measures to potential participants, when appropriate.

Delayed Program Database. Early in program implementation, the program lacked a database; as a result, reporting was inconsistent. This was reportedly a function of the program's rapid launch with minimal staff and the level of PY1's goals. The program database is now near completion, and AIU Multifamily staff report they have received the reporting requested consistently and in a timely manner.

Recommendations

Complete Database Rollout. Completing the tracking database will benefit all parties involved with the Program. Cadmus suggests a number of additional fields be tracked in the database to

facilitate program evaluation, including equipment fuel types, customer addresses and account numbers, numbers of buildings in complexes, numbers of units and square footage of each of these, and installers' contact information.

Launch Custom Measures in PY2. Account managers have found participants had little knowledge of energy efficiency (in general) and how it applies to their building(s) (in particular). Cadmus encourages the Program to begin performing complete building energy audits to determine where property owners can generate savings for themselves and their tenants. It is more time-effective to assess a building only once and determine how many measures will be applicable, rather than visiting a building several times and duplicating the energy analysis.

Allow More CFLs Per Unit. The estimated 2.3 operation hours for CFLs installed in tenant units is very conservative when the Program only allows four CFLs. However, if over 10 CFLs are routinely installed in tenant units, those hours of operation and savings become suspect. Cadmus believes increasing the number of CFLs installed in tenant units up to eight will comfortably maintain estimated savings. The presence of an installer in the unit is a costly undertaking, and all energy-saving measures applicable to the unit should be leveraged at that time. Graduated savings levels for CFLs installed in tenant units could be used to allow for additional cost-effective installations. The first eight CFLs installed will have savings attributed to them at current default savings. The remainder of CFLs can be installed at the discretion of CSG or apartment maintenance staff, but will have savings attributed at a reduced rate.

HEP Program

Impact Results

The HEP Program served 152 electrically heated homes, saving 201 MWh of energy. Table 13 describes energy savings by measure.

Table 13.Home Energy Performance; Savings by Measure

Measures	Number	Achieved kWh savings
Audits on Homes with Electric Heat	152	
ISMs at Home with Electric DHW:		
Faucet Aerators Installed	43	2,484
Low Flow Shower Heads Installed	51	3,023
Hot Water Pipe Insulation Installed	19	491
DHW Subtotal	113	5,998
Sites with Electric Heat that Had Installed:		
Infiltration from 0.8 to 0.35 ACH	0	0
Ceiling Insulation (R-7 to R-38)	0	0
Ceiling Insulation (R-11 to R-38)	0	0
R-11 Wall Insulation	0	0
Insulation Subtotal	0	0
Number of CFL replacements:		
CFL 60w to 15w	3,767	109,243
CFL 75w to 20w	1,111	39,996
CFL 100w to 23w	928	46,400
Lighting Subtotal	5,806	195,639
Electric Program Total	5,919	201,637

As part of the impact evaluation, Cadmus reviewed default estimates of all measures for reasonableness and against audit software calculations, and recommended significant changes on DHW measures; for example, the pipe insulation estimate was reduced from 810 kWh to 34 kWh. Other measures had slight differences that could be traced back to differences in base assumptions and were not adjusted for computing evaluation results. Net savings also assumed at a NTG ratio of 76%, which Cadmus found to be consistent with NTG values used elsewhere for similar programs.

Process Results

Customer Satisfaction. Program implementers indicated that, based on their conversations with participants, most new participants come into the program through word-of-mouth. In addition, according to implementers, program participants feel they received great value for the $25 audit fee and are surprised to receive free energy-saving measures through the ISMs. In comparison with other programs around the country, AIU's $25 audit fee is extremely low. For example, a similar energy-efficiency program in Tennessee charges $250 for an audit, according to CSG staff. Finally, according to program implementers, participants have been impressed with the auditors' expertise.

Marketing. The HEP program markets directly to consumers through direct mailings. To date, implementers have sent 10 batches of mailings, ranging from 5,000–10,000 pieces each. New mailings are triggered when the number of calls received from the previous mailer tapers off. One 10,000-piece mailing sent in March 2009 resulted in a 3.21% response rate, and supplied

enough responses for HEP auditors to be scheduled until June 2009. The mailings go to specific zip codes to target outreach to specific homes types and demographics.

No Insulation Incentives Processed. In PY1, CSG processed no insulation incentives. Several staff interviewed said these results did not meet suggested targets. Others, however, suggested there were no firm incentive-suggested targets for PY1, and low first-year numbers were normal for this type of program, with incentive numbers not increasing until PY2. Everyone interviewed agreed it would be hard to meet the PY2 incentive-suggested targets, given the low PY1 results. Potential reasons for not meeting suggested targets include the following:

- The current recession means program participants are less likely to invest in expensive items, such as HVAC units or insulation. Recognizing incentives are very difficult to change, implementers acknowledged incentive levels may be too low and incentive conditions too restrictive for success during current economic conditions.

- There is no post-audit follow-up with participants. Program implementers said they are working to determine the best follow-up method without being "pushy" or being perceived as a "telemarketer."

- The HEP program currently expects participants to call HVAC or HEP Program Allies (contractors). Discussions about providing leads to HVAC or HEP Program Allies have occurred, but no action has been taken because AIU is concerned about how to distribute leads fairly.

- According to implementers, program participants have asked basic questions about incentive recommendations provided in the written report at the end of the audit. The basic level of the questions may indicate the auditor needs to spend more time explaining the recommendations, particularly regarding measures for which AIU offers incentives.

- Program participants who can afford upgrades tend to live in newer homes, which do not qualify for incentives.

- Program participants living in older homes (those built before 1975) and qualifying for incentives are less likely to be able to afford them.

- More education may be required to help customers increase their willingness to invest in the incented measures.

- For the first three to four months, the AIU HEP Web page emphasized audits and ISMs over incented shell and HVAC measure installations. Because so few customers applied for incentives during that period, CSG changed the HEP Web page to emphasize these incented measures.

Program Design Changes. During PY1, CSG made the following improvements to program design:

- Changed promotion efforts from targeting customers with high-energy bills to customer ZIP codes with both large concentrations of older homes (pre-1975) and high energy bills. This increased the proportion of participants who could benefit from the program.

- Revised HEP audit scheduling process to allow customers to call directly and schedule appointments rather than send in a response card with a $25 check and wait for a call from the auditor. The revised program has auditors collect payment at the time of their visit. CSG also revised the mailer as a brochure and letter, which has been more successful because it looks more official and is less likely to be mistaken for junk mail.

HomeCheck Software Key to Program Efficiency. CSG developed the HomeCheck audit tool for high-volume utility programs. The program limits required data for determining estimated annual heating and cooling loads. CSG tests have shown the model is accurate, even compared to more sophisticated models. After establishing load-specific information, auditors enter variables on each measure into HomeCheck and generate a report at the customer's site that details each measure's cost, savings, and payback.

Data Tracking and Scheduling. CSG's Core Application, the main program used in their office, allows CSG to effectively schedule audits, intake field data, and provide quantitative analysis to meet AIU's data needs. Weekly, CSG downloads data from AIU's customer database to the Core Application for program targeting. In addition, HomeCheck is integrated with the Core Application, which allows accurate and timely field data capture and analysis.

More Insulation Program Allies Needed. At the end of PY1, there were only three HEP Insulation Program Allies. One program implementer believes only one of these companies really understands the program's safety requirements. Potential barriers to becoming an HEP Insulation Program Ally include:

- Required BPI training lasts a week and costs $2,100 plus expenses, both of which are proving to be significant barriers for smaller businesses.

- Some insulation contractors have been resistant to installation method changes, and must be educated on the process.

HEP implementers, however, agree existing HEP Insulation Program Allies have been enthusiastic about increased business from the HEP program, and many non-BPI certified insulation contractors have expressed interest in joining the program.

HEP implementers hope to establish a network of HEP Insulation Program Allies across the state. Implementers believe the ideal number of HEP Insulation Program Allies to be 100, spread throughout the state. One implementer stated that as the network becomes more substantial, there would be less need for audits because the HEP Insulation Program Allies would both promote the program and educate consumers about its benefits.

PY2 Changes. CSG plans to hire an HEP-dedicated manager for PY2, increasing program capacity. During PY1, CSG had one program manager for all AIU residential incentive programs. CSG also plans to hire two new auditors in southern Illinois. Currently, with auditors

located only in Peoria, implementers cluster calls outside the Peoria region to minimize drive times. HEP has consistently completed 50 to 60 audits per week, with each auditor able to complete four audits per day. Ninety-eight percent of scheduling-blocks have been filled.

Recommendations

Consider Increasing Incentives. In the current economic climate, program participants are most likely unwilling to invest in expensive shell or HVAC measures, regardless of how well the HEP program is promoted or implemented. Higher incentives or less restrictive incentive conditions (e.g., only 10% of participants qualified for the ceiling insulation incentive, which requires an existing insulation no greater than R-11) should be examined and tested for cost-effectiveness.

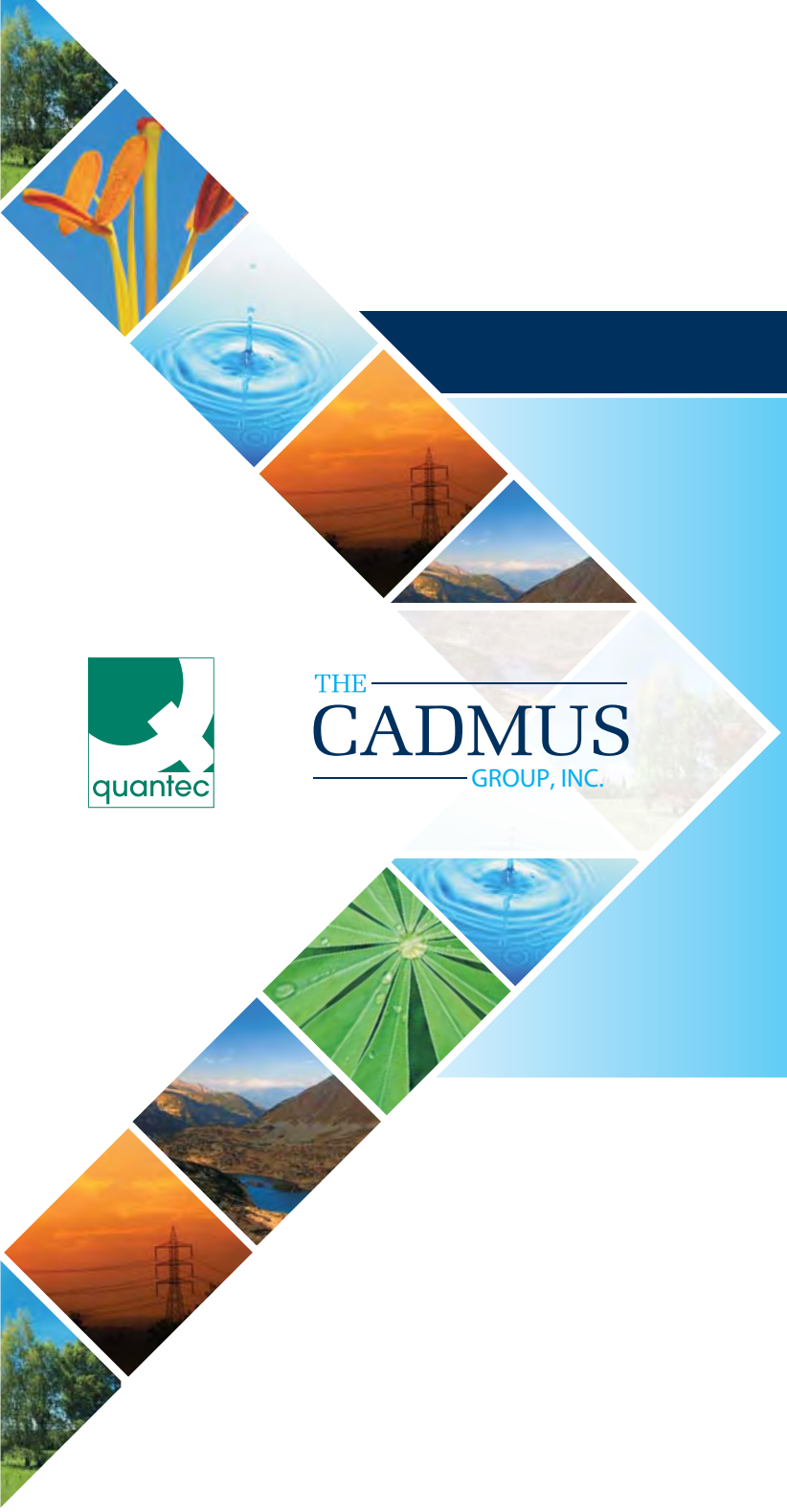
Improve Shell and HVAC Promotion. A number of steps could be taken to improve shell and HVAC measure promotion, including writing the audit report in more layman-friendly language, following up with audit participants, recruiting contractors to be insulation program allies and assisting them with BPI training costs, and promoting online BPI training via the Internet to contractors allow more convenient scheduling.

Analyze DWH Opportunities. Suggested targets for DWH measures were not met. The market should be analyzed to determine if the market is too small or if the program should be changed.

Continue to Assess the Number of HEP Auditors. In addition to the two new auditors CSG plans to hire in PY2 to reach the St. Louis and Southern Illinois territories, additional auditors may be needed to reach the rest of AIU's service territory.

Replace Default Savings Estimates for DWH Measures. HEP Program audits track key, home-specific data (such as existing numbers of showerheads and their flow rates) to develop gross savings for each measure through the audits. Average values from the audits should be used for future default savings. Consider using average audit data for remaining measures if the approach for DWH proves to be reliable, robust, and defendable.

Appendix A: Lighting and Appliance Program Evaluation



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THE CADMUS GROUP, INC.

Lighting and Appliance Program Evaluation

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FINAL REPORT

Prepared by:

The Cadmus Group, Inc.
720 SW Washington Street
Suite 400
Portland, OR 97205
(503) 228.2992

With Team Members:

Jane Colby
Scott Dimetrosky
Carol Mulholland
Anna Carvill
Dorianne Reinhardt Paul
M. Sami Khawaja

Prepared for:

Amenen Illinois Utilities

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1. Executive Summary

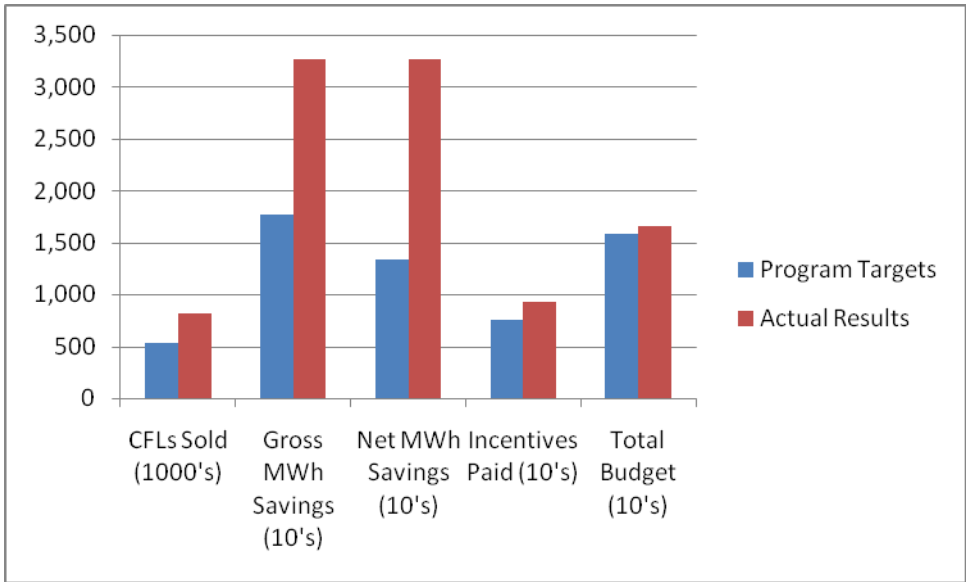
The Residential Lighting and Appliance Program encourages the purchase of high-efficiency lighting products, such as compact fluorescent lamps (CFLs), ENERGY STAR-rated lighting fixtures, and appliances. During its first year (PY1), the Program focused exclusively on lighting, with appliance promotion scheduled to begin in PY2. The Program is primarily implemented through upstream markdowns to manufacturers, and marketed both through retail stores at the customer's point-of-purchase (POP) and through an online store that also sells discounted CFLs. A variety of lights were discounted through the Program, with an average incentive of $1.00 for standard, twister-type CFLs and $1.53 for specialty bulbs (such as flood lights, candle lights, three-way bulbs, etc.).

Ameren Illinois Utilities (AIU) launched the Program in August 2008, through 19 retail stores (increasing to 122 stores in October 2008). AIU advertised the Program through branded POP materials, customer and retailer education materials, in-store customer educational events, training for retail sales staff at retail sites, and general advertising using billboards, television and radio ads, and bill stuffers.

AIU's prime implementation contractor, Conservation Services Group (CSG) subcontracted the Program's implementation to Applied Proactive Technologies (APT) and Energy Federation Incorporated (EFI). Their responsibilities include Program fieldwork with retailers, Internet order fulfillments, and tracking and incentives payments.

PY1 Program targets were to sell: 535,452 CFLs, netting 13,402 MWh savings within an incentives budget of $757,562 and a total budget of $1,589,117. Actual PY1 Program results included sales of 815,403 CFLs, for a total of 32,631 gross MWh savings. Cadmus compared telephone survey data on CFLs purchased in the AIU service territory to similar results from Kansas, Pennsylvania, and Georgia (Comparison Area—states without CFL programs). The results produced an estimated net-to-gross (NTG) ratio of 1.03. Other data from the CFL User Survey support a high NTG ratio. The survey showed significant CFL sales in AIU service territory occurred at nonprogram retailers, such as WalMart (36% of sales in AIU service territory), and that 2008 first-time purchases of CFLs were much higher for AIU than in the Comparison Area (31% vs. 14%). Historically, a number of utility programs have enjoyed NTG ratios greater than one. More recently, however, CFLs are becoming a mature technology, consumer awareness is high, and NTG ratios are dropping. As such, Cadmus does not recommend AIU apply a NTG ratio greater than 1.0 for a CFL program, and, therefore, estimates net PY1 savings of 32,631 MWh. Figure 1, below, shows the program targets compared to actual results for CFLs sold, gross and net MWh savings, incentives budget, and total budget.

Figure 1. Program Targets Compared to Actual Results



The telephone survey showed more AIU customers were aware and familiar with CFLs than those in the Comparison Area (97% vs. 92%) and had a higher rate of purchase of CFLs in the six months prior to the survey (0.52 vs. 0.38 CFLs per household per month).

From a process standpoint, all interviewed Program staff were pleased with the first year's progress and results. Program staff were able to manage Program sales to stay within the residential portfolio budget and maintain administrative costs under those planned for the Program. Communication among stakeholders was perceived by those involved to be excellent, and anecdotal feedback from customers and retailers was positive.

Cadmus recommends AIU continue its proactive efforts to educate customers on the proper use, purchasing considerations, and disposal of CFLs. The CFL User survey indicated a relatively low level of awareness and concern among CFL users about mercury or disposal issues with CFLs (5%); however, research in other states indicates mercury and CFL disposal is a growing issue of concern. Also, the CFL User Survey indicated, of the 76% who have CFLs installed, a significant portion (27%) use CFLs in dimmable or three-way fixtures, while only 44% of those use specialty CFLs designed for such fixtures (15% of CFL users). Using standard CFLs in dimmable or three-way fixtures can significantly reduce the life of these bulbs and should be discouraged. Cadmus recommends AIU educate customers on the proper placement of CFLs to help customers avoid this problem.

The CFL User Survey also reported AIU customers purchased CFLs from WalMart more than any other retailer (36%), even though WalMart was not a participating retailer. Should AIU include WalMart as a future retailer, a participation agreement between AIU and WalMart should be structured to account for the high level of baseline sales already occurring rather than paying incentives on every CFL sold.

2. Introduction

Program Description

The Residential Lighting and Appliance Program encourages the purchase of high-efficiency lighting products, such as compact fluorescent lamps (CFLs) and ENERGY STAR-rated lighting fixtures and other appliances. During the Program's first year (PY1), it focused exclusively on lighting, with appliance promotion scheduled to begin in PY2. The Program is implemented primarily through upstream markdowns to manufacturers, marketed both through retail stores at the customer's point-of-purchase (POP) and an online store that sells discounted CFLs. A variety of lights are discounted through the Program, with an average incentive of $1.00 for standard, twister-type CFLs and $1.53 for specialty bulbs (such as flood lights, candle lights, three-way bulbs, etc.).

AIU launched the Program in August 2008, through 19 Home Depot and Sam's Club retail stores. Additionally, AIU mailed a catalog containing CFLs available for sale to 286,000 targeted customers, along with advertising materials, information about an online Web site for future ordering, and two free CFLs. The 572,000 CFLs included in the mailing were purchased with monies from a $2 million rate relief fund, and were not counted in the Program's results or budget. AIU targeted customers based on their lack of proximity to retail outlets where they could purchase CFLs directly. The Program ramped up in October and November 2008 to include a total of 122 stores stocking qualifying bulbs, including Lowes, Ace, Menards, CVS, and local specialty stores. The Program also developed branded POP materials, and customer and retailer education materials, offered in-store customer educational events, and trained retail sales staff. AIU offered general advertising through billboards, television and radio ads, and bill stuffers.

A primary question for program designers was how to offer discounts to AIU customers without attracting non-AIU customers from the adjacent service territories of cooperative and municipally-owned utilities. AIU's other residential programs require participating customers to provide account numbers before receiving an incentive; upstream programs, however, do not allow for discrimination among retail customers because incentives are provided directly to manufacturers prior to stocking at the retail store. To minimize this "leakage" effect, AIU program designers carefully limited eligible retail stores in PY1 to those with at least 80% AIU customers in the areas they serve.

AIU hired Conservation Services Group (CSG) as its overall implementation contractor for the residential program portfolio, including the L&A Program. In turn, CSG subcontracted certain L&A Program activities to Applied Proactive Technologies (APT) and Energy Federation Incorporated (EFI). APT's responsibilities include all Program fieldwork:

- Negotiating Memorandums of Understanding (MOU's) with retailers and manufacturers;
- Training retail store employees;
- Developing point-of-sale materials and ensuring proper placement in retail stores;

- Monitoring and adjusting the MOUs; and
- Conducting lighting clinics for retail store customers.

EFI runs the CFL catalog and Internet order fulfillment process, and tracks and pays incentives to manufacturers on CSG's behalf.

AIU's initial Program goals, based on its 2007 Energy Efficiency Plan, were to sell 360,000 CFLs for a total budget of $1,160,000. AIU's request for proposal (RFP) for implementation contractors asked bidders to supply revised Program sales, budgets, and energy savings in their proposals. Table 1 contains the recommended amounts from CSG's proposed implementation plan, which were adopted by AIU as its official Program targets. However, once the Program began and AIU had a better understanding of the schedule for all its residential programs, AIU informally increased its sales objectives to 900,000 bulbs to compensate for other delayed programs.

Table 1. Program Targets

	Program Targets
CFLs Sold	535,452
Gross MWh Savings	17,634
Net MWh Savings	13,402
Incentives Paid	$756,652
Total Budget	$1,589,117

Evaluation Questions

Cadmus' evaluation of the L&A Program's PY1 sought to answer the following key questions:

Impact Questions

1. What are the program's gross impacts?
2. What are the program's net impacts?
3. Did the program meet its energy targets within its budget? If not, why not?
4. What are the market effects associated with program activities?

Process Questions

1. Has the program design changed from the plan filed in 2007? If so, how, why, and were changes advantageous?

2. Is implementation on track and meeting goals? Has the program been implemented in a manner consistent with program design?

3. How effective were program implementation, design and processes, and marketing efforts?

4. What were program staff experiences and satisfaction with the program?

5. What were customers' perceptions of CFLs and were any issues associated with CFL use?

3. Evaluation Methods

Analytical Methods

Impact evaluations for upstream rebate programs are inherently difficult to conduct due to a lack of participant contact information. This PY1 evaluation, limited by time and budget constraints, used participating retailer sales data, CFL User Survey results, and secondary data from other service territories to inform the impact analysis. Specifically, Cadmus derived savings estimates from the following inputs:

- ***Number of Program Bulbs.*** The Program tracking database was reviewed and utilized to calculate the number of CFLs incented through the Program.

- ***Leakage.*** Although Program bulbs may leave the AIU service territory (leakage), Cadmus assumes this effect is minimal for a few reasons. First, the Program has attempted to limit leakage by selecting stores that serve zip codes with at least 80% AIU customers. Secondly, some adjacent service territories also offer CFL discounts; so leakage can be assumed to work in both directions (positively and negatively). Therefore, we have assumed leakage is zero for PY1.

- ***Installation Rate.*** The CFL User Survey provides the basis for estimating the percentage of CFLs installed versus those put in storage.

- ***Energy (kWh) Saved.*** kWh savings per bulb were estimated and agreed upon in AIU's Energy Efficiency Plan, approved in November 2007. Table 2 shows assumed kWh savings by CFL type.

Table 2. kWh Savings by CFL Type

Description	kWh savings
Feit 23w PAR-38 EcoBulb Flood ESL23PAR38T	99
GE 15w R-30 Dimmable Flood FLE15/2/DV/R30	79
GE 15w R30 Soft White Flood FLE15/2/R30XL	79
Harmony 15w Mini-Spiral H15MS	79
Harmony 20w Lightwiz H20027S	80
Harmony 25w Lightwiz H25027	99
Maxlite 13w MiniBulb A19 SKB13EA	39
MaxLite 20w MiniBulb A20 SKB20EAWW/SP	80
Philips 14w Bug-A-Way 203711	39
Sylvania 20w R40 Reflector Flood 29399	80
TCP 14w G25 Globe 2G2514	39

- ***Net-to-Gross (NTG).*** Spillover, freeridership, and other NTG indicators were estimated by combining CFL User Survey results (to estimate total CFL and baseline sales) and program tracking (to estimate total Program sales).

Data Sources

Table 3 summarizes data sources Cadmus used to evaluate the L&A Program. Each data source is described in more detail following the table.

Table 3. Summary of Evaluation Data Sources

Action	Sample Size	Details
CFL User Survey	302	CFL awareness, sales, saturation, NTG, and Program implementation.
Program Document	N/A	Used to inform the process evaluations and understand Program logistics.
Stakeholder Interviews	6	Used to inform the process evaluations and understand Program logistics.
Retail Sales Analysis	Census	Provides Program lighting sales.

CFL User Survey

Cadmus developed a residential customer telephone survey to estimate a number of important progress indicators, including:

- ***CFL Awareness and Purchasing***. These questions gathered data on types of bulbs used and stored in the home. Questions were also asked to determine where bulbs were purchased and in what quantity.

- ***Non-CFL Purchasing***. The questions focused on whether customers had purchased incandescent bulbs in the last six months, the number of these bulbs, and the number of other types of bulbs purchased.

- ***Use of Lights***. These questions focused on CFL and incandescent bulb use. If respondents indicated they had incandescent bulbs in their homes, they were asked a series of questions regarding in which scenarios they would use an incandescent or CFL bulb.

- ***CFL Satisfaction***. This section asked about participants' satisfaction with CFLs, including reasons for dissatisfaction.

- ***Concerns and Removal Rates of CFLs***. Questions in this section gathered information on customer concerns about CFL bulbs and what they did with bulbs no longer in use.

- ***ENERGY STAR Awareness***. This section focused on customer awareness of the ENERGY STAR-label on CFL bulb packages.

- ***LED Awareness***. Questions in this section gathered information on light emitting diodes (LEDs) and customer familiarity with this type of bulb.

- ***Demographics***. This section captured household and respondent characteristics, including income, age, home type, home square-footage, and energy expenditures.

The CFL User Survey closely replicated the methodology established as part of the California Public Utilities Commission (CPUC) CFL Market Effects Study.[1] This approach not only allowed AIU to leverage the extensive work conducted to develop data collection instruments, protocols, and analyses, but also provided the opportunity for cross-sectional analysis comparing AIU's results to other areas of the country.

Program Document Review

Cadmus reviewed all Program documents, including: records of marketing and outreach efforts; copies of the point-of-purchase signage; and subcontractor progress reports. The review provided information on the Program launch and operations.

Stakeholder Interviews

Cadmus interviewed key Program and subcontractor staff by phone (the interview guide is included in Appendix B). Interviewees included: program manager from AIU (1); CSG managers (2); APT (2); and EFI (1). The interviews focused on assessing Program delivery.

Retail Sales Analysis

Detailed tracking reports were available from AIU for all rebated transactions. These files tied payment requests to identified transactions and tracked:

- Program activity by product or product family;
- Program activity, on an aggregated basis, of products rebated and dollars spent;
- Program activity by various identified components (i.e., by product, store chain, and manufacturer); and
- Current and year-to-date Program activity.

Sampling Plan

CFL User Survey. Approximately 300 surveys were conducted with randomly selected AIU residential customers, reaching approximately 100 CFL purchasers during PY1 and data compared to similar surveys in Kansas, Georgia, and Pennsylvania. The surveys were designed to achieve a precision level of ±5% at the 90% confidence levels (for the program overall). PA Consulting Group conducted the surveys in AIU service territory. AIU data collection started on April 27, 2009, but was suspended from May 13 to May 17 because of severe storms and power outages in AIU's service area. Calling resumed on May 18, and finished on May 20, 2009, when the goal of 300 completes was met.

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[1] California Public Utilities Commission: Compact Fluorescent Lamps Market Effects Scoping Study Findings and Work Plan. October 31, 2008. Prepared by The Cadmus Group.

Respondents in the three comparison states—Georgia, Kansas, and Pennsylvania (referred to throughout this report as the "Comparison Area")—were selected through random-digit dialing (RDD). The survey only spoke with individuals responsible for purchasing light bulbs for their households. The Comparison Area surveys targeted a minimum of 100 respondents per state who had purchased CFLs in the past three months. The status of other groups of interest (CFL non-users, non-purchasers, and those unaware of CFLs) was monitored, but no quotas were set. Table 4 shows the final disposition of all calls attempted and completed for this project in AIU's territory as well as the Comparison Area.[2]

Table 4. Final Distribution of Telephone Surveys

State	Measure	Completes	Target	Percent Complete	Incidence Rate	Complete Interviews	Hard Refusals	Lighting Recruits	Missing/Non-working number	Language Barrier
	Unaware	2	N/A	N/A	.3					
	Non-Purchaser	3	N/A	N/A	1.3%					
	Non-User	20	N/A	N/A	8.4%					
	6mo CFL Purchaser	97	100	102%	40.8%					
	06-08 CFL Purchaser	116	N/A	N/A	48.7%					
	Non-Purchaser	94	N/A	N/A	15%					
	Non-User	87	N/A	N/A	13%					
	3mo CFL Purchaser	101	100	101%	14%					
AIU	06-08 CFL Purchaser	380	N/A	N/A	55%	302	220	N/A	167	10
	Unaware	28	N/A	N/A	5%					
	Non-Purchaser	106	N/A	N/A	20%					
	Non-User	103	N/A	N/A	20%					
	3mo CFL Purchaser	106	100	106%	20%					
KS	06-08 CFL Purchaser	281	N/A	N/A	54%	525	824	175	860	16
	Unaware	45	N/A	N/A	7%					
	Non-Purchaser	131	N/A	N/A	20%					
	Non-User	136	N/A	N/A	21%					
	3mo CFL Purchaser	103	100	103%	16%					
PA	06-08 CFL Purchaser	331	N/A	N/A	51%	653	1042	227	639	22
	Unaware	53	N/A	N/A	9%					
	Non-Purchaser	118	N/A	N/A	20%					
	Non-User	122	N/A	N/A	21%					
	3mo CFL Purchaser	97	100	97%	17%					
GA	06-08 CFL Purchaser	298	N/A	N/A	51%	579	1303	203	1585	31

Unaware: Respondent unaware of CFLs.
Non-Purchaser: Aware but has not purchased any CFLs in the last three years (2006–2008).
Non-User: Do not have CFLs currently installed in their homes and do not have any CFLs currently in storage.
3mo CFL Purchaser: Purchased a CFL in the last three months (prior to survey).
06-08 Purchaser: Purchased at least one CFL in the last three years (2006–2008).
Note: Incidence rate is the percentage of the population called that completed the survey. The incidence may sum to greater than 100% because respondents may be counted in more than one category.

[2] Appendix A contains a final version of the telephone survey.

Comparison Methodology

Cadmus' analysis compares AIU findings with the Comparison Area. The assumption here is that CFL sales and usage patterns in the Comparison Area approximate baseline market conditions for AIU (i.e., sales that would have occurred in AIU in the absence of intervention). States in the Comparison Area were chosen because they did not have long-term or significant histories of utility- or regional government-sponsored programs to promote CFLs.

Comparison state selection also was based on an examination of state-by-state socioeconomic indicators (including households, population, income, and education) from the 2006 American Community Survey.

Although this Comparison State approach has been implemented successfully in recent program evaluations in Iowa, Wisconsin, and Massachusetts, Cadmus recognizes the study's limitations, including:

- No single state can truly represent another state. We selected a comparison group of states, rather than a single comparison state, to mitigate this issue.
- Manufacturer and retailer sales strategies in program and nonprogram states may be interdependent (i.e., some manufacturers and retailers may make decisions about how to sell CFLs in one state or region based on what they are doing in another).
- The Comparison State approach does not explicitly control for many other factors that can impact CFL sales, including income, home size, education, energy rates, "big box" store saturation, etc.[3]

Other Data Sources. No sampling was required for the Program document review, stakeholder interviews, and retail sales analysis.

[3] To more precisely control for a comprehensive set of factors impacting CFL sales, a regression model is currently being developed for multiple program states, including California, Massachusetts, New York, and Michigan. The model will also include approximately six control regions not currently running CFL programs. Cadmus recommends AIU also participate in this pooled data regression approach to control for these other factors.

4. Program Results

Impact Evaluation

Gross Savings

Total Program sales were 815,403 CFLs: 47,442 through the online store; and 767,961 through retailers. Gross MWh savings for the Program were 32,631 MWh.[4] Program sales took place through 122 individual retail outlets in specific AIU service territory cities, representing 11 different retailers, including the online store. Table 5 summarizes sales by retailer.

Table 5. CFLs Sold, Incentives Paid, and Gross MWh Saved

Store	Qty Sold	Incentives $	MWh
Ace Hardware	30,420	32,963	1,158
Affiliated Home Center	102	137	5
CVS	3,273	3,273	131
Home Depot	448,508	539,512	17,567
Kerr Home Center Inc.	189	189	8
Kull Lumber Company Inc	258	258	10
Lowes	21,874	24,900	1,032
Menards	89,692	98,661	3,434
Petersburg Hardware/Service Co	347	432	15
Sam's Club	173,298	143,334	6,817
Web-Store	47,442	83,011	2,319
Total	815,403	926,925	32,631

Of the various CFL types sold, the most popular was the 14W four-pack (representing 38% of the total Program PY1 savings). Sales took place starting in August 2008, completing PY1 in May 31, 2009**.** Figure 2 and Figure 3 illustrate the distribution of CFL sales and MWh savings over time. The sales drop-off occurring in March through May resulted from AIU's decision to slow the program by reducing the number of products eligible for incentives, and reduced the risk of exceeding PY1's residential portfolio budget.

[4] Results determined from program tracking database supplied by CSG.

Figure 2. CFL Sales by Program Month

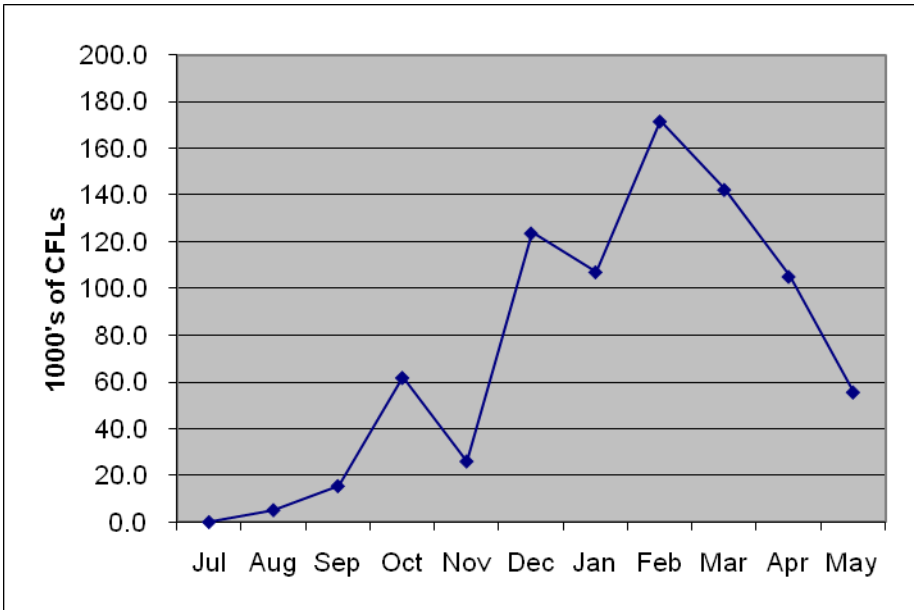
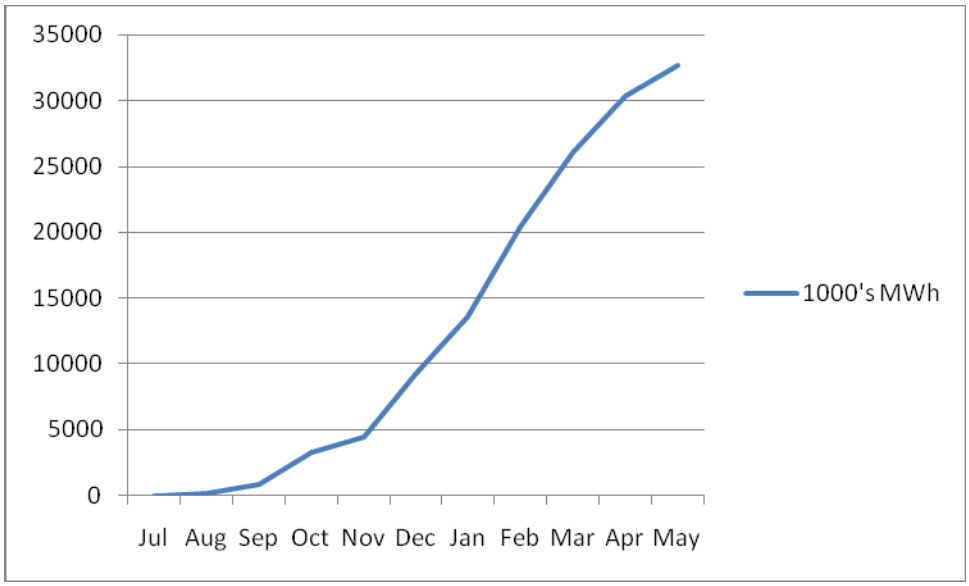


Figure 3. Gross MWh Savings by Program Month (Cumulative)



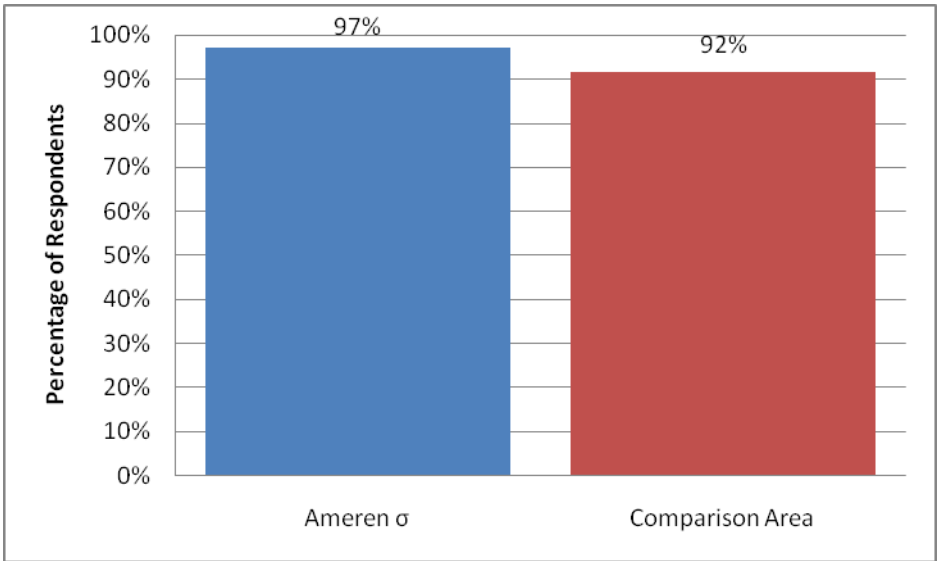
Market Effects

The CFL User Survey provided insights into the ways in which AIU's Program affected the market. Cadmus compared AIU responses to those in from the Comparison Area. We collected information on CFL awareness and familiarity, recent purchases, installation rates, CFL satisfaction, awareness of the ENERGY STAR label, and awareness of LEDs.

CFL Awareness and Familiarity

The survey asked a series of questions to assess customer familiarity with and experience using CFLs. Figure 4 illustrates nearly all respondents (AIU [97%] and the Comparison Area [92%]) were aware of CFLs after hearing a brief description of the bulbs. Awareness in AIU's service area was significantly higher than in the Comparison Area, indicating a positive Program effect, and these results were statistically significant at the 90% confidence level.[5] Respondents were then asked to rank their familiarity with CFLs. In AIU's service territory, 76% of respondents believed themselves either "very familiar" or "somewhat familiar" with CFLs, compared to 67% in the Comparison Area (Table 6).

Figure 4. Awareness of CFLs (Base—All Respondents; AIU n=302, Comparison Area n=1,757)



σ Results between AIU and the Comparison Area are significantly different at the 90% confidence level.

[5] Throughout this report, the symbol 'σ' is used to indicate that results between AIU's service territory and the Comparison Area differ significantly at the 90% confidence level.

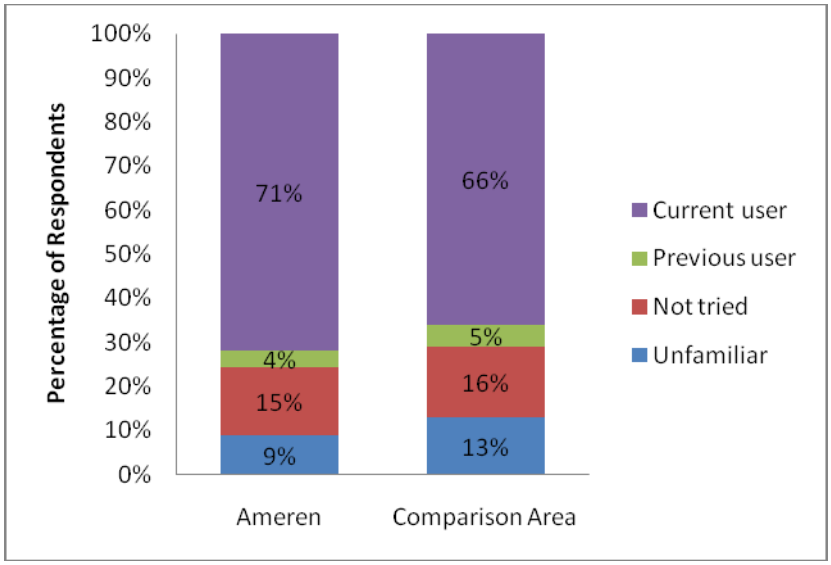
Table 6. Participants' Familiarity with CFLs (base – all respondents aware of CFLs)

	Ameren	Comparison Area
N	302	1757
Very familiar – 1	35%	33%
Somewhat familiar - 2 σ	41%	34%
Slightly familiar -3 σ	14%	20%
Not at all familiar - 4	9%	13%
Don't know/Refused	1%	1%

σ Results between Ameren and the Comparison Area are significantly different at the 90% confidence level.

Those familiar with CFLs were asked to describe their past and current usage. Overall, AIU's customer responses were slightly higher than those in the Comparison Area. Seventy-one percent of AIU respondents said they currently use at least one CFL inside or outside their home, compared to 66% in the Comparison (Figure 5). AIU was similar to the Comparison Area in terms of respondents who had not tried CFLs; 15% of AIU customers had not tried CFLs, compared to 16% in the Comparison Area.

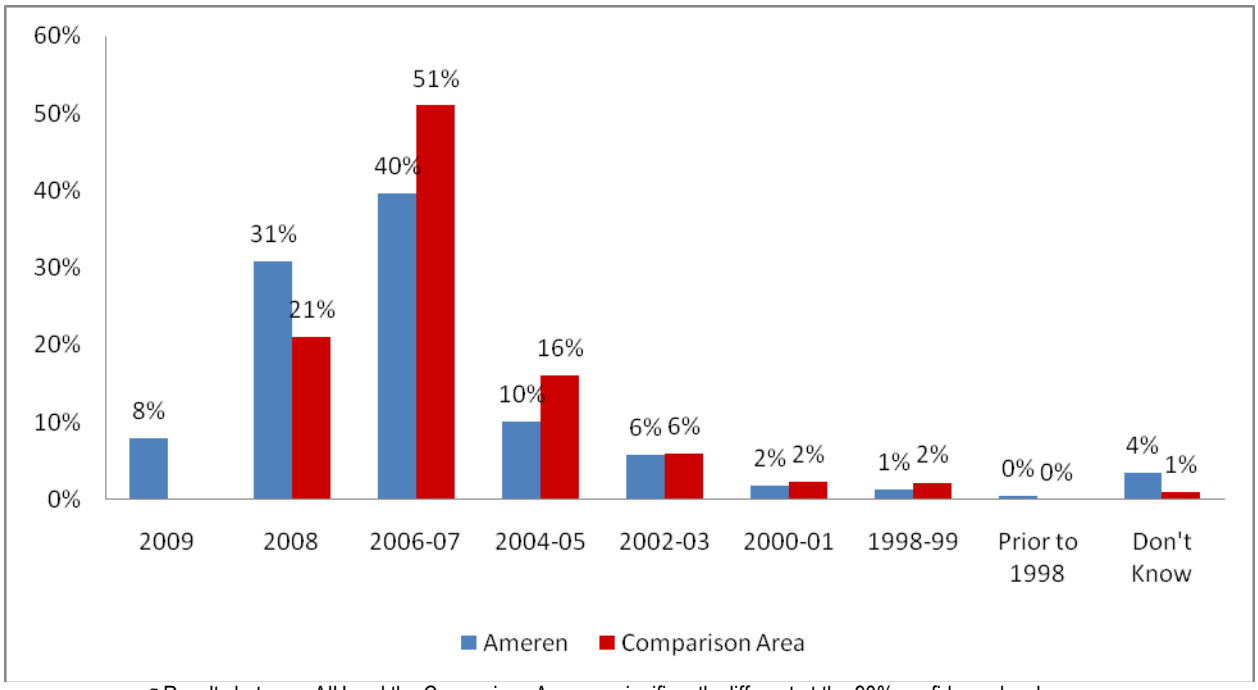
Figure 5. Use of CFLs (Base—All Respondents Aware of CFLs)



σ Results between AIU and the Comparison Area are significantly different at the 90% confidence level except for "Not Tried" responses

First use of CFLs can be an indication of when the market changed or when effective programs were implemented in an area. Figure 6 shows both AIU service area and Comparison Area respondents were more likely to have tried CFLs for the first time in 2006–2008. Two-thirds of AIU respondents say they first purchased or received a CFL in either 2007 or 2008. An additional 8% first purchased or received their first CFL in 2009. AIU had significantly more respondents say they first tried CFLs in 2008 than in the Comparison Area, which indicates a likely and significant program effect. Data were not available for 2009 for the Comparison Area.

Figure 6. First Use of CFLs
(Base—Respondents Who Have Tried or Currently Use CFLs)



σ Results between AIU and the Comparison Area are significantly different at the 90% confidence level

Recent Purchases of CFLs

The majority of respondents in AIU's service territory (70%) purchased light bulbs in the six months prior to the phone survey. Of these recent purchasers, 50% purchased CFLs, 47% purchased incandescent bulbs, and 37% bought specialty bulbs. AIU customers' purchasing trends favored CFLs more than in the Comparison Area.

The survey also asked respondents to estimate the number of bulbs purchased during the six months prior to the survey. As shown in Table 7, AIU households purchased an average of 0.52 CFLs, 0.41 incandescent bulbs, and 0.24 specialty bulbs per month. AIU households purchased fewer incandescent bulbs than in the Comparison Area (0.71).

Self-reported light bulb purchases present challenges because of purchase frequency, the small dollar amount spent, and the prevalence of multipacks. Site visits planned for PY2 should verify the accuracy of these results.

Table 8 shows CFL lighting purchasing preferences in AIU's territory and the Comparison Area for households purchasing CFLs in the three months prior to being surveyed. AIU households purchased most of their CFLs from mass merchandisers (47%) and large home improvement stores (38%), while households in the Comparison Area purchased a greater percentage from large home improvement stores (41) than from mass merchandisers (37%).

Table 7. Recent Bulb Purchases—Average Bulbs Per Month (All Purchasing Households; Base—All Products Purchased)

		CFLs	Incandescent	Specialty	All Bulbs
AIU	Unweighted n	105	99	78	212
	Average # purchased per month all households	0.52	0.41	0.24	1.16
	Percentage purchased n past 6 months, purchasing households	44%	35%	20%	
Comparison Area	Unweighted n	295	577	442	992
	Average # purchased per month, all households	0.40	0.77	0.50	1.67
	Percentage purchased in past 3 months, purchasing households	23%	47%	29%	

σ Results between AIU and the Comparison Area are significantly different at the 90% confidence level.

Table 8. CFL Purchases by Retail Distribution Channel (Base—Respondents Purchasing CFLs; Respondents May Have Purchased Bulbs at More Than One Type of Store)

	Households Purchasing Bulbs by Distribution Channel	
	AIU	Comparison Area
N	86	267
Large Home Improvement	38%	41%
Membership Club	5%	6%
Mass Merchandise	48%	37%
Discount	2%	6%
Grocery	4%	5%
Drug	0%	0%
Small Hardware	5%	3%
Lighting Electronics	0%	1%
Other/Don't Know	11%	2%

σ Results between AIU and Comparison Area significantly different at the 90% confidence level except for drug stores and lighting electronics

Installation Rates for Recent Bulb Purchases

AIU households that indicated they had purchased CFLs in the six months prior to the survey had higher installation rates per home than did those in the Comparison Area, as shown in Table 9 (0.43 compared to 0.30 in the Comparison Area).

Table 9. Installation and Storage Rates of CFLs

		n	Average # of Products, all households
AIU	Installed	115	0.43
	In Storage	71	0.14
Comparison Area	Installed	312	0.30
	In Storage	219	0.17

σ Results between AIU and the Comparison Area are significantly different at the 90% confidence level except for AIU In Storage

Household reasons for storing CFLs provide insights into whether or not the bulbs will be installed in the future (Table 10). The vast majority of respondents in AIU households and the Comparison Area reported they stored the bulbs for future use. Bulbs that did not fit or work in fixtures may still be installed at a later date.

Table 10. Reasons for Storing CFLs (Base—Respondents Currently Storing CFLs, Multiple Response)

		AIU	Comparison Area
Why Storing	N	130	758
	For future use	85%	83%
	Do not fit/work in fixture	2%	4%
	Don't know/refused	0%	1%

σ Results between AIU and the Comparison Area are NOT significantly different at the 90% confidence level.

Satisfaction with CFLs

The survey asked respondents to rate their satisfaction with a number of CFL attributes using a scale of 0 to 10, with 0 being 'not at all satisfied' and 10 being 'very satisfied.' As Table 11 shows, AIU respondents gave slightly higher ratings of overall satisfaction with CFLs currently in their homes (8.7) than did those in the Comparison Area (8.2). They also gave higher ratings about all the specific CFL attributes than Comparison Area respondents.

Table 11. Satisfaction with CFL Attributes (Base—Respondents Who Previously Used or Currently Use CFLs)

	AIU (n=216)	Comparison Area (n=1228)
	Average	Average
Overall satisfaction with CFLs currently in home σ	8.7	8.2
How long CFLs last before burning out σ	9.0	5.3
Constant light output/no flickering σ	9.2	8.6
Fit in light fixtures σ	8.7	7.9
Color of light σ	8.4	7.6
Brightness of light	8.2	7.8
Amount of time to light up	7.8	7.3
Look in light fixtures σ	7.8	6.5
Retail Price σ	7.0	5.3

σ Marked Results between AIU and the Comparison Area are significantly different at the 90% confidence level.

Awareness of the ENERGY STAR Label

Survey respondents were read the following brief description of the ENERGY STAR label:

> *ENERGY STAR labels are used by the Environmental Protection Agency and the Department of Energy to identify energy-efficient lighting and appliances for consumers. The label is blue and white with the word 'energy' followed by a five-pointed star.*

Respondents were instructed to use a scale of 0 to 10, with 0 being 'not at all familiar' and 10 being 'very familiar' with the ENERGY STAR label. As Table 12 shows, AIU respondents rated their familiarity with the ENERGY STAR label on household products higher than did those in the Comparison Area (7.0 vs. 5.4). To derive a better understanding of the AIU respondent's familiarity with the ENERGY STAR label, they were asked if they were aware of any differences between ENERGY STAR-labeled CFLs compared to CFLs without the ENERGY

STAR label. The majority of AIU respondents, 70%, indicated they were not aware of any differences between bulbs that have the ENERGY STAR label compared to the bulbs that do not.

Table 12. Familiarity with the ENERGY STAR Label (Base—All Respondents)

	AIU	Comparison Area
N	224	1,671
Level of familiarity with ENERGY STAR label on household products σ	7.0	5.4
N	168	1,408
Have seen ENERGY STAR label on CFL packaging or displays	37%	46%

σ Marked results between AIU and the Comparison Area are significantly different at the 90% confidence level.

LED Awareness and Use

LEDs are a solid-state lighting technology that has been used for years in indicator lights and novelty products and in other small electronic applications. Recently, the technology has advanced into the household lighting market, promoting ENERGY STAR to initiate a qualification process to include LEDs as a category of energy-efficient lighting. As the technology develops, LEDs are expected to exceed the lumen output and energy savings potential of CFLs and be adaptable to a wide range of household applications. To gauge some initial awareness and adoption of LEDs in household applications, the survey asked respondents a series of questions about their awareness and use of the technology.

Over half (51.7%) of AIU households were familiar with LED products, including lamps, fixtures, and bulbs intended for household use. Five percent of households said they currently used LED lamps, fixtures, or bulbs for regular household lighting. Table 13 shows AIU household awareness of LEDs and home use of LEDs to be about the same as in the Comparison Area.

Table 13. Familiarity with LEDs (Base—All Respondents)

	AIU	Comparison Area
N	302	1,757
Familiar with LEDs	51%	50%
N	155	940
Currently using LED lamps, fixtures or bulbs for regular household lighting	5%	6%

σResults between AIU and the Comparison Area are NOT significantly different at the 90% confidence level.

Net Impacts

Cadmus used the CFL User Survey results to calculate the NTG ratio, and applied two adjustment factors to calculate net savings:

- Freeridership, or the number of customers who purchased and installed Program-discounted CFLs, even though they would have taken the same action without Program incentives; and

- Spillover, or the number of customers who installed CFLs because they were influenced by the Program but did not receive Program incentives.

Cadmus calculated the NTG ratio by subtracting the monthly CFL purchase rate of the Comparison Area' survey respondents from the monthly CFL purchase rate of AIU survey respondents during the Program period. This difference was multiplied by the number of Program months and total number of AIU customers to calculate total CFLs purchased as a result of AIU's Program. That number served as the numerator of the NTG ratio. The denominator of the NTG ratio served as the number of actual CFL sales from the Program database.

According to the CFL User Survey, AIU customers purchased an average of 0.5166 CFLs per month over the six months prior to the survey (which occurred during the Program period). The average number of CFLs purchased in the Comparison Area was 0.4 per customer per month. The net (or Program-induced) amount was 0.1166 CFLs per customer per month. To be conservative, Cadmus used only the six-month period discussed with respondents as part of the CFL User Survey to estimate Program impacts, which resulted in a more conservative savings estimate that ignored the Program's slower ramp-up and ramp-down periods. We multiplied the number of Program-induced sales per customer per month (0.1166) by six months to determine total Program-induced sales per customer. We applied the resulting number (0.6996) to AIU's total electric residential customer base of 1.2 million to conclude 839,520 net CFLs were purchased due to the Program. When we compared this number to the 815,403 CFLs tracked and sold through the Program, it resulted in a NTG ratio of 1.03. Table 14 summarizes the calculations.

Table 14. Summary of CFL NTG Calculations

(A)	(B)	(C)	(D)	(E)	(F)	(F)
CFL Sales/Month per Residential Customer			Total Induced CFL Sales over Six Months, per Customer(C*6)	Total Induced CFL Sales all Residential Customers (D*1.2 million)	Program CFL Sales	Net-to-gross (E/F)
AIU	Comparison Area Baseline	Program Induced Monthly Sales (A-B)				
0.5166	0.4	0.1166	0.6996	839,520	815,403	1.03

Although the calculations point to a 1.03 NTG ratio, and earlier CFL programs in other states showed NTG ratios higher than 1.0, Cadmus does not recommend using a NTG ratio greater than 1.0, primarily because standard CFLs have become a fairly mature technology with widespread awareness and substantial baseline sales throughout the U.S. In addition to the study limitations described in the methodology section, these net impact results should be considered in light of several differences between the AIU customer surveys and those conducted in the Comparison Area:

1. AIU's CFL User Survey asked respondents to recall the number of CFLs purchased and installed in the last six months (covering the period of AIU's Program) compared to a similar question in the Comparison Area asking for purchases and installations in the past three months. Average monthly results were computed; so we could compare the different regions. While it was important to gather information on the entire period of AIU's L&A

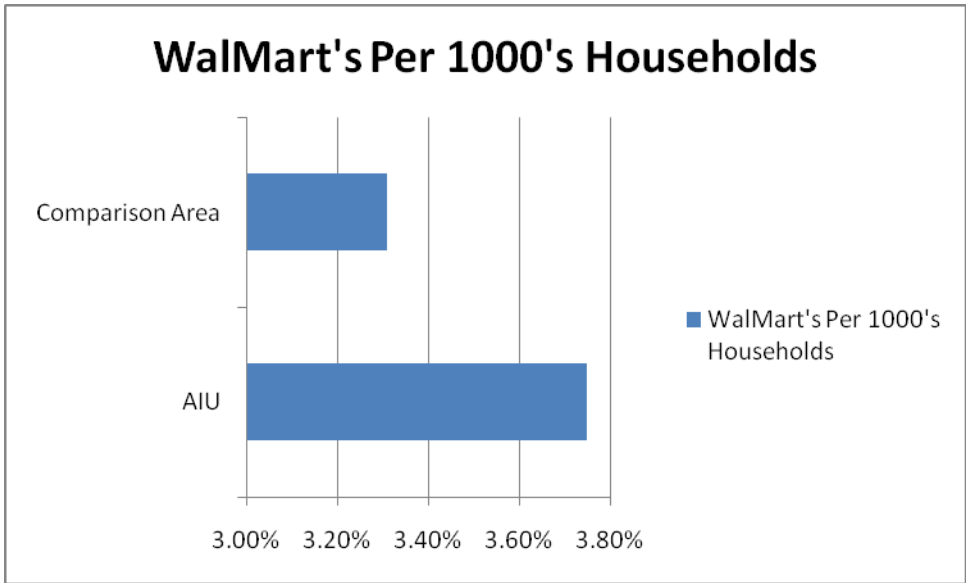
Program, recall bias may have influenced results as participants were likely to have more difficulty remembering six months back compared to three months back.

2. A seasonality bias may also exist because of survey timing. Comparison Area telephone surveys were conducted in October and November 2008, and specifically asked about the previous three months of purchases. AIU surveys took place in April and May 2009, and asked about the previous six months of purchases. Fall, typically the most active period for lighting purchases, was coincident with a national efficient lighting campaign, and was "freshest" in the minds of the Comparison Area survey respondents.

3. The likelihood of making any type of lighting purchase increases with the longer the time period in question. Consequently, AIU's installed CFL results may contain an inherent bias because respondents were asked about purchases in the past six months versus three months for the Comparison Area.

4. Other biases may exist because of differences in retail outlet availability between AIU's service territory and the Comparison Area. Most CFL purchases took place at "big box" discount and home improvement stores. The single most reported retail outlet for CFL purchases in AIU's service territory was WalMart (36%), a nonparticipating retailer. Thus, the number of "big box" stores available to AIU customers may influence CFL purchase rates in comparison to other areas. Figure 7 compares the number of big box stores per 1,000s of households in AIU service territory to those in the Comparison Area. This figure indicates a possible bias due to the higher number of WalMart stores per household in AIU's service territory.

Figure 7. Number of WalMart Stores per Million Households in AIU's territory and the Comparison Area



Process Evaluation

Cadmus used Stakeholder Interviews, the CFL User Survey, and our review of Program materials to feed into the process evaluation. Stakeholder interviews provided details on the Program design, staffing levels, stakeholder perceptions of Program goals, communications among Program stakeholders, marketing approaches to customers and retailers, the invoicing and payment process, and planned Program changes. The CFL User Survey provided insights into customer satisfaction with CFLs as well as any customer issues with CFLs. Data reviews provided further information on the Program design and implementation process.

Program Design

AIU's L&A Program is a market transformation initiative intended to increase long-term availability and sale of energy-efficient lighting and appliances at retail outlets in AIU's service territory. The Program works in coordination with industry partners to educate AIU customers on the benefits of these products, reduce market barriers, and create sustained demand for the products over time. The market transformation Program design is attractive to retail stores because AIU provides the advertising materials, employee training, and customer clinics, which all lead to increased sales and higher profits.

AIU, through its contractor and subcontractors, conducted 1,589 visits to the 122 participating retail stores, trained 2,253 store employees, and held 32 in-store lighting clinics during PY1.

AIU's service territory is unique in that it covers approximately 40,000 square miles, with 1.2 million electric and 800,000 gas customers. Scattered throughout this territory are small, municipally-owned electric utilities and rural electric cooperatives. AIU carefully considered two issues in its Program design:

1. The potential for "sales leakage" (Program discounts going to non-AIU customers) because of cooperative and muni customers living near retail stores in AIU's service territory; and

2. A significant portion of customers did not have close access to home improvement or discount outlet stores.

To mitigate leakage, AIU limited participating retail stores to those whose service area included at least 80% AIU customers (based on ZIP code). To meet the needs of rural customers, the Program offered catalog and Web site options for purchasing CFLs. This option was advertised to 286,000 targeted rural customers, who received a mailing with advertising materials, catalog, and Web site information as well as two free CFLs. The promotion resulted in orders for 45,874 CFLs, exceeding AIU's expectations for this part of the Program by a factor of five.

Program Staffing

Prior to the 2008 Illinois Commerce Commission (ICC) order that led it to implement its current demand-side management programs, AIU had not implemented a large-scale, energy-efficiency

program since the 1970s, and thus lacked experienced program implementation staff. AIU chose to utilize in-house expertise for contract management and oversight, but hired experienced contractors to implement the programs through a competitive process. AIU hired CSG, which proposed implementing the L&A program with two subcontractors: APT and EFI. An AIU staff person spends approximately one-half of his time managing the L&A Program.

CSG operates residential energy-efficiency implementation programs in 18 states, working for both utilities and public authorities. The company has 450 employees, 14 to 15 of whom work on AIU programs, with seven to nine employees located in AIU's offices at any one time. AIU's primary contact point with CSG is Bob King, the Chief Operating Officer, who carries "start-up" responsibilities for CSG. Mr. King brings over 25 years experience in the industry, and spent approximately half of his time in AIU's offices during PY1. Other CSG employees who work on AIU's programs have been hired specifically for that purpose.

CSG hired APT as the "field-work" subcontractor to work with participating retail stores. APT is also an experienced energy-efficiency program implementation contractor, and has worked with utilities on market transformation programs since 1996. APT has 120 employees, with five primarily dedicated to AIU's Program. APT hired three field representatives, a manager in Illinois, and a coordinator to work on the Program full time. The field representatives spend most of their traveling time among participating retail stores.

CSG also subcontracted with EFI to process manufacturer payments and perform back-end accounting. Manufacturers submit invoices and sales data to EFI, which verifies results and pays the incentives. EFI then submits its evidence and invoices to CSG. EFI also manages the Web site and catalog ordering system, and fulfills the orders. EFI has 100 employees, five of whom work part-time on the L&P Program. One manages the store front, one works with sales data, one coordinates with AIU/CSG, one is dedicated to IT, and one manages the process. EFI's offices are in Massachusetts.

Both AIU and its contractors found it challenging to hire staff for this Program (and others). Because much of AIU's service territory is in rural Illinois, which has a limited history of energy-efficiency programs, it was difficult to find local job candidates with energy-efficiency knowledge and experience. CSG hired its on-site manager in March 2009, at which point Bob King could reduce the amount of time he spent managing the program's day-to-day activities. APT hired three field representatives and one program manager during PY1, and plans to hire two more field representatives to manage the expansion to new stores during PY2. AIU also added staff during the year to manage the programs.

Both CSG and APT needed to train the new staff they hired. CSG holds a three-day operations boot camp for new employees, and Mr. King works with employees in small groups each week for the first couple months of employment. CSG extended its training to AIU staff.

Program Budget and Goals

Legislative requirements to meet annual portfolio goals within annual budgets have been a key consideration for AIU in both program design and management. The legislation allows flexibility among programs, which helped AIU manage the residential portfolio in PY1. AIU increased

L&A Program targets and delayed implementation of other programs to ensure a smoother, continuous ramp-up of the overall portfolio. The requirement to meet annual portfolio goals within annual budgets created a significant amount of anxiety among Program staff, and required considerable staff time and effort to manage. Overall, AIU managed this process effectively, exceeding its residential savings targets while spending less than the overall budget.

AIU adjusted the Program's sales targets twice during PY1. The initial Program sales goal of 360,000 bulbs was based on AIU's 2007 Energy Efficiency Plan filing with the ICC. CSG's proposal to AIU assumed lower manufacturing costs than had the filing, and proposed selling over 500,000 CFLs in PY1 within the Program budget. After Program implementation began, AIU and CSG informally increased the L&A Program targets to an even higher 900,000 bulbs. This last increase was made because several of the other residential portfolio programs did not start as planned, and AIU needed to find another way to meet its overall PY1 goals. The second increase also reduced the potential need to suspend incentives midyear, should the Program prove too successful and consume the annual budget before PY1 ended.

Cadmus asked stakeholders to identify Program goals; and they provided the following responses:

- Saving kWh;
- Saving kW;
- Achieving a greater awareness of ENERGY STAR products;
- Growing the number of channels where program-qualifying products are sold;
- Creating market transformation;
- Providing training to consumers; and
- Customers buying and using products.

Communications

Good communication among stakeholders is important for running an effective program, especially when multiple subcontractors are involved. AIU and CSG made a number of key decisions to facilitate good communication among all involved in implementing the Program. First, AIU's decision to contract program implementation to experienced contractors with existing tracking systems gave the L&A Program a strong foundation. CSG was able to modify an existing database from a similar program, which facilitates tracking important information and preparing effective reports. CSG provides AIU with a monthly Key Indicators Report, which tracks energy savings, participation, number and types of CFLs sold, pending sales, carbon emissions reduced, Program staffing progress, and marketing and other activities affecting the Program. APT prepares a Monthly Field Report, which tracks participating retailer activity, progress towards each retailer's allocations and budgets, scheduled lighting clinics and community outreach, retailer training, and anecdotal field representative notes from field visits.

Other official Program communications include a weekly L&A Program call and monthly in-person meetings between AIU and all subcontractors. AIU staff commented that the qualitative discussions at the monthly meetings have been very valuable.

Finally, the decision to house CSG employees in AIU's offices contributed to excellent stakeholder communications. "Constant communication with others" was one subcontractor's description of the communication level between parties in the Program. No implementation staff complained about any communication breakdowns.

Marketing to Customers

The L&A Program is marketed to customers through a number of methods, some of which are Program-specific, and some of which focus on AIU's broader efficiency efforts. Specific L&A Program marketing and outreach includes:

- POP displays at the retail stores;
- Training for retailer employees;
- Press releases;
- Ameren stickers on CFL products;
- Community relations events with giveaways;
- Lighting displays in retail stores to show different CFL colors and to compare them to incandescent bulbs;
- Electric meters in retail stores to demonstrate usage differences between incandescent and CFL bulbs;
- Comparators in retail stores to show lumen differences between the two types of bulb;
- Lighting clinics in retail stores to explain to customers about specialty lights and color differences, and to help customers identify the best product for their needs; and
- Promotion through the ActOnEnergy.com Web site, which was designed specifically for branding and promoting all AIU's energy-efficiency programs.

AIU's more general ActOnEnergy advertising included:

- Promoting the national ENERGY STAR pledge by holding a contest with prizes from October through April. AIU received approximately 2,750 entries and achieved 313% of its ENERGY STAR savings goals.
- Placing general, energy-efficiency advertising through billboards, TV, radio, and newspapers.

Overall, AIU's marketing efforts have been very successful, and AIU easily surpassed its original Program sales targets. Several stakeholders suggested the final revised target of 900,000 bulbs might have been exceeded had AIU not reduced its offerings; so the portfolio would not

exceed its PY1 budget. While Cadmus cannot measure the effectiveness of any one marketing approach without specific market testing, we can say, overall, the consumer marketing efforts were successful.

Marketing to Retailers

APT was responsible for securing retail and manufacturer participation in the Program. ATP built on its existing relationships with national retail chains and manufacturers to bring nearly all those targeted into the Program. APT initiated retailer involvement through an RFP that requested bids for incentives, bulbs offered, and marketing support in exchange for tracking, product placement, and POP displays. Once retailer proposals were received, APT's managers negotiated an MOU that outlined the number and type of CFLs to be sold in each store, and allocated budget, promotion, and advertising. The MOU RFP and negotiation process took about four weeks. According to APT representatives, retailers were very satisfied with the Program. "Frankly, everyone loves everything we provide for them," stated one interviewee.[6] APT's field representatives provide free labor for the retailers, providing customer education clinics, employee training, and marketing materials. According to APT, the in-store promotions were successful in increasing retailer sales and profits.

APT requires retailers promote only ENERGY STAR products. APT also manages the number and types of bulbs incentivized at each store. Through its field representatives, APT ensures retailers comply with the MOU, and creates MOU Addendums to incorporate program changes, either from revised program targets or from retailer requests.

Invoicing and Payments

EFI is responsible for paying incentives to manufacturers. At the end of each two-week tracking period, manufacturers send incentive applications to EFI, which verifies results to ensure accuracy and compliance with allocations. EFI enters the amounts into the Program database, and closes that program cycle by issuing incentive checks. Once EFI pays the incentive applications, sales data are submitted to CSG through a file transfer process Web site along with EFI's invoice. CSG pays EFI for the manufacturer incentives, plus a commission based on the percentage of sales. EFI is usually paid within 30 to 45 days.

CSG pays APT on a monthly basis for time and expenses within the contractually agreed-upon budget, within 30 days of invoicing. AIU pays CSG for its time and expenses, also within 30 days of its invoice. All stakeholders reported satisfaction with the payment process and timing.

2009–2010 Proposed Program Changes

In PY2, the number of retailer outlets will increase from 119 to between 250 and 300. The expansion will focus on smaller towns (under 10,000 people), and on smaller, independent retailers rather than on national chain stores. To alleviate its concern about "leakage" into muni

[6] In PY2 Cadmus plans to interview retailers to independently assess program satisfaction.

or cooperative service territories, AIU was able to secure grant funding of approximately $250,000 through the Department of Commerce and Economic Opportunity (DCEO), which it will use to pay incentives at retail stores located near ZIP codes where less than 80% of the residents are AIU customers.[7]

AIU also is increasing the specialty CFL allocation; these lamps are typically sold in smaller pack sizes, are more costly, and require higher incentive amounts than do standard CFLs. Average savings per bulb are higher for specialty CFLs, and they are less likely to be put in storage than are standard CFLs. AIU allocated approximately 70% of its incentive money in PY1 for standard CFLs and 30% for specialty CFLs. The planned PY2 allocations are 50% for standard CFLs and 50% for specialty CFLs.

PY1 of the L&A program offered incentives only for lighting. In PY2, AIU will offer incentives for three ENERGY STAR products: room air conditioners, ceiling fans with lights, and dehumidifiers. This program component will be a more traditional rebate program: customers will purchase energy-efficient appliances, and mail a rebate form to AIU; they will need to include their AIU account number.

Customer Use of CFLs

CFL bulbs, initially only made for regular light fixtures, are now more readily available for other fixture types, including those made for dimmable and three-way bulbs. Cadmus asked survey respondents if they had installed any CFLs in dimmable or three-way fixtures. As shown in Table 15, about a quarter (27%) of respondents indicated they installed CFLs in dimmable fixtures, three-way fixtures, or both. Only 44% of respondents using CFLs in dimmable fixtures have installed CFLs made specifically for those fixtures. The remaining 56% of this group installed regular CFLs in dimmable fixtures. Similarly, over half of those customers who have installed CFLs in three-way fixtures used regular, not three-way, CFLs (58%).

Table 15. CFLs Installed in Dimmable or Three-Way Fixtures

	Frequency	Column %
Dimmable	14	6%
Three-way	38	17%
Both	6	3%
None	160	73%
Total	218	100%

Cadmus asked respondents who had heard of CFLs a series of questions about CFL disposal. The questions focused on whether respondents were aware of mercury in CFLs and the precautions to be taken when disposing of the CFLs.

Customers were first asked whether they had any concerns about CFL use or operation. Eighty-nine percent of respondents did not have any concerns with the CFL bulbs, 6% mentioned the bulbs require special handling, and 3% indicated the bulbs have mercury (see Table 16).

[7] AIU expects to receive an additional $250,000 grant through DCEO when the initial funding is exhausted.

Table 16. Concerns with Use or Operation of CFLs

	Frequency	Column %
None	259	89
Requires special disposal	16	6%
Mercury	9	3%
Other	9	3%
Expensive	5	2%
Color of light	3	1%
Not bright enough	2	1%
Slow start-up	2	1%
Burn out too soon	2	1%
Too bright	1	1%

Cadmus asked respondents if they have ever disposed of any CFLs that were broken, burned out, or no longer useful. Thirty percent of respondents indicated they had disposed of CFLs. As shown in Table 17, the majority (78%) of respondents who had disposed of CFLs threw them away in the trash. A small portion of respondents recycled the CFLs, either at a retail store or a hazardous waste center (8% and 5%, respectively). The survey did not probe for awareness of CFL recycling options, but responses indicated respondents did not seem to be taking advantage of recycling options.

Table 17. Method of Disposing of CFLs

	Frequency	Column %
Threw away in trash	66	78%
Recycled at retail store	7	8%
Recycled at hazardous waste center	4	5%
Other	9	11%

5. Conclusions and Recommendations

Results

Table 18 compares AIU's PY1 Program targets to actual results.[8] As previously noted, the implementation time frame was short and most Program implementers had to be hired. Even with these constraints, the program was able to exceed its targeted sales. CFLs sold and gross savings achieved were much greater than the targets, by 152% and 185%, respectively, while incentives paid and total budgets spent were only 123% and 106% of initial estimates, respectively. If applying the NTG calculated by this report, net MWh savings exceeded program goals by 251%; however, as mentioned earlier, Cadmus does not recommend using a NTG ratio greater than 1.0. Using 1.0 for the NTG ratio yields net results of 32,631 MWh, or 243% of its initial savings targets.

Table 18. Program Targets Compared to Actual Results

	Program Targets	Actual Results	Percent of Targets
CFLs Sold	535,452	815,403	152%
Gross MWh Savings	17,634	32,631	185%
Net MWh Savings	13,402	32,631	243%
Incentives Paid	$756,652	$926,925	123%
Total Budget	$1,589,117	$1,685,843	106%

All stakeholder's interviewed showed high satisfaction levels with communication levels between parties.

Customers who purchased CFLs generally have been quite satisfied with them, and, while Cadmus did not directly measure customer satisfaction with the Program itself, feedback from field representatives and retailers was positive (based on anecdotal but direct interactions with customers). AIU program staff also believed customers were aware of and pleased with the program.

The L&A Program design did not deviate from AIU's 2007 Energy Efficiency Plan, apart from the increased sales target. This advantageous change allowed the Program to maintain its momentum and compensate for limited energy savings from other delayed programs. Program implementation was effective in that marketing and outreach resulted in aggressive savings over a short period of time.

The Program seems to have increased consumer CFL awareness and purchases compared to states without CFL programs (97% vs. 92%), and increased CFL purchases in the six months prior to the survey (by comparison). Seventy-six percent of respondents indicated they currently

[8] Results based on those included in program database as of draft report time. Reports from AIU staff indicated approximately 5,000 additional CFLs were sold during PY1, but were not yet included in the program database

had CFLs installed in their homes (Table 19). On average, respondents who installed CFLs stated they installed an average of 12 CFLs inside and/or outside their homes.

Table 19. Currently have CFLs Installed Inside or Outside Home

	Frequency	Percent
Yes	220	76%
No	71	24%
Total	291	100%

From a process standpoint, the L&A Program has been extremely successful. Program staff were able to manage Program sales to stay within the annual budget, and exceed Program sales targets while maintaining Program momentum. Communication among stakeholders was described by interviewees as excellent, and anecdotal feedback from customers and retailers was positive.

The CFL User Survey pointed to a couple of topics AIU can continue to include in its CFL educational information for customers. The survey indicated a relatively low level of concern among CFL users about mercury or other CFL disposal issues (5%). Research in other regions has shown uncovered mercury and CFL disposal are growing issues of concern. Some customers in other regions have been confused about "mixed messages" and have stopped using CFLs. AIU can preempt this kind of rebound effect by educating its customers about the minimal amounts of mercury in CFLs (for instance, the mercury in one CFL is comparable to that in a bite of tuna) and by educating customers on simple disposal options. The CFL User Survey also indicated a significant portion (27%) are using CFLs in dimmable or three-way fixtures, while only 44% of those are using specialty CFLs designed for such fixtures (15% of total CFL users are misusing). Using standard CFLs in dimmable or three-way fixtures can significantly reduce the life of these bulbs and should be discouraged.

Another important finding from the CFL User Survey was that WalMart was the CFL purchase outlet most often identified by survey respondents (36%), even though it was not a participating retailer in the Program. WalMart is a major force in the retail market. Should AIU include WalMart as a future retailer, a participation agreement between AIU and WalMart should be structured to account for the high level of CFLs already sold at WalMart. For example, incentives to WalMart's manufacturers could be based on the increase in sales over an agreed-upon baseline, rather than on every CFL sold.

Appendix A: CFL User Survey

Participant Survey instrument

User Breakdown

Respondent Type	Description	Relevant Questions/ Responses
Unaware	Respondents who are unaware of CFLs, even after prompting	S1<>1 &S2<>1
Non-Purchasers (CFLs)	Respondents who have never purchased any CFLs	Q_1=3
Non-Users (CFLs)	Respondents who are currently not using or storing CFLs at their home	Q_2<>1 & Q_3<>1
6 mo CFL purchaser	Respondents who obtained CFLs within the last six months	Q_5=1 or Q_5=3
6 mo incandescent purchaser (a subset of previous categories)	Respondents who purchased incandescents within the last six months	OTH1=1

Hello, my name is [interviewer name], and I'm calling on behalf of the Ameren Illinois Utilities (which includes the companies formerly known as CIPS (pronounced “sips”), CILCO (pronounced “silco”), and IP (pronounced by saying the letters “I”, “P”)). We are contacting households to discuss how you use different types of light bulbs in your home. May I speak with someone who is the most knowledgeable about household purchases? [EXPLAIN IF THERE IS MORE THAN ONE DECISION-MAKER WE ONLY NEED TO TALK TO ONE PERSON. ARRANGE CALL BACK IF RESPONDENT NOT AVAILABLE]

This call may be recorded or monitored for quality assurance purposes.

Screener Section

S1 Before we start, I'd like to ask you a few questions about your awareness of different types of light bulbs. Before this call today, had you ever heard of compact fluorescent light bulbs, or CFLs?

1 Yes (SKIP TO S3)
2 No
-8 DON'T KNOW
-9 REFUSED

S2 Compact fluorescent light bulbs – also known as CFLs – usually do not look like regular incandescent bulbs. The most common type of CFL is made with a glass tube bent into a spiral, resembling a soft-serve ice cream, and it fits in a regular light bulb socket. Before today, were you familiar with CFLs?

1 Yes
2 No (SKIP TO OTH1)
-8 DON'T KNOW (SKIP TO OTH1)
-9 REFUSED (SKIP TO OTH1)

S3 How familiar are you with energy saving CFLs? Would you say that you are…

1 Very familiar
2 Somewhat familiar
3 Slightly familiar
4 Not at all familiar
-8 DON'T KNOW (SKIP TO OTH1)
-9 REFUSED (SKIP TO OTH1)

Q_1 Have you or anyone else in your household ever purchased or been given any compact fluorescent light bulbs or CFLs to use in a home?

1 Yes, R has
2 Yes, someone else has (ASK TO SPEAK TO THAT PERSON AND REPEAT

INTRO)

3 No (SKIP TO Q_2)

-8 DON'T KNOW (SKIP TO Q_2)

-9 REFUSED (SKIP TO Q_2)

Q_1a In what year did you or someone else in your household purchase or receive your first CFL for use in your home?

1 2009
2 2008
3 2007
4 2006
5 2005
6 2004
7 2003
8 2002
9 2001
10 2000
11 1998-1999
12 1993-1997
13 1990-1992
14 Other (Specify) _____
-8 DON'T KNOW

-9 REFUSED (SKIP TO Q_2)

[ASK Q_1B IF Q_1A=2, -8 or 14, ELSE SKIP TO Q_1C]

Q_1b Was it… [READ LIST. RECORD ONLY ONE RESPONSE]

1 In the last 6 months?
2 Prior to the last 6 months
-8 DON'T KNOW

-9 REFUSED

CFL User Section

Q_2 Do you currently have any CFLs installed on the inside or outside of your home?

1 Yes
2 No (SKIP TO Q_2c)
-8 DON'T KNOW (SKIP TO Q_2c)
-9 REFUSED (SKIP TO Q_2c)

Q_2a About how many CFLs are currently installed on the inside or outside of your home?

__ (Enter # of CFLs)
-8 DON'T KNOW (SKIP TO Q_3)
-9 REFUSED (SKIP TO Q_3)

Q_2b Did you have these same [Q_2a quantity] CFLs installed six months ago or before October, 2008?

1 Yes (SKIP TO Q_3)
2 No
-8 DON'T KNOW
-9 REFUSED

Q_2c About how many CFLs were installed on the inside or outside of your home six months ago?

__ (Enter # of CFLs)
-8 DON'T KNOW
-9 REFUSED

Q_3 Are you currently storing any CFLs at your home? This could be in your closet, your pantry, your garage, or anywhere at your home.

1 Yes

2 No (SKIP TO Q_3c)

-8 DON'T KNOW (SKIP TO Q_3c)

-9 REFUSED (SKIP TO Q_3c)

Q_3a About how many CFLs are you storing at your home?

__ (Enter # of CFLs)

-8 DON'T KNOW (SKIP TO Q_3C)

-9 REFUSED (SKIP TO Q_3C)

Q_3b Were you storing these same [Q_3a quantity] CFLs six months ago, before October, 2008)?

1 Yes (SKIP TO Q_4)

2 No

-8 DON'T KNOW

-9 REFUSED

Q_3c About how many CFLs were you storing at your home six months ago?

__ (Enter # of CFLs)

-8 DON'T KNOW

-9 REFUSED

Q_4[ASK IF Q_3 = 1] Why are you currently storing CFLs?

For Q_4_1 –10:

0 Not mentioned

1 Mentioned

Q_4_1 So that I have them on hand if a bulb burns out

Q_4_2 Purchased more CFLs than I needed / in bulk / on sale

Q_4_3 Bought them in bulk

Q_4_4 Bought them on sale

Q_4_5 Can't use them in certain rooms

Q_4_6 Can't use them in certain applications (e.g. dimmer switch)

Q_4_7 Didn't like having them installed

Q_4_8 Other (SPECIFY)

Q_4_9 Don't Know

Q_4_10 Refused

[IF Q_1=3 SKIP TO OTH1, OTHERWISE ASK Q_5]

Recent CFL Purchaser Section

[Ask if Q_1≠3]

Q_5 You mentioned that in the last six months, you have purchased or been given CFLs for use in your home. Did you purchase these or were you given the CFLs in the last six months to use in a home, that is since October, 2008?

1	Yes, purchased	
2	Yes, given	(SKIP TO Q_7)
3	Yes, both	
4	No	(SKIP TO OTH1)
-8	DON'T KNOW	(SKIP TO OTH1)
-9	REFUSED	(SKIP TO OTH1)

Q_6 Approximately, how many CFLs – in total – did you buy in the past six months to use in a home? If a package contained multiple CFLs, please count each CFL bulb separately. [PURPOSE OF THIS QUESTION IS TO GET RESPONDENT THINKING ABOUT THE NUMBER OF CFLS. WE WILL CONFIRM THAT THIS NUMBER MATCHES WITH THE RESPONSES TO THE SUBSEQUENT QUESTIONS ON QUANTITIES PURCHASED.]

__	Enter #	
0	None	(SKIP to Q_7)
-4	Interviewer Skip Error	
-8	Don't know	(IF NONE GIVEN, SKIP TO OTH1)
-9	Refused	(IF NONE GIVEN, SKIP TO OTH1)

Q_6a1 to Q_6a13 What was the name of this/these stores?

1 $1 Super Store
2 98 Cent World
3 99 Cent Depot
4 99 Cent Mart
5 99 Cents Only
6 99 Cents Outlet Plus

7 99 Cents Plus

8 99 Ranch

9 Ace Hardware

10 Ace Maintenance Mart

11 Albertson's

12 All American Home Center

13 Arcadia Market

14 B & B Hardware

15 Best Way Supermarket

16 Big A Drugs

17 Big Lots

18 Big Save 98 Cents

19 Big Saver Food

20 Cal Do It Center

21 Cardenas Market

22 Cole Hardware

23 Contractor's Warehouse

24 Costco

25 CVS/Sav-On Drugs

26 D & M Gift Store

27 Del Mar Supermarket

28 Discount Club 3

29 Dixieline Lumber

30 Dollar Club

31 Dollar K

32 Dollar Mart

33 Dollar Tree

34 Drug Emporium

35 El Toro Market

36 El Valle Discount

37 Food 4 Less

38 Foothill Builders Mart

39 Friedman Brothers Hardware

40 Fry's Electronics

41 Ganahl Lumber

42 Giant Bargain

43 Grant's Hardware

44 Grocery Outlet

45 Hannam Market

46 Hawaii Supermarket

47 Henry's Farmers Market

48 Home Depot

49 Hong Kong Market

50 JC 98 Cents Plus

51 Jumbo 99

52 Lamps Plus

53 Light Bulbs Etc.

54 Light Bulbs Unlimited

55 Light Concern

56 Lion Foods

57 Long's Drugs

58 Lowes

59 Marukai Market

60 Northgate Markets

61 Orchard Supply

62 Payless Foods

63 Q Bargain

64 Qualy Electric Supply Inc.

65 Ralph's

66 Rite Aid

67 San Gabriel Superstore

68 Shun Fat Supermarket

69 Smart & Final

70 Stater Bros

71 Super 99

72 Super Bargain Inc.

73 Superco Home Theater & Apppliances

74 Superfood Warehouse

75 Superior Super

76 T.S. Emporium

77 Tashman's Hardware

78 Tawa Supermarket

79 Todo $1 Only Store

80 Top Fancy Lighting

81 True Value Hardware

82 Under $1 Store

83 Valley Thrift Store

84 Victor's Lighting

85 Walgreen's

86 Wal-Mart

87 Winco Foods

88 Target

89 Sam's Club

90 Acme

91 Aldi

92 Genuardi's

93 Hen House Market

94 Hy-Vee

95 Pathmark

96 Price Chopper

97 Safeway

98 Save-A-Lot

99 Superfresh

100 EFI

101 Menards

999 Other

777 DON'T KNOW/REFUSED

Q_6a1aO to Q_6a13aO (If Q_6a1 to Q_6a5=999) What is the name of the store?

Q_6a1a to Q_6a13a (If Q_6a1 to Q_6a5=999 or 777) What is the store type?

1 Discount store, such as Dollar General or the Dollar Store
2 Grocery store
3 Small hardware store such as Ace Hardware
4 Lighting or electronics store
5 Drug store such as Walgreens or CVS
6 Large home improvement store, such as Home Depot, Lowe's or Menards
7 Mass merchandise store, such as Wal-Mart or Target
8 Membership club store, such as Sam's Club

Q_6b1 to Q_6b13 In what city is the <INSERT STORE> store in?

Q_6c1 to Q_6c13 How many packages, in total, did you buy from the [store] in [city] to use in a home?

____ Enter number of packages of CFLs
-8 DON'T KNOW
-9 REFUSED

Q_6d1_1 to Q_6d13_13 Now, thinking about the [package] package - of the ones you bought from [store] in [city] to use in a home, how many CFLs were in the package?

____ Enter number of CFLS in package
-8 DON'T KNOW
-9 REFUSED

[Q_6d_total = ∑Q_6d1_1 -- Q_6d13_5]

Q_6e1_1 to Q_6e13_13 And approximately what was the price of that package?

__ Dollars

-8 Don't Know

-9 REFUSED

Q_6f1_1 to Q_6f13_13 Do you know if this particular package of CFLs was part of an Ameren Illinois utility promotion or sponsored sale? There might have been a sticker on the package or a utility sign or display in the store.

1 Yes

2 No

-8 DON'T KNOW

-9 REFUSED

Q_6f1a_1 to Q_6f13a_13 Did you buy more than one of this type of package at [INSERT STORE AND CITY]

1 Yes

2 No

-8 DON'T KNOW

-9 REFUSED

Q_6f1b_1 to Q_6f13b_13 How many did you buy?

__ Number of this type of CFL package

-8 DON'T KNOW

-9 REFUSED

[SKIP Q_6_CHECK IF Q_6D_TOTAL=Q_6]

Q_6_CHECK We just discussed a total of *[Q_6d_total]* CFLs that you purchased at various stores in the last six months. Earlier you said that you purchased a total of *[Q_6]* CFLs in the last six months. Should I now use *[Q_6d_total]* as your estimate of the total number of CFLs you purchased in the last six months?

1 Yes
2 No [GO BACK TO Q_6c1 AND CORRECT RESPONSES]
-8 DON'T KNOW
-9 REFUSED

Q7 You mentioned that you [READ IF TOTAL CFLS>1 for Q_6 or Q_6i: also] have been given CFLs in the past six months, either by somebody else or at a CFL giveaway event. How many CFLs have you been given in the past three months?

__ (Enter # of CFLs)
0 None (SKIP TO Q_8)
-8 DON'T KNOW
-9 REFUSED

Q_7a Where or from whom did you receive these CFLs? [RECORD QUANTITY OF CFLS RECEIVED FROM EACH SOURCE]

For Q_7a_1 –Q_7a_11:
0 Not mentioned
1 Mentioned

Q_7a_1 Utility (Specify)
Q_7a_2 Sierra Club
Q_7a_3 Girl/Boy Scout
Q_7a_4 Sporting Event
Q_7a_5 Employer/Business Meeting (Specify)
Q_7a_6 Retail Store (Specify)

Q_7a_7 School (Specify)

Q_7a_8 Friend/family

Q_7a_9 Other (Specify)

Q_7a_10 Don't know

Q_7a_11 Refused

Q_7aa How many bulbs did you receive from the …

Q_7aa1 Utility?

Q_7aa2 Sierra Club?

Q_7aa3 Girl/Boy Scouts?

Q_7aa4 Sporting Event?

Q_7aa5 Employer/business meeting?

Q_7aa6 Retail store?

Q_7aa7 School?

Q_7aa8 Friend/family?

Q_7aa9 Other?

Q_7bm_1 to Q_7bm_13 What month did you receive these CFLs from (event/person)?

__ Month

-8 Don't know

-9 Refused

Q_8 You mentioned that you bought or had been given *[Q_6+Q_7]* CFLs in the past six months. How many of these are currently installed inside or outside of your home?

__ Enter # of CFLs installed

-8 Don't know

-9 Refused

Q_9 (If Q_3 = 1) How many of the *[Q_6+Q_7]* CFLs you bought or had been given in the last six months are currently being stored at your home?

__ Enter # of CFLs stored

-8 Don't know

-9 Refused

[If Q_6+Q_7 = Q_8+Q_9 SKIP TO Q_11]

Q_10 You mentioned that *[Q_8]* of the CFLs you purchased in the last six months are currently installed, and *[Q_9]* are currently being stored. What did you do with the other CFLs *[(Q_6+Q_7)-(Q_8+Q_9)]* you purchased or were given in the past six months that were neither installed nor stored? [RECORD QUANTITY OF CFLS FOR EACH RESPONSE]

Q_10_1 They burned out

Q_10_2 Using them in another home (ASK CITY, STATE WHERE HOME IS LOCATED)

Q_10_3 Storing them in another home (ASK CITY, STATE WHERE HOME IS LOCATED)

Q_10_4 Using them at office/work/other nonresidential location (ASK CITY, STATE WHERE OFFICE IS LOCATED)

Q_10_5 Storing them in office/work/other nonresidential location (ASK CITY, STATE WHERE OFFICE IS LOCATED)

Q_10_6 Gave them away (ASK IF THEY KNOW CITY, STATE WHERE THEY WENT)

Q_10_7 Misplaced them

Q_10_8 They broke

Q_10_9 Returned them to the store

Q_10_10 Installed them but later removed

Q_10_11 Other (SPECIFY)

Q_10_12 DON'T KNOW

Q_10_13 REFUSED

Q_10a How many bulbs…

Q_10a1 (Ask if Q_10_1=1) Burned out?

Q_10a2 (Ask if Q_10_2=1) Are being used in another home?

Q_10a3 (Ask if Q_10_3=1) Are being stored in another home?

Q_10a4 (Ask if Q_10_4=1) Are being used at office/work?

Q_10a5 (Ask if Q_10_5=1) Are being stored at office/work?

Q_10a6 (Ask if Q_10_6=1) Were given away?

Q_10a7 (Ask if Q_10_7=1) Were misplaced?

Q_10a8 (Ask if Q_10_8=1) Broke?

Q_10a9 (Ask if Q_10_9=1) Were returned to the store?

Q_10a10 (Ask if Q_10_10=1) Were installed but later removed?

Q_10a11 (Ask if Q_10_11=1) Did something else happen to?

[TOTAL QUANTITY RECORDED IN Q_10_1 – Q_10_13 MUST EQUAL [(Q_6+Q_7)-(Q_8+Q_9)] FROM ABOVE]

Q_10c [ASK ONLY IF Q_10_10=1] You said [Q_10_10 quantity] CFLs were installed but have since been removed. Why were the bulbs removed?

For Q_10c_1 – Q_10c_11:

0 Not mentioned

1 Mentioned

Q_10c_1 Didn't like the color

Q_10c_2 It took too long to start up

Q_10c_3 It wasn't bright enough

Q_10c_4 Didn't like the way it looked

Q_10c_5 It didn't fit

Q_10c_6 It made noise / buzzed

Q_10c_7 It didn't work in a dimmer switch

Q_10c_8 It wasn't available in 3-way

Q_10c_9 Other (Specify)

Q_10c_10 Don't Know

Q_10c_11 Refused

Q_10b [ASK ONLY IF Q_10_10=1] What type of bulb did you use to replace the CFL(s) you removed?

1 Incandescent

2 CFL

3 Both

4 Other (SPECIFY)

-8 DON'T KNOW

-9 REFUSED

Q_10d [ASK ONLY IF Q_10_10=1] What happened to the bulbs that you installed but later removed? [RECORD DISPOSITION FOR EACH BULB INSTALLED BUT LATER REMOVED FROM Q_10_10]

For Q_10d_1 – Q_10d_15:

0 Not mentioned

1 Mentioned

Q_10d_1 Storing them in this home

Q_10d_2 They burned out

Q_10d_3 Using them in another home (ASK CITY, STATE WHERE HOME IS LOCATED)

Q_10d_4 Storing them in another home (ASK CITY, STATE WHERE HOME IS LOCATED)

Q_10d_5 Using them at office/work/other nonresidential location (ASK CITY, STATE WHERE OFFICE IS LOCATED)

Q_10d_6 Storing them in office/work/other nonresidential location (ASK CITY, STATE WHERE OFFICE IS LOCATED)

Q_10d_7 Gave them away (ASK IF THEY KNOW CITY, STATE WHERE THEY WENT)

Q_10d_8 Misplaced them

Q_10d_9 They broke

Q_10d_10 Returned them to the store

Q_10d_11 Threw them away in the trash

Q_10d_12 Recycled them

Q_10d_13 Other (SPECIFY)

Q_10d_14 DON'T KNOW

Q_10d_15 REFUSED

Q_10e How many bulbs…

Q_10e1 (Ask if Q_10d_1=1) Are being stored in your home?

Q_10e2 (Ask if Q_10d_2=1) Burned out?

Q_10e3 (Ask if Q_10d_3=1) Are being used in another home?

Q_10e4 (Ask if Q_10d_4=1) Are being stored in another home?

Q_10e5 (Ask if Q_10d_5=1) Are being used at office/work?

Q_10e6 (Ask if Q_10d_6=1) Are being stored at office/work?

Q_10e7 (Ask if Q_10d_7=1) Were given away?

Q_10e8 (Ask if Q_10d_8=1) Were misplaced?

Q_10e9 (Ask if Q_10d_9=1) Broke?

Q_10e10 (Ask if Q_10d_10=1) Were returned to the store?

Q_10e11 (Ask if Q_10d_11=1) Were thrown in the trash?

Q_10e12 (Ask if Q_10d_12=1) Did you recycle?

Q_10e13 (Ask if Q_10d_13=1) Did something else happen to?

[TOTAL QUANTITY RECORDED IN Q_10_10b_0 – Q_10_10b_14 MUST EQUAL QUANTITY FROM Q_10_10 ABOVE]

Q_11 *[ASK ONLY IF Q_3 = 1]* Have you installed any *other* CFLs in the past six months on the inside or outside of your home – that is, other than the *[Q_8]* CFLs we just discussed?

1 Yes
2 No (SKIP to OTH1)
-8 Don't know (SKIP to OTH1)
-9 Refused (SKIP to OTH1)

Q_11a How many *other* CFLs did you install in the past six months?

__ Enter #
-8 Don't know
-9 Refused

Other Light Bulb Purchases Section

Now I have a few questions about some other types of light bulbs you may have purchased recently.

OTH1 Have you purchased any incandescent light bulbs at retail stores for use in a home in the last six months, that is since October, 2008?

1 Yes
2 No [SKIP TO OTH3]
-8 DON'T KNOW [SKIP TO OTH3]
-9 REFUSED [SKIP TO OTH3]

OTH2 How many incandescent light bulbs – in total – did you buy in the last six months for use in a home? Please try to estimate the total number of incandescent light bulbs, as opposed to packages.

__ Number of Incandescent Bulbs
-8 DON'T KNOW
-9 REFUSED

OTH3 During the past six months, how many other types of bulbs – BESIDES regular incandescent light bulbs and CFLs – did you purchase? This might include halogen bulbs, long fluorescent tubes, and other types of specialty light bulbs. [RECORD NUMBER OF BULBS. IF "DON'T KNOW," PROBE "IS IT LESS THAN OR MORE THAN 5 BULBS?" AND WORK FROM THERE TO GET ESTIMATE]

__ Number of Other Light Bulbs
-8 DON'T KNOW
-9 REFUSED

CFL User Characterization Section

Q_12Int Do you currently have any incandescent light bulbs installed in your home?

1 Yes
2 No (SKIP TO Q_13)
-8 DON'T KNOW (SKIP TO Q_13)
-9 REFUSED (SKIP TO Q_13)

Q_12 When your next incandescent light bulb burns out, what will you do? [READ ALL, ACCEPT ONLY ONE, ROTATE ANSWERS]

1 Replace it with another incandescent from storage/cabinet
2 Buy another incandescent from the store to replace it (SKIP TO Q_13)
3 [ONLY READ IF Q_3 = 1] Replace it with a CFL from storage/cabinet (SKIP TO Q_12b)
4 Buy a CFL from the store and replace it (SKIP TO Q_13)
5 Other (SPECIFY) (SKIP TO Q_13)
-8 DON'T KNOW (SKIP TO Q_13)
-9 REFUSED (SKIP TO Q_13)

Q_12a If you didn't have incandescents in storage/cabinet, what would you do? [READ ALL, ACCEPT ONLY ONE, ROTATE ANSWERS]

1 Buy an incandescent from the store to replace it (SKIP TO Q_13)
2 [ONLY READ IF Q_3 = 1] Replace it with a CFL from storage/cabinet (SKIP TO Q_13)
3 Buy a CFL from the store and replace it (SKIP TO Q_13)
4 Other (SPECIFY) (SKIP TO Q_13)
-8 DON'T KNOW (SKIP TO Q_13)
-9 REFUSED (SKIP TO Q_13)

Q_12b [ONLY READ IF Q_3 = 1] If you didn't have any CFLs in storage/cabinet, what would you do? [READ ALL, ACCEPT ONLY ONE, ROTATE ANSWERS]

1 Replace it with incandescent from storage/cabinet
2 Buy an incandescent from the store and replace it
3 Buy a CFL from the store and replace it
4 Other (SPECIFY)
-8 DON'T KNOW
-9 REFUSED

Q_13 [ASK IF Q_2=1] When your next CFL burns out, what will you do? [READ ALL, ACCEPT ONLY ONE, ROTATE ANSWERS]

1 [ONLY READ IF Q_3 = 1] Replace it with another CFL from storage/cabinet
2 Buy another CFL from the store to replace it (SKIP TO Q_15)
3 Replace it with an incandescent from storage/cabinet (SKIP TO Q_13b)
4 Buy an incandescent from the store and replace it (SKIP TO Q_15)
5 Other (SPECIFY) (SKIP TO Q_15)
-8 DON'T KNOW (SKIP TO Q_15)
-9 REFUSED (SKIP TO Q_15)

Q_13a [ONLY READ IF Q_3 = 1] If you didn't have any CFLs in storage/cabinet, what would you do? [READ ALL, ACCEPT ONLY ONE, ROTATE ANSWERS]

1 Buy another CFL from the store to replace it (SKIP TO Q_15)
2 Replace it with an incandescent from storage/cabinet (SKIP TO Q_15)
3 Buy an incandescent from the store and replace it (SKIP TO Q_15)
4 Other (SPECIFY) (SKIP TO Q_15)
-8 DON'T KNOW (SKIP TO Q_15)
-9 REFUSED (SKIP TO Q_15)

Q_13b If you didn't have any incandescents in storage/cabinet, what would you do? [READ ALL, ACCEPT ONLY ONE, ROTATE ANSWERS]

1 Replace it with another CFL from storage/cabinet

2 Buy another CFL from the store and replace it

3 Buy an incandescent from the store and replace it

4 Other (SPECIFY)

-8 DON'T KNOW

-9 REFUSED

Q_15 (Ask if S1=1 or S2=1) Prior to six months ago or October 2008, have you had any CFLs that you installed but then removed before they burned out?

1 Yes

2 No (SKIP TO Q15b)

-8 DON'T KNOW (SKIP TO Q15b)

-9 REFUSED (SKIP TO Q15b)

Q_15a What were the main reasons for removing the CFLs? [ACCEPT MULTIPLE, DO NOT READ]

For Q_15a_1 – Q_15a11:

0 Not mentioned

1 Mentioned

Q_15a_1 Didn't like the color

Q_15a_2 It took too long to start up

Q_15a_3 It wasn't bright enough

Q_15a_4 Didn't like the way it looked

Q_15a_5 It didn't fit

Q_15a_6 It made noise / buzzed

Q_15a_7 Other (SPECIFY)

Q_15a_8 Don't Know

Q_15a_9 Refused

Q_15a_10 It didn't work in a dimmer switch

Q_15a_11 It wasn't available in 3-way

Q_15b Where will you most likely purchase future CFLs, if you buy them at a later date?

1 Discount store, such as Dollar General or the Dollar Store

2 Grocery store

3 Small hardware store such as Ace Hardware

4 Lighting or electronics store

5 Drug store such as Walgreens or CVS

6 Large home improvement store, such as Home Depot, Lowe's or Menards

7 Mass merchandise store, such as Wal-Mart or Target

8 Membership club store, such as Sam's Club

-8 DON'T KNOW

-9 REFUSED

CFL Satisfaction Section

[ASK IF Q_2=1 ELSE SKIP TO CD1]

SAT1. On a 0 to 10 scale, with 0 being not at all satisfied and 10 being very satisfied, how satisfied are you with the CFLs you currently have in your home?

Satisfaction Rating	(0-10)
-8	DON'T KNOW
-9	REFUSED

Using the same scale, how would you rate your satisfaction with… [ROTATE SAT2 – SAT9]

SAT2. The color of the light they provide?
SAT3. The brightness of the light they provide? [ASK SAT3a]
SAT4. The constant light output, that is, no flickering?
SAT5. The amount of time they take to light up?
SAT6. The way they fit into light fixtures?
SAT7. The way they look in light fixtures?
SAT8. How long they last before burning out?
SAT9. How much you paid for them?

[ASK SAT3a IF SAT3<10 ELSE SKIP TO SAT10]

SAT3a. Are they too bright or not bright enough?

1 Too bright
2 Not bright enough
-8 DON'T KNOW
-9 REFUSED

[ASK SAT10 IF SAT1<10 ELSE SKIP TO SAT11]

SAT10. In what other ways are you not completely satisfied with the CFLs you currently have in your home?

SAT11. Has there been any change in your level of satisfaction with CFLs used in your home over time?

1	Yes	
2	No	(SKIP TO SAT20)
-8	DON'T KNOW	(SKIP TO SAT20)
-9	REFUSED	(SKIP TO SAT20)

In which of the areas we just discussed has there been a change, and has that change been positive or negative? [READ LIST IN SAME ORDER AS PRESENTED IN SAT2 – SAT 9. ALSO ASK ABOUT SAT10. RECORD POSITIVE CHANGE AS '1' AND NEGATIVE CHANGE AS '2.' RECORD NO CHANGE AS '0,' DON'T KNOW '-8' AND REFUSED AS '-9']

SAT12. Light color
SAT13. Light brightness
SAT14. Constant light output, no flickering
SAT15. The amount of time they take to light up
SAT16. The way they fit into light fixtures
SAT17. The way they look in light fixtures
SAT18. How long they last before burning out
SAT19. How much you paid for them

SAT20. Do you currently have any CFLs installed in dimmable or three-way fixtures? (By dimmable, I mean lighting fixtures where you can control the amount of light given off by the lamp by using a dimming switch. By three-way, I mean lighting fixtures that have an regular switch but also let you adjust the amount of light to two or three different levels, besides on and off.)

1	Dimmable	
2	Three-way	
3	Both	
4	None	(SKIP TO CD1)
-8	DON'T KNOW	(SKIP TO CD1)
-9	REFUSED	(SKIP TO CD1)

[ASK SAT21 IF SAT20=1 OR 3 ELSE SKIP TO SAT24]

SAT21. Are the CFLs you are using in dimmable fixtures made to work in dimmable fixtures, or are they just regular CFLs?

1 Made for dimmable fixtures

2 Regular CFLs

3 Other (Specify)

-8 DON'T KNOW

-9 REFUSED

SAT22. On a 0 to 10 scale, with 0 being not at all satisfied and 10 being very satisfied, how satisfied are you with the CFLs you are currently using in dimmable fixtures?

Satisfaction Rating (0-10)

-8 DON'T KNOW

-9 REFUSED

[ASK SAT23 IF SAT22<10 ELSE SKIP TO SAT24]

SAT23. In what ways are you not completely satisfied with the CFLs you currently using in dimmable fixtures?

[ASK SAT24 IF SAT20=2 OR 3 ELSE SKIP TO CD1]

SAT24. Are the CFLs you are using in three-way fixtures made to work in three-way fixtures, or are they just regular CFLs?

1 Made for three-way fixtures

2 Regular CFLs

3 Other (Specify)

-8 DON'T KNOW

-9 REFUSED

SAT25. On a 0 to 10 scale, with 0 being not at all satisfied and 10 being very satisfied, how satisfied are you with the CFLs you currently using in three-way fixtures?

Satisfaction Rating (0-10)

-8 DON'T KNOW

-9 REFUSED

[ASK SAT26 IF SAT22<10 ELSE SKIP TO CD1]

SAT26. In what ways are you not completely satisfied with the CFLs you currently using in three-way fixtures?

_____

CFL Disposal Section

[ASK CD1 IF S1=1 OR S2=1 ELSE SKIP TO ES1]

CD1. Do you have any other concerns with the use or operation of CFLs? [DO NOT READ. ALLOW MULTIPLE RESPONSE]

1. None
2. (Mercury)
3. (Requires special disposal/Must be recycled)
4. (Fire hazard)
5. Flickering
6. Color of light
7. Too bright
8. Not bright enough
9. Slow start-up/Delay coming on
10. Burn out too soon/short life
11. Expensive
12. (Other) [Specify_____]

-88 DON'T KNOW

-99 REFUSED

CD2. Do you have any concerns with the disposal of CFLs? [DO NOT READ. ALLOW MULTIPLE RESPONSE]

1. None
2. (Mercury)
3. (Requires special disposal/Must be recycled)
4. (Fire hazard)
5. (Other) [Specify_____]
6. (Don't know)

CD3. Have you ever disposed of any CFLs that have broken, burned out, or are no longer useful?

1	Yes	
2	No	(SKIP TO ES1)
-8	DON'T KNOW	(SKIP TO ES1)
-9	REFUSED	(SKIP TO ES1)

CD4. How have you disposed of the CFLs after they broke, burned out, or were no longer useful? [DO NOT READ. ALLOW MULTIPLE RESPONSE]

1 Threw away in trash

2 Recycled / dropped off at hazardous waste center

3 Recycled / dropped off at retail store

4 Other (SPECIFY)

-8 DON'T KNOW

-9 REFUSED

CD4a. [If CD4=3] At which store did you recycle or drop off the CFLs?

1 Ace Hardware

2 Home Depot

3 Other (Specify)

-8 DON'T KNOW

-9 REFUSED

ENERGY STAR Awareness Section

ESInt Are you familiar with the ENERGY STAR label on household products?

(The label is a blue and white label with the word "energy" followed by a five-pointed star. Energy Star labels are used by the Environmental Protection Agency and the Department of Energy to identify and label highly energy-saving lighting and appliances for consumers.)

1 Yes
2 No (SKIP TO LED1)
-8 DON'T KNOW (SKIP TO LED1)
-9 REFUSED (SKIP TO LED1)

ES1. On a scale of 0 to 10, with 0 being not at all familiar and 10 being very familiar, how familiar were you with the Energy Star label before today?

Familiarity Rating (0-10)
-88 DON'T KNOW
-99 REFUSED

[IF ES1<1 SKIP TO LED1]

ES2. Have you ever seen an Energy Star label on CFL packaging or on the display materials where CFLs are sold?

1 Yes
2 No (SKIP TO LED1)
-8 DON'T KNOW (SKIP TO LED1)
-9 REFUSED (SKIP TO LED1)

ES3. Are you aware of any difference in the quality of CFLs that have the Energy Star label and CFLs that do not have this label?

1 Yes
2 No (SKIP TO LED1)

-8 DON'T KNOW (SKIP TO LED1)

-9 REFUSED (SKIP TO LED1)

ES4. In what way is the quality of CFLs with the Energy Star label different than the quality of other CFLs? Anything else?

Light Emitting Diodes

LED1. Are you familiar with light emitting diodes or LED lights?

1	Yes	
2	No	(SKIP TO Q_16)
-8	DON'T KNOW	(SKIP TO Q_16)
-9	REFUSED	(SKIP TO Q_16)

LED2. Have you ever heard of LED holiday or Christmas lights?

1	Yes	
2	No	(SKIP TO LED4)
-8	DON'T KNOW	(SKIP TO LED4)
-9	REFUSED	(SKIP TO LED4)

LED3. Do you own any LED holiday lights that you are currently using or planning to use the next holiday season?

1 Yes

2 No

-8 DON'T KNOW

-9 REFUSED

LED4. What other types of LED lamps, fixtures, or bulbs have you heard of? [DO NOT READ. ALLOW MULTIPLE RESPONSES]

1 None

2 Task/desk lamps

3 Undercabinet lighting

4 Light bulbs/screw in bulbs/GU-type bulbs

5 Recessed/can lighting

6 Night lights

7 Flashlights

8 Novelty fixtures

9 Other [Specify]

-8 DON'T KNOW

-9 REFUSED

LED5. Are you currently using any LED lamps, fixtures, or bulbs for regular household lighting?

1	Yes	
2	No	(SKIP TO Q_16)
-8	DON'T KNOW	(SKIP TO Q_16)
-9	REFUSED	(SKIP TO Q_16)

LED6. What types of LED lamps, fixtures, or bulbs are you currently using? [DO NOT READ. ALLOW MULTIPLE RESPONSES]

1. Task/desk lamps
2. Under cabinet lighting
3. Light bulbs/screw in bulbs/GU-type bulbs
4. Recessed/can lighting
5. Night lights
6. Flashlights
7. Novelty fixtures
8. Other [Specify]

-8 DON'T KNOW

-9 REFUSED

Nonresidential CFL Purchaser Section

[Q_16_total=∑(Q_10_4+Q_10_5)]

[If using or storing CFLs in nonresidential location from either Q_10=4 or 5, skip Q_16 and use the following as a lead-in for Q_17: "You mentioned previously that you purchased or were given *[Q_16_total]* CFLs that you are now using or storing at your office, at work, or at some other nonresidential location. Including these *[Q_16_total]* CFLs,"]

Q_16 Have you or someone else in your household ever purchased any CFLs at retail stores and installed them at your office, at work or at some other nonresidential location?

1 Yes

2 No (SKIP TO D1)

-8 DON'T KNOW (SKIP TO D1)

-9 REFUSED (SKIP TO D1)

Q_17 In the last six months, approximately how many total CFLs bulbs, not packages, did you or someone else in your household purchase at retail stores and install at your office, at work or at some other nonresidential location?

__ (Enter # of CFLs)

-8 DON'T KNOW

-9 REFUSED

Q_18 What type of nonresidential location did you install these [Q_17] CFLs at?

1 Office (non-medical)

2 Restaurant/Food Service

3 Food Stores (including liquor stores and convenience stores)

4 Agricultural (greenhouses…)

5 Retail Stores

6 Warehouse

7 Health Care

8 Education

9 Lodging

10 Public Assembly (church, fitness center, theatre, library, museum, convention center, community center, other rec*)*

11 Services (gas, repair, etc)

12 Industrial

13 Laundry

14 Other (Specify)

-8 Don't know

-9 Refused

Q_19 Which of the following statements best describes why you bought the CFLs for use at your office, work or some other nonresidential location?

1 I just bought them for use in a lamp on or near my desk or workspace

2 I buy all of the lighting for my office, work or other nonresidential location

3 I wanted my office, work or nonresidential location to use CFLs and this was the only way to get them to use CFLs

4 Other (Specify)

-8 DON'T KNOW

-9 REFUSED

Demographics Section

"My last questions are about your home and energy use.

D1 Which one of the following best describes the type of home in which you live?

1 A single-family detached [no common walls]

2 A single-family attached [at least one common wall with the surrounding swellings, such as a town home, patio home, or condo]

3 Multi-family home, such as an apartment [requires a different family living above or below, such as an apartment]

4 A mobile home or trailer

5 Other [SPECIFY] _____

D2 What is the approximate age of your home?

____ years

-8 Don't know

-9 Refused

D3 About how large is your home in square feet, excluding your garage and/or patio?

____ Square feet

-8 Don't know

-9 Refused

D3a [If D3=-8] Would you say your home is… [READ]

1 Under 1,000 square feet

2 1,000 – 1,500 square feet

3 1,501 – 2,000 square feet

4 2,001 – 2,500 square feet

5 2,501 – 3,000 square feet

6 More than 3,000 square feet

-8 Don't know

-9 Refused

D3b [If D3a=6] You said your home is more than 3,000 square feet. What would you say is the total square footage?

_____ Square feet

D4 Is your home…

1 All electric

2 Gas and electric

3 Some other combination of energy sources

-8 Don't know

-9 Refused

D5 In 2008, which of the following categories best describes your total annual household income before taxes? *[READ LIST]*

1 Less than $15,000

2 $15,000 to $24,999

3 $25,000 to $34,999

4 $35,000 to $49,999

5 $50,000 to $74,999

6 $75,000 to $99,999

7 $100,000 to $149,999

8 $150,000 or more

-8 DON'T KNOW

-9 REFUSED

D6 What is your average Ameren Illinois Utilities bill in the summer?

_____ Dollars

-8 Don't know

-9 Refused

D7 What is your average Ameren Illinois Utilities bill in the winter?

_____ Dollars

-8 Don't know

-9 Refused

D8 Which of the following best describes your age?

1 Less than 18 years old

2 18-24 years old

3 25-34 years old

4 35-44 years old

5 45-54 years old

6 55-64 years old

7 65 or older

-8 DON'T KNOW

-9 REFUSED

D9 RECORD GENDER OF RESPONDENT *[DO NOT ASK]*

1 Male

2 Female

-8 DON'T KNOW

This completes the survey. Ameren Illinois Utilities appreciates your participation. Thanks for your time and have a good evening.

Appendix B: Stakeholder Interview Guide

Stakeholder Interview Guide

Ameren Illinois Lighting & Appliance Program

[This interview guide is to be used for interviewing program management staff at AIU, program delivery staff at Conservation Services Group (CSG) and staff at Applied Proactive Technologies. Not all questions are applicable to all people being interviewed.]

Thank you for taking the time to talk with us today about the program.

As you know, The Cadmus Group, Inc., is evaluating the program for the next three years on behalf of AIU. The purpose of this interview is to gather information on program processes, operations, and activities since the program's inception. Please note that this is not an audit, and that your comments will be kept confidential. Our goal is to create a complete description of the program from all perspectives so that we can identify what is working well and what can potentially be improved. Because of your role in program implementation, your perspective is very important to us, and we appreciate your taking the time to share it with us.

We expect this interview to take less than an hour of your time.

Introduction

1. What is your role in the Ameren IU Lighting & Appliance program? (probe for: title, responsibilities, number of staff supervising/assisting) For how long have you had this role?

2. Which program aspects (design, marketing, delivery, administration, customer response) are you most familiar with?

3. [Contractors only] What other services does your company offer?

4. [Contractors Only] How many employees does your company have? How many are engaged in this program?

5. [Contractors Only] What type of training do your employees receive prior to delivery of the Program?

6. What do you believe are the program's primary goals? Do you have any metrics you track that are associated with these goals?

7. Would you say that these goals are currently being met? Why or why not?

8. In general terms, will you please walk me through the your part of the delivery of Ameren IU's Lighting Program? (probe for marketing, contact with retail stores, promotional materials, tracking results, interaction with other program stakeholders)

Program Delivery

Implementation Strategy

9. What is your strategy for implementing the entire lighting and appliance program? [Probe for why lighting was started first, how they plan to integrate appliances, what are they doing now in preparation for expansion].

10. What did you learn in implementing the lighting piece that you will apply towards implementing the appliance piece?

Marketing

11. What is your strategy for identifying the retailers for this program?

12. What methods have you used for marketing the program to these retailers? (phone calls, canvassing, business associations, or other)?

13. How effective would you say those methods have proved to be?

14. What marketing materials do you use? (ask for copies of marketing materials)

15. How effective are these marketing materials?

16. Do you market directly to consumers? (What approaches are used?)

17. How effective would you say those methods have been?

18. Were any other trade allies or market players involved in marketing? How?

Market Feedback

19. What has been the response of the retailers to this program?

20. Do you think customers are generally aware of the program?

Lights

21. How are particular products determined to be eligible for the program?

22. How were the incentive amounts determined?

23. At what point in the purchase cycle are the incentives paid (i.e. to consumers, to retailers, or manufacturers)?

24. How are customers made aware of the discounts or incentives?

25. Do eligible products have any identifying information on their package?

26. How is data collected on product purchases? What information is collected? Have there been any difficulties with data tracking?

27. Do you feel the incentives offered by the Program are sufficient for attracting participants?

28. Are you satisfied with the range of products that are eligible for incentives?

Payment and Invoicing

29. How are all the stakeholders (Ameren) or ("you" if a contractor) paid for their (your) part in the program?

30. Generally, how long after you [or "the contractor" if speaking with Ameren employee] submit(s) the invoice(s) are you paid for a project?

31. If there are problems with an invoice, how are they generally resolved?

Overall program

32. Other than the tracking we discussed earlier, what other reporting is required by the program?

33. Is that amount of reporting sufficient?

34. What areas of program delivery would you say work really well?

35. What areas do you believe do not work well?

36. What ideas do you have for improving these areas?

37. Is there anything else, specifically you would change about the program?

38. Have there been any changes to program design since implementation began?

39. If yes, what are the reasons for these changes?

40. Do you foresee any changes that will occur in program design over the next year?

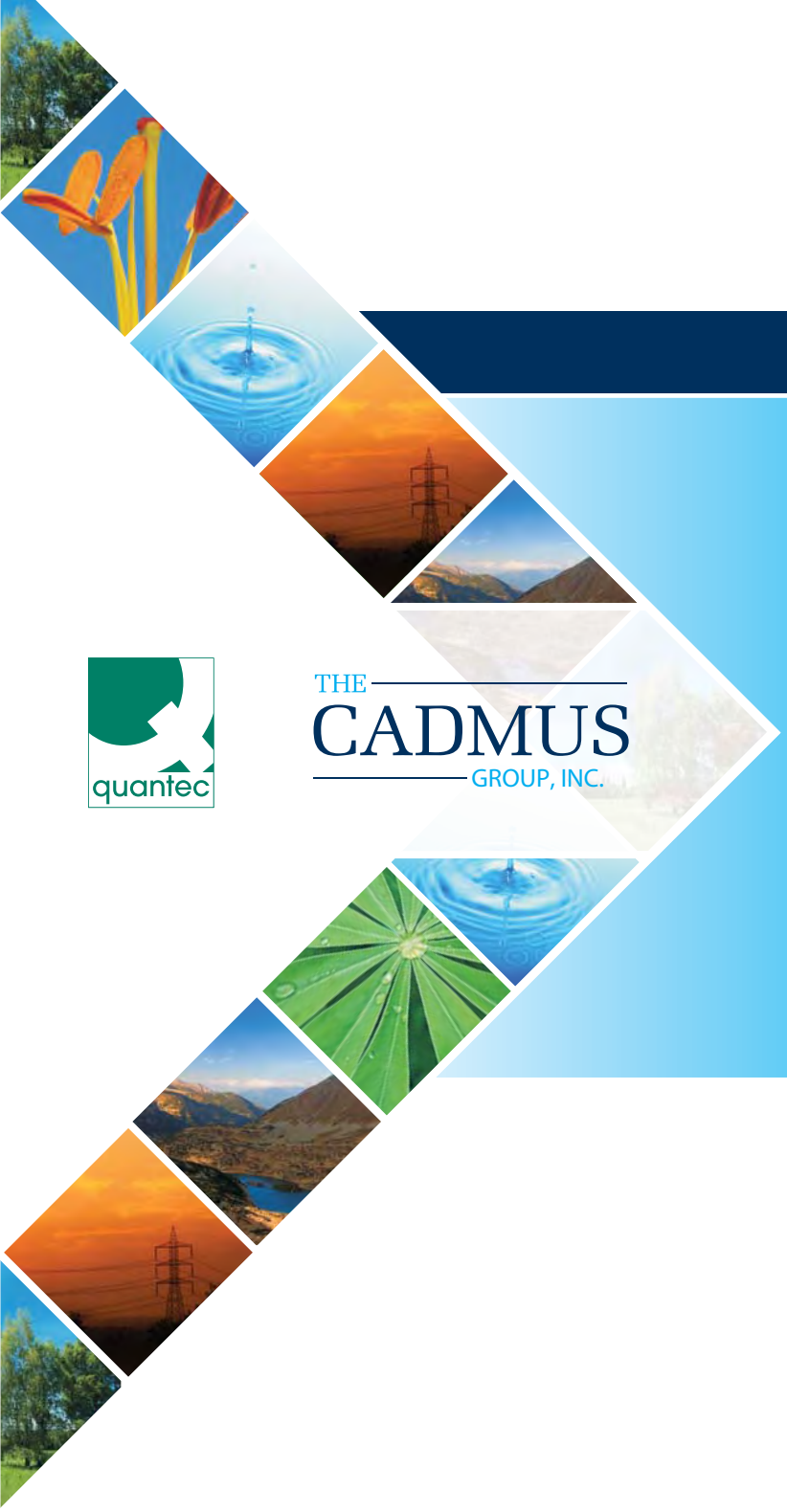
41. If yes, what are the changes and why?

42. Overall, do you feel the program has been successful so far?

43. Do you feel that the program will be successful over the next two years?

Thank you for your time! Can we call you again in a year to ask you some additional questions about the program?

Appendix B: Appliance Recycling Program Evaluation



Appliance Recycling Program Evaluation

September 24, 2009

FINAL REPORT

Prepared by:

The Cadmus Group, Inc.
720 SW Washington Street
Suite 400
Portland, OR 97205
(503) 228.2992

With Team Members:

Carol Mulholland
Doug Bruchs
Dorianne Reinhardt Paul

Prepared for:

Amenen Illinois Utilities

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1. Executive Summary

The Appliance Recycling Program (the Program) offers incentives and free removal of secondary inefficient refrigerators and freezers. The Cadmus Group's evaluation of AIU's Appliance Recycling Program PY1 (the Program) consisted of four primary tasks displayed in Table ES1.

Table ES1. Summary of Evaluation Approach (PY1)

Action	Impact	Process	Details
Participant Survey	X	X	Calculating net-to-gross and assessing program implementation. (n=93)
Stakeholder Interviews		X	Providing insight into program design and delivery. (n=5)
Secondary Research		X	Reviewing results of recent appliance recycling evaluations.
Secondary Data Analysis	X		Determining per unit savings based on age and size. (Census)

To develop an estimate of Program gross savings, Cadmus utilized an existing data source containing detailed energy metering information for thousands of refrigerators and freezers at the time of manufacture. With the application of a degradation factor, these data were used to develop per-unit energy savings estimates for every combination of appliance configuration, age, size, and defrost type. Combining this information with data from the Program database yielded an energy savings estimate for each appliance participating in the Program as well as the per-unit average annual energy consumption for both participating refrigerators and freezers.

Once the average annual energy consumption for participating refrigerators and freezers were determined, Cadmus calculated the average gross energy savings for PY1 by applying the Program's part-use factor. The part-use factor, determined through the participant survey, accounts for all participating appliances not plugged in year-round prior to removal. As Table ES2 shows, 3.3% of the removed refrigerators were not used at all prior to participating, and 14.8% were only used for 34% of the year. Applying these findings to the average annual energy consumption yields a gross per-unit energy savings of 1,522 kWh annually for refrigerators. A similar analysis for freezers results in annual per freezer savings of 1,247 kWh.

Table ES2. Gross Per-Unit Energy Savings—Part-Use Adjusted (PY1)

	Refrigerator			Freezer		
Operational Status	Percent of Recycled Units	Part-Use Factor	Adjusted Per-Unit Energy Savings (kWh/Yr)	Percent of Recycled Units	Part-Use Factor	Adjusted Per-Unit Energy Savings (kWh/Yr)
Not Running	3.3%	-	-	0%	-	-
Running Part Time	14.8%	0.34	596	23%	0.32	468
Running All Time	82.0%	1.00	1,749	77%	1.00	1,476
Total	100.0%		1,522	100%		1,247

Again utilizing the findings of the participant survey, Cadmus determined the net-to-gross (NTG) to be 0.51 and 0.63 for refrigerators and freezers, respectively. Applying these NTG

values to gross per-unit savings in the table above as well as the total Program participation yielded an estimate of the Program net savings.

A comparison of the Program's gross and net energy targets (projected participation and *ex ante* values) with the evaluated savings (actual participation and *ex post* values) is provided in Table ES3. As seen in the table, the Program exceeded its participation target of 3,700 in the first year. While the Program fell short of its gross savings target (due to an inappropriately high *ex ante* value and lower observed part-use factor), the Program exceed its net savings target (the *ex post* NTG was significantly higher than the *ex ante* value for both appliances).

Table ES3. PY1 Net Annual Energy Savings

	Recycled Units			Gross Savings			Net Savings		
Appliance	PY1 Target	PY1 Actual	Real. Rate	PY1 Target - *Ex Ante* (MWh)	PY1 Evaluated- *Ex Post* (MWh)	Real. Rate	PY1 Target - *Ex Ante* (MWh)	PY1 Evaluated- *Ex Post* (MWh)	Real. Rate
Refrigerators	2,775	2,752	99%	5,273	4,188	0.79	1,845	2,143	1.16
Freezers	925	1,096	118%	1,537	1,367	0.89	830	868	1.05
Total	3,700	3,848	104%	6,810	5,555	0.82	2,676	3,011	1.13

This evaluation draws the following conclusions:

- ***High Program Demand Exists and Current Design can Meet Future Targets***. The Program's PY1 participation level suggests sufficient demand exists to meet the Program's participation targets for PY2 and PY3. Further, AIU does not need to make any significant changes to the current Program design and marketing methods.

- ***Lower Part-Use Factor Common for New Programs***. The part-use factor should increase naturally in subsequent years as the Program penetrates further into the used appliance market and the pool of existing unused appliances decreases.

- ***Current Program Team Works Well Together***. Based on feedback from interviewed stakeholders, satisfaction levels expressed by surveyed participants and the observed Program participation level, Cadmus believes AIU management and the implementation teams work well together and administer the Program effectively.

Recommendations for future actions include:

- ***Trust Implementer Experience.*** Several stakeholders noted degrees of concern expressed by AIU and the Program implementers differed regarding low early participation numbers. Because appliance recycling programs tend to be seasonal, and, given its implementation team's considerable experience, AIU should rely on CSG and ARCA when deciding when and how to market the Program.

- ***Consider Limited Small Commercial Sector Participation.*** Since many nonresidential customers operated older, inefficient, residential-style refrigerators, the Program should consider expanding eligibility to a limited portion of the small commercial sector. For example, the Program could limit small commercial participation only to appliances on

the first floor (to alleviate transportation issues) or to a specific subsector (such as churches). While advertising a small commercial add-on element may lead to confusion and frustration regarding eligibility, the Program could only enroll those qualifying nonresidential customers that contact the Program in response to current marketing practices.

2. Introduction

Program Description

The AIU's Appliance Recycling Program's (the Program) overarching target of is to remove and dispose of operable but inefficient secondary refrigerators and freezers, preventing the units from remaining active at the participant's premise or elsewhere within AIU's service territory. Secondary refrigerators and stand-alone freezers tend to be older, less-efficient units, continuously plugged in, yet infrequently used, partially full, and located in unconditioned areas of homes (e.g., garages), where they must work harder to keep food cool. In addition to reducing energy consumption at both the household and utility levels, the Program decommissions participating appliances in an environmentally sound manner.[1]

Conservation Services Group (CSG)—the primary implementer for all of AIU's residential demand-side management (DSM) programs—implements the Program, with the Appliance Recycling Centers of America (ARCA).

The Program is available to all AIU residential electric customers with qualifying equipment, as defined below:

- Appliances must be secondary units;
- Appliances must be located on the account premises, and be operational at the time of pickup;
- Appliances must be between 10 and 27 cubic feet;
- Appliances must be manufactured before 1993; and
- Appliances must be household type models (i.e., commercial refrigerators and freezers are not eligible).

To encourage Program participation, AIU offered a $35 incentive, a value similar to that employed by many appliance recycling programs nationwide. The Program utilized the following *ex ante* per-unit savings shown in Table 1.

[1] Environmentally-sound disposal of this equipment includes proper disposal of oils, PCBs, mercury, and CFC-11 foam, and the recycling of CFC-12, HFC-134a, plastic, glass, steel, and aluminum.

Table 1. Program *Ex Ante* Values (PY1)

Appliance	Gross Annual Savings (kWh/Year)[2]	NTG[3]	Net Annual Savings (kWh/Year)
Refrigerator	1,900	35%	665
Freezer	1,662	54%	897

Evaluation Questions

From an evaluation perspective, appliance recycling programs differ from most programs in that savings are generated by rebating removal of an operable but inefficient measure rather than rebating installation of an efficient measure. This poses unique evaluation challenges that require additional methodological approaches. In detail, this report discusses these challenges and the methods utilized to overcome them. The overarching impact and process evaluation questions driving the study follows below.

Impact Questions

1. What are the average gross energy savings generated by a participating appliance?
2. What percentage of participating appliances would have been discarded and destroyed or would have been kept but unused in the Program's absence?
3. Did the Program meet its targets?

Process Questions

1. Did Program design change during implementation?
2. How effective were the employed marketing efforts?
3. How well did the AIU and implementation team work together?
4. Were Program participants satisfied with their experiences?
5. What changes can be made to the Program's design or delivery to improve its effectiveness?

[2] The employed *ex ante* values appear to be based on the 2002–2003 California Statewide Residential Appliance Recycling Program evaluation. It should be noted that while the per-unit gross savings for freezers and net-to-gross (NTG) for both measures match the findings of the 2002–2003 statewide evaluation, the gross refrigerator savings determined for California were 1,946 kWh (not 1,900 kWh). It should also be noted a more recent California statewide evaluation (completed by ADM & Associates for 2004–2005) has been completed. The 2004–2005 evaluation provides more recent gross savings (also through metering) and NTG estimates. Further, the 2004–2005 evaluation found lower per-unit gross energy savings and significantly higher NTG estimates than the previous California statewide evaluation used as the basis for AIU's *ex ante* values.

[3] Ibid.

3. Evaluation Methods

Analytical Methods

The evaluation plan, developed to assess the Program, consisted of four primary tasks (see Table 2). The participant survey informed both the impact and process evaluations. A brief description of each task follows. Additional detail regarding the methodology of each evaluation task is provided in subsequent chapters.

Table 2. Summary of Evaluation Approach (PY1)

Action	Impact	Process	Details
Participant Survey	X	X	Used for calculating the net-to-gross (NTG), and assessing implementation.
Stakeholder Interviews		X	Provides insight into program design and delivery.
Secondary Research		X	Review results of recent appliance recycling evaluations.
Secondary Data Analysis	X		Determine per unit savings based on age and size.

Participant Surveys

Participant survey data collection began April 30, 2009, and ended May 10, 2009. The participant survey asked a number of questions to determine sources of Program information, descriptions of recycled appliances, participants' consideration of appliance disposal alternatives, Program satisfaction, and demographics.

The evaluation team drafted and finalized a participant survey utilizing industry best practices for appliance recycling evaluations. The survey included questions addressing the following pertinent issues:

- *Verification of Measure Removal.* This section of the survey ensured we spoke with the appropriate person. It contained questions related to recall of participation, involvement in the decision process, and measure removal.

- *Appliance Context and Decision-Making Processes.* These questions addressed key aspects of the customer's decision-making process, and informed freeridership, spillover, and verification analysis.

- *Program Satisfaction.* These questions collected process-related questions regarding participants' satisfaction with the Program, including reasons for dissatisfaction, if applicable. The questions also addressed the likelihood as to whether participants will refer others to the Program.

- *Demographics.* This section captured household and respondent characteristics, which included: race, income, square footage of home, energy use, and energy expenditures.

Cooperation with survey efforts was very high, with 71.6% of sampled respondents agreeing to respond to telephone surveys. One reason for the high cooperation rate may have been very recent program participation. Most respondents had their appliances picked up within six months (some as recently as a month before the telephone survey). The short survey lengths also contributed to the high response rate. Average interviews lasted just over nine minutes.

Stakeholder Interviews

To assess the Program's effectiveness and implementation, the evaluation team conducted interviews with a number of stakeholders intimately familiar with the Program. Specifically, the evaluation team interviewed five stakeholders from AIU, CSG, and the ACRA. Details regarding interviewed stakeholders are provided in Table 3.

Table 3. Stakeholder Interviews

Title	Organization
Residential Portfolio Project Manager	AIU
ARP Program Manager	AIU
Implementation Team Project Manager	CSG
Implementation Team Member	CSG
Call Center Manager	ARCA

Stakeholder interviews were conducted utilizing an interview guide aimed at discussing the Program's design, delivery, management, communication, effectiveness, and future with each respondent.

Information obtained from stakeholders was used to inform the following evaluation elements:

- Determination of program progress
- Identification of changes during implementation
- Assessment of program marketing

Secondary Research

To ensure the evaluation aligned with the evaluation industry's best practices for appliance recycling evaluations, the evaluation team gathered and reviewed multiple previous appliance recycling evaluation final reports. In addition to examining the methodologies employed in each report, the evaluation team assessed participant and nonparticipant survey instruments used.

Data collected through secondary research aided the following evaluation elements:

- Development of the gross savings methodology
- Development of the participant and nonparticipant survey instruments
- Development of the net savings methodology

Secondary Data Analysis

To leverage existing appliance recycling data sources, the evaluation team obtained datasets detailing energy consumption of thousands of refrigerators and freezers at the time of their manufacturer. With the application of a degradation factor, these data were used to develop per-unit energy savings estimates based on an appliance's age, size, and configuration. Combining this information with data on Program participants yielded an estimate of the Program's gross savings. Significant detail regarding this process is provided in the following chapter.

The engineering analysis informed the following evaluation elements:

- Determination of estimated per-unit energy savings
- Determination of appropriate degradation factor
- Estimate of program gross savings

Data Sources

The evaluation team utilized the following data sources to inform the impact and process evaluations:

- Final PY1 program database (provided by CSG)
- Information gathered through participant surveys
- Information gathered through stakeholder interviews
- Database containing results of 30,000 metered appliances[4]
- Other recent appliance recycling evaluations[5]
- Marketing and informational materials (provided by AIU)

Sampling Plan

The following details the sampling plan for the participant survey and stakeholder interviews.

Participant Surveys

The first step in sample design was to analyze the participant database provided by CSG and confirm it contained information necessary to complete the data collection. These data included: participant contact information, appliance details, and incentive amounts. Once verified, the evaluation team assigned a random number to each participant, and prioritized the call listed based on the random number. The sample was randomly selected from the population of households that participated in the Program between September 2008 and March 2009. No stratification was employed.

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[4] http://www.waptac.org/sp.asp?mc=techaids_refrigerator_energyuse

[5] Degradation factors applied were determined utilizing data from ADM & Associate's evaluation of the 2004–2005 California Statewide Appliance Recycling Program.

The evaluation team recommended a completion target of 70 surveys. As Table 4 shows, participants' response to the survey was higher than anticipated, with 93 completed surveys. The resulting precision levels at the 90% confidence interval are provided for each appliance as well as for the overall Program.

Table 4. Participant Survey Sample

Appliance	Population of Participants (Sept. 08–Mar. 09)	Number of Completed Surveys	Level of Precision at the 90% Confidence Interval
Refrigerator	2,110	69	±9.8%
Freezer	736	24	±16.6%
Total	2,846	93	±8.4%

Stakeholder Interviews

The evaluation team requested a list of utility and implementer contracts from AIU. The evaluation team then balanced the proposed number of interviews (n=5) between the three stakeholder groups (AIU, CSG, and ARCA) to gain the broadest possible perspective on the Program.

4. Program Results

Impact Findings

Impact evaluation findings are presented in the following five subsections:

1. Summary of Program Participation
2. Review of Terminology
3. Determination of Average Annual Gross Energy Consumption
4. Determination of Gross Savings
5. Determination of Net Savings

Summary of Program Participation

On September 8, 2008, AIU's ARP picked up its first appliance. By the end of the Program's first year, 3,848 old but operable refrigerators and freezers had been permanently removed from AIU's service territory and decommissioned in an environmentally responsible manner.[6] Table 5 shows PY1 participation by appliance.

Table 5. Program Participation (PY1)

Appliance	Recycled Units	Percent of Total Participation
Refrigerator	2,752	72%
Freezer	1,096	28%
Total	3,848	100%

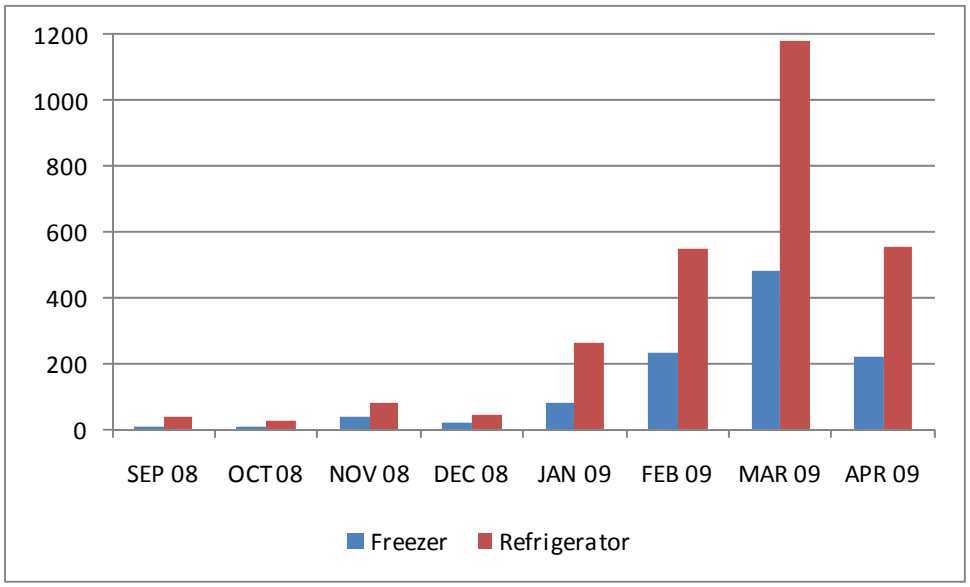
As shown in Figure 1, below, participation peaked during March. Participation started slowly during the Program's first two months, when less than 100 appliances were picked up, and remained low for the duration of 2008. Participation began to increase in January 2009, rising again in February, then peaking in March, when 1,660 appliances were picked up. Lower winter participation rates, followed by surges in spring participation, are not uncommon with U.S. appliance recycling programs.

This seasonality in appliance recycling participation commonly is attributed to two factors. First, most remodeling and home organization efforts leading to Program participation occur during warmer and drier weather. Second, secondary appliances typically have their greatest utility in winter, and households are often reluctant to enroll in an appliance recycling program until they have used the appliances to handle food surpluses that can occur during the holiday season.

In addition to these two factors, the large increase in March Program participation corresponds to the timing of both a media event and a trade ally marketing push designed to stimulate demand for the program at that time.

[6] Environmentally-sound disposal of this equipment includes: proper disposal of oils, PCBs, mercury, and CFC-11 foam, and recycling of CFC-12, HFC-134a, plastic, glass, steel, and aluminum.

Figure 1. Program Participation by Month (PY1)



Review of Terminology

In the case of appliance recycling programs, gross and net savings were calculated by determining a program's "part-use" and "attribution" factors. First used in the 2002 California Statewide Residential Appliance Recycling Program (RARP), the factors have become the industry standard for assessing actual outcomes from appliance recycling. Each factor is defined below:

- ***Part-Use Factor***: Adjusts for the fraction of time participants used the appliance and/or the fraction of time it would have been used had they kept it.

- ***Attribution Factor***: Adjusts for the percentage of participants that would have disposed of the unit independently of the Program, and also provides credit to the Program for destroying a unit that otherwise would have been transferred to another user.

For the 2002 study, both factors were used to determine the Program's NTG. However, the evaluation of the 2004–2005 statewide California study used the part-use factor in its calculation of the program's gross savings, not net savings. While this application does not affect a program's net impact, it provides a more accurate assessment of achieved gross savings. In addition, this approach has gained industry acceptance after the results were presented at the 2007 International Energy Program Evaluation Conference. Similar to the 2004–2005 California study, part-use was also used to determine total gross savings, not net savings. As such, part-use is explained in the Determination of Gross Savings subsection of this chapter, while attribution is detailed in the Determination of Net Savings subsection.

Determination of Average Annual Gross Energy Consumption

To calculate energy consumption for early retirement of participating refrigerators and freezers, the Evaluation Team first utilized a database detailing consumption of over 30,000 specific refrigerator and freezer makes and models between 1979 and 1992.[7] Since the database contained annual energy consumption estimates from a metering study at the time of manufacture, and appliance performance degrades over time, annual degradation factors of 1.97% and 1.06% were applied to refrigerators and freezers, respectively, in the database to calculate the appliances' assumed energy consumption at the time of participation.[8] In addition, the evaluation team utilized Federal energy standards for each appliance and a best-fit trend analysis to estimate energy consumption of appliances newer and older, respectively, than those contained in the database.

Next, each appliance in the database was assigned to a configuration category (e.g., Top Freezer Refrigerator), age category (e.g., 16–18 years old), size category (e.g., 19–21 cubic feet), and defrost type (manual vs. automatic). Once assigned, the average estimated energy consumption at the time of retirement for every combination of configuration, age, size, and defrost type was determined. Results of this effort were aggregated into a database.

The database detailing savings specific to each configuration, age, size, and defrost type was then merged with Program records detailing the number of Program appliances with a similar set of characteristics. Once merged, a weighted average was used to determine annual energy savings generated by a refrigerator and freezer recycled through PY1.

An example of how the datasets were combined and the weighted average calculated is provided in Table 6, below, for a subset of automatic defrosting Top Freezer refrigerators of various ages between 13–15 cubic feet in size.

Estimated annual energy consumption for both refrigerators and freezers determined through this process is shown in Table 7, below. Utilizing this "bottom-up" approach (in which consumption of each participating appliance is estimated) provides a more accurate assessment of overall Program savings than simply applying metering study results from a different service territory at a different time with a different set of appliances.

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[7] http://www.waptac.org/sp.asp?mc=techaids_refrigerator_energyuse

[8] The degradation factors applied were determined utilizing data from the 2004–2005 California Statewide Appliance Recycling Evaluation.

Table 6. Example of Gross Consumption Data Analysis Approach

Configuration	Size (Cubic Feet)	Age (Years)	Number of Reference Appliances[1]	Energy Consumption at the Time of Participation (kWh/Yr)[2]	Number of AIU Participants[3]
Top Freezer Fridge	13 to 15	16-18	321	1,047	29
Top Freezer Fridge	13 to 15	19-21	614	1,269	70
Top Freezer Fridge	13 to 15	22-24	634	1,490	24
Top Freezer Fridge	13 to 15	25-27	746	1,731	46
Top Freezer Fridge	13 to 15	28-30	456	2,112	65
Weighted Average based on AIU Participation				1,589	

[1]The total number of appliances included in the DOE database for the specific appliance type, size, age, and defrost type combination from which estimated energy savings were calculated.

[2]The average energy consumption calculated utilizing the DOE database for each specific appliance type, size, age, and defrost type combination with an annual degradation factor of 1.96% (based on data from the 2004–2005 CA ARP evaluation) applied.

Table 7. Estimate of Annual Energy Consumption (PY1)

Appliance	Average Annual Energy Consumption (kWh/Year)
Refrigerator	1,749
Freezer	1,476

Adjustment for Part Use

Gross savings needed to be adjusted for units used for a portion of the year. To do so, the evaluation team calculated and applied the Program's part-use factor. Retirement of appliances not previously in operation or operated only part of the year did not yield the full year of energy savings presented in Table 7. A weighted average of the part-use factors was used in the following three participant categories:

- Participating units **not used for at least one full year** prior to being recycled were assigned a part-use factor of **0**. As the unit was not consuming electricity, no savings were generated by its retirement.
- Recycled units **operating the full year** prior to participation were assigned a part-use factor of **1**.
- To determine the part-use factor for units **used only a portion of the previous year**, the average number of months such units were used was divided by 12. The part-use factor for these appliances ranged between **0** and **1**.

Refrigerators or freezers that operated for only a portion of the year were used an average 4.1 and 3.8 months a year, respectively. Dividing these values by 12 yielded part-use factors of 0.34 and 0.32, respectively.

Table 8 illustrates how the part-use factors for each of the three categories above were applied to determine average part-use adjusted gross annual energy savings for refrigerators and freezers.

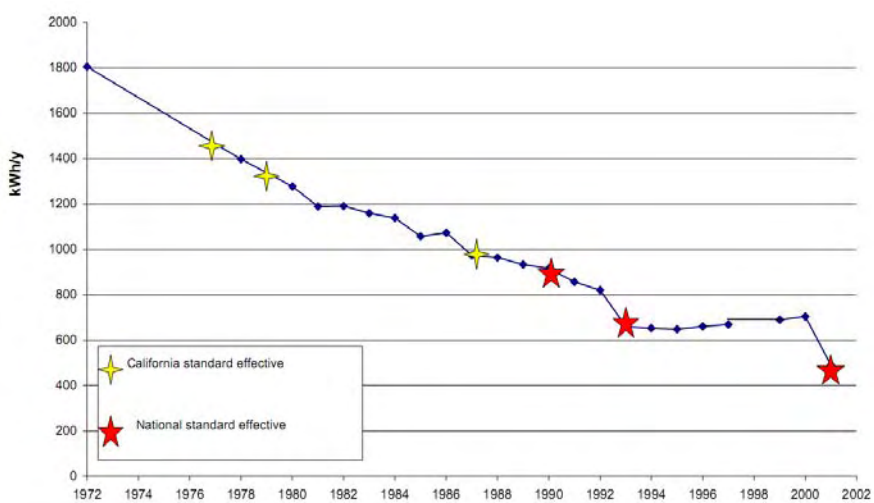
Table 8. Gross Per-Unit Energy Savings - Part-Use Adjusted (PY1)

	Refrigerator			Freezer		
Operational Status	Percent of Recycled Units	Part-Use Factor	Adjusted Per-Unit Energy Savings (kWh/Yr)	Percent of Recycled Units	Part-Use Factor	Adjusted Per-Unit Energy Savings (kWh/Yr)
Not Running	3.3%	-	-	0%	-	-
Running Part Time	14.8%	0.34	596	23%	0.32	468
Running All Time	82.0%	1.00	1,749	77%	1.00	1,476
Total	100.0%		1,522	100%		1,247

As shown in the table, the average per-unit gross annual energy savings determined for PY1 were less than the Program's *ex ante* values of 1,900 and 1,662 kWh, likely ascertained from the 2002–2003 Statewide California Appliance Recycling Program evaluation. For several reasons, this disparity between savings values proved unsurprising.

First, appliance recycling programs experience an overall downward savings trend over time as appliances recycled became new and more efficient. The *ex ante* values used for PY1 were based on the 2002–2003 Statewide California Appliance Recycling Program, completed more than five years ago. For example, the difference in per-unit gross savings between the 2002–2003 and 2004–2005 California evaluations was 11% (1,946 kWh and 1,775 kWh, respectively). Given the time passed since even the 2004–2005 metering study and the increase in efficiency standards in recent years (Figure 2), the downward energy savings trend would likely continue or even be exacerbated for a current appliance recycling program.

Figure 2. Refrigerator Energy Consumption Over Time (At the Time of Manufacture)



Second, the number of AIU participating appliances not utilized year-round was significantly higher than observed in the previous Statewide California evaluations. Comparisons between

AIU's Program and the 2004-2005 California evaluation are provided in the tables below. As shown, the disparity was particularly great for freezers. In fact, given the decrease in per-unit savings expected due to efficiency improvements between the 2004–2005 California evaluation and the 2009 AIU evaluation, the full-year energy consumption determined for AIU was in accordance with the 2004–2005 California evaluation. Clearly, the difference in part-use factors was the primary cause of the disparity between *ex ante* and evaluated gross per-unit energy savings.

A new appliance recycling program, such as AIU's, exhibiting a lower part-use factor than an established program is neither surprising nor uncommon. Prior to implementation, many unused or partial-used appliances collected by AIU in PY1 sat idle in Ameren customers' homes waiting for means to discard them. The AIU's Program provided just the impetus many of these customers needed to finally discard their unwanted appliances. As the pool of unused, unwanted appliances lingering in AIU households shrinks because of the Program, the Program should collect an increasing number of operational appliances and see an increase in its evaluated part-use factor.

Table 9. Comparison of Self-Reported Appliance Usage

	Refrigerators		Freezers	
Operational Status	AIU (PY1)	California (2004-2005)	AIU (PY1)	California (2004-2005)
Not in Use	3.3%	4.2%	0.0%	5.7%
Used Part Time	14.8%	3.4%	22.7%	6.4%
Used Full Time	82.0%	92.4%	77.3%	87.9%

Table 10. Comparison of Evaluated Part-Use Factors and Impact on Gross Savings

	Refrigerators		Freezers	
Operational Status	AIU (PY1)	California (2004-2005)	AIU (PY1)	California (2004-2005)
Full Year Energy Consumption	1,749	1,755	1,476	1,406
Gross Savings (Part-Use Adjusted)	1,522	1,655	1,193	1,257
Part-Use Factor	87%	94%	81%	89%

Utilizing weighted and part-use adjusted per-unit gross annual energy savings presented in Table 8, the Program-wide annual gross energy generated by AIU in PY1 is presented in Table 11.

Table 11. PY1 Part-Use Adjusted Gross Annual Energy Savings

Appliance	Gross Energy Savings (kWh/Year)	Participation	Total Program Gross Savings (kWh/Year)
Refrigerator	1,522	2,752	4,188,295
Freezer	1,247	1,096	1,366,870
Total		3,848	5,555,165

Determination of Net Savings

Assessing freeridership requires understanding what would have happened (in the case of participants) once used appliance left the home. It is important to note freeridership for appliance recycling programs revolves not just about getting older, antiquated appliances out of the home, but most importantly getting them off the grid.

Only four possible scenarios could happen to a refrigerator, freezer, and/or room air conditioner, had it not been recycled through the Program:

- The unit would have been kept by the household, but not be used;
- The unit would have been kept by the household, and still be used;
- The unit would have been discarded by the household through a method in which the unit would be destroyed; and
- The unit would have been discarded by the household through a method in which the unit would be transferred and kept in use.

Of the four scenarios, two are indicative of freeridership:

- The unit would have been kept by the household but not be used; or
- The unit would have been discarded by the household, through a method in which the unit would be destroyed.

Freeridership occurs under these scenarios because units would have been removed from the grid and not used and/or destroyed even if had they not been recycled through the Program. As a result, the Program cannot claim energy savings generated by the appliance's retirement.

A description of the NTG ratio calculation, a particularly complex process in regard to appliance recycling programs, is provided below along with total savings attributable to the Program.

Attribution

Table 12, below, again presents the four possible scenarios that could have occurred had a participating refrigerator or freezer not been recycled through the Program; Scenarios 1 and 3 indicate freeridership. Both scenarios are explored in further detail below.

Table 12. Potential Attribution Scenarios

Scenarios Independent of Program	Scenario	Indicative of Freeridership
Unit Kept But Not Used	1	Yes
Unit Kept And Used	2	No
Unit Discarded and Destroyed[9]	3	Yes
Unit Discarded, Transferred, Used	4	No

Scenario 1

Determining units that would have been kept and not used was determined through the participant survey. First, responding participants were asked whether they would have kept the unit had they not participated in the Program. Those stating they would have were then asked if they would have used the unit or stored it unplugged. The product of these responses provided the proportion of units that would have been kept and not used (therefore not drawing electricity from the grid and being indicative of freeridership). Energy savings associated with these units were therefore be subtracted from the Program's determined gross savings.

Table 13 provides details for this calculation. As shown, according to the self-reported participant survey results, 30.4% and 8.78% of refrigerators and freezers, respectively, would have been kept and stored unplugged independently of Program intervention.

Table 13. Freeridership Scenario 1—Units Kept But Not Used

Appliance	Pct. Of Appliances Kept	Pct. Of Kept Appliances That Would Not Be Used	Pct. Of All Appliances Kept and Not Used
Refrigerator	46.3%	65.6%	30.4%
Freezer	30.4%	28.6%	8.7%

Scenario 3

Calculating freeridership associated with Scenario 3 (units would have been discarded and destroyed in the Program's absence) is more complex and relies on a number of different data sources. Specifically, the calculation typically utilizes the results of both a participant survey and a nonparticipant survey as well as findings of the market research effort. In the PY1 evaluation, however, a simplified freeridership percentage was calculated using only a participant survey. In subsequent evaluations of program years 2010–2012, the evaluators will supplement participant results with results of a nonparticipant survey.

Table 14 presents responses provided by participants related to Scenario 3, indicating actions participants claimed they would have taken had the program not been available.

It should be noted the response "The dealer I bought a new one from took it away" was identified as indicative of freeridership (the vast majority of units are destroyed and not resold), based on

[9] It is important to note that while Scenario 3 would have led to the destruction of the appliance, it is unlikely the unit would have been decommissioned in the environmentally responsible manner undertaken by the Program. As a result, while the energy impact may be equivalent, the larger environmental and societal impacts are not.

results of market actor interviews in multiple utility evaluations. This assumption will be verified later in the evaluation cycle.

Table 14. Freeridership Scenario 3—Units Discarded and Destroyed (Participant Responses)

Stated Method of Disposal In Absence of Program	Indicative of Freeridership	Refrigerators	Freezers
Sell it to a private party, either by running an ad or to someone you know	No	14%	17%
Sell it to a used appliance dealer	No	0%	4%
Give it away to a private party, such as a friend or neighbor	No	13%	17%
Give it away to a charity organization, such as goodwill industries or a church	No	3%	0%
Have it removed by the dealer you got your new or replacement appliance from	Yes	6%	4%
Haul it to the dump yourself	Yes	4%	8%
Haul it to a recycling center yourself	Yes	6%	8%
Hire someone else to haul it away for junking or dumping	Yes	0%	4%
Other[1]	Yes	6%	4%
Total	-	100%	100%
[1]All other responses were reviewed individually and determined to be indicative of freeridership			

The information provided by participants regarding "what they would have done independent of the Program" is summarized in Table 15. As shown, the percentage of appliances participants reported to have been discarded absent the Program was multiplied by the percentage of appliances that would have been permanently destroyed through the reported disposal method. The product of these values provided an estimate of Scenario 3 freeridership: the percent of total Program units that would have been discarded and permanently destroyed independently of the Program.

Table 15. Summary of Freeridership Scenario 3—Units Discarded and Destroyed

Appliance	Pct. That Would Have Been Discarded	Pct. That Would Have Been Destroyed	Pct. That Would Have Been Discarded and Destroyed
Refrigerator	53.7%	34.4%	18.5%
Freezer	59.6%	40%	27.8%

Table 16. Summary of Self-Report Action Independent of Program Intervention

Freeridership Scenarios	Refrigerators	Freezers
Scenario 1 (Unit Kept but Not Used)	30.4%	8.7%
Scenario 3 (Unit Discarded and Destroyed)	18.5%	27.8%
Freeridership Total	48.9%	36.5%

Subtracting the freeridership values presented in the table above yields the appliance-specific NTG ratios presented in Table 17, below.

Table 17. NTG Ratios (PY1)

Appliance	Participant NTG Ratio
Refrigerators	0.51
Freezers	0.63

Once the PY1 NTGs were determined for each measure, total program gross savings were adjusted, as presented in Table 18, to account for Program attribution.

Table 18. PY1 Part-Use Adjusted Net Annual Energy Savings

Appliance	Total Program Gross Savings (kWh/Year)	NTG	Total Program Net Savings (kWh/Year)
Refrigerator	4,188,295	0.51	2,142,985
Freezer	1,366,870	0.63	867,665
Total	5,555,165		3,010,650

A comparison to NTG resulting from similar appliance recycling programs is provided in Table 19. As shown, NTGs have varied widely, based on the program itself and on the methodology utilized to evaluate it. Values determined for AIU in PY1 fell within the NTG range observed in the past decade.

Table 19. Comparison to other Appliance Recycling Program NTG

Study	Refrigerator NTG Ratio	Freezer NTG Ratio
Impact Evaluation of 1994 Spare Refrigerator Recycling Program, Project ID 515, Final Report to SCE, Xenergy, 1996	0.42	0.38
Impact Evaluation of the Spare Refrigerator Recycling Program, CEC Study #537, Final Report to SCE, Xenergy, 1998	0.53	0.57
Measurement and Evaluation Study of 2002 Statewide Residential Appliance Recycling Program, Final Report, KEMA-Xenergy, 2004	0.35	0.54
Measurement and Verification Report for NCPA SB5X Refrigerator Recycling, Final Report, Robert Morris & Associates, 2003	0.64	0.64
Measurement and Verification of SB5X Energy Efficiency Programs for the Sacramento Municipal Utility District, Final Report, Heschong Mahone Group, 2003	0.55	0.68
Impact and Process Evaluation of Ontario Power Authority's 2007 Great Refrigerator Roundup Program, The Cadmus Group, 2008	0.48	0.52
EM&V Study of 2004-05 Statewide Residential Appliance Recycling Program, ADM Associates, Inc., 2008	0.61	0.71
Residential Appliance Turn-In Program in Wisconsin, PA Consulting Group, 2008	0.57	N/A
PowerWise Appliance Recycling Program, Salt River Project, FY 2009 Evaluation, The Cadmus Group, 2009	0.67	0.68

Process Evaluation

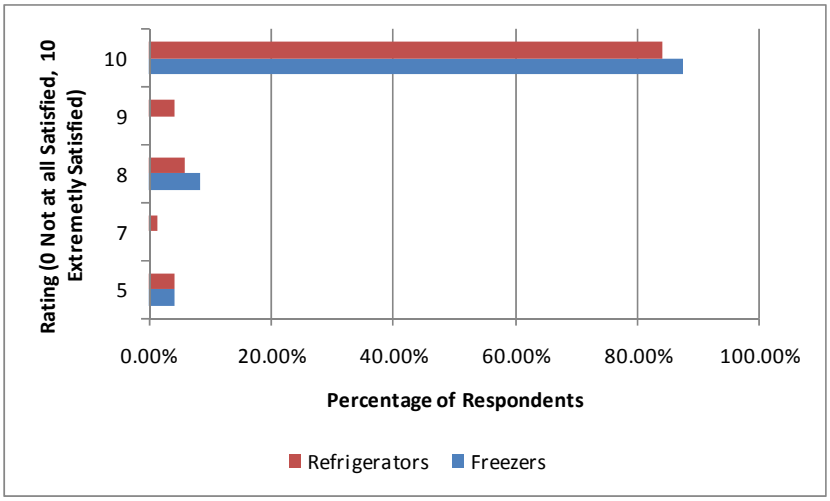
As detailed in Table 2, three of the four evaluation tasks informed the process evaluation:

1. Participant Survey
2. Stakeholder Interviews
3. Secondary Research

Participant Survey Findings

Participants expressed significant satisfaction with the Program, with 95% rating the Program with an 8, 9, or 10, on a 10-point scale. In fact, only four of the 93 respondents rated their Program satisfaction less than a 7. A breakdown of participants' satisfaction responses is illustrated in Figure 3.

Figure 3. Participant Satisfaction



Similarly, 95% of customers said they would highly recommend the Program to a friend or family member. On a 10-point scale, with 10 indicating the participant was extremely likely to recommend the Program to a friend, the average rating for recommending the program was 9.9. Further, 72% of the responding participants said they would have participated even without an incentive.

Participant Awareness

Sources by which participants became aware of the Program are indicated in

Table 20 (multiple responses possible). Bill inserts (62%) and newspapers or magazines (25%) were the two leading factors cited. Additional ways participants heard about the appliance recycling program included: TV, family or friends, radio, and other newsletters.

Table 20. Program Awareness

	Refrigerator		Freezer		Total	
	n	Percent Responding	n	Percent Responding	n	Percent Responding
Bill insert	47	68.1%	11	45.8%	58	62.4%
Newspaper/magazine	11	15.9%	12	50.0%	23	24.7%
TV	4	5.8%	2	8.3%	6	6.5%
Family/friends	5	7.2%	0	0%	5	5.4%
Radio	3	4.3%	0	0%	3	3.2%
Other newsletter	2	2.9%	0	0%	2	2.2%
Direct mail brochure	1	1.4%	0	0%	1	1.1%
AIU website	1	1.4%	0	0%	1	1.1%
Act on Energy Web site	1	1.4%	0	0%	1	1.1%
Other	1	1.4%	0	0%	1	1.1%

Refrigerator and Freezer Descriptions and Characteristics

According to respondents, recycled refrigerators and freezers averaged about 25 years old. Of those replacing their recycled appliance, 89% were replaced with an ENERGY STAR-labeled appliance. However, it should be noted telephone respondents often had difficulty accurately assessing the efficiency of their appliances.

Appliance locations also played a factor in energy use. As shown in Table 21, almost 90% of the recycled appliances were located in the garage (50%) or basement (40%). Approximately 57% of respondents indicated the location of the recycled appliance was heated, while only 39% had their recycled appliance in an air-conditioned space.

Table 21. Location of Recycled Appliance

	Refrigerator		Freezer		Total	
	n	Percent Responding	n	Percent Responding	n	Percent Responding
Garage	36	52.2%	10	41.7%	46	49.5%
Basement	24	34.8%	14	58.3%	38	40.9%
Kitchen	3	4.3%	0	.0%	3	3.2%
Porch/Patio	1	1.4%	0	.0%	1	1.1%
Other*	5	7.2%	0	.0%	5	5.4%
Total	69	100.0%	24	100.0%	93	100.0%
*Other responses include: spare room, craft shop, laundry room, dog kennel, and living room						

Respondents were asked to describe the working condition of the recycled appliance. Over 75% indicated the refrigerator or freezer recycled was still in good physical condition. Another 19% said the appliance needed minor repairs, and 4% said the appliance had problems. Only one respondent noted their appliance did not work (which technically would make the appliance ineligible to participate). The fact that nearly all appliances were cited in good condition reflects positively on the Program's ability to capture working, inefficient appliances.

Table 22. Condition of Recycled Appliance

	Refrigerator		Freezer		Total	
	n	Percent Responding	n	Percent Responding	n	Percent Responding
In good condition	47	70.1%	22	91.7%	69	75.8%
Needed minor repairs	16	23.9%	1	4.2%	17	18.7%
Had some problems	3	4.5%	1	4.2%	4	4.4%
Didn't work	1	1.5%	0	.0%	1	1.1%
Total	67	100.0%	24	100.0%	91	100.0%

Reason and Timing for Recycling

The majority of participants (two-thirds) considered disposing of their appliances prior to hearing about the Program. In fact, 54% of participants said they were not only considering the option, but would have removed the refrigerator had the Program not been available. The other 46% would have kept the appliance had AIU not sponsored the appliance recycling program.

The primary driver for recycling the appliance was simply because they no longer wanted the appliance and had no need to replace it (see Table 23). Qualitatively, many of these respondents commented that the appliance was old, and they no longer needed it. However, about a quarter of respondents replaced the recycled appliance because they purchased a new appliance.

Table 23. Reason for Recycling Appliance

	Refrigerator		Freezer		Total	
	n	Percent Responding	n	Percent Responding	n	Percent Responding
No longer wanted appliance w/o replacement	46	66.7%	16	69.6%	62	67.4%
Brand new appliance to replace it	19	27.5%	6	26.1%	25	27.2%
Used appliance to replace it	4	5.8%	1	4.3%	5	5.4%
Total	69	100.0%	23	100.0%	92	100.0%

Respondents inferred the free pick-up or rebate influenced their decision to recycle the appliance when they did. Table 24 shows almost half (48%) of respondents stated the main reason they decided to recycle their appliance with AIU was due to the free pick-up. Another 28% of respondents indicated the $35 incentive for each recycled appliance was the reason they went with the AIU program over other options. Other reasons for participating in the program included: good for the environment, convenience, only program known, and the utility sponsorship.

Table 24. Main Reason for Choosing Program over Other Disposal Options

	Refrigerator		Freezer		Total	
	n	Percent Responding	n	Percent Responding	n	Percent Responding
Free pick-up	32	47.1%	12	52.2%	44	48.4%
Cash	18	26.5%	7	30.4%	25	27.5%
Good for environment	6	8.8%	0	.0%	6	6.6%
Convenient	6	8.8%	0	.0%	6	6.6%
Only one known	1	1.5%	2	8.7%	3	3.3%
Utility sponsorship	2	2.9%	0	.0%	2	2.2%
Other	3	4.4%	2	8.7%	5	5.5%
Total	68	100.0%	23	100.0%	91	100.0%

Notably, the free pick-up was mentioned above all other options as the main reason for participation, even more than the Program incentive. To explore this issue further, those who said the cash incentive was the main reason for participation were asked if they still would have participated in the Program had the $35 per appliance incentive not been available. Seventy-four percent indicated they still would have participated in the Program without the incentive.

Given this, it appears the cash incentive was not a primary motivator for Program participation. That nearly three-quarters of participants would have participated in the Program regardless of the incentive begs the question of whether the incentive (or that high of an incentive) was necessary. The free pick-up clearly stood in respondents' minds more prevalently. They saw this service as a monetary benefit, as many would have had to pay to have the appliance recycled. It should be noted, however, that a monetary incentive is often necessary to capture some respondents' attention.

Stakeholder Interview Findings

Experienced Project Team. To draw experience to implementation of their DSM portfolio, AIU contracted with CSG. In turn, CSG partnered with ARCA, an organization that focuses exclusively on appliance recycling, implementing similar utility-funded programs nationally and internationally. Due to these partnerships, CSG and ARCA were able to provide AIU with a turnkey appliance recycling program capable of quickly launching and meeting its first-year targets.

Standardization of Program Design. AIU's program design was similar to that employed by many utilities. ARCA accepts incoming calls from prospective customers on behalf of AIU's Act On Energy initiative, schedules the pick-up appointment, picks up the appliance, recycles the appliance following environmental protocols, and provides the customer with an incentive on behalf of AIU. However, deliberate steps were taken early in the design process to improve the design and ensure consistency with recycling programs.

First, the original Program's design (developed by ICF International and AIU's Strategic Initiatives Group) included only refrigerators. When CSG was contracted to implement the

Program, they added freezers. Second, to align AIU with the appliance recycling program offered by ComEd, room air conditioners were added to the list of eligible measures. Incentives, however, were not provided for room air conditioners, and room air conditioners were only picked up in conjunction with a refrigerator or freezer.

Focus on Secondary Units. One difference between AIU's Program and some (not all) other utility appliance recycling programs was limiting eligibility only to secondary appliances. Focusing on secondary appliances increases the likelihood of recycling older, less-efficient appliances, and reducing the overall stock of appliances active on the grid. Since identifying secondary appliances can be difficult, language was included in the initial call script regarding duration of use as a secondary appliance (not a recently replaced primary unit). Based on findings of the participant survey, these efforts appear to have been successful.

Limited Changes During Implementation. While small administrative and logistical processes were probably modified during Program implementation, none of the interviewed stakeholders said substantive changes were made to the Program design or delivery during its implementation.

Regular Communication and Data Transparency. All stakeholders said communications between the three parties (AIU, CSG, and ARCA) were regular and effective. Specifically, stakeholders mentioned that, in addition to formal weekly project meetings, informal communication via e-mail or in-person meetings regarding project status and marketing were common. In addition, CSG's and AIU's ability to view ARCA's database via a Web portal increased Program transparency. CSG stakeholders noted the data contained in ARCA's database were integrated into CSG's portfolio-wide implementation database. Finally, while all parties could access the Program database, monthly reports were also developed.

Effective Marketing Efforts. Program marketing utilized a number of efforts. First, in October 2008, AIU advertised the Program to approximately 42,000 customers via a "CFL Box" (included two free CFLs and information regarding the Program). This effort, strategically limited to a portion of the service territory to allow the Program to ramp up slowly and not exhaust available funds early in its implementation cycle, yielded a minimal response. In January 2009, AIU provided a bill insert to all residential customers (approximately 1.2 million). The substantial mailing appears to have contributed to the spike in participation experienced in the late winter and early spring of 2009. However, it should be noted that appliance recycling programs typically experience a significant increase in participation during spring. In addition to bill inserts, the Program also benefitted from numerous earned media opportunities later in the Program cycle. According to ARCA's call center, 57% of participants cited the bill inserts as the impetus for their participation, while 16% cited newspaper coverage of the Program. In general, these percentages were corroborated by the participant survey findings. Near the Program year's end, efforts began to develop truck wraps (advertising on trucks picking up appliances).

Achievable Program Targets. A target of 3,700 recycled appliances was set for the Program's first year. Implementation staff considered the target low, and efforts were made to restrain participation early in the Program cycle to ensure funding would last throughout the Program year.

Demand Exceeded PY1 Program Budget. Despite efforts to regulate participation throughout the year, Program funds were exhausted by early April. As a result, all prospective customers during the rest of the Program year were placed on a waiting list until next year's Program became available. Exhaustion of funds likely resulted from a relatively low appliance target and successful, large-scale marketing through bill inserts and earned media.

Nonresidential Prospects. The stakeholder interviewed at the call center noted approximately 10% of received calls were from residential customers who had an appliance that did not meet the current age eligibility requirement. In addition, the stakeholder estimated another 5% of calls were from nonresidential customers (schools, churches, government, and small commercial) operating residential-style appliances.

High Customer Satisfaction Levels. Most interviewed stakeholders explicitly mentioned the Program being "popular" or participants being very "excited" about the Program. Again, this sentiment was validated by the participant survey findings.

Secondary Research Findings

While appliance recycling programs tend to be very similar (offering free pickup and environmentally responsible decommissioning of appliances), they vary in size, incentive levels, and supplementary appliances (with non-refrigerators or freezers also eligible for participation). Even within the statewide California appliance recycling program—offered by Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E)—incentive levels vary for certain appliances.

Further, some appliance recycling programs, such as The Great Refrigerator Roundup Program sponsored by the Ontario Power Authority (OPA), do not provide a monetary incentive at all. In its first three years of implementation (2007–2009), the OPA generated significant participation, offering only free pick-up of an appliance as an incentive. The OPA cited latent demand for the service as one reason for not offering a monetary incentive. While latent demand is likely in any area previously without a program (such as AIU's service territory), the significant number of older appliances stuck in basements in Ontario made removal of the appliance itself a more valuable service than in areas such as Arizona, where appliances are located in kitchens and garages on the main level.

Other programs, such as AIU's, try to target specific appliances located outside the kitchen by limiting participation only to "secondary units." However, the distinction between primary and secondary appliances is difficult to determine because a primary refrigerator becomes a secondary refrigerator as soon as its replacement arrives. Rather than decide whether the recently replaced appliance is a primary or secondary unit, most programs do not explicitly differentiate between scenarios. While language regarding secondary units is often omitted, imagery used for appliance recycling marketing across the country typically depicts appliances in garages, outside, or in basements.

Another way appliance recycling programs vary is by the appliances decommissioned. Many programs, including the three California utility programs, also pick up older room air conditioners. However, since the marginal cost associated with picking up other appliances is

minimal once on site, the OPA added dehumidifiers to its 2009 appliance recycling program. Other inefficient measures, such as halogen torchieres, were also considered for inclusion in the program.

Table 25 provides a summary of several appliance recycling programs. Specifically, the table provides participation levels, inception dates, appliances eligible to be collected, and incentive levels offered.

Table 25. Information Regarding a Sample of Ongoing Appliance Recycling Programs

Utility/Entity	Participation	Inception Year	Eligible Appliances and Incentive Levels
PG&E	~58,000 Refrigerators, ~11,000 Freezers, and ~400 Room Air Conditioners in 2006 and 2007	2000	Refrigerators ($35), Freezers ($35), and Room Air Conditioners ($25)
SCE	~105,000 Refrigerators, ~17,000 Freezers, and ~300 Room Air Conditioners in 2006 and 2007	2000	Refrigerators ($35), Freezers ($35), and Room Air Conditioners ($25)
SDG&E	~21,000 Refrigerators, ~3,500 Freezers, and ~30 Room Air Conditioners in 2006 and 2007	2000	Refrigerators ($35), Freezers ($35), and Room Air Conditioners ($25)
Energy Trust of Oregon	Not Available	2008	Refrigerators and Freezers (both $30)
OPA	~35,000 Refrigerators, ~12,000 Freezers, and ~12,500 Room Air Conditioners	2007	Refrigerators, Freezers, Room Air Conditioners, and Dehumidifiers (All $0)
Salt River Project	~3,000 Refrigerators, ~750 Freezers	2008	Refrigerators and Freezers (both $35)

5. Conclusions and Recommendations

The following conclusions and recommendations offered are based on findings presented in the previous chapter.

Conclusions

- ***High Program Demand Exists***. The participation level experienced in the Program's first year likely indicates sufficient demand exists to meet the Program's participation targets for subsequent Program years.

- ***Current Program Design can Meet Appliance Targets.*** No changes to the current Program design and marketing methods appear necessary to meet the Program's participation targets for subsequent Program years.

- ***Lower Part-Use Factor Common for New Programs***. The part-use factor should increase naturally in subsequent years as the Program penetrates further into the used appliance market and the pool of existing unused appliances decreases.

- ***The Current Program Team Works Well Together***. Based on feedback from interviewed stakeholders, satisfaction levels expressed by surveyed participants, and the observed Program participation level, it appears the Program's management and implementation team work well together and effectively administer the Program.

Recommendations

- ***Trust Implementer Experience***. Several stakeholders noted levels of concern expressed by AIU and Program implementers differed regarding low early participation numbers. Given the seasonality of appliance recycling programs and the considerable experience of its implementation team, AIU should lean on CSG and ARCA when deciding when and how to market the Program.

- ***Consider Including a Limited Small Commercial Sector***. Since many nonresidential customers operated older, inefficient, residential-style refrigerators, the Program should consider expanding eligibility to a limited portion of the small commercial sector. For example, the Program could limit small commercial participation to appliances only on the first floor (to alleviate transportation issues) or to a specific subsector (such as churches). While advertising a small commercial add-on element may lead to confusion and frustration regarding eligibility, the Program could only enroll those qualifying nonresidential customers that contact the Program through current marketing practices.

Appendix A: Participant Survey Instrument

Ameren Illinois Utilities Appliance Recycling Survey

Codebook

NOTES:

1. Variable names are in bold type.

2. Questions were asked of all respondents unless indicated otherwise.

SCREENING QUESTIONS

S1 According to our records, someone in your household contacted Ameren Illinois Utilities to participate in Ameren Illinois Utilities' Refrigerator/Freezer Recycling Program. Are you that person?

1 Yes

2 No

-8 Don't know

-9 Refused

S1a *[If S1≠ 1]* May I please speak to the person that called Ameren Illinois Utilities?

1 Yes

2 No

-8 Don't know

-9 Refused

VERIFICATION

Q1_1ba Program records indicate that you received an incentive of [amount of program incentive/subsidy] for having [quantity] [measure] disposed of by the recycling program around [date of pickup]. Do you recall having your [measure] picked up by the recycling program?

1 Yes
2 No (SKIP to Q1_2)
-8 Don't Know (SKIP to Q1_2)
-9 Refused (SKIP to Q1_2)

Q1_1bb Is this the correct quantity?

1 Yes (SKIP to Q1_4)
2 No
-8 Don't Know (SKIP to Q1_4)
-9 Refused (SKIP to Q1_4)

Q1_1bc (IF QUANTITY > 1) What is the correct quantity?

__ Quantity
-8 Don't Know
-9 Refused

SECTION 2: SOURCE OF PROGRAM INFORMATION

Q2_1 How did you first learn about Ameren Illinois Utilities' refrigerator/freezer pick up and recycling program? (PROBE: Did you hear about the program from any other sources?) (DO NOT READ LIST, RECORD ONE NUMBER)

For Q2_1_1 through Q2_1_19:

0 Not Mentioned
1 Mentioned

Q2_1_1 Newspaper / Magazine/Print Media

Q2_1_2 Bill Inserts/Contact
Q2_1_3 Ameren Illinois Utilities website
Q2_1_4 Act On Energy Website
Q2_1_5 Other website *[if yes, which web site(s)?]*

Q2_1_6 Internet Advertising/ Online Ad

Q2_1_7 Family/friends/word-of-mouth
Q2_1_8 Ameren Illinois Utilities Representative
Q2_1_9 Radio
Q2_1_10 TV
Q2_1_11 Billboard/outdoor ad
Q2_1_12 Direct mail brochure
Q2_1_13 Realtor
Q2_1_14 Home Builders
Q2_1_15 Other newsletter

Q2_1_16 Retailer/Store [i.e. Sears, Best Buy, Ace Hardware]

Q2_1_17 Ameren Illinois Utilities Truck Ad

Q2_1_18 Home Shows/Trade Shows

Q2_1_19 Other (specify)

Q2_1_19 Other way of learning about refrigerator/freezer recycling program

(OPEN ENDED RESPONSE)

REFRIGERATOR/FREEZER DESCRIPTIONS

Q3_1 ASK IF **[QUANTITY]** = 1

Now I'm going to ask you some specific questions about the [**refrigerator, freezer]** that was picked up and recycled.

During the time just before you decided to get rid of the [**refrigerator, freezer],** was it being used as your main [**refrigerator, freezer]**, or had it been a secondary or spare?

(Interviewer: a main refrigerator is typically in the kitchen, a secondary or spare is usually kept someplace else and might or might not be running. If the person recently bought a new main refrigerator and was just waiting for the old one to be picked up, it should be classified as "main.")

1 Main

2 Secondary or Spare

Q3_1a ASK IF **[QUANTITY]** > 1

Now I'm going to ask you some specific questions about the [**refrigerators, freezers]** that were picked up and recycled.

During the time just before you decided to get rid of the **[refrigerators, freezers],** how many of the picked up **[refrigerators, freezers]** were being used as your main **[refrigerator, freezer]**?

(Interviewer: a main refrigerator is typically in the kitchen, a secondary or spare is usually kept someplace else and might or might not be running. If the person recently bought a new main refrigerator and was just waiting for the old one to be picked up, it should be classified as "main.")

___ Enter number of MAIN **[refrigerator, freezer]**

Q3_1b ASK IF **[QUANTITY]** > 1 AND **[QUANTITY]** DOES NOT EQUAL NUMBER OF MAIN **[REFRIGERATOR, FREEZER]**

(During the time just before you decided to get rid of the **[refrigerators, freezers]**)

How many were being used as your secondary/spare **[refrigerator, freezer]?**

(Interviewer: a main refrigerator is typically in the kitchen, a secondary or spare is usually kept someplace else and might or might not be running. If the person recently bought a new main refrigerator and was just waiting for the old one to be picked up, it should be classified as "main.")

___ Enter number of SECONDARY/SPARE **[refrigerators, freezers]**

[IF BOTH MAIN AND SECONDARY APPLIANCES WERE PICKED UP AND RECYCLED, SURVEY PROGRAMMING WILL PRIORITIZE SECONDARY APPLIANCE] For the rest of the questions, please think about the **[main, secondary/spare] [refrigerator, freezer]** you used most often.

ASK Q3_2-Q3_4 ONLY IF Q3_1=2 OR Q3_1b > =1

Q3_2a How many months had it been a secondary or spare? (If respondent is confused, reinforce that "how long had it been a spare when you decided to get rid of it.")

__ months

-5 Programming error

-8 DON'T KNOW

-9 REFUSED

Q3_2b How many years had it been a secondary or spare? (If respondent is confused, reinforce that "how long had it been a spare when you decided to get rid of it.")

__ years

-5 Programming error

-8 DON'T KNOW

-9 REFUSED

Q3_2year Number of years appliance had been a secondary/spare (computed during cleaning)

__ years

-5 Programming error

-8 DON'T KNOW

-9 REFUSED

Q3_3 Thinking about the (last 12 months (IF 1 YEAR OR MORE)/months (ALL OTHER)) you had it as a spare prior to getting it picked up, was it plugged in and running …

1 All the time

2 For special occasions only

3 During certain months of the year only, or

4 Never plugged in or running

-5 Programming error

-8 DON'T KNOW

-9 REFUSED

ASK Q3_4 ONLY IF Q3_3=2 OR 3

Q3_4 IF you were to add up the total time it was running as a spare in the last 12 months, how many months would that be? Your best estimate is okay. (GET NEAREST MONTH OR HALF MONTH)

__ MONTHS (1-11, half = 0.5)

96 All the time

-8 DON'T KNOW

-9 REFUSED

Q3_5 Where was it located?

1 Kitchen

2 Garage

3 Porch/Patio

4 Basement

5 Other (SPECIFY)

-8 DON'T KNOW

-9 REFUSED

Q3_6 Was the location heated?

1 Yes

2 No

-8 DON'T KNOW

-9 REFUSED

Q3_7 Was the location air-conditioned?

1 Yes

2 No

-8 DON'T KNOW

-9 REFUSED

Q3_8a At the time of the pick-up, how old do you estimate the **(refrigerator, freezer)** was? RECORD MONTHS OR YEARS, 12 MONTHS = 1 YEAR

__ months (1-11)

97 Don't remember

-8 DON'T KNOW

-9 REFUSED

Q3_8b At the time of the pick-up, how old do you estimate the **(refrigerator, freezer)** was? RECORD MONTHS OR YEARS, 12 MONTHS = 1 YEAR

__ years

97 Don't remember

-8 DON'T KNOW

-9 REFUSED

Q3_8year Age of appliance in years (computed during cleaning)

__ years

-7 Don't remember

-8 DON'T KNOW

-9 REFUSED

Q3_9 Did you decide to get rid of it because you… (READ)

1 Got a brand new **[refrigerator, freezer]** to replace it

2 Got a used **[refrigerator, freezer]** to replace it

3 Or just wanted to get rid of a **[refrigerator, freezer]** that you no longer wanted without replacing it .....SKIP TO Q3_11

-8 DON'T KNOW .....SKIP TO Q3_11

-9 REFUSED .....SKIP TO Q3_11

Q3_10 Is the replacement **[refrigerator, freezer]** an ENERGY STAR labeled **[refrigerator, freezer]**?

1 Yes

2 No

-8 DON'T KNOW

-9 REFUSED

Q3_11 Had you already considered disposing of this **[refrigerator, freezer]** before hearing about Ameren Illinois Utilities' Refrigerator/Freezer recycling program? By dispose we mean getting rid of it either by selling it, giving it away, having someone pick it up, or taking it to the dump or a recycling center.

1 Yes

2 No

-8 DON'T KNOW

-9 REFUSED

Q3_12 Without the Ameren Illinois Utilities Refrigerator/Freezer Recycling program, what would you most likely have done with your old **[refrigerator, freezer]**? (READ)

1 Gotten rid of it

2 Kept it

-8 DON'T KNOW

-9 REFUSED

Q3_13 (IF Q 3_12=1) How soon would you have disposed of your old **[refrigerator, freezer]**? Would you have disposed of it within a year of when the Program took it, or more than a year later?

1 Within a year of when the program took it

2 More than a year later

-8 DON'T KNOW

-9 REFUSED

Q3_14 What was the condition of this appliance? Would you say …? (READ LIST; INDICATE ONE RESPONSE)

1 It worked and was in good physical condition

2 It worked but needed minor repairs (door seal or handle)

3 It worked but had some problems (it wouldn't defrost)

4 Or, it didn't work (SKIP TO Q4_1)

-8 DON'T KNOW

-9 REFUSED

Q3_15 (IF Q3_12 =2) If you had kept the **[refrigerator, freezer]**, would it have been used full time as either your primary unit or a spare, stored unplugged, or used occasionally (example: at holidays)? (DO NOT READ) IF NEEDED: Your best estimate is fine.

1 Used full time

2 Store it unplugged

3 Use it occasionally

-8 DON'T KNOW

-9 REFUSED

CONSIDERATION OF ALTERNATIVES SECTION

Q4_1 I am now going to read a list of alternative ways that you <u>could</u> have disposed of this appliance. For each, tell me if this is a method you had <u>considered using or doing</u>. (PROGRAMMER: ITEMS E

ONLY IF 3.9 = 01 OR 02. RANDOMIZE a-i, j and k ALWAYS LAST.)

For Q4_1a through Q4_1k:

1 Yes, considered using/doing
2 No, didn't consider or didn't know about

-8 Don't Know

-9 Refused

Q4_1a Sell it to a private party, either by running an ad or to someone you know
Q4_1b Sell it to an appliance dealer
Q4_1c Give it away to a private party, such as a friend, relative, or neighbor
Q4_1d Give it away to a charity organization, such as Goodwill Industries or a church
Q4_1e Have it removed by the dealer you got your new or replacement appliance from
Q4_1g Haul it to the dump yourself
Q4_1h Haul it to a recycling center yourself
Q4_1i Hire someone else haul it away for junking or dumping
Q4_1j Keep it
Q4_1k Or something else I've not mentioned

Q4_5 Did you attempt to trade in or sell the **[refrigerator, freezer]** before deciding to participate in the program?

1 Yes, to a dealer

2 Yes, to a non-dealer (friend, family member, neighbor, etc.)

3 No

-8 DON'T KNOW

-9 REFUSED

Q4_9 One factor in disposing of an appliance is being able to physically move and transport it. Do you have the ability to do this yourself, or would you need assistance such as renting or borrowing a truck or having someone other than your immediate family help you?

1 Yes, could do it myself

2 Would need assistance

-8 DON'T KNOW

-9 REFUSED

Q4_11 Now that you have considered some potential methods of disposal and additional factors involved in keeping or disposing of your old **[refrigerator, freezer]**, what you would have done if you had not disposed of it through the Ameren Illinois Utilities' program?

1 Sold it to a private party, either by running an ad or to someone you know

2 Sold it to an used appliance dealer

3 Given it away to a private party, such as a friend or neighbor

4 Given it away to a charity organization, such as Goodwill Industries or a church

5 Had it removed by the dealer you got your new or replacement appliance from

7 Hauled it to the dump yourself

8 Hauled to a recycling center yourself

9 Had someone else pick it up for junking or dumping

10 Kept it

11 Some Other Way (SPECIFY)

-8 DON'T KNOW

-9 REFUSED

Q4_12 What is the MAIN reason you chose <u>this service</u> over <u>other methods</u> of disposing of your appliance? IF MULTIPLE ARE MENTIONED: Of those, which is the main reason? (DO NOT READ) (ACCEPT ONE ANSWER ONLY)

(IF RESPONDENT SAYS SOMETHING LIKE: "I didn't need or want the refrigerator" RE-ASK THE QUESTION)

1 Cash/incentive payment

2 Free pick-up service/others don't pick up/don't have to take it myself

3 Environmentally safe disposal/recycled/good for environment

4 Recommendation of a friend/relative

5 Recommendation of retailer/dealer

6 Utility sponsorship of the program

7 Easy way/convenient

8 Never heard of any others/only one I know of

9 Other (SPECIFY)

-8 DON'T KNOW..... *(SKIP TO Q4_14)*

-9 REFUSED..... *(SKIP TO Q4_14)*

Q4_13 Were there any other reasons? IF YES: What were they?

For Q4_13_1 through Q4_13_10:

0 Not Mentioned

1 Mentioned

-8 DON'T KNOW
-9 REFUSED

Q4_13_1 No/None/No other reasons

Q4_13_2 Cash/Incentive payment

Q4_13_3 Free pick-up service/others don't pick up/don't have to take it myself

Q4_13_4 Environmentally safe disposal/recycled/good for environment

Q4_13_5 Recommendation of a friend/relative

Q4_13_6 Recommendation of retailer/dealer

Q4_13_7 Ameren Illinois Utility sponsorship of the program

Q4_13_8 Easy way/convenient

Q4_13_9 Never heard of any others/only one I know of

Q4_13_10 Other [SPECIFY]

Q4_14 Would you have participated in the program without the check for $**[total incentive amount]**?

1 Yes

2 No

-8 DON'T KNOW

-9 REFUSED

Section 5 Spillover and Market Impact

Q5_1 Since participating in the refrigerator/freezer pick-up and recycling program, have you participated in any other programs offered by Ameren Illinois Utilities?

1 Yes

2 No..... *(SKIP TO Q6_1)*

-8 DON'T KNOW..... *(SKIP TO Q6_1)*

-9 REFUSED..... *(SKIP TO Q6_1)*

Q5_2a Which programs did you participate in? *(RECORD)*

(OPEN ENDED RESPONSE)

Q5_2b On a scale from 0-10, how important or influential was your participation in this recycling program in your decision to participate in other Ameren Illinois Utilities energy efficiency programs?

__ 0-10 Important/Influential

-8 DON'T KNOW

-9 REFUSED

PROGRAM SATISFACTION

Q6_1 On a scale of 0 to 10, with 0 being not satisfied, and 10 being very satisfied, *overall* how satisfied are you with the Ameren Illinois Utilities refrigerator/freezer Recycling Program?

__ 0-10 Satisfaction *[IF GREATER THAN 4, GO TO Q6_3*]

-8 Don't know

-9 Refused

Q6_2 (If Q6_1 is rated less than 5) What was unsatisfactory about the refrigerator/freezer Recycling Program? [Do not read; mark all that apply]

For Q6_2_1 through Q6_2_7:

0 Not Mentioned

1 Mentioned

-8 DON'T KNOW
-9 REFUSED

Q6_2_1 Incentive was too small.

Q6_2_2 Contractor never called me back.

Q6_2_3 Contractor never showed up/showed up late.

Q6_2_4 Contractor was unreliable/unprofessional.

Q6_2_5 Difficult to get an appointment time that was convenient for me.

Q6_2_6 Wanted to use a different (non-program) contractor.

Q6_2_7 Other [Specify]

Q6_3 On a scale of 0-10, where 0 is not at all likely and 10 is very likely, how likely are you to recommend the Ameren Illinois Utilities refrigerator/freezer Recycling Program to friends and family members?

__ 0-10 Likely Rating

-8 Don't know

-9 Refused

Q6_4 Is there anything you would suggest to improve the Ameren Illinois Utilities refrigerator/freezer Recycling Program?

(OPEN ENDED RESPONSE)

Demographics

Q7_1 Which one of the following best describes the type of home in which you live?

1 A single-family detached [no common walls]
2 A single-family attached [at least one common wall with the surrounding dwellings, such as a town home, patio home, or condo]
3 Multi-family home, such as an apartment [requires a different family living above or below, such as an apartment]
4 A mobile home or trailer
5 Other *[SPECIFY]*

Q7_2 What is the approximate age of your home?

_____ years

-8 Don't know

-9 Refused

Q7_3 About how large is your home in square feet, excluding your garage and/or patio?

_____ square feet
-8 DON'T KNOW
-9 REFUSED

Q7_3a (If Q7_3=-8) Would you say your home is…

1 Under 1,000 square feet
2 1,000 – 1,500 square feet
3 1,501 – 2,000 square feet
4 2,001 – 2,500 square feet
5 2,501 – 3,000 square feet
6 More than 3,000 square feet *[SPECIFY]*
-5 Programming error
-8 Don't know
-9 Refused

Q7_3b (If Q7_3=6) You said your home is more than 3,000 square feet. What would you say is the total square footage?

____ Square feet

Q7_4 Is your home…

1 All electric
2 Gas and electric
3 Some other combination of energy sources
-8 Don't know
-9 Refused

Q7_5 In 2008, which of the following categories best describes your total annual household income before taxes? READ LIST.

1 Less than $15,000

2 $15,000 to $24,999

3 $25,000 to $34,999

4 $35,000 to $49,999

5 $50,000 to $74,999

6 $75,000 to $99,999

7 $100,000 to $149,999

8 $150,000 or more

-8 DON'T KNOW

-9 REFUSED

Q7_6 What is your average Ameren Illinois Utilities bill in the summer?

__ Dollars

-8 DON'T KNOW

-9 REFUSED

Q7_7 What is your average Ameren Illinois Utilities bill in the winter?

__ Dollars

-8 DON'T KNOW

-9 REFUSED

Q7_8 Which of the following best describes your age?

1 Less than 18 years old

2 18-24 years old

3 25-34 years old

4 35-44 years old

5 45-54 years old

6 55-64 years old

7 65 or older

-8 DON'T KNOW

-9 REFUSED

Q7_9 Sex of Respondent (record, do not ask)

1 Male

2 Female

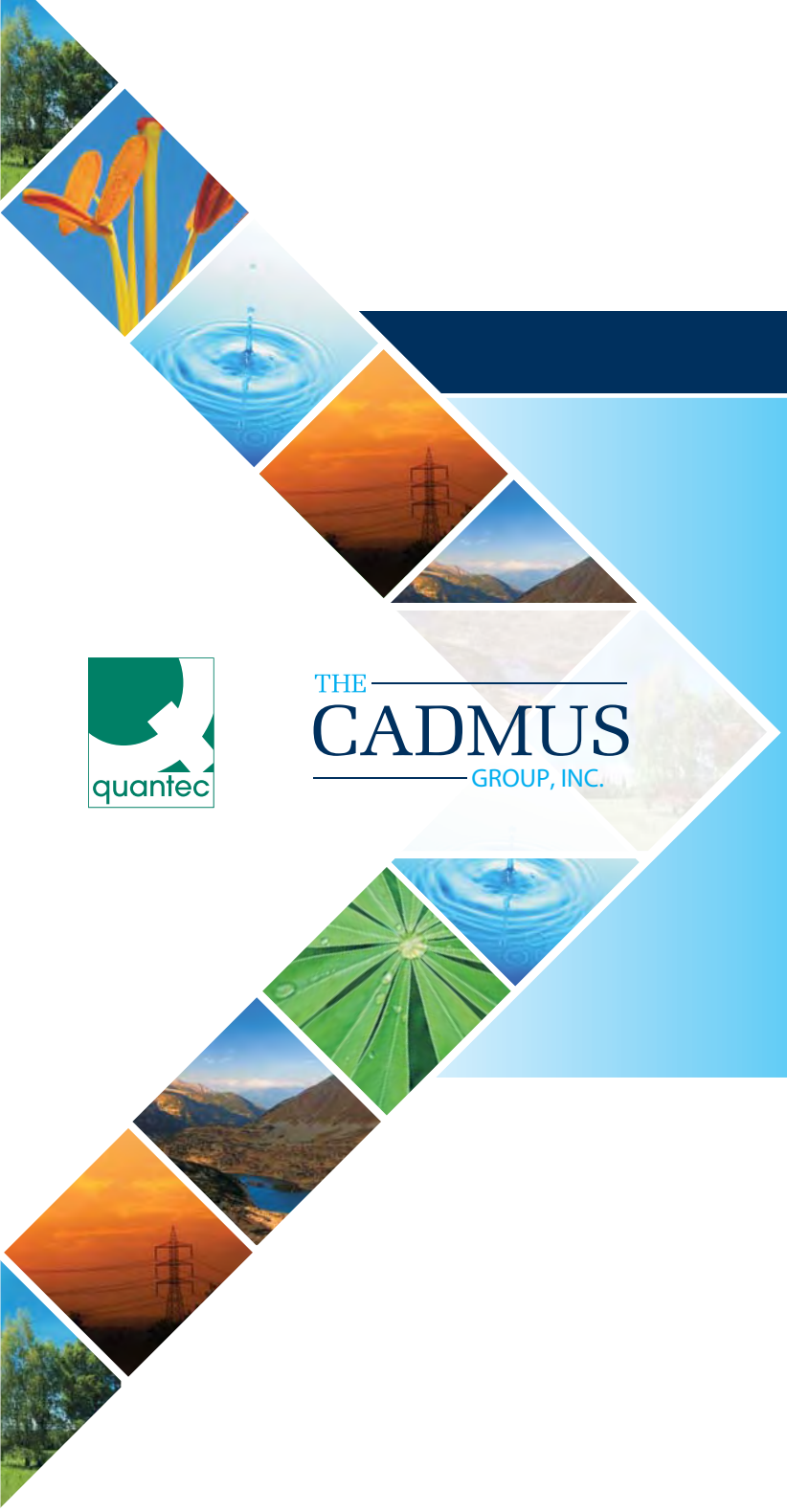
-8 DON'T KNOW

-9 REFUSED

Sample variables

Respnum$	Respondent number
Caseid	PA internal ID number
Meas	Appliance Recycled
Sampqty	Quantity of appliances recycled
Dollar	Incentive amount

Appendix C: Multifamily Buildings Program Evaluation



Multifamily Buildings Program Evaluation

September 24, 2009

FINAL REPORT

Prepared by:

The Cadmus Group, Inc.
720 SW Washington Street
Suite 400
Portland, OR 97205
(503) 228.2992

With Team Members:

Jamie Drakos
Sarah Griffis

Prepared for:

Ameren Illinois Utilities

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1. Executive Summary

Ameren Illinois Utilities' (AIU) Multifamily Program (Program) began delivery in November 2008, with program year one (PY1) ending in May 2009. Conservation Services Group (CSG) implements the Program in AIU's service territory.

The Program is offered to privately-owned, market-rate, multifamily buildings, with "multifamily" defined as buildings with three or more units. All qualifying buildings are offered the following services:

- A free, walkthrough lighting assessment.
- Incentives for installation of energy-efficient lighting in common areas.
- Free compact fluorescent lamps (CFLs) and water conservation measures for installation in resident units, along with an informational brochure on measures installed for residents.
- Energy audits for installation of HVAC and more complex measures.
- Incentives for custom measures (windows, replacement of roof-top air conditioning [AC] units) subject to an energy audit to validate cost-effectiveness and establish incentive levels.

The Program includes both gas- and electric-saving measures; however, this report contains only results on kWh and kW savings. An additional report on therm savings will be delivered after the Program's completion.

The Program, within a short, seven-month time frame, was able to: recruit knowledgeable staff; develop Program and marketing materials; facilitate necessary Program changes; and meet Program targets. This Program evaluation, initiated in March 2009, concludes the Program has started strongly and offers only limited recommendations for changes in PY2.

Table 1 shows the Program's progress in the first year.

Table 1. PY1 Achievements and Targets

Metric	Actual	Targets
Net MWh	817	762
Participation (no. of units)	2,342	2,340
Incentives	$74,956	$54,850

Estimated measure savings used to calculate the Program's effects were based on default savings values attributed to individual measures. The AIU Energy Efficiency and Demand Response filing (AIU EE DR), filed with the Illinois Commerce Commission (ICC), detailed the first

estimates of measure savings. CSG revised some of those measure-saving estimates, as shown in Table 2.

Table 2. Default Measure Savings and NTG Ratios

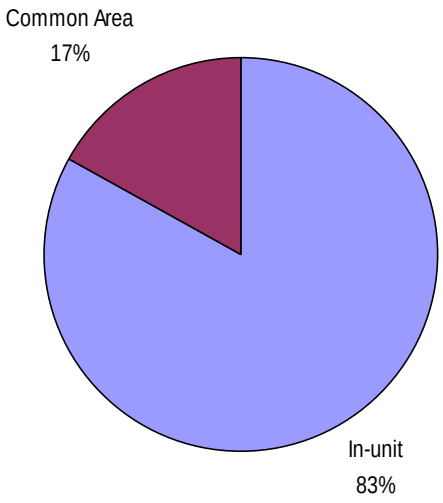
Measures	AIU EE DR Plan (Annual Gross kWh/unit savings)	CSG (Annual Gross kWh/unit savings)	NTG Ratio
In-unit Measures			
Showerhead 2.0 GPM	355	355	76%
15 watt CFL	79	38.4	76%
20 watt CFL	80	47	76%
23 watt CFL	99	65.8	76%
Faucet Aerator	52	52	76%
Pipe Insulation	215	215	76%
Common Area Measures			
4' T8 (32w lamps with electronic ballast and reflector)	64	67	76%
4' T8 (32w lamps with electronic ballast)	178	88	76%
Integral CFL (>13 watts screw-in)	205	287	76%
LED Exit Sign (new fixture or LED retro-fit)	351	269	76%
Modular CFL (<=18 watts pin based electronic ballast fixture)	123	718	76%
Modular CFL (>18 watts pin based electronic ballast fixture)	351	422	76%
Occupancy Sensor	214	0	N/A

CSG revised measure saving estimates for CFLs installed in-unit downward from the original AIU EE DR, and revised measure savings estimates for Modular CFLs installed in common areas upward.

Cadmus reviewed all measure savings estimates and concluded savings attributed to pipe insulation should be changed from 215 kWh for units with electric water heat to 65.4 kWh as detailed in Section 4. The Program's achievements shown above in Table 1 are based on Cadmus' recommended savings estimates for pipe insulation.

The Program's achievement of 817MWh in savings were attained mostly through installation of in-unit measures rather than common area lighting measures, as shown in Figure 1.

Figure 1. Percentage of Savings Achieved by Installation Type



The number of projects that included in-unit installations far exceeded the number with common-area lighting installations, as shown in Table 3.

Table 3. Installation Distribution

Install Location	Number of Sites
Common Area Lighting Only	3
In-Unit Only	59
Both Common Area and In-Unit	7
Total Number of Facilities	69

Cadmus reviewed all documentation maintained on 10 completed projects, including nine in-unit only projects and one common area lighting only project. These records were mostly complete and accurate, but a few small errors were noted. Two of the 10 sites had incomplete Program documentation or entries that did not match the database. We also found CFL installation in tenant units sometimes far exceeded the maximum (four CFLs) allowed by Program guidelines. Cadmus plans to conduct another Program documentation review early in PY2 to confirm all data are being collected and catalogued properly.

Interviews with Program staff and stakeholders portrayed a solid and well-operating program. AIU and CSG Program staff communicate clearly and consistently. The Program (a type of a program which, for many utilities, has an extended ramp-up period) had strong successes in its first year.

A few design changes factored into the Program's success, including:

- Certified electrical contractors were no longer required to replace common area lighting; the participating facility's maintenance staff could make those replacements.

- Facilities participating in the Program's in-unit portion were not required to also participate in either the Program's common area lighting or the custom measures portions.

- The Program only focused on common area lighting and in-unit measure installations its first year; it will launch custom measures in PY2.

CSG staff marketed the Program mostly by conducting cold calls on properties and engaging the 69 properties participating in the Program at the end of PY1. The program's marketing and informational materials were determined to be easily accessible and understandable.

Overall, CSG account managers have found staff at participating properties lack knowledge of energy efficiency, energy-saving measures, and benefits associated with upgrading their equipment. The program therefore has provided a significant benefit by educating property managers and customers on the costs and benefits of energy efficiency.

An issue that arose through the evaluation was the lack of a database early in the Program's operation and subsequent inconsistent reporting. This issue, however, was not unique to the Program and was reportedly a function of AIU's overall rapid launch of its residential programs with minimal staff and their hope of achieving the targets established. The Program database is now near completion, and, in PY2, AIU multifamily staff reported they have received requested reports consistently and in a timely manner. AIU staff indicated, ultimately, they would like to have a Web-based access point for the database to review Program progress in real time.

Cadmus offers the following recommendations for consideration by AIU and CSG staff. We believe instituting the recommended changes will help the Program's continued success in PY2 and PY3:

- **Complete the database rollout, and include fields capturing data necessary for program evaluation**. Completing the tracking database will benefit all parties involved with the Program. It will allow CSG staff to more easily track the Program and report its progress. The database will also generate reporting more quickly for AIU staff when needed. Incorporating data fields Cadmus has requested into the database (as highlighted in Table 9) will ensure ease and accuracy in the Program's impact evaluation. CSG may also want to consider implementing AIU's request to have an interface for their staff to access the database.

- **Launch the Program's custom measures component in PY2.** Account managers have found participants had little knowledge of energy efficiency (in general) and (in particular) how it applies to their building(s). Cadmus encourages the Program to begin performing complete building energy audits to determine where property owners can generate savings for themselves and their tenants. It is more time-effective to assess a building only once and determine how many measures will be applicable, rather than visit a building several times and duplicate the energy analysis.

  Also, as CFLs become the most common lighting technology available**,** lifetime savings from those measures will diminish and threaten the Program's cost-effectiveness. If the

Program is well-versed in delivering more complex measures early on, it will not have as steep a learning curve while launching those measures later in the Program. We recognize educating Program participants about the need for installing other measures may be difficult in a new market, where people have limited information on energy efficiency and its benefits, but we believe failing to do so will inhibit the Program's efforts to meet its PY3 targets.

- **Change Program requirements allowing only four CFLs to be installed in any one tenant unit.** The estimated 2.3 operation hours for CFLs installed in tenant units are very conservative when the Program only allows four CFLs. However, if over 10 CFLs are routinely installed in tenant units, those hours of operation and savings become suspect. We believe the Program could even increase the number of CFLs installed in tenant units up to eight and comfortably maintain estimated savings. We understand the presence of an installer in a tenant unit is costly, and all energy-saving measures applicable to the unit should be leveraged at that time. We recommend AIU and CSG consider graduated savings levels for CFLs installed in tenant units to allow additional cost-effective installations. The first eight CFLs installed will have savings attributed to them at the current default savings' level. The remainder of the CFLs can be installed at the discretion of CSG or apartment maintenance staff, but will have savings attributed to those at a reduced rate.

- **Continue consistent communication**. In PY1, AIU and CSG staff maintained good, consistent communication between parties, a valuable asset to both parties and noted several times as a great benefit by AIU staff. The collaboration (and trust) between parties in launching the Program is one reason for the Program's successful first year. One particularly important activity seems to have been joint field work, which gave AIU staff an opportunity to appreciate the caliber of CSG's field staff, along with gaining a first-hand understanding of how the Program operates.

2. Introduction

Program Description

Ameren Illinois Utilities' (AIU) Multifamily Program (Program) began delivery in November, 2008, with program year one (PY1) ending in May 2009. Conservation Services Group (CSG) implements the Program in AIU's service territory. The Cadmus Group, Inc. (Cadmus) was awarded a contract to evaluate AIU's suite of residential programs in late 2008. Cadmus' contract includes reviewing default savings estimates, and ensuring CSG collects all data required for a comprehensive impact and process evaluation.

The Program is offered to privately-owned, market-rate, multifamily buildings, with "multifamily" defined as buildings with three or more units. The following services are offered to all qualifying buildings:

- A free, walkthrough lighting assessment.
- Incentives for installation of energy-efficient lighting in common areas.
- Free compact fluorescent lamps (CFLs) and water conservation measures for installation in resident units, along with an informational brochure for residents on measures installed.
- Energy audits for HVAC installation and more complex measures.
- Incentives for custom measures (windows, replacement of roof-top air-conditioning [AC] units) subject to an energy audit to validate cost-effectiveness and establish incentive levels.

The Program focuses its marketing on management companies holding multiple properties, typically utilizing cold calls and in-person visits to prospective properties. CSG staff, when contacting a potential participant, explain the Program, its benefits, requirements, and costs to the building decision maker. While the Program originally intended to also reach out to electrical contractors and other trade allies, these efforts have mostly been postponed until the second program year (PY2), as detailed below in Section 4.

Once a building owner or manager decides to participate in the Program, they receive a free walkthrough common area lighting assessment. This assessment determines opportunities existing for a building to reduce energy usage by installing new lighting measures. After approval of a building's "Request for Reservation of Incentive Funds" application, the participants can install common area lighting upgrades and apply to CSG for incentives with the "Incentive Funds Application." Projects are inspected by CSG staff, either prior to or after installation. To date, however, CSG has conducted 100% post-installation inspections.

Building owners or managers can, in addition to installing new common area lighting or as a separate project, retrofit tenant units with CFLs and hot water conservation measures. The in-unit measures are offered at no cost, and are shipped to the property after CSG receives a "Materials Request Form." The property staff install these measures in the resident units, report their installation to CSG, and return any unused measures.

The Program also provides for measures that include HVAC and other, more complex building measures. Though these have not been well-defined, they must be assessed for cost-effectiveness and incentive levels through an energy analysis. None of these more complex measures or energy analyses were implemented in PY1.

Evaluation Questions

Cadmus' PY1 evaluation was designed to answer the following, researchable questions. As our inquiry broadens in subsequent years, PY2 and PY3 evaluations will include additional evaluation questions.

Impact Questions

1. Are default savings estimates used for the Program measures reasonable?
2. What are the impacts from the Program, net and gross?
3. Did the Program generate energy savings? If so, how much and if not, why not?

Process Questions

1. Has the Program's design changed? If so, how and why? Are future program design changes expected?
2. How effective were marketing and outreach efforts, and Program implementation processes?
3. Does quality communication occur between stakeholder parties?
4. Are program allies satisfied with the Program and its offerings?
5. Are implementation efforts on track to meet future Program targets?

3. Evaluation Methods

Analytical Methods

The PY1 Multifamily Program evaluation consisted of a program database review and stakeholder interviews. Launched in November 2008, while the Program met its targets, it did not have sufficient activity and data to allow a more comprehensive evaluation. The planned PY2 and PY3 evaluations will include participant surveys, site visits, and billing/engineering analyses in addition to tasks conducted as part of this evaluation. Table 4 provides an overview of tasks completed in evaluating PY1.

Table 4. Summary of Evaluation Tasks

Action	Impact	Process	Details
Documentation Review	✓		Review of Program documentation, including applications and all verification documentation on a sample of buildings enrolled in the Program.
Stakeholder Interviews		✓	Interviews with Program management and implementation staff to provide insights into program design, marketing, and delivery.
Program Database Review	✓	✓	Ensure appropriate data were collected to inform the evaluation, particularly the impact work. Review of information compiled on program stakeholders. Savings assumptions reviewed for accuracy and consistency. Recommendations made as needed.

Program Database Review

Cadmus received copies of the Program database maintained by CSG. This database included records of all projects completed between the Program's launch and the end of PY1 (May 2009). Upon receipt, we conducted several analyses, including: an engineering review of measure savings estimates; an evaluability assessment; and a comparison of the database to monthly reports CSG provided by to AIU.

The engineering analysis reviewed all measure savings estimates to check for reasonableness and accuracy, not only for measure savings but for the net-to-gross (NTG) ratio. Measures included in the multifamily program were compared to California's 2005 Database for Energy Efficient Resources (DEER) measure savings along with savings claims approved by other utility commissions and programs. Estimates outside the range of reasonableness were noted.

The evaluability assessment was conducted to ensure CSG collected appropriate data, and that important program definitions were being applied consistently. Specifically, Cadmus reviewed data fields in the collection form against data needed for current and future process and impact evaluations.

Program Documentation Review

Cadmus reviewed all Program documents, including informational materials, application forms, and marketing materials. Our review focused on correctness, comprehensiveness, and ease of understanding. We also reviewed Program applications, installation records, audit documents, and incentive paperwork for 10 facilities enrolled in the Program between November 2008 and May 2009. Data gleaned from these documents were checked for completeness and were compared to the database for consistency.

Stakeholder Interviews

The interviewees included two AIU program managers, two CSG program managers, and one electrical contractor, for a total of five interviews. These interviews focused on assessing the Program's process flow, design versus implementation, changes in implementation, and marketing. Following each set of interviews, the evaluation team assessed the current methodology's appropriateness to determine whether midstream changes were required to effectively evaluate the Program. Interviews were conducted in June 2009 and followed the interview guide attached as Appendix A.

Data Sources

Cadmus collected data from the following sources; these data were used to assess the program's delivery and impacts:

- Two database extracts provided by CSG, one prior to PY1 completion, and one complete with all PY1 activity.
- Monthly reports from CSG to AIU.
- An Excel spreadsheet with names and contact information for all electrical contractors contacted by the Program.
- Marketing, informational, and marketing materials provided by CSG.

Document requests were first provided in April 2009, then again in June and July 2009. Database extracts cataloged all activity between November 2008 and June 2009.

Sampling Plan

Cadmus reviewed all data in the database for all projects completed between the Program's launch and the end of PY1. After reviewing actual participation documents, we selected a random sample of 10 facilities receiving treatments for review in greater detail. CSG provided all program documents associated with the sample sites.

4. Program Results

This program evaluation is separated into two subsections. First is an impact report, summarizing the Program's progress towards its PY1 installation and energy targets. This section includes feedback from our reviews of measure savings assumptions, the database, program tracking, and documentation collected on each project. The section's second portion focuses on process evaluation findings.

Impact Results

Program Database Review

Cadmus requested and received a copy of the Program's database from CSG. This covered all measures installed during PY1. The Program, which began November 2008, had a short time frame within which to pursue its targets. However, in spite of these challenges, only seven months after the Program's launch, it successfully met its PY1 targets, as shown in Table 5.

Table 5. PY1 Achievements

Metric	Actual
Net MWh	817
Participation (no. of units)	2,342
Incentives	$74,956

The program served 69 facilities, with a mix of installations (shown in Table 6).

Table 6. Installation Distribution

Install Location	Number of Sites
Common Area Lighting Only	3
In-Unit Only	59
Both Common Area and In-Unit	7
Total Number of Facilities	69

Program trends show common area installations were not as popular as in-unit installations. In the process evaluation below, we present reasons cited by Program staff for the high level of interest in the Program's in-unit portion.

While the number of common area installations were relatively small, those measures were responsible for 17% of the Program's net savings. Table 7, below, details common area measure installations, including the measure type, quantity installed, and gross and net kWh savings.

Table 7. Common Area Measure Distribution

Measure	Quantity Installed	kWh Gross Savings	kWh Net Savings
4' T8 (32w lamps with electronic ballast and reflector)	491	32,879	24,988
4' T8 (32w lamps with electronic ballast)	94	8,234	6,258
Integral CFL (>13 watts screw-in)	174	49,854	37,889
LED Exit Sign (new fixture or LED retro-fit)	179	48,084	36,544
Modular CFL (<=18 watts pin based electronic ballast fixture)	29	20,831	15,832
Modular CFL (>18 watts pin based electronic ballast fixture)	51	21,500	16,340
Occupancy Sensor	5	-	-
Total	1,023	181,383	137,851

The measure most installed for common areas was the 4-foot T8 with an electronic ballast and reflector. The majority of the common area lighting savings came from CFL and LED exit sign installations.

Measures installed in individual units included lighting as well as hot water conservation measures. Table 8 shows the measure types, quantity installed, and gross and net kWh savings for the in-unit measure installations.

Table 8. In-Unit Measure Distribution and Savings

Measure	Quantity Installed	kWh Gross Savings	kWh Net Savings
15 watt CFL	9,368	359,731	273,546
20 watt CFL	274	12,878	9,782
23 watt CFL	207	13,621	10,350
Faucet Aerator	2,535	81,016	62,320
Pipe Insulation	886	48,165	36,605
Showerhead 2.0 gpm	1,937	376,300	286,200
Total	15,207	891,711	678,803

In the program database, savings were attributed to each measure based on default measure savings. The savings shown here are slightly less, as the default savings for pipe insulation were high. The default savings utilized in the Program's database were 215 kWh for apartments with electric water heat. We calculated Table 8 savings with a more suitable estimate of 65.4 kWh[1] for units with electric water heat.

As shown, the showerhead generated significant kWh savings for the Program. The Program made multiple CFLs available to every unit and, not surprisingly, has achieved substantial kWh savings from the lighting measures.

[1] Pipe insulation savings estimate based on PPL Electric Utilities forecast savings of 10.9 kWh savings per linear foot, with an average of 6 feet of insulation installed: http://www.pplelectric.com/NR/rdonlyres/7DFC6B99-6141-4B02-B29C-C352654A0302/0/PPL_Plan_Appendices_Final.pdf

Evaluability Assessment

A program evaluability assessment ensures, going forward, the Program's data collection will include information necessary to conduct future evaluations. Cadmus conducted this assessment while reviewing the database and associated documentation delivered to our team.

Our review showed the Program currently collects some data required to perform the evaluation (see Table 9). In addition, some data are being collected through Program forms and documentation, but they have not been included in the Program's database.

Table 9. Data Collection

Required Data for Evaluation	Tracked in Database?	Field Exists on Participation Forms?	Should be Added to Program Database
Water heat fuel type	No	Yes	X
Space heating fuel	No	No	X
All facility and building addresses	No	No	X
All common area AIU electric account nos.	No*	No*	X
All common area AIU gas account nos.	No*	No*	X
In-unit measures installed by type and quantity	Yes	Yes	
Number of treated buildings	Yes	Yes	
Total number of buildings at the facility	No	No	X
Number of treated units	Yes	Yes	
Total number of units in each building	No	No	X
Total square feet of building and facility	No	No	X
Custom measures energy audit	N/A PY1	N/A PY1	X
Property owner/manager name and contact information	Yes	Yes	
Installer Name	No	Yes	X
Installer contact information	No	Yes	X
Names and contact information for all program allies	Yes	Yes	

*One facility account number is tracked, all common area account numbers should be tracked

Our evaluability assessment revealed many data needed for evaluation are being tracked by the Program, and much of those data are housed in the program database. However, the remaining required elements need to be tracked by Program implementers and included in the electronic database to ensure Cadmus can fully calculate the Program's impacts for PY2 and PY3. In addition, when the Program's custom measures portion is launched, Cadmus will work with CSG to ensure all required data are collected, including type, size, and efficiency of both measures being replaced and the installed measures.

Engineering Review

Cadmus reviewed all measure savings estimates and NTG ratios for accuracy and reasonableness. Measures savings estimates for the multifamily program were mostly considered reasonable; our engineering team questioned a couple of the savings numbers provided. Most savings estimates were cleared with a few additional questions.

Table 10. Default Measure Savings and NTG Ratios

Measures	AIU EE DR Plan (Annual Gross kWh/unit savings)	CSG (Annual Average Gross kWh/unit savings)	NTG Ratio
In-unit Measures			
Showerhead 2.0 GPM	355	355	76%
15 watt CFL	79	38.4	76%
20 watt CFL	80	47	76%
23 watt CFL	99	65.8	76%
Faucet Aerator	52	52	76%
Pipe Insulation	215	215	76%
Common Area Measures			
4' T8 (32w lamps with electronic ballast and reflector)	64	67	76%
4' T8 (32w lamps with electronic ballast)	178	88	76%
Integral CFL (>13 watts screw-in)	205	287	76%
LED Exit Sign (new fixture or LED retro-fit)	351	269	76%
Modular CFL (<=18 watts pin based electronic ballast fixture)	123	718	76%
Modular CFL (>18 watts pin based electronic ballast fixture)	351	422	76%
Occupancy Sensor	214	0	N/A

As shown in this table, measure savings estimates provided to the ICC through the AIU EE DR Plan were modified by CSG staff to better reflect the savings they expected. CSG calculates individually the savings for measures installed in common areas based on the measure replaced and the hours of operation for that fixture. Individually, these calculations were confirmed by Cadmus engineering staff. Overall, average savings for each measure are shown above. The savings of 718 kWh for the 18-watt modular CFLs greatly exceed the estimated savings in the AIU EE DR Plan because these particular installations were in fixtures operating 24 hours each day.

The showerhead savings estimate initially seemed high, but appears reasonable based on baseline equipment assumptions. However, we consider the pipe insulation savings estimate high at 215 kWh per year. Cadmus conducted research of default savings for pipe insulation used in different areas of the nation and found savings estimates of 65.4 kWh[2] per year, which we consider more accurate than default savings estimates used by the Program.

[2] Pipe insulation savings estimate based on PPL Electric Utilities forecasted savings of 10.9 kWh savings per linear foot, with an average of 6 feet of insulation installed. http://www.pplelectric.com/NR/rdonlyres/7DFC6B99-6141-4B02-B29C-C352654A0302/0/PPL_Plan_Appendices_Final.pdf

Program Documentation Review

Cadmus requested (and received) all documentation from CSG on 10 randomly selected projects completed in the Program's first year. These documents were reviewed to assess:

- Consistency between documentation and database entries.
- Completeness of Program applications, data collection, and evidence of inspection.
- That data collection and recording included key information necessary for evaluating the Program.

The random sample included nine sites with in-unit installations and one site (Site ID 6586) with only a common area installation. Table 11 shows site identification numbers for the 10 sites and documents completed for each site.

Table 11. Sample Site Documentation

Documents	Site ID									
	1569	1583	1587	2394	4875	6586	7306	7434	7440	7445
Materials Request Form		X	X	X	X	N/A	X	X	X	X
Program Participation Agreement	X	X		X	X	N/A	X	X	X	X
Post-Installation Data Collection From	X	X	X	X	X	N/A	X	X	X	X
On-Going Project Reconciliation Form		X								
Invoice	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A	N/A
Complex Map				X						
Request For Reservation Of Incentive Funds	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A	N/A
Payout Detail	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A	N/A
Incentive Funds Application	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A	N/A
AIU Bill							X			
Documents Match Database?	No*	Yes**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* missing 1 pipe insulation entry
**unable to verify pipe insulation exactly

Site documents were compared to the database extract for correctness and completeness. Documents highlighted in grey were included for just one project and were not required documentation. Site 1569 did not match the database due to a missing pipe insulation entry. The Post-Installation Data Collection Form for Site 1569 also showed 44 20-Watt CFL installations and 47 23-Watt CFL installations. The database extract showed these installations combined, with 91 20-Watt CFL installations and no 23-Watt CFL installations. Documentation for Site 1583 was difficult to verify for pipe insulation as there were corrections and post-it notes covering some text. Based on the information we could view, we believe documents matched the database.

Program documentation review of these 10 properties showed the Program did, in many locations, install up to 12 and 13 CFLs in a single apartment. However, the Program requirements limit the number of CFLs installed in any one apartment to four. Cadmus has not

been able to determine why multiple properties installed, in some apartments, many more CFLs. For the nine properties performing in-unit installations, 104 units received CFLs; of those, 56 units received more than four CFLs. Installation of this number of CFLs can be cost-effective as long as fixtures operate, on average, for at least an hour a day. Savings, however, may not be as high as the 38 to 66 kWh per CFL estimated, and could impact overall program savings. On average, however, there were only 5.7 CFLs per unit receiving CFLs in the documents reviewed. We believe it is reasonable to assume those CFLs operate for 2.3 hours per day; hence, we see no reason to downgrade CFL savings this year. Cadmus will consult with CSG and AIU staff as needed to determine if the Program should modify its requirements to allow installation of additional CFLs, or if savings estimates for CFLs over a certain number in each unit should be attributed to the Program at a different level.

Process Results

The PY1 process evaluation consisted of several interviews with Program stakeholders, as shown in Table 12.

Table 12. Stakeholder Interviewees

Organization	Title
CSG	Residential Programs Manager
CSG	Chief Operations Officer
AIU	Manager of Customer Service and Energy Efficiency
AIU	Multifamily Program Lead
D&M Electrical	Manager, Lighting

The Residential Programs Manager at CSG manages day-to-day activities for AIU's suite of residential programs, including the Multifamily Program. The Multifamily Program Lead at AIU oversees activities of several residential programs for AIU, including the HVAC and Home Energy Performance programs, in addition to the Multifamily Program. The Chief Operations Officer is the executive in charge of AIU programs for CSG. The Manager of Customer Service and Energy Efficiency manages all of AIU's energy-efficiency programs. We also interviewed a representative from the one participating program ally during PY1.

Program Design

Cadmus asked interviewees to relate how the Program was designed and to identify any changes since its implementation. The Program was designed mostly by CSG staff to meet AIU's defined portfolio savings targets. CSG authored the Program documentation, including informational materials, Program forms, applications, and Program (trade) ally information. Shortly after the Program began, AIU and CSG staff realized several changes needed to be made to the Program's design, including:

- Program design originally required participants to engage certified electrical contractors to replace common area lighting. Ultimately, CSG discovered most common area lighting

retrofits could be completed by the participating facility's maintenance staff, and discontinued this requirement.

- Original Program design called for all facilities participating in the in-unit portion of the Program to participate in either the common area lighting or the custom measures portion of the Program. The Program currently delivers in-unit measures to facilities not participating in any other Program portions.

- The Program only focused on common area lighting and in-unit measure installations in its first year. Program design called for a custom measures piece to the Program to address more expensive and complex measures, such as replacement of HVAC equipment. CSG and AIU determined that, in the first year, with limited time and staff to meet PY1s, the Program would focus on common area lighting and in-unit installations.

These changes were instituted to facilitate participation; so the Program could install measures and generate energy savings immediately.

The interviewees responsible for day-to-day Program operations shared the following perceptions of the Program's goals:

- Help AIU customers use less energy by installing more efficient technology;
- Provide incentives for more efficient products that customers could not otherwise afford;
- Educate customers on energy-efficient measures about which they were unaware;
- Help property owners make building improvements; and
- Help customers save money on electricity bills.

Program goals stated by AIU and CSG staff responsible for the Program did not include generation of kWh savings for AIU, but upper management in both organizations focused on savings.

Program Delivery

Marketing and Outreach

Program delivery began with marketing and outreach to potential participants. CSG compiled a list of properties from magazines, newspapers, local realtors, tax assessor searches, and just looking for sites on their travels through the community.

CSG created the marketing materials, which AIU staff approved. Materials included: fliers, an informational piece left in tenant units, a Program overview, a Web site, and an introduction letter. Interviewees, including the contractor active with the Program, agreed these were effective, eye-catching materials providing comprehensive information on the Program.

CSG tried several different methods for contacting potential participants, including sending letters to complexes, speaking at landlord association meetings, and cold calling properties. The most successful strategy was cold calling apartment complexes. CSG, early in the Program's delivery, sent out 25 letters to properties and received no response. When the account managers

visited these complexes, property staff did not recall the letters. CSG staff, sometimes accompanied by AIU staff, also gave presentations at business association and neighborhood meetings. These presentations have helped with networking, but generated little participation.

The Program's design originally included outreach to electrical and HVAC contractors to assist in Program marketing and delivery. However, as the Program launched, it became clear that electrical contractors were not always necessary for lighting retrofits, and the HVAC portion of the Program was put on hold until PY2. CSG did perform limited outreach to 12 electrical contractors. One contractor, after a referral to the Program through AIU's commercial programs, registered as a Program partner and completed a common area lighting retrofit and in-unit installations on behalf of the Program.

Application and Installation

CSG account managers contacted interested property owners or managers explained the Program and demonstrate the products. Properties had to meet the following eligibility requirements to participate:

- They had to be an AIU customer.
- The facility had to be multi-metered; master-metered complexes were only considered for Program participation on a case-by-case basis.
- The facility had to be privately owned.
- The facility had to have more than three units.
- In-unit measures had to be installed within 15 days from receipt; common area lighting projects had to be completed within 60 days of the request for reservation of funds.

Account managers conducted a lighting assessment and worked with property staff to determine the best measures for their sites. While participants could apply on their own to participate, Program staff found most property owners and managers were unaware of energy-efficiency measures (EEMs), their costs, lifetimes, nor associated savings, and needed education on EEMs and guidance in planning projects.

The account managers assisted participants with filling out required paperwork. When the property was approved, the project proceeded by setting an installation date. Common area measures were ordered from a distributor, and in-unit measures were either shipped or delivered directly to the property. For local complexes, the account managers assisted at the site on the first day of installation by showing property managers and maintenance staff correct measure installations, incentive/data collection forms, and how to return leftover equipment. The property owner or manager returned the completed paperwork to CSG.

As shown in the Impact Section, more projects have focused on in-unit measures than common area measures. Interviewees cited several reasons for this: in-unit measures were free, and installation could be completed by facility staff; budgets for larger properties were set in

advance, and upgrading measures had to be worked into expenses at a future date; and property owners were looking to future tax liabilities and wanted to wait to invest in their property when it could provide a tax advantage. In spite of this, property owners were reported to be very interested in common area measures because of short payback periods and AIU incentives; one interviewee indicated LED exit signs were of particular interest to participants.

Interviewees were asked if the range of measures and level of incentives available were reasonable for the Program. Interviewees indicated measures offered were more than sufficient, especially since property staff had little knowledge of EEMs. Program staff believed they might need to add measures in the future, but are currently receiving a great deal of interest, with property staff amazed at the Program benefits. There was also enough inefficient equipment to replace that offerings were sufficient. All interviewees believed the incentives were at a good level.

Inspection

Inspection of participant properties differed by project type. The in-unit measures were not physically inspected after installation as that would be disruptive to tenants and difficult to complete. For these installations, the Program required property staff to maintain detailed notes on measures installed in each apartment through their "Post-Installation Data Collection" form. CSG staff reviewed the form to verify number and type of measures installed versus number and type of measures provided to a facility for installation. If a difference occurred, the remainder of measures were picked up or delivered back to CSG staff. In practice, CSG staff have generally been in attendance on the first day of installation to assist facility staff and verify work performed.

A common area lighting project could, by program design, be inspected prior to or after installation. The "Request for Reservation of Incentive Funds" form, filled out by the participating facility, detailed planned measure installations before the project's start. The "Incentive Funds Application," forwarded to CSG upon the project's completion, showed measures and their ultimate place of installation. To date, CSG has conducted post-installation inspections on 100% of properties with common area lighting installations and hopes to continue the practice.

Data Collection and Tracking

Program staff provided data collection documents to all participating properties. The two forms mentioned above generated most of the data collected and tracked by the Program: the Incentive Funds Application (for common area lighting installations); and the Post-Installation Data Collection form (for in-unit installation data). Data included in these forms made up the fields in the database created and maintained by CSG for Program tracking.

At the time of our interviews with CSG staff, the database tracking the Program was not yet complete. Program staff were collecting data from installation and incentive forms, and entering that information into an Excel spreadsheet. These data were then condensed into monthly and quarterly reports provided to AIU staff. In addition to these reports, CSG and AIU staff held weekly project meetings and monthly portfolio review meetings. AIU staff interviewed indicated

there were concerns about consistency and timeliness of reports at the Program's beginning, but reporting had been much more consistent and timely as of the beginning of PY2. They understood the programs had been rolled out on an accelerated schedule, and CSG's time was dedicated to finding and hiring appropriate staff while simultaneously designing and launching programs. The database, at that time, took second priority.

AIU staff indicated they would like to have access to the tracking database to be able to check Program progress in real time. Ideally, CSG would provide a Web-interface where AIU staff could review data and generate up-to-date Program reports as needed.

Program Allies

This report describes reasons Program ally outreach was not widely conducted. However, one electrical contractor was referred to the Program after installing a generator at a multifamily site and contacting the AIU's commercial program for information on lighting upgrades. The company became a Program ally, and completed a combined in-unit and common area lighting installation. While the ally does most of their business installing generators at different facilities, they also do a small amount of commercial and residential lighting. Cadmus spoke with the staff member in charge of lighting and wiring projects.

Upon hearing of the Program, the contractor researched it further and reportedly found comprehensive information and applications online. She also phoned the Act on Energy toll-free number and found the people staffing the hotline helpful and able to answer additional questions.

The contractor's staff performed a lighting assessment and provided the facility manager with an initial quote and energy savings estimate. They then completed and submitted all required paperwork for the facility. CSG staff inspected the measures after installation, and payment for services was received in a timely manner.

At the end of this project, the contractor worked with CSG to create a marketing pamphlet for her business, and is considering running a radio advertisement to generate additional interest.

Changes for Program Year 2

Interviewees indicated Program changes would occur in its second year (PY2). These include preparation for inclusion of more complex (and HVAC) measures in Program offerings. These preparations also include CSG account managers receiving training on new measures, outreach to Program allies able to conduct an energy analysis and recommend more complex measures to multifamily property staff, and account managers recommending these measures to potential participants, when appropriate.

Interviewees did not foresee challenges with the next Program year. AIU and CSG staff felt their experience and familiarity with the area is growing. They also believe the Program has been useful to participants and tenants and will continue to be successful in the next two years.

5. Conclusions and Recommendations

Conclusions

Impact Evaluation

The Program, in PY1, successfully generated energy savings, as shown below in Table 13.

Table 13. PY1 Achievements and Targets

Metric	Actual	Targets
Net MWh	817	762
Participation (no. of units)	2,342	2,340
Incentives	$74,956	$54,850

The Program savings were due, in large part, to the installation of in-unit measures rather than common area lighting measures. Reasons cited for the popularity of the in-unit installations during the process evaluation included: in-unit measures were free and installation could be completed by facility staff; budgets for larger properties were set in advance, and upgrading measures had to be worked into expenses at a future date; and property owners were looking to future tax liabilities and wanted to wait to invest in their properties when it could provide a tax advantage.

Engineering Review

Measure savings estimates provided by CSG were mostly reasonable. Only one default savings estimate remained in question: pipe insulation. We encourage the Program to reduce savings attributed to pipe insulation to 65.4 kWh for apartments with electric water heating.

Program Documentation Review

Documentation kept by the Program on each project was mostly complete and accurate, with the database matching records on file. Only two sites had incomplete documentation or entries that did not match the database. One project was completed early in the Program, just after launch, when the database was still under construction. The other project suffered from a property manager returning messy and confusing data entry sheets.

The Program's documentation review of these 10 properties also showed it did, in many locations, install up to 12 and 13 CFLs in a single apartment. However, Program requirements clearly limited the number of CFLs to be installed in any one apartment to four. Cadmus will consult with CSG and AIU staff as needed to determine if the Program should modify its requirements to allow installation of additional CFLs, or if savings estimates for CFLs over a certain number in each unit should be attributed to the Program at a different level. Cadmus plans to conduct another review of Program documentation early in PY2 to confirm all data are being collected and catalogued properly.

Process Evaluation

Interviews with Program staff and stakeholders portrayed a solid and well-operating program. Program staff from AIU and CSG had clear and consistent communication. CSG staff had been able to provide program design and implementation expertise to AIU as they launched this new and large portfolio of programs. The Multifamily Program, which can have an extended ramp-up period for many utilities, has been successful in generating energy savings for participants, their tenants, and AIU during the first program year.

The following few changes assisted the Program's successful first year:

- Certified electrical contractors were no longer required for replacing of common area lighting; participating facility's maintenance staff could make those replacements.
- Facilities participating in the in-unit portion of the Program were not required to also participate in either the common area lighting or custom measures portion of the Program.
- The Program focused only on common area lighting and in-unit measure installations in the first year; it will launch custom measures in PY2.

CSG staff marketed the Program mostly by conducting cold calls on properties and engaging the 69 properties participating in the Program at the end of PY1. Marketing and informational materials were also easily accessed and understandable.

Overall, CSG account managers found staff at participating properties lacked knowledge about energy efficiency, energy-saving measures, and benefits associated with upgrading their equipment. The Program therefore has provided a significant benefit by educating property managers and customers about energy efficiency.

The only issue that emerged in the course of our process evaluation was the lack of a database early on and inconsistent reporting. This was not unique to the Multifamily Program, and was reportedly a function of the rapid launch of programs with minimal staff and PY1 goals to achieve. The database for the Program is now near completion, and AIU Multifamily staff report they have received requested reporting consistently and in a timely manner. AIU staff indicated, ultimately, they would like to have a Web-based access point for the database to review Program progress in real time.

Recommendations

The following recommendations are offered for consideration by AIU and CSG staff. Institution of these recommendations will help the Program continue its success in the next two years:

- **Complete the database rollout, and include fields capturing data necessary for program evaluation**. Completing the tracking database will benefit all parties involved with the Program. It will allow CSG staff to more easily track the Program and report its progress. The database will also generate reporting more quickly for AIU staff when

needed. Incorporating data fields Cadmus has requested into the database (as highlighted in Table 9) will ensure ease and accuracy in the Program's impact evaluation. CSG may also want to consider implementing AIU's request to have an interface for their staff to access the database.

- **Launch the Program's custom measures component in PY2.** Account managers have found participants had little knowledge of energy efficiency (in general) and (in particular) how it applies to their building(s). Cadmus encourages the Program to begin performing complete building energy audits to determine where property owners can generate savings for themselves and their tenants. It is more time-effective to assess a building only once and determine how many measures will be applicable, rather than visit a building several times and duplicate the energy analysis.

  Also, as CFLs become the most common lighting technology available**,** lifetime savings from those measures will diminish and threaten the Program's cost-effectiveness. If the Program is well-versed in delivering more complex measures early on, it will not have as steep a learning curve while launching those measures later in the Program. We recognize educating Program participants about the need for installing other measures may be difficult in a new market, where people have limited information on energy efficiency and its benefits, but we believe failing to do so will inhibit the Program's efforts to meet its PY3 goals.

- **Change Program requirements allowing only four CFLs to be installed in any one tenant unit.** The estimated 2.3 operation hours for CFLs installed in tenant units is very conservative when the Program only allows four CFLs. However, if over 10 CFLs are routinely installed in tenant units, those hours of operation and savings become suspect. We believe the Program could even increase the number of CFLs installed in tenant units up to eight and comfortably maintain estimated savings. We understand the presence of an installer in the unit is a costly undertaking, and all energy-saving measures applicable to the unit should be leveraged at that time. We recommend AIU and CSG consider graduated savings levels for CFLs installed in tenant units to allow additional cost-effective installations. The first eight CFLs installed will have savings attributed to them at the current default savings. The remainder of CFLs can be installed at the discretion of CSG or apartment maintenance staff, but will have savings attributed to those at a reduced rate.

- **Continue consistent communication**. In PY1, AIU and CSG staff have maintained good, consistent communication between parties, a valuable asset to both parties and noted several times as a great benefit by AIU staff. The collaboration and trust between parties in launching the Program is one reason for the Program's successful first year. One particularly important activity seems to have been joint field work, which gave AIU staff an opportunity to appreciate the caliber of CSG's field staff, along with gaining a first-hand understanding of how the Program operates.

Appendix A: Stakeholder Interview Guide

[This interview guide is to be used for interviewing program management staff at AmerenIU, program delivery staff at Conservation Services Group (CSG) and staff at trade ally organizations. Not all questions are applicable to all people being interviewed.]

Thank you for taking the time to talk with us today about the program.

As you know, The Cadmus Group, Inc., is evaluating the program for the next three years on behalf of AmerenIU. The purpose of this interview is to gather information on program processes, operations, and activities since the program's inception. Please note that this is not an audit, and that your comments will be kept confidential. Our goal is to create a complete description of the program from all perspectives so that we can identify what is working well and what can potentially be improved. Because of your role in program implementation, your perspective is very important to us, and we appreciate your taking the time to share it with us.

We expect this interview to take less than an hour of your time.

Introduction

1. What is your role in the Ameren IU Multifamily program? (probe for: title, responsibilities, number of staff supervising/assisting) For how long have you had this role?

2. Which program aspects (design, marketing, delivery, administration, customer response) are you most familiar with?

3. [Trade allies only] What other services does your company offer?

4. [Trade allies only] How many employees does your company have? How many are engaged in this program?

5. [CSG & Trade allies only]What type of training do your employees receive prior to delivery of the Program?

6. What do you believe are the program's primary goals?

7. In general terms, will you please walk me through the delivery of Ameren IU's Multifamily Program? (probe for marketing, contact with customers, scheduling and conducting audits, supplying recommendations to landlord, installing measures, any follow-up, incentive applications, and inspections)

Program Delivery

Marketing

8. What is your strategy for identifying multifamily complexes to target?
9. What methods have you used for marketing the program to potential participants (phone calls, canvassing, business associations, or other)?
10. How effective would you say those methods have proved to be?
11. What marketing materials do you use? (ask for copies of marketing materials)
12. How effective are these marketing materials?
13. [CSG and Ameren] What methods did you employ for marketing the program to contractors and trade allies?

Energy Audits and Installations

14. How is a site determined to be eligible for the program?
15. Are potential energy-efficiency upgrades recommended to participants or requested by participants?
16. What would trigger a custom audit?
17. Who installs the materials?
18. Do the installers receive any specialized training?
    a. If yes, how are they trained (internally, externally, etc.)?
19. Are installations inspected after completion?
    a. If yes, by whom?
20. How is data collected on participants and the participating buildings? Have there been any difficulties with data tracking?
21. What other reporting is required by the Program? How often are these reports submitted?
22. Do you feel the incentives offered by the Program are sufficient for engaging participants?
23. Are you satisfied with the range of equipment that is eligible for incentives?

24. Are there measures that you feel would be beneficial to many buildings, but are not adopted by participants?

25. [Trade allies only] How are projects submitted for CSG's approval?

Payment and Invoicing

26. How are you [or "is CSG" if speaking with Ameren employee] paid for completed projects?

27. Generally, how long after you [or "CSG" if speaking with Ameren employee] submit(s) the invoice(s) are you paid for a project?

28. If there are problems with an invoice, how are they generally resolved?

Overall program

29. [Ameren and CSG] Other than reporting on individual projects, what other reporting is required by the program?

30. [Ameren and CSG] Is that amount of reporting sufficient?

31. [Ameren and CSG] Have there been any changes to program design since implementation began?

32. If yes, what are the reasons for these changes?

33. Do you foresee any changes that will occur in program design over the next year?

34. If yes, what are the changes and why?

35. Overall, do you feel the program is and/or will be useful for participants?

36. Do you feel that the program will be successful over the next two years?

Thank you for your time! May we call you again in a year to ask you some additional questions about the program?

Appendix D: Home Energy Performance Electric Program Evaluation

Home Energy Performance Electric Program Evaluation

October 23, 2009

FINAL REPORT

Prepared by:

The Cadmus Group, Inc.
720 SW Washington Street
Suite 400
Portland, OR 97205
(503) 228.2992

With Team Members:

Robert Huang
Sandra Brown

Prepared for:

Ameren Illinois Utilities

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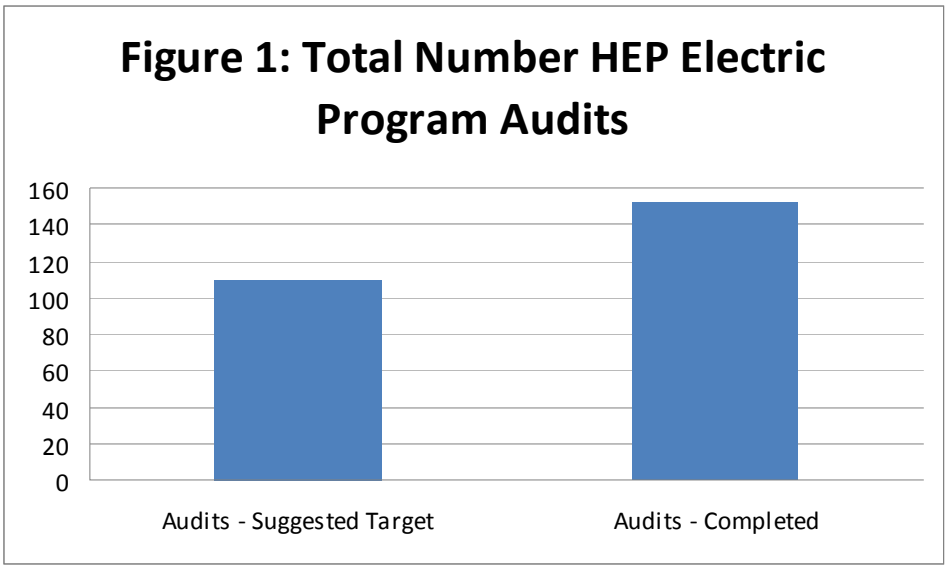
1. Executive Summary

The Home Energy Performance (HEP) Electric program is a home diagnostic and improvement service offered to AIU's residential customers for a $25 fee. (HEP Gas program savings will be covered in a separate report.) This program is the newest of the four residential programs started in PY1, with initial audits started in early 2009. During home audits, Conservation Services Group (CSG) auditors install several domestic hot water (DHW) and lighting instant savings measures (ISMs) on site, then recommend incented insulation and HVAC measures (to be installed by HVAC and HEP Insulation Program Allies). Cadmus conducted a review of default[1] and audit-based gross savings and a series of process interviews with program implementers (AIU and CSG personnel) to determine what did and did not work for HEP in Program Year 1 (PY1).

In some respects, HEP is a well-run program. The program met the PY1 suggested target for the total number of HEP audits (see Figure 1) and total number of CFL replacements. According to implementers, a number of participants indicated a neighbor or friend has told them about the HEP program. The program has solid systems in place for program data tracking, invoicing, and estimating potential home energy savings. Marketing, done through direct mail and a Web site, appears to be effective.



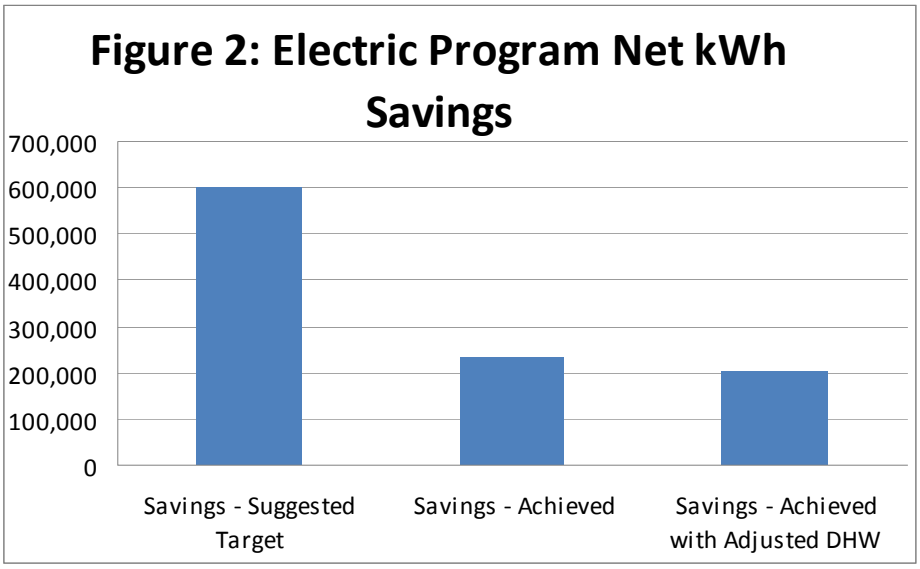
In our preliminary impact evaluation of PY1, we conducted a review of the default savings used in developing program suggested targets and for tracking program progress. We have found most

[1] The term "default" savings represents the savings values used in the AIU "Energy Efficiency and Demand-Response Plan" ("Plan") filed November 15, 2007, and approved by the Illinois Commerce Commission as reflected in its Order dated February 6, 2008. It is recognized the implementer (CSG) was not responsible for determining default savings. Default savings were determined by a consultant (ICF) who designed the current Plan.

of these values to be in line with our expectations and with values used by other programs in the MidWest and elsewhere. The only exception was the DHW measures. Based on our comparison to gross savings from HEP audits and deemed savings in similar Midwest programs, the estimates for faucet aerators, low-flow showerheads, and hot water pipe insulation are too high. Furthermore, assumptions used to generate DHW default savings are not well documented.

Although a suggested target of 135 insulation measures installed had been established, none were actually installed. There are many possible reasons for this discrepancy. We suspect the recession proved a significant barrier for follow through on audit recommendations. It is also possible incentives were insufficient to move potential participants to the next post-audit phase. As we have not conducted any surveys with audit participants, we are unable to answer the question with confidence. In addition, the program did not meet the suggested target of 283 DHW measures as only 113 DHW measures were installed. Finally, to date, the program has enlisted only three HEP Insulation Program Allies. It is likely the Building Performance Institute (BPI) certification requirement is a barrier in terms of monetary and time commitment cost.

Figure 2 summarizes the preliminary estimates of program impacts and shows the difference between the suggested target for program net energy savings of 600,026 kWh[2] and two types of achieved program net energy savings. We estimated achieved net savings in the second column using the current default savings for DHW to arrive at 234,626 kWh. If DHW measure savings are ”adjusted” using results of the CSG audits’ gross savings estimates, achieved net savings estimates are reduced to 201,140 kWh (see the third column in Figure 2). Most of the difference between suggested targets and savings achieved was due to no insulation measures being installed.



[2] The document “AIU Residential Programs Home Energy Performance Implementation Plan (undated)” calculated this suggested net overall savings suggested target for HEP. The original estimate of HEP total net savings target, as stated in “Energy Efficiency and Demand-Response Plan (November 15, 2007),”was 995 MWh.

AIU's net-to-gross (NTG) values are consistent with values from other, similar programs. We do not recommend any changes at this time to the 76% NTG ratio used in PY1.

Cadmus recommends HEP enact the following program adjustments:

- Examine increasing incentives or making them less restrictive to program participants (e.g., only 6% of homes with electric heat qualified for the ceiling insulation incentive, which requires an existing insulation no greater than R-11). In this economic climate, program participants are hard-pressed to make investments in HVAC and insulation measures. An analysis needs to be conducted to find out what incentive changes, if any, are feasible (i.e., within the constraints of the Total Resource Cost Test). Cadmus recognizes these incentive levels may be difficult to change. Cadmus will interview PY1 participants to find out why they did not take advantage of shell measure incentives offered.

- Improve promotion of shell and HVAC measures to program participants through enhanced leave-behind written reports and more aggressive participant follow up.

- Recruit more HEP Insulation Program Allies by reaching out to them through existing networks, promoting BPI certification training via the Internet, defraying training costs, or even consider eliminating the training requirement.

- Examine if there are simply not enough sites with electric water heaters to meet suggested targets for DHW measure installations.

- Evaluate the need for more auditors to improve program coverage.

- Improve the accessibility and format of HEP program data tracking and reporting.

- Replace default gross savings values for DHW measures with average audit-based gross savings values developed using HEP audit data.

2. Introduction

AIU's HEP program, implemented by CSG, conducted its first home audit in January 2009 for PY1 (June 1, 2008, to May 31, 2009). AIU awarded Cadmus the contract to evaluate AIU's suite of residential programs in 2009. Cadmus was brought in at the outset of HEP program delivery to review default savings estimates and conduct a process evaluation.

The HEP program is a home diagnostic and improvement program offered to AIU's residential customers for a $25 fee. Program auditors conduct an energy audit of participant homes; this includes installing DHW and lighting ISMs and providing participants with a list of potential shell and HVAC saving measures.

Cadmus conducted two evaluation tasks in PY1. The first task was an impact evaluation review of HEP's default savings numbers and program suggested targets. The second task was a process evaluation, comprised of a series of interviews with program implementers and managers from both AIU and CSG. Cadmus gained an understanding of program implementation, factors working well, and possible improvements.

HEP Program Description

The HEP program works as follows:

- CSG sends targeted mailers to residences in AIU's service territory.
- Potential participants call the CSG Peoria office, and schedule an HEP audit with one of three auditors.
- During the HEP audit, a CSG auditor conducts a 10-minute interview with the program participant, installs DHW and lighting ISMs (faucet aerators, low-flow showerheads, water heater pipe insulation, and compact fluorescent lamps [CFLs]), and assesses potential shell measures (air sealing, wall, attic, and basement insulation) and HVAC replacement savings using CSG's proprietary software, HomeCheck.
- After the HEP audit, program participants receive a customized report with recommendations for additional shell and HVAC measures, and a list of certified contractors (HEP Insulation Program Allies and HVAC Program Allies).

Evaluation Questions

Impact Questions

1. How do the default gross savings compare to the audit-based gross savings estimates?
2. How does the net-to-gross ratio of the HEP program compare to other comparable programs?
3. Did the HEP program meet its suggested targets?

Process Questions

1. How was the HEP program marketed and implemented?
2. Were there any HEP program design changes during implementation?
3. How effective were the employed marketing efforts?
4. How well did the AIU and implementation team work together?
5. Were HEP program participants satisfied with their experiences?
6. What changes can be made to the HEP program's design or delivery to improve its effectiveness?

3. Evaluation Methods

Impact Evaluation Methodology

Cadmus obtained information on default and audit-based gross savings estimates for the HEP program. Audit-based gross savings estimates were derived from HEP audits performed from January to May 2009. Audit-based gross savings, supplied by CSG, were site-specific estimates for those HEP measures that took into account existing conditions. Default gross savings, per measure unit savings estimates filed with the Illinois Commerce Commission, were supplied by CSG in an Excel file, and were originally developed by ICF. Ameren Illinois and CSG also supplied a series of spreadsheets with partial information on base assumptions surrounding default gross savings. The following steps describe the high-level assessment of the audit-based and default gross savings:

- Removed measures if "existing" conditions disqualified the residence for the incentive (e.g., existing attic insulation at the site had to be less than R-11 to qualify for the incentive).
- Calculated the average audit-based gross savings estimate for each measure (e.g., air sealing, attic insulation, wall insulation, aerators, light bulb replacement, etc.).
- Compared available AIU default gross savings values provided to Cadmus to average audit-based gross savings estimates and other available utility deemed savings data.
- Identified areas requiring additional research based on differences observed.

In addition, Cadmus compared the net energy savings and program participation suggested targets (from "AIU Residential Programs Home Energy Performance Implementation Plan (undated)") to those actually achieved in PY1 (based on data gathered on program participation in the HEP audits).

Finally, Cadmus compared HEP NTG ratios to values observed at other utility programs. NTG ratios were obtained from "AIU Residential Programs Home Energy Performance Implementation Plan (undated)." As part of the PY2 evaluation, which includes both surveys and site visits, Cadmus will complete a more comprehensive NTG study.

Process Evaluation Methodology

During the process evaluation, Cadmus conducted the following steps:

- Developed a series of questions tailored to the HEP program. The questions focused on suggested target attainment, implementation, and procedure, and assessed what worked well and where opportunities for improvement existed.

- Cadmus conducted hour-long interviews with identified individuals of interest within the HEP program.

4. Program Level Results

Impact Evaluation Results

The following describe the findings of Cadmus' high-level review of default gross savings (for greater detail, see Table 1):

- Default gross savings values for DHW measures (e.g., faucet aerators, low-flow showerheads, and hot water pipe insulation) are questionable, and appear to be miscalculated. Compared to audit-based gross savings estimates and deemed gross savings used by other utility programs, the program's default gross savings values appear high. For example, hot water pipe insulation at sites with electric heat pump heat has a default gross savings value of 810 kWh, while gross savings estimates based on audit data were 34 kWh. Supporting documentation from the firm that helped design AIU's programs does not clearly define the basis for the DHW default gross savings calculation.

- Default gross savings values, including Central Air Conditioning Seasonal Energy Efficiency Rating (SEER) 16 and 14, and CFL bulb replacements, appear accurate compared to audit-based gross savings. Slight differences in default and audit-based gross savings could be traced back to differences in base assumptions

- Additional differences between audit-based and default gross savings are explained by use of a "typical" home as a basis for default gross savings, while audit-based gross savings use an actual sampling of homes in AIU's service territory. For example, air sealing uses a standard home with an assumed cubic feet per minute (CFM) infiltration reduction, while gross savings uses a variety of real homes with different factors (e.g., HVAC efficiency, number of stories, etc.) and different CFM reduction estimates, which lead to variances in savings.

Table 1: Comparison of Default and Audit-Based Gross Savings Estimates						
Electric Heat Pump Heat	Unit	Per Unit Default Savings (kWh) for AIU (a)	Per Unit Audit-Based Savings (kWh) for AIU (b)	Ratio of Default to Audit-Based for AIU (a/b)	In Need of Further Review	Comments
Air Sealing	CFM	2.00	1.22	1.64	N	The default savings calculation assumes a 1,100 CFM_{50} reduction in a standard type of home. The audit-based savings calculation has various, differently sized homes with different levels of CPM reductions, number of stories, and HVAC efficiency.
Faucet Aerators	each	257	75	3.43	Y	The default savings value for faucet aerators is not accurate. Other deemed savings values are much closer to Ameren Illinois audit-based savings. PG&E data from "2008 Deemed Values—ComEd" estimated 99 kWh savings for aerators with electric hot water heaters. Excel Energy data from "Deemed Savings—All Residential Measure for Excel Energy Programs" were 48 kWh savings for aerators.
Low-Flow Shower Heads	each	301	67	4.50	Y	The default savings value for low-flow showerheads is not accurate. Other deemed savings values are much closer to Ameren Illinois audit-based savings. PG&E data from "2008 Deemed Values—ComEd" estimated 133 kWh savings for low-flow showerheads with electric hot water heaters. Excel Energy data from "Deemed Savings—All Residential Measure for Excel Energy Programs" estimated 40 to 80 kWh savings per showerhead.
Hot Water Pipe Insulation	each	810	29	28.13	Y	The default savings value for hot water pipe insulation is not accurate. Other deemed savings values are much closer to Ameren Illinois audit-based savings. PG&E data from "2008 Deemed Values—ComEd" estimated 133 kWh savings for hot water pipe insulation with electric hot water heaters. Excel Energy data from "Deemed Savings—All Residential Measure for Excel Energy Programs" estimated 40kWh for hot water pipe insulation.

Table 1 (Continued): Comparison of Default and Audit-Based Gross Savings Estimates						
Electric Resistance Heat	Unit	Per Unit Default Savings (kWh) for AIU (a)	Per Unit Audit-Based Savings (kWh) for AIU (b)	Ratio of Default to Audit-Based for AIU (a/b)	In Need of Further Review	Comments
Air Sealing	CFM	5.00	2.21	2.26	N	The default savings calculation assumes a 1,100 CFM_{50} reduction in a standard type of home. The audit-based savings calculation has various, differently sized homes with different levels of CPM reductions, number of stories, and HVAC efficiency.
Faucet Aerators	each	392	63	6.27	Y	The default savings value for faucet aerators is not accurate. Other deemed savings values are much closer to Ameren Illinois audit-based savings. PG&E data from "2008 Deemed Values—ComEd" estimated 99 kWh savings for aerators with electric hot water heaters. Excel Energy data from "Deemed Savings—All Residential Measure for Excel Energy Programs" were 48 kWh savings for aerators.
Low-Flow Shower Heads	each	436	41	10.66	Y	The default savings value for low-flow showerheads is not accurate. Other deemed savings values are much closer to Ameren Illinois audit-based savings. PG&E data from "2008 Deemed Values—ComEd" estimated 133 kWh savings for low-flow showerheads with electric hot water heaters. Excel Energy data from "Deemed Savings—All Residential Measure for Excel Energy Programs" estimated 40 to 80 kWh savings per showerhead.
Hot Water Pipe Insulation	each	952	36	26.44	Y	The default savings value for hot water pipe insulation is not accurate. Other deemed savings values are much closer to Ameren Illinois audit-based savings. PG&E data from "2008 Deemed Values—ComEd" estimated 133 kWh savings for hot water pipe insulation with electric hot water heaters. Excel Energy data from "Deemed Savings—All Residential Measure for Excel Energy Programs" estimated 40kWh for hot water pipe insulation.
Electricity	Unit	Per Unit Default Savings (kWh) for AIU (a)	Per Unit Audit-Based Savings (kWh) for AIU (b)	Ratio of Default to Audit-Based for AIU (a/b)	In Need of Further Review	Comments
Central Air Condition 14 SEER	each	300.00	341.47	0.88	N	Very close. No further examination needed.
Central Air Condition 16 SEER	each	348.00	390.65	0.89	N	Very close. No further examination needed.
CFL 15W	each	38.40	55.66	0.69	N	Default savings for lights used an estimate of the bulb being on for roughly 2.3 hours per day. The audit-based savings estimates used a value of 1 to 8 hours per day, depending on the site.
CFL 20W	each	47.00	62.12	0.76	N	
CFL 23W	each	64.10	86.19	0.74	N	

In Table 1, above, the DHW measure audit-based gross savings estimates are for homes with electric water heaters and electric heat (either electric heat pump or electric resistance). CSG audited only 10 sites with both electric heat pump heat and electric water heat and only 13 sites with both electric resistance heat and electric water heat. Given these limited number of sites, Cadmus developed another estimate of audit-based DHW measure savings that included all 50 sites with electric hot water heaters (including those with gas heat), as shown in Table 2.

Table 2: DHW Audit-Based Gross Savings Estimates for All Sites with Electric Water Heaters

DHW Measure	Unit	Per Unit Audit-Based Savings (kWh) for AIU
Faucet Aerators	each	73.62
Low Flow Shower Heads	each	67.93
Hot Water Pipe Insulation	each	32.00

A review of PY1 Electric program suggested targets and actual program achievements are shown in Table 3:

- The program met the suggested target for total number of CFL replacements: 4,100 and net savings from CFL replacements, 156,910 kWh. In PY1, 5,806 replacements, with estimated net savings of 195,639 kWh, were achieved.

- The program met the suggested target for total number of audits, 110; 152 audits were conducted in PY1.

- However, the program did not meet the suggested target for insulation incentives processed, 135. No insulation incentives were processed. In addition, the program did not meet the suggested target of 283 DHW measures installed as only 113 DHW measures were installed.

- Since no insulation measures were installed, the electric program's overall suggested target of 600,026 net kWh saved was not met as only 234,626 net kWh was actually achieved.

- If DHW measure savings are adjusted based on HEP audit results, the achieved savings are reduced further to 201,140 kWh.

Finally, all HEP electric program measures use an NTG of 76%. These values are consistent with NTG values used elsewhere.

Table 3: Program Year 1 Electric Program Measure Net Suggested Target and Actual Savings						
	Quantity		Net Savings Based on per unit Default Gross Savings		Net Savings with Adjusted DHW DHW Savings from Audit-Based Gross Savings[1]	
	Suggested Target	*Achieved*	*Suggested Target*	*Achieved*	*Suggested Target*	*Achieved*
Audits on Homes with Electric Heat	*110*	152	*kWh*		*kWh*	
ISMs at Homes with Electric Hot Water:						
Faucet Aerators Installed	125	43	32,125	11,051	6,994	2,406
Low-Flow Shower Heads Installed	88	51	24,992	14,484	4,543	2,633
Hot Water Pipe Insulation Installed	70	19	49,560	13,452	1,702	462
DHW Subtotal	*283*	*113*	*106,677*	*38,987*	*13,239*	*5,501*
Sites with Electric Heat that Had Installed:						
Infiltration from 0.8 to 0.35 ACH	55	0	161,150	0	161,150	0
Ceiling Insulation (R-7 to R-38)	29	0	34,916	0	34,916	0
Ceiling Insulation (R-11 to R-38)	29	0	23,113	0	23,113	0
R-11 Wall Insulation	22	0	117,260	0	117,260	0
Insulation Subtotal	*135*	*0*	*336,439*	*0*	*336,439*	*0*
Number of CFL replacements:						
CFL 60w to 15w	1,330	3,767	38,570	109,243	38,570	109,243
CFL 75w to 20w	1,440	1,111	51,840	39,996	51,840	39,996
CFL 100w to 23w	1,330	928	66,500	46,400	66,500	46,400
Lighting Subtotal	*4,100*	*5,806*	*156,910*	*195,639*	*156,910*	*195,639*
Electric Program Total			*600,026*	*234,626*	*506,588*	*201,140*

[1] Savings for DHW measures derived from HEP audit-based savings values, see Table 2.

Process Evaluation Results

Soft Program Suggested Targets Being Met

Implementers stated they were meeting other additional, "softer" program suggested targets:

- **Rebranding AIU:** Through the ActOnEnergy brand, AIU uses HEP to communicate its interest in helping customers save both energy and money.
- **Customer satisfaction:** Program participants appear to be satisfied with HEP's results, with participant word-of-mouth bringing many new customers into the program.

Implementers Have Heard Praise from Program Participants

Program implementers indicated, based on their conversations with participants, that most new participants come into the program through word-of-mouth. In addition, according to

implementers, program participants feel they received great value for the $25 audit fee and are surprised to receive free energy-saving measures through the ISMs. In comparison with other programs around the country, AIU's $25 audit fee is extremely low. For example, a similar energy-efficiency program in Tennessee charges $250 for an audit, according to CSG staff. Finally, according to program implementers, participants have been impressed with the auditors' expertise.

Auditors Undergo a Three-Week Training

The three-week auditor training process includes:

- Week One: Staff from CSG's corporate office in Westborough, Massachusetts, travel to Peoria to conduct weeklong training, modeled after BPI standards. Training includes instruction on the use of HomeCheck.
- Week Two: Trainees spend three days accompanying experienced home auditors on the east coast.
- Week Three: Trainees complete seven to eight HEP trial audits on AIU employee-volunteer homes.

HEP Audit Includes ISM Installation and Recommendations for HVAC and Insulation Measures

Auditors conduct the following activities at HEP audits:

- The auditor arrives, conducts a 10-minute participant interview, and installs the following measures:
    - CFLs in areas where lights are on for more than three hours per day (usually in family rooms and kitchens), as determined by homeowner interviews. While there is no cap on the number of CFLs that can be installed, CSG regularly reviews auditors who consistently install more than five CFLs.
    - Sink aerators and low-flow showerheads, based upon the auditor's best professional judgment.
    - Pipe insulation up to 9 feet (up to 6 feet on hot pipes and 3 feet on cold pipes).
- The auditor must install ISMs at the time of the audit and never leave uninstalled ISMs behind.
- The auditor assesses attic and basement for additional follow-up measures. The auditor then:
    - Assesses opportunities for air sealing and insulation (wall, attic, and basement). If the auditor finds conditions disqualifying the participant from receiving

incentives, the auditor still completes the audit, and makes sure the participant knows what opportunities exist without the incentive.

  - Checks HVAC units to determine SEER and Annual Fuel Utilization Efficiency levels.

- Auditor (equipped with a laptop, wireless card, and printer) inputs the data set into HomeCheck and generates an audit report. The auditor then:

  - Reviews recommendations with the participant. Each measure has cost, payback, savings, and savings investment ratio included in the report, for both incented and non-incented measures.

  - Leaves behind a hard copy of the report with lists of HEP Insulation Program Allies and HVAC Program Allies.

  - Sends all data directly to the CSG database through the wireless connection.

Mailers are an Effective Marketing Tool

The HEP program markets directly to consumers through direct mailings. To date, implementers have sent 10 batches, ranging from 5,000–10,000 pieces each. New mailings were triggered when the number of calls received from the previous mailer tapered off. One 10,000-piece mailing sent in March 2009 resulted in a 3.21% response rate, and supplied enough responses for HEP auditors to be scheduled until June 2009. The mailings go to specific zip codes to target outreach to specific homes types and demographics. In PY1, HEP audits began around Peoria, then branched out to include areas around Champagne and Springfield.

The mailers have been successful because they fill HEP auditor schedules well in advance. Auditors typically were scheduled two weeks out during summer and six weeks out during winter. Given the limited number of auditors and HEP Insulation Program Allies, broader outreach efforts would be difficult to accommodate. At current outreach levels, the auditor schedules are at 98% capacity. As the program matures, and demand in metropolitan areas becomes filled, broader outreach may be necessary to meet program suggested targets.

In PY1, CSG improved mailings in two ways:

- First, CSG revised how it targets mailers to focus on communities that could take advantage of incentives. Initially, implementers used high-energy bills to target mailers, and the first audits were conducted at large new homes that did not need incented HVAC and building envelope measures. The targeting method was revised to focus on zip codes, with both large concentrations of older homes (pre-1975) and high-energy bills; this increased the proportion of participants who could benefit from incented measure installation.

- CSG also revised the HEP audit scheduling process to make it more efficient. Initially, the mailer used to market the home audit included a tear-off response card the participant

mailed in with a $25 check. Schedulers then contacted participants to set up an appointment. This process caused scheduling delays and created problems for both schedulers and participants. CSG revised the mailer to require the participant to contact the scheduler directly, and auditors now collect participant checks at the time of the audit. CSG also revised the mailer as a brochure and letter, which has been more successful because it looks more official and is less likely to be mistaken for junk mail.

Efficient Payments Assisted Program Growth

Quick invoice turnaround between AIU, CSG, and HEP Insulation Program Allies ensures the HEP Program's stability and effectiveness. CSG receives payment from AIU within 10 days after submitting an invoice. AIU's quick payment to CSG allows CSG to make incentive payments in a timely manner. The payment process efficiency will be important in PY2 as CSG and AIU work to attract more HEP Insulation Program Allies.

The HEP Insulation Program Allies receive their incentives by submitting invoices, signed by both the ally and homeowner, for completed work to CSG. CSG conducts periodic inspections of the work; ensuring homeowners receive quality work that meets BPI standards. If CSG finds a site with poor workmanship, it will not pay the HEP Insulation Program Ally until the issues have been resolved.

In general, CSG's financial staff resolved any invoicing issues quickly, typically within 24 hours.

HomeCheck has been the Program's Backbone

CSG developed the HomeCheck audit tool for high-volume utility programs and designed it to limit the amount of data required to determine an estimated annual heating and cooling load. CSG tests have shown the model is accurate compared to even more sophisticated models. After establishing load-specific information, auditors enter variables on each measure into HomeCheck and generate a report detailing each measure's cost, savings, and payback.

CSG's Tracking System is in Two Separate, Integrated Systems

CSG's Core Application, the main program used in their office, allows CSG to effectively schedule audits, intake field data, and provide quantitative analysis to meet AIU's data needs. Weekly, CSG downloads data from AIU's customer database to the Core Application for program targeting. In addition, HomeCheck is integrated with the Core Application, which allows accurate and timely field data capture and analysis.

A New Manager in PY2

CSG plans to hire an HEP-dedicated manager for PY2, increasing program capacity. During PY1, CSG had one program manager for all AIU residential incentive programs.

Process Evaluation Results—Issues of Concern

Many Reasons No Incentives Processed

In PY1, CSG processed no insulation incentives. Several of those interviewed said these results did not meet suggested targets. Others, however, suggested there were no firm incentive-suggested targets for PY1, low first-year numbers were normal for this type of program, and incentive numbers would not increase until PY2. Everyone interviewed agreed it would be hard to meet the PY2 incentive suggested targets, given the low PY1 results. Potential reasons for not meeting the suggested targets include the following:

- The current recession means program participants are less likely to invest in expensive items, such as HVAC units or insulation. Recognizing incentives are very difficult to change, implementers acknowledged that incentive levels might be too low and incentive conditions too restrictive for success during current economic conditions.

- There is no post-audit follow-up with participants. Program implementers said they are working to determine the best follow-up method without being "pushy" or perceived as a "telemarketer."

- The HEP program currently expects participants to call HVAC or HEP Program Allies (contractors). Discussions about providing leads to HVAC or HEP Program Allies have occurred, but no action has been taken because AIU is concerned about how to distribute leads fairly.

- According to implementers, program participants have asked basic questions about incentive recommendations provided in the written report at the end of the audit. The basic level of the questions may indicate the auditor needs to spend more time explaining the recommendations, particularly regarding measures for which AIU offers incentives.

- Program participants who can afford upgrades tend to live in newer homes, which do not qualify for incentives.

- Program participants living in older homes (those built before 1975) and qualifying for incentives are less likely to be able to afford them.

- More education may be required to help customers increase willingness to invest in the incented measures.

- For the first three to four months, the AIU HEP Web page emphasized audits and ISMs over incented shell and HVAC measure installations. Because so few customers applied for incentives during that period, CSG changed the HEP Web page to emphasize these incented measures.

More HEP Insulation Program Allies Needed

At the end of PY1, there were only three HEP Insulation Program Allies. One program implementer believes only one of these companies really understands the program's safety requirements. Potential barriers to becoming an HEP Insulation Program Ally include:

- Required BPI training lasts a week and costs $2,100 plus expenses, both of which are proving to be significant barriers for smaller businesses.
- Some insulation contractors have been resistant to installation method changes, and must be educated on the process.

HEP implementers, however, agree existing HEP Insulation Program Allies have been enthusiastic about increased business from the HEP program, and many non-BPI certified insulation contractors have expressed interest in joining the program.

HEP implementers hope to establish a network of HEP Insulation Program Allies across the state. Implementers believe the ideal number of HEP Insulation Program Allies to be 100, spread throughout the state. One implementer stated that as the network becomes more substantial, there would be less need for audits because the HEP Insulation Program Allies would both promote the program and educate consumers about its benefits.

More Auditors Needed

Currently, the program has only three HEP auditors, all based in Peoria and limited to the I-74 corridor. Their location limits HEP program promotion outside the immediate Peoria area. CSG plans to hire two new auditors in southern Illinois. Currently, implementers cluster calls outside the Peoria region to minimize drive times, and inform participants it may take longer to schedule their appointments. HEP has consistently completed 50 to 60 audits per week, with each auditor able to complete four audits per day. Ninety-eight percent of scheduling-blocks have been filled, which far exceeds the 85% internal program suggested target.

Data Availability and Format Needs to be Improved

CSG conducts a monthly portfolio review and updates AIU management on each residential program's progress, including HEP. During these meetings Dave Pelton, Larry Brown, and Bob King of CSG meet with AIU management's Keith Martin, Ken Woolcott, and other AIU program managers. They discuss year-to-date (YTD) suggested targets and progress, new hires, outreach efforts, presentations, and program budgets. The main emphasis is on YTD savings suggested targets and progress toward meeting those suggested targets. Program managers at AIU indicated they would like to see several improvements to HEP data reports:

- AIU program staff would like increased accessibility to CSG's program data. While CSG's office is close to AIU's office, and CSG responds quickly to any data requests, having access to real-time data updates would facilitate AIU's ability to assess the

program. One program implementer suggested a Web-based interface. CSG and AIU are discussing better ways to share information.

- AIU would like to see cumulative as well as monthly data included in CSG's portfolio analysis and data extract reports, along with a comparison of cumulative data to annual suggested targets. AIU also would like the monthly report format to remain consistent through the end of the program, unless AIU requests a change.

5. Conclusions and Recommendations

Conclusions

The HEP Electric program is well run in some respects, as reflected in the number of HEP audits and CFL replacements that have been conducted. However, several areas need to be addressed in PY2:

- Although HEP program suggested targets were met for some individual ISM measures, overall savings suggested targets were not met. The main reason for this was that no insulation incentives were processed, when the overall suggested target was 135.

- A variety of issues contributed to low achieved savings: the poor economy, lack of post-audit follow-up, low incentives, unclear explanation of incentives provided to customers at the end of the audit, and most participants' general lack of understanding of energy-efficiency issues.

- The program needs more Program Allies and implementation staff. Currently, it has only three HEP Insulation Program Allies and three auditors. CSG plans to hire more auditors, which will help the program expand.

- AIU and CSG need to continue to review how program data can be made more easily accessible to AIU's program managers.

- Default gross savings values for DHW measures (e.g., faucet aerators, low-flow showerheads, and hot water pipe insulation) seemed to be much higher than audit-based gross savings estimates and savings estimates used by other utilities. Minor differences occurred between default savings for other measures and the program's audit-based gross savings, which can be attributed to use of a single "model" home to calculate the default savings, while audit-based savings used actual sampling of homes in AIU's service territory. The assumptions contributing to DHW default gross savings values were not well documented.

- AIU's NTG values were consistent with values in California and elsewhere.

Recommendations

- **Examine the possibility of increasing incentives or making them less restrictive.** In this economic climate, program participants are most likely unwilling to invest in expensive shell or HVAC measures, regardless of how well the HEP program is promoted or implemented. Higher incentives or less restrictive incentive conditions (e.g., only 6% of homes with electric heat qualified for the ceiling insulation incentive, which requires an existing insulation no greater than R-11) should be examined. These considerations need to be made within the limitation of passing the Total Resource Cost

Test. Cadmus recognizes these incentive levels may be difficult to change. We will survey PY1 program participants to determine their reasons for not taking advantage of incentives.

- **Improve promoting shell and HVAC measures to program participants.** A number of steps could be taken:
    - *Improve the written report left behind (see Appendix).* Technical language included in the report may be difficult for the average homeowner to understand. In addition, paybacks proposed by the report may discourage some homeowners (e.g., some HVAC measures show payback periods as long as 185 years). CSG needs to examine how payback is calculated, and explicitly include the incentive value in the report.
    - *Follow up with audit participants.* Program implementers are hesitant to be "pushy" with customers. Implementers need to consider follow up in the form of seeking satisfaction with the service and asking if further action was being considered.
- **Engage contractors, and recruit them to be HEP Insulation Program Allies.** With only three HEP Insulation Program Allies at present, the HEP program needs to establish a network of BPI-certified contractors to install incented insulation measures. As the program matures and customers ask for work done only by HEP Insulation Program Allies, more insulation contractors should join the program to meet the increased demand. Cadmus endorses the following potential solutions program staff are considering:
    - *Reaching out to insulation contractors.* HEP implementers work through local college sustainability networks and labor management organizations to promote the Ally program. These organizations have received grants to supplement tuition for the next three BPI training sessions.
    - *Addressing BPI training costs.* AIU may want to consider defraying the cost of required BPI training or removing the BPI requirement entirely if its cost continues to be a barrier to program entry. HVAC Program Allies, who are not required to undergo BPI training, currently have 170 members, according to program implementers.
    - *Promoting BPI certification training via the Internet*. Online training could be offered at lower prices and at more convenient times to insulation contractors.
- **Further examine why suggested targets for DHW measure installations were not met.** Cadmus will evaluate if there are simply not enough homes with electric water heaters to meet HEP Electric program goals for DHW measures.
- **Evaluate the need to bring in more HEP auditors**. CSG plans to hire two new auditors in PY2 to reach the St. Louis and Southern Illinois territories. If program demand remains

high, CSG will need to hire additional auditors to reach the rest of AIU's service territory.

- **Improve the accessibility and format of HEP program data reporting by:**
    - Developing a system that provides Ameren with data in real-time via a Web-based interface, or by allowing Ameren project managers to download the Microsoft Excel data extracts online.
    - Developing consistent reports that compare both cumulative and monthly data to annual suggested targets.
- **Replace default gross savings values for DHW measures (e.g., faucet aerators, low-flow showerheads, and hot water pipe insulation) with average audit-based gross savings values.** HEP audits track key, home-specific data (such as the existing number of showerheads and their flow rates) to develop gross savings for each measure. We recommend AIU adopt the values shown in Table 2 as the new default gross savings numbers for DHW measures. These values would be used for all homes with electric water heat, regardless of the type of heating system (gas or electric).
- **If using the HEP audit data to determine default savings for domestic hot water measures proves to be a reliable, robust, and defendable methodology, use the HEP audit data as the basis for default savings for all other HEP measures.**

Appendix: HEP Audit Report

See attached sample of HEP Audit report left behind for program participants.