



Opinion **Dynamics**

Boston | Headquarters

617 492 1400 tel
617 497 7944 fax
800 966 1254 toll free

1000 Winter St
Waltham, MA 02451



Impact and Process Evaluation of the 2016 Illinois Power Agency Community Based CFL Distribution Program

Final

October 13, 2017

CADMUS

NAVIGANT



Michael'sEnergy

Contributors

Jane Colby
Principal, Cadmus

Sara Wist
Associate, Cadmus

Jeana Swedenburg
Senior Associate, Cadmus

Laura James
Associate, Cadmus

Morgan Richmond
Analyst, Cadmus

Table of Contents

1. Executive Summary	1
2. Evaluation Approach	1
2.1 Research Objectives.....	1
2.2 Evaluation Tasks.....	1
2.3 Sources and Mitigation of Error	4
3. Detailed Evaluation Findings.....	6
3.1 Program Design and Implementation	6
3.2 Program Participation.....	7
3.3 Impact Assessment.....	12
4. Conclusions and Recommendations	15
Appendix A. Phone Survey Instrument.....	17
Appendix B. Email Survey Instrument	22
Appendix C. Registration Postcard	27
Appendix D. Algorithms and Assumptions	28
Appendix E. Cost-Effectiveness Inputs.....	29

Table of Tables

Table 1. Key Program Impact Findings	1
Table 2. Input Values for Community Based CFL Distribution Program Gross Impacts Analysis.....	3
Table 3. Possible Sources of Error	4
Table 4. Installation Rate and Other Action Taken with Bulbs Received.....	8
Table 5. Installation Rate and Other Action Taken, 8-Bulb Homes Only.....	9
Table 6. Phone and Online Reported Satisfaction	10
Table 7. Type of Building of Residence (n = 70)	11
Table 8. Rent or Own the Home (n = 69).....	11
Table 9. PY9 Community Based CFL Distribution Program Ex Ante and Ex Post Gross Electric Impacts.....	12
Table 10. Yearly Gross Impact of PY9 Residential Lighting Measures by Assumed Installation Year.....	12
Table 11. PY9 Total Community Based CFL Distribution Net Electric Impacts	14
Table 12. Input Values for Savings Algorithms.....	28
Table 13. Yearly Gross Heating Penalty Impact of Lighting Measures by Assumed Installation Year.....	29
Table 14. Net Gas Impacts	29

Table of Figures

Figure 1. Reported Bulbs by Count.....	8
Figure 2. Satisfaction with Bulbs (n = 67)	10
Figure 3. Site of Most Recent Bulb Purchase (n = 71)	11
Figure 4. Electric Utility of Non-AIC Participants (n = 55).....	13

1. Executive Summary

This report presents results from the program year nine (PY9) Community Based CFL Distribution Program. Through the program, CLEAResult, distributed high-efficiency CFL light bulbs to low-income households through food banks within Ameren Illinois Company’s (AIC) service territory. Implemented for the first time in PY9, the program sought to distribute 630,000 bulbs, for an expected net savings of 8,400 MWh. CLEAResult designed the program and was chosen to implement it through an Illinois Power Agency (IPA) bid.

CLEAResult partnered with seven Illinois food banks to distribute the bulbs during the period from June 1, 2016, through May 31, 2017, which it recruited based on the high concentration of AIC customers in each food bank’s territory. CLEAResult coordinated with manufacturers to distribute pallet shipments to each participating food bank, which then distributed the bulbs to their local distribution centers (i.e., food pantries). CLEAResult visited food banks for quality assurance, but did not visit food pantries. Each food bank distributed program bulbs to between 11 and 121 food pantries. Eligible households, defined as any household receiving supplies from participating food pantries, could receive up to two four-packs of CFLs. These four-packs either were branded with the AIC logo or included educational materials with the AIC brand. According to survey results, 10% of participants received more than eight bulbs.

Below we present the key findings and recommendations from the PY9 evaluation.

Program Impacts

The Community Based CFL Distribution Program distributed 562,896 bulbs over nine months (September 2016 through May 2017), achieving 89% of the targeted amount. Using assumptions from the Illinois Statewide Technical Reference Manual (IL-TRM) V5.0, this resulted in the program impacts shown in Table 1. The program achieved net savings of 7,560 MWh, 90% of the 8,400 MWh goal set at the program’s outset.

Table 1. Key Program Impact Findings

	Ex Ante Gross	Realization Rate	Ex Post Gross	NTGR	PY9 Ex Post Net
Total MWh	8,016	94%	7,560	1.000	7,560
Total MW	0.896	94%	0.845	1.000	0.845

Key Findings and Recommendations

Participant survey results indicated that respondents installed and did not remove 41% of the bulbs received. Another 22% of bulbs are in storage and may be installed at a future date, but 37% of bulbs distributed had been installed and removed, given away, lost, or otherwise discarded. The evaluation team found that 97% of recipients were very or somewhat satisfied with CFL bulbs they received through the program. The program implementer expressed satisfaction with the overall program implementation and accomplishments.

The program began with five partner food banks, but, three to four months into the program, two food banks dropped out of the program due to challenges with implementation, data collection, and food safety concerns with possible broken bulbs. CLEAResult recruited two additional food banks to replace the two that left, but the distribution delay played a role in the program falling short of its goal to distribute 630,000 bulbs.

- **Key Finding #1:** Distributing more than the program-stipulated two packs per household to some participants may have contributed to lower-than-expected installation rates. According to survey results, 10% of participants received more than eight bulbs (i.e., as many as 48 bulbs per household).

The 41% actual installation rate fell below the 59% year-one installation rate specified in the IL-TRM V5.0.

- **Recommendation #1a:** CLEAResult should meet with representatives from participating food banks and food pantries to debrief partners about operations over the previous year. The discussion should include any factors contributing to food pantry distributions of more than stipulated two boxes per household (e.g., excess supply) as well as issues such as food safety concerns related to broken bulbs, participant response to the program, general timing and logistics, and any other subjects of concern to attendees.
- **Recommendation #1b:** CLEAResult should conduct quality assurance and quality control visits to food pantries, instead of only to food banks. Visits by CLEAResult staff will help ensure food pantry staff understand the program's requirements and distribute bulbs in accordance with program rules.
- **Key Finding #2:** Two food banks, which did not fully understand the responsibilities associated with becoming a program partner, dropped out due to data and implementation requirements. The misunderstanding of data requirements may have been driven in part by staff turnover at CLEAResult, which had a change in program manager midway through the program.
 - **Recommendation #2:** Ensure that communication with food bank staff involves staff most likely to remain permanently and consistently available throughout the program. If it does not do so already, the food bank distribution agreement should include a summary bulleted list of requirements for participating food banks. CLEAResult should review this list with senior-most food bank contacts, asking these contacts to describe their food bank's plan for meeting each requirement.
- **Key Finding #3:** Food pantry staff and patrons' concerns about bulb and glass safety played a role in the challenge to distribute and install all of the planned CFLs. A flyer from CLEAResult describing the bulbs' safety features was not distributed to all participants.
 - **Recommendation #3:** Information addressing mercury safety should be delivered to all participants, or the program should consider switching to LED distribution in the future. In addition, CLEAResult should work with food banks and food pantry representatives to identify the implications of bulb distribution on food safety regulations at food pantries and to develop clear guidance for food pantries regarding storage and distribution of bulbs.

2. Evaluation Approach

The evaluation team relied on IL-TRM V5.0, program distribution data, participant registration data, a participant survey, and program implementer interviews to evaluate the Community Based CFL Distribution Program.

2.1 Research Objectives

The Community Based CFL Distribution Program's PY9 assessment included process and impact analyses.

Impact Questions

The evaluation of the PY9 Community Based CFL Distribution Program's sought to answer the following research questions:

1. What were the estimated gross energy and demand impacts from this program?
2. What were the estimated net energy and demand impacts from this program?

Process Questions

The evaluation team also conducted a limited process evaluation to explore how the program performed during its first year and to answer the following process-related questions:

1. Program Participation
 - a. How many CFLs were distributed to participants?
 - b. How many CFLs were installed, stored, and disposed of?
2. Program Design and Implementation
 - a. What implementation challenges occurred in PY9?
 - b. What changes could be made to improve program effectiveness?

2.2 Evaluation Tasks

2.2.1 Program Staff Interviews

We conducted interviews with AIC program staff and CLEAResult implementation team staff to understand the program's design and implementation and to discuss evaluation priorities. In total, we completed two interviews, one with the AIC program manager and one with the CLEAResult program manager.

2.2.2 Participant Surveys

The evaluation team conducted a participant survey to gather process and impact data to inform the program evaluation. The survey consisted of two parts. First, participants completed a registration form to provide their contact information and some basic information for the evaluation. The evaluation team used contact

information from the registration forms to develop a sample frame for the follow-up survey (i.e., the second part of the survey effort).

The evaluation team calculated the following information using customers' electric utility data and the number of bulbs received, as reported on the registration forms:

- Leakage rate
- Bulb distribution per household

The team also estimated the following inputs using data collected through the participant follow-up survey:

- Installation rate for prospective use
- Satisfaction with bulbs
- Participant characteristics

The following sections provide greater detail on the evaluation team's sample development and participant survey implementation. The team based the leakage rate, prospective installation rate, and participant characteristics on the number of distributed bulbs. Other values were based on the number of participants. The Detailed Evaluation Findings section indicates values that the evaluation team used for each calculation.

Sample

For privacy reasons, food pantries often prefer not to collect contact data or other information from customers. To accommodate this preference, the evaluation team arranged for recipients to register voluntarily to be contacted for the survey. The team printed 50,000 registration forms that food pantry staff distributed to customers along with the program bulbs. The form asked for the name of the respondent's electric utility, the number of bulbs received, and the recipient's phone number and/or email address. Participants completed and returned the form to the food pantry to enter a drawing for one of five \$200 VISA gift cards.¹ Appendix C of this report includes the registration form.

The food pantries collected and mailed several thousand completed registration forms to the evaluation team. Due to time and resource constraints, the team did not count or enter data from all returned forms. Rather, the team randomly selected 1,024 registered participants as the survey sample frame and entered these data into a database. The evaluation team targeted 70 completed surveys, in order to achieve a maximum error of $\pm 10\%$ precision with 90% confidence.

Survey Delivery

To mitigate any bias resulting from the participants' access to a landline telephone, an email account, or the Internet, the evaluation team conducted a phone-based survey and an online survey, with a combined target of 70 completed surveys (35 from each fielding method). The team assigned half of the sample frame to the phone survey and half to the online survey. Participants completed 36 phone surveys and 38 online surveys, for a total of 74 respondents.

¹ The evaluation team selected five returned forms at random and distributed gift cards on 4/24/2017.

Analysis

For most survey questions, there was no statistically significant difference at the 95% level in the responses from the two groups, and this report presents only the aggregate result (based on the combined phone and online samples). Where a statistically significant difference existed, the report presents both the online and the phone survey results. Demographically, the survey only found a significant difference in terms of the rate of home ownership. Forty-one percent of phone respondents own their home, compared to sixty-five percent of on-line respondents.

2.2.3 Gross Impact Calculations

The evaluation team used the energy savings equation provided in the IL-TRM V5.0 to determine the program’s gross energy impacts. This involved using the following equations for the analysis:²

$$\Delta kWh = ((WattsBase - WattsEE) / 1000) * ISR * (1-Leakage) * Hours * WHFe$$

$$\Delta kW = ((WattsBase - WattsEE) / 1000) * ISR * (1-Leakage) * WHFd * CF$$

The team used the values and sources shown in Table 2 to calculate gross impacts.

Table 2. Input Values for Community Based CFL Distribution Program Gross Impacts Analysis

Input	Value	Source
WattsBase	43	IL-TRM 5.0 Incandescent Equivalent Post-EISA 2007
WattsEE	13	Manufacturer stated value for distributed bulbs
ISR - year 1 ^a	59%	IL-TRM 5.0 CFL Distribution Program
ISR - year 2 ^a	13%	IL-TRM 5.0 CFL Distribution Program
ISR - year 3 ^a	11%	IL-TRM 5.0 CFL Distribution Program
Leakage	5.7%	Results from survey registration form data
Hours of Use	759	IL-TRM 5.0 for Retail (Time of Sale) and Efficiency Kits—Residential Interior and in-unit Multifamily
Waste Heat Factor _E	1.06	IL-TRM 5.0 Interior single-family or unknown location
Waste Heat Factor _D	1.11	IL-TRM 5.0 Interior single-family or unknown location
Coincidence Factor	8.1%	IL-TRM 5.0 CF for Unknown Location Bulbs
Heating Penalty	N/A	IL-TRM 5.0: Assume all heating is natural gas if heating fuel is not known

^a ISR= in-service rate

Leakage Rate

All values used in the engineering analysis came from the IL-TRM V5.0, except for the leakage rate, which, as noted, the TRM did not provide. To calculate leakage, the evaluation team used the listed utility and the number of bulbs received as reported on registration forms completed by registrants selected for the follow-up survey:

² The IL-TRM V5.0 equation for demand reduction did not account for leakage. The evaluation team added leakage to the equation used for this analysis to remain consistent with the energy savings equation.

Leakage (%) = Total bulbs received by non-AIC respondents / Total bulbs received by respondents

2.3 Sources and Mitigation of Error

Table 3 summarizes possible sources of error associated with research tasks conducted for the Community Based CFL Distribution Program. A detailed discussion of each item follows.

Table 3. Possible Sources of Error

Analytical Task	Survey Error		Non-Survey Error
	Sampling Error	Non-Sampling Survey Error	
Participant Surveys and registration forms	Yes	<ul style="list-style-type: none"> • Non-Response • Measurement errors • Data processing errors • External validity 	N/A
Gross Impact Calculations	N/A	<ul style="list-style-type: none"> • Non-Response • Measurement errors • Data processing errors • External validity 	Analysis errors

Throughout planning and implementation of the PY9 evaluation, the evaluation team took a number of steps to mitigate potential error sources.

Survey Errors

- Sampling Errors
 - **Phone and Email-Based Participant Surveys:** The evaluation team designed the survey sample to achieve a maximum error of $\pm 10\%$ precision with 90% confidence. To mitigate bias from demographic distinctions (e.g., lack of access to landline phones or the internet), the team conducted the survey via phone and via an online platform. The survey achieved better than the target number of completes. Maximum error for the survey results is better than 6% with 90% confidence. In addition, the evaluation team was able to use data from the 1,024 registration forms completed by participants for certain calculations, including leakage. This much larger sample provided approximately 1.5% precision at 95% confidence.
- Non-Sampling Errors
 - **Non-Response:** The CFL Distribution Program targets a low-income population, which may be more susceptible to non-response bias due to various factors including less access to modes of communication. Since the leakage calculation derived from the survey data was incorporated into the gross impact calculations, this error potentially impacted gross and net impact analysis as well. To mitigate this potential bias, the survey team divided the sample into two modes of survey delivery, an online survey and phone survey. Both modes delivered similar numbers of completed surveys, with 36 surveys completed via phone and 38 completed via the online platform. In addition, the survey team used the larger sample available from the hand-written registration forms for the leakage calculation, where non-response error had the most potential to negatively impact the evaluation.

- **Measurement Errors:** Inaccurate survey responses may result from respondents' recall error or from their misunderstanding survey language. The evaluation team designed the survey instruments for brevity and, prior to launching the survey, reviewed the questions' language for clarity. We addressed both the validity and reliability of quantitative data through multiple strategies. First, we relied on the experience of the evaluation team to create questions that, at face value, appear to measure the idea or construct that they we intended to measure. We reviewed the questions to ensure that we did not ask double-barreled questions (i.e., questions that asked about two subjects but had only one response) or loaded questions (i.e., questions that were slanted one way or another). We also checked the overall logical flow of the questions so as not to confuse respondents, which would decrease reliability.
- **Data Processing Error:** There were multiple opportunities for data processing error in the survey analysis. Participants supplied hand-written information on the registration forms, which was often difficult to decipher. In addition, phone surveys presented an opportunity for phone interviewers to introduce error in transcription. To mitigate these sources of error, the team incorporated only three very basic questions on the registration form. Two staff were assigned to transcribe the forms, and received training on the program and the territory it served, to make understanding city names and area codes easier. Phone surveys were conducted by trained phone interviewers that have logged several hours transcribing responses as they conduct surveys. Finally, the team addressed processing errors through quality checks of completed survey data.
- **External Validity:** To increase external validity (the ability to generalize findings to other situations and other populations), the evaluation team developed a thorough research design before engaging in any data collection or analysis. For survey research, the evaluation team designed an appropriate sample frame and random sample of respondents.

Non-Survey Error

- Analysis Error
 - **Data Processing Error:** For gross impact calculations, the evaluation team applied deemed savings values to participant data to calculate gross impacts. To minimize data processing errors, the team had different team members review all calculations to verify accuracy.
 - **Data Processing Error:** For net impact calculations, the evaluation team applied the NTGRs to estimate the program's net impacts. To minimize data processing errors, the team had different team members review all calculations to verify accuracy.

3. Detailed Evaluation Findings

Within this section of the report, we provide detailed findings related to program process and program impacts.

3.1 Program Design and Implementation

The evaluation team conducted interviews with the CLEAResult and AIC program managers for the Community Based CFL Distribution Program. Both individuals expressed overall satisfaction with the program results and indicated key areas of potential improvements (e.g., internal and external communications, quality control and assurance, and choice of partner food banks).

Implementation Roles

The major partners responsible for delivering the CFL Distribution Program included AIC, Leidos, CLEAResult, and the food bank partners. AIC administered the program, overseeing CLEAResult as the implementer through their subcontractor, Leidos. AIC approved the program design and monitored program activity over the year. Leidos performed quality assurance and budget management for the program and coordinated activity with the program evaluation team. CLEAResult submitted a program design to AIC for review, and then implemented the final approved design, including recruiting and managing relationships with food banks, sourcing program bulbs, and tracking and reporting program activity. Food banks identified participating food pantries, trained food pantry staff, and distributed program bulbs and materials to food pantries.

AIC, Leidos, and CLEAResult staff held regularly scheduled conference calls on a monthly basis (though these calls were not always conducted during the program's final months), and CLEAResult and AIC reported engaging in ad hoc conversations regarding day-to-day issues. Upon request from Leidos or AIC, CLEAResult provided ad hoc reports (including bulb distribution schedules) throughout the year and provided the final program tracking data to both parties after closure of the PY9 program.

Implementation Challenges

Communications were a challenge for the program in PY9. In particular, there were obstacles to effective communication both between AIC, Leidos and CLEAResult, and between CLEAResult and the food banks and pantries. AIC's program manager identified challenges associated with internal communications between AIC, CLEAResult, and Leidos. As the program's invoicing went through Leidos, while AIC oversaw other parts of the program implementation, not all parties always received all information on program issues and activity. For example, AIC's program manager had not seen the program's final impact tracker until the evaluation team requested it for reporting purposes. Staff turnover also presented issues: CLEAResult's initial program manager transitioned out of the role three to four months into the program, which led to communication challenges while the second CLEAResult program manager joined the team.

CLEAResult's program manager identified challenges related to communications with food bank and food pantry staff regarding data requirements, administrative needs, and reporting. As many food bank and food pantry staff work on a volunteer, part-time basis, program staff encountered issues in identifying consistent points of contact to manage each food bank's involvement. Food pantry staff also expressed concerns to CLEAResult regarding the safety of CFL bulbs stored with food, due to the potential for broken glass and mercury contamination. As a result, pantries requested clarity about food and bulb safety recommendations. Several food banks, despite signing a distribution agreement, struggled to limit their distribution of bulbs to approved food pantries (i.e., inside AIC territory). In addition, some food banks found CLEAResult's required

tracking and reporting too challenging to maintain. Two food banks dropped out of the program mid-year, resulting in delayed bulb distributions until CLEAResult recruited another two food banks to the program.

For quality assurance purposes, CLEAResult made phone calls to a few pantries each month that had received bulbs based on the food banks' most recent distribution reports. CLEAResult asked if the pantries received the products, determined whether distribution issues occurred, and ensured that the food pantries distributed the bulbs to their patrons. Despite this protocol, CLEAResult acknowledged that repeat customers may have received free bulbs upon multiple visits to the pantries, leading to some patrons receiving more than the program's allotted two four-packs of bulbs.

CLEAResult responded effectively to initial program implementation gaps associated with staff turnover. Once established in the role, the new program manager quickly recruited two additional food banks to replace the two that dropped out. CLEAResult reported receiving excellent recognition from food bank and food pantry staff. Food pantry staff expressed their appreciation to CLEAResult for providing free bulbs to their patrons.

3.2 Program Participation

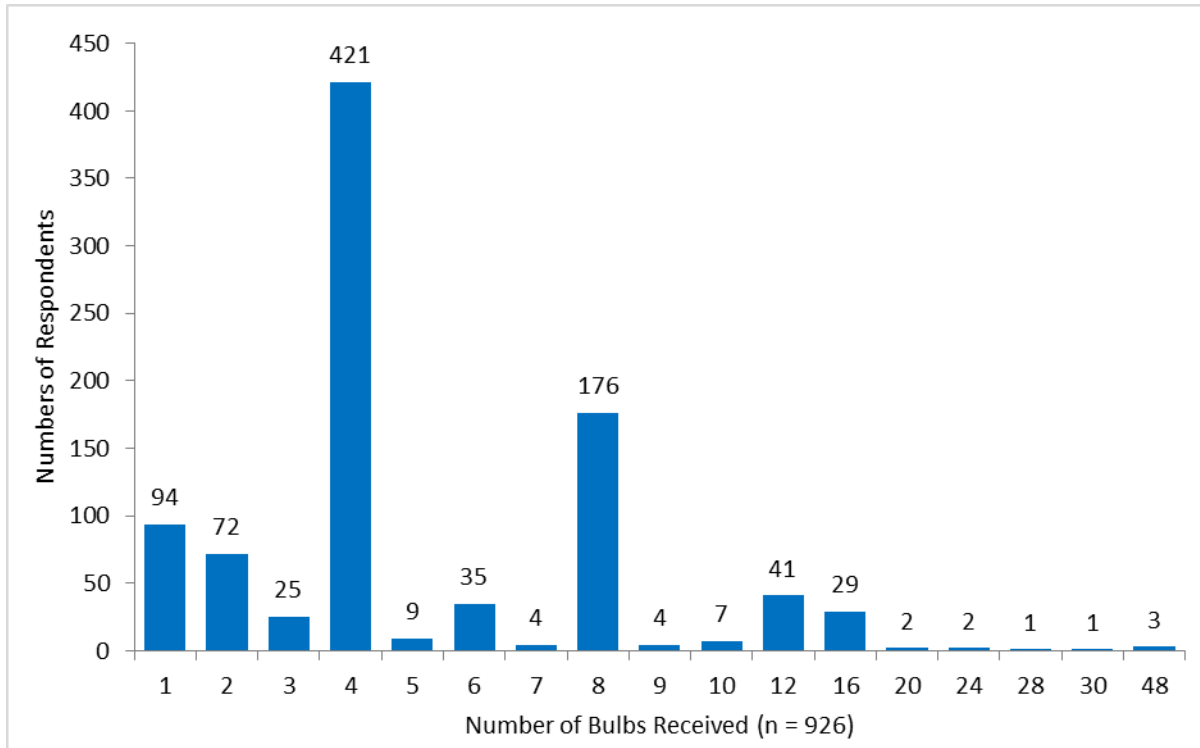
This section presents the findings from the participant survey and the program administrator and implementer interviews.

3.2.1 Bulb Distribution

The implementer tracking data only recorded the distributions to individual food pantries, but did not track actual distribution of bulbs to participants. The implementer tracked distribution of 11,727 cases (562,896 bulbs) to the seven food pantries.

Survey respondents (n=73) reported receiving an average of six bulbs per household, while registration data (collected from postcards sent in by several thousand food pantry patrons) indicated an average of 5.4 bulbs per household (n=926). The evaluation team utilized the registration data because of the larger sample size. Figure 1 shows the distribution of registered participants who reported receiving between one and 48 bulbs. Quantities greater than eight are at odds with the program stipulation that bulbs be distributed in four-packs and only up to two four-packs per household (for a total of eight bulbs per recipient). These results may indicate recall error by the respondent or that some food pantries opened packs and distributed individual bulbs or distributed more bulbs per household than instructed.

Figure 1. Reported Bulbs by Count



A majority of registered participants, 64% (n=926), reported receiving either four or eight bulbs (the equivalent of one or two four-packs). Another 26% reported receiving one to three or five to seven bulbs, which indicates they may have received part of a four-pack. The remaining 10% received more than eight bulbs, with three of these registered participants reporting receiving 48 bulbs.

3.2.2 Bulb Installation and Removal

The survey asked participants for information on bulb installation and removal, and received complete and valid information from 66 respondents. Table 4 shows that respondents installed 41% of the total bulbs received. Another 22% of bulbs were stored and may be installed in the future. Of the remaining bulbs, 37% were installed but subsequently removed, were given away, or were otherwise disposed. On average, survey respondents reported 2.6 bulbs per household were currently installed.

Table 4. Installation Rate and Other Action Taken with Bulbs Received

Action Taken with Received Bulbs	Percentage Bulbs (n=413)
Installed, remain installed	41.4%
Stored	21.5%
Installed and later removed	1.7%
Given Away	0.5%
Thrown away, lost, not accounted for	34.9%

Eleven survey respondents had received more than the expected eight bulbs per household. The evaluation team analyzed the installation rate among just those respondents that received eight bulbs or less, to determine if the excessive distribution to some households had a significant impact on savings. The team found that the first year installation rate increased to 53% once the high-bulb households were removed from the analysis. Table 5 presents the ISR results for just those households that received eight bulbs or fewer. (Based on the population of 562,896 bulbs, both the ISR estimates have a precision of $\pm 4\%$ or less at 95% confidence.)

Table 5. Installation Rate and Other Action Taken, 8-Bulb Homes Only

Action Taken with Received Bulbs	Percentage Bulbs (n=257)
Installed, remain installed	52.9%
Stored	24.5%
Installed and later removed	0.0%
Given Away	0.8%
Thrown away, lost, not accounted for	21.8%

3.2.3 Reasons Bulbs Are Not Installed

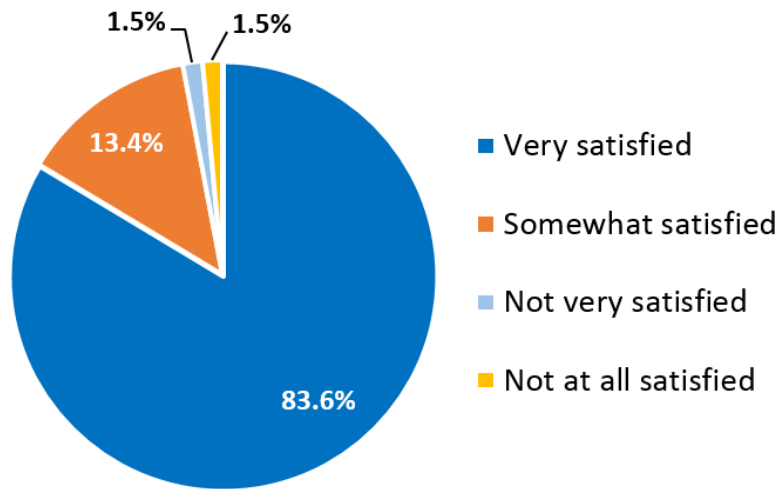
Eight respondents that said they had not yet installed all of their bulbs but intended to install them, reported they had not installed the bulbs because there were no empty sockets or burned-out bulbs in their home. Another recipient removed all of the bulbs because several broke and the recipient was concerned about mercury. The recipient also thought the bulb’s packaging should have more information regarding mercury and clean-up protocol in case of a bulb break. (The evaluation team noted that this recipient may not have received any literature with their bulbs, since the materials the program delivered explicitly discuss mercury safety and CFL recycling.)

3.2.4 Bulb Satisfaction

The survey collected customer satisfaction with the CFLs using a four-point scale of very satisfied, somewhat satisfied, not too satisfied, or not at all satisfied. The evaluation team found that 97% of recipients were very or somewhat satisfied with the CFL bulbs they received through the Community Based CFL Distribution Program. Only two participants reported being not very or not at all satisfied with the bulbs. Of these, one reported that the bulbs stopped working, and the other was concerned with mercury contained in CFLs bulbs in the event of breakage.

Figure 2 shows reported satisfaction with the CFL bulbs for program participants.

Figure 2. Satisfaction with Bulbs (n = 67)



Online and phone respondents had statistically significant differences in their responses regarding bulb satisfaction. About two-thirds (67.7%) of phone respondents indicated they were very satisfied compared to 97.2% of online respondents. The reported satisfaction responses are shown by survey type in Table 6.

Table 6. Phone and Online Reported Satisfaction

Satisfaction Level	Number of Phone Respondents (n = 31)	Number of Online Respondents (n = 36)
Very satisfied	21	35
Somewhat satisfied	9	0
Not very satisfied	1	0
Not at all satisfied	0	1

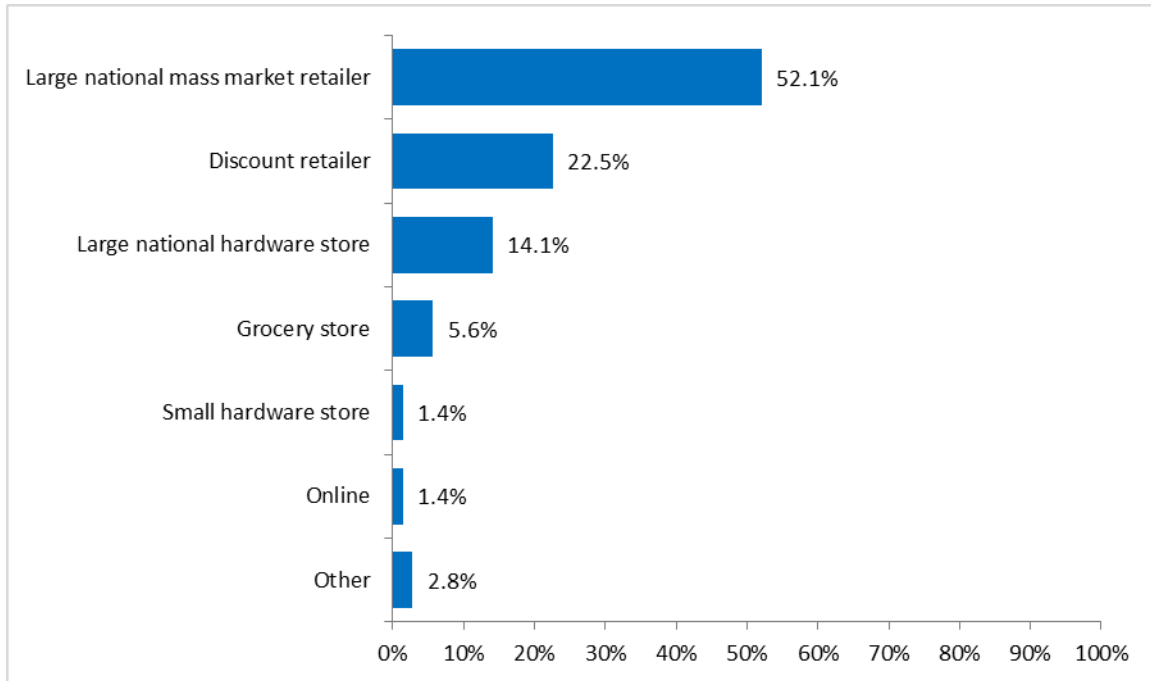
3.2.5 Energy Efficiency Prior Behavior

The evaluation team asked participants about any previous use of energy-efficient bulbs, purchase of energy-efficient bulbs after receiving CFL bulbs through the Community Based CFL Distribution Program, and the type of store at which participants most recently bought bulbs. The evaluation team found that 63% of respondents (n=71) reported having used a CFL bulb in their home prior to the program and 26% reported previous use of an LED bulb.

Since receiving the bulbs, 9% of respondents reported having purchased additional CFLs and 4% of respondents reported purchasing LEDs.

Over half of the respondents reported that their most recent bulb purchase (of any kind) occurred at large national mass-market retailers (such as Walmart or Costco). Another 23% reported that they most recently purchased bulbs at a discount retailer (such as Family Dollar or Goodwill), and 14% reported that their most recent purchase was at a large national hardware store (such as Home Depot). The types of retail locations where respondents most recently purchased bulbs are shown in Figure 3.

Figure 3. Site of Most Recent Bulb Purchase (n = 71)



3.2.6 Respondent Characteristics

Survey respondents ranged in age from 20 to 73 years old, with a median age of 54. The majority of respondents reported living in a single-family detached home (69%). In addition, 57% of respondents reported owning their home while 42% reported renting. Table 7 and Table 8 show the results of respondent residence demographics (weighted by number of bulbs received). Rates of owning a home between phone and online respondents were statistically different, with 43% of phone respondents and 68% of online respondents reporting owning their home.

Table 7. Type of Building of Residence (n = 70)

Type of Building	Percentage Response ^a
A single-family home, detached	69%
A building with 3 or 4 apartments	4%
A building with 5 or more apartments	12%
A mobile home	15%

^a Percentages are weighted by number of bulbs each respondent received

Table 8. Rent or Own the Home (n = 69)

Rent or Own the Home	Percentage Response ^a
Own	57%
Rent	42%
Rent to own	1%

^a Percentages are weighted by number of bulbs each respondent received

3.3 Impact Assessment

The following sections outline the results of the gross and net impact analysis for the program.

3.3.1 Gross Impacts

Based on reported program participation and ex post impact values, the program achieved total gross electric impacts of 7,560 MWh and demand impacts of 0.845 MW. Table 9 shows ex ante and ex post gross electric and demand impacts. The gross realization rate of 94% is a result of the 6% program leakage rate.

Table 9. PY9 Community Based CFL Distribution Program Ex Ante and Ex Post Gross Electric Impacts

Measure	Reported Measures	Verified Measures ^a	Reported Ex Ante ISR	Ex Ante		Evaluated Ex Post ISR ^b	Ex Post		Gross Realization Rate ^d	
				Gross Impacts			Gross Impacts		MWh	MW
				MWh	MW		MWh	MW		
13-watt CFL	562,896	332,109	59%	8,016	0.896	59%	7,560	0.845	94%	94%
Total	562,896	332,109	59%	8,016	0.896	59%	7,560	0.845	94%	94%

^a The difference between reported measures and verified measures results from the application of the IL-TRM V5.0 ISR of 59%. Both the Ex Ante and the Ex Post Impacts incorporate this value.

^b Reported percentages are rounded from their true values.

^c Realization rates differing from 1.0 result from differences between ex ante and ex post installation rates and per-unit impacts: gross realization rate = ex post gross impacts ÷ ex ante gross impacts.

In addition to gross savings achieved from CFL installations in PY9, the evaluation team calculated gross savings from delayed CFL installations, per the IL-TRM V5.0. The IL-TRM V5.0 assumes consumers will install 83% of community-distributed CFLs within three years. More specifically, the IL-TRM V5.0 presently assumes that participants will install 59% of distributed CFLs in year one, 13% in year two and an additional 11% of CFLs in year three. As a result, Table 10 shows the yearly gross impact of PY9 program bulbs realized in PY9, PY10, and PY11. The evaluation team will include these savings in subsequent evaluation reports.

Table 10. Yearly Gross Impact of PY9 Residential Lighting Measures by Assumed Installation Year

Measure	Energy (MWh)			Demand (MW)		
	PY9	PY10	PY11	PY9	PY10	PY11
13-watt CFL	7,560	1,666	1,409	0.845	0.186	0.158
Total	7,560	1,666	1,409	0.845	0.186	0.158

Leakage Rate

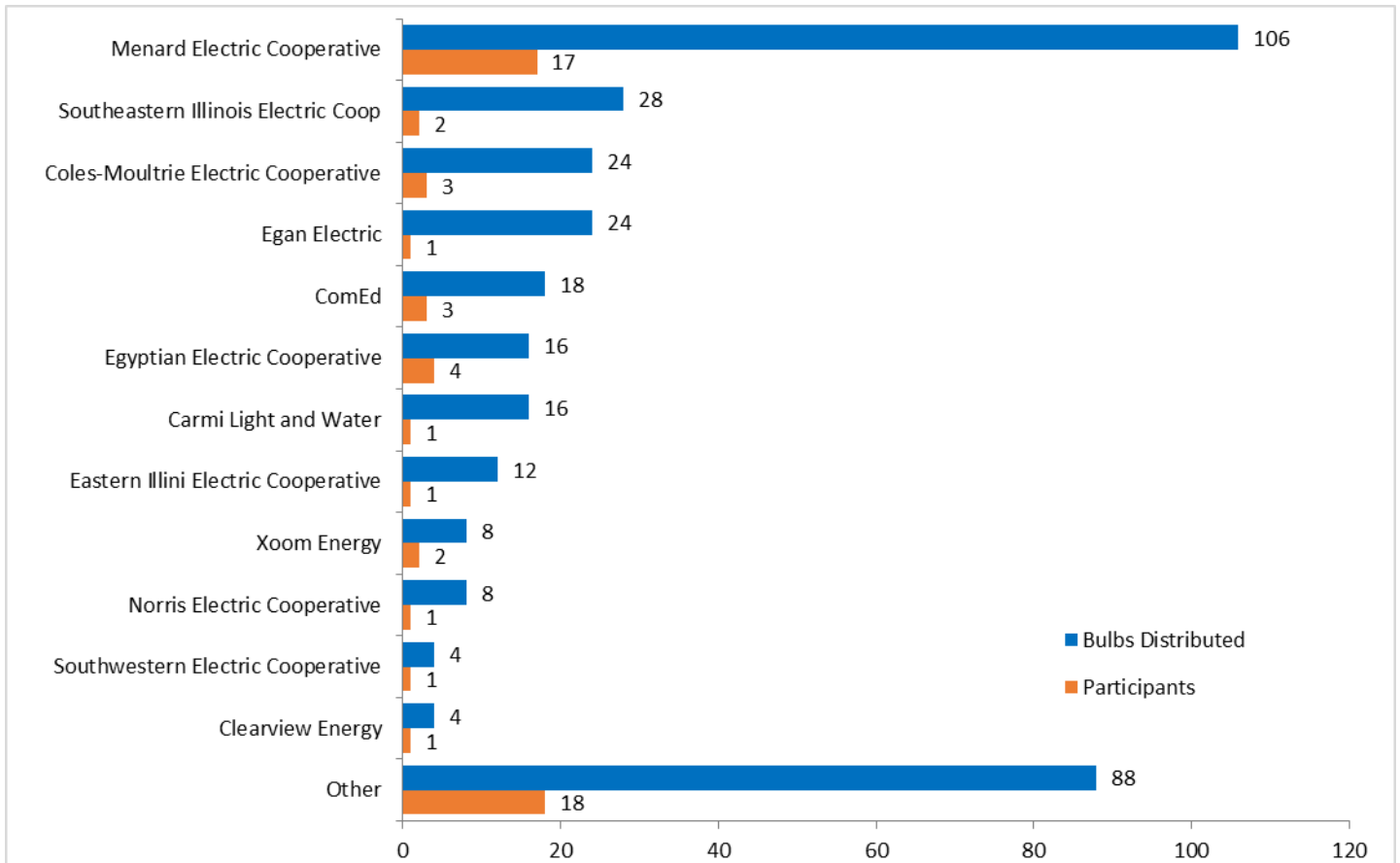
As described in the Evaluation Approach, the evaluation team used the registration form data to calculate the leakage rate for the program. Of the 1,024 registrants selected for the survey sample frame, 858 provided both the number of bulbs they received and the name of their utility in addition to their contact information. (The evaluation team excluded 16 respondents that indicated their utility was “Other” without specifying the utility’s name, as some common utilities are actually subsidiaries of AIC.)

The 858 respondents reported receiving 4,730 bulbs in total. Most were AIC customers (819) who received 4,461 bulbs. The remaining 39 respondents reported an electric utility other than AIC and received the remaining 269 bulbs, for a leakage rate of 6%. This estimate has a precision of ±1% at 95% confidence.

Although the follow-up survey also collected respondent utility information, the evaluation team used the larger sample available from the registration data to calculate the leakage rate.

Figure 4 shows the distribution of registered participants and program bulbs across non-AIC utilities. Of the non-AIC utilities, Menard Electric customers received the largest number of leaked program bulbs, followed by Southeastern Illinois Electric Coop.

Figure 4. Electric Utility of Non-AIC Participants (n = 55)



3.3.2 Net Impacts

To develop net impacts for PY9, the evaluation team applied a net-to-gross ratio (NTGR) of 1.00 (approved by the Stakeholder Advisory Group [SAG]) to ex post gross impacts.

The program achieved total net electric savings of 7,560 MWh and net demand impacts of 0.845 MW. Table 11 shows net electric and demand impacts results and the net realization rate for the program.

Table 11. PY9 Total Community Based CFL Distribution Net Electric Impacts

Measure	Ex Ante Net Impacts (MWh)	Ex Ante Net Impacts (MW)	Ex Post Net Impacts (MWh)	Ex Post Net Impacts (MW)
13-watt CFL	8,016	0.896	7,560	0.845
PY9 Net Realization Rate ^a			94%	94%

^a Net realization rate = ex post net impacts ÷ ex ante net impacts.

4. Conclusions and Recommendations

The PY9 Community Based CFL Distribution Program delivered 562,896 bulbs to customers and achieved 7,560 MWh of savings. These results represent 89% and 90%, respectively, of the goals set at the program's outset. Customers received the program well: 97% were very or somewhat satisfied with the program. Some participants received more than the program guideline of two bulb four-packs per home. At 41%, the program's first-year installation rate was lower than the IL-TRM V5.0 assumption of 59%. Further, participants gave away, removed after installation, or did not account for 37% of all received bulbs, with another 22% stored for future use. A majority of participants had some previous experience with CFLs (63%), and a significant portion (26%) had previous experience with LEDs.

- **Key Finding #1:** Distributing more than the program-stipulated two packs per household to some participants may have contributed to lower-than-expected installation rates. According to survey results, 10% of participants received more than eight bulbs (i.e., as many as 48 bulbs per household). The 41% actual installation rate fell below the 59% year-one installation rate specified in the IL-TRM V5.0.
 - **Recommendation #1a:** CLEAResult should meet with representatives from participating food banks and food pantries to debrief partners about operations over the previous year. The discussion should include any factors contributing to food pantry distributions of more than stipulated two boxes per household (e.g., excess supply) as well as issues such as food safety concerns related to broken bulbs, participant response to the program, general timing and logistics, and any other subjects of concern to attendees.
 - **Recommendation #1b:** CLEAResult should conduct quality assurance and quality control visits to food pantries, instead of only to food banks. Visits by CLEAResult staff will help ensure food pantry staff understand the program's requirements and distribute bulbs in accordance with program rules.
- **Key Finding #2:** Two food banks did not fully understand the responsibilities associated with becoming a program partner and dropped out due to data and implementation requirements. The misunderstanding of data requirements may have been driven in part by staff turnover at CLEAResult, which had a change in program manager midway through the program.
 - **Recommendation #2:** Ensure that communication with food bank staff involves staff most likely to remain permanently and consistently available throughout the program. If it does not do so already, the food bank distribution agreement should include a summary bulleted list of requirements for participating food banks. CLEAResult should review this list with senior-most food bank contacts, asking these contacts to describe their food bank's plan for meeting each requirement.
- **Key Finding #3:** Food pantry staff and patrons' concerns about bulb and glass safety played a role in the challenge to distribute and install all of the planned CFLs. A flyer from CLEAResult describing the bulbs' safety features was not distributed to all participants.
 - **Recommendation #3:** Information addressing mercury safety should be delivered to all participants, or the program should consider switching to LED distribution in the future. In addition, CLEAResult should work with food banks and food pantry representatives to identify the implications of bulb distribution on food safety regulations at food pantries and to develop clear guidance for food pantries regarding storage and distribution of bulbs.

Inputs for Future Planning

To inform future program planning, the evaluation team reviewed the participant survey data and estimated an installation rate for CFL bulbs distributed via food pantries. The program's first-year ISR of 41% (based on all survey results) likely was depressed by the program's failure to maintain an eight bulb per household limit. A 53% first-year ISR, calculated based on participants who received eight bulbs or less, offers a more reasonable alternative for this program design (assuming the program is implemented as intended). The evaluation team recommends adjusting the IL-TRM first-year ISR for Efficiency Kits CFL Distribution³ to 53%. As the team does not have data that directly measures subsequent year ISRs for this program, we recommend the IL-TRM maintains existing ISR values (e.g., 13% for year two and 11% for year three).

³ Defined in the IL-TRM as "Free bulbs provided without request, with little or no education. Based on 'Impact and Process Evaluation of 2013 (PY6) Ameren Illinois Company Residential CFL Distribution Program', Report Table 11 and Appendix B."

Appendix A. Phone Survey Instrument

A. Introduction

- A1. Hello, may I speak with **[CONTACT NAME]**?
1. Yes
 2. No or not a convenient time **[ASK IF RESPONDENT WOULD LIKE TO ARRANGE A MORE CONVENIENT TIME]**
 98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]**
 99. (Refused) **[THANK AND TERMINATE]**
- A2. I'm **[INSERT NAME]** calling on behalf of Ameren Illinois, regarding the CFL light bulb give-away at a local food pantry. Do you recall receiving CFL light bulbs?
1. Yes
 2. No **[ASK "IS THERE SOMEONE ELSE IN YOUR HOME I COULD SPEAK TO NOW WHO MAY KNOW ABOUT THE BULBS?" IF NO ONE ELSE IS AVAILABLE, THANK AND TERMINATE]**
 98. Refused **[THANK AND TERMINATE]**
 99. Don't know **[THANK AND TERMINATE]**
- A3. Can I ask you a few questions about your experience with the light bulbs? Your feedback will help Ameren Illinois offer more programs like the CFL giveaway in the future.
1. Yes
 2. No **[THANK AND TERMINATE]**
 98. (Don't know) **[ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]**
 99. (Refused) **[THANK AND TERMINATE]**

[IF ASKED]

3. **[IF RESPONDENT ASKS HOW LONG, SAY "APPROXIMATELY 5 MINUTES."]**
4. **[IF NEEDED, STATE "THIS SURVEY IS FOR RESEARCH PURPOSES ONLY AND THIS IS NOT A MARKETING CALL. THIS SURVEY IS COMPLETELY VOLUNTARY AND WILL NOT AFFECT YOUR UTILITY BILL OR ACCOUNT IN ANY WAY."]**
5. **[ONLY IF ASKED FOR AN AMEREN ILLINOIS CONTACT TO VERIFY THE SURVEY AUTHENTICITY, OFFER**

SHARON RUHLAND, AMEREN ILLINOIS
T 309.677.5192
SRuhland@ameren.com

B. Installation and Satisfaction

- B1. Our records show you received **[REPORTED BULBS]** light bulbs from a local food pantry. Is this correct?
[DO NOT READ]
1. Yes, I received that number of light bulbs **[CODE "REPORTED BULBS" AS "#BULBS"]**
 2. No, I received a different number **[SPECIFY: _____; CODE AS "#BULBS"]**
 3. No, I did not receive any light bulbs **[VERIFY, THEN THANK AND TERMINATE]**
 4. I received some bulbs but I don't know how many **[CODE "REPORTED BULBS" AS "#BULBS"]**

- 98. Don't know if I received bulbs [THANK AND TERMINATE]
- 99. Refused [THANK AND TERMINATE]

- B2. Have you installed one or more of the bulbs? [DO NOT READ]
- 1. Yes, I have installed at least one
 - 2. No, I have not installed any of the bulbs I received
 - 3. Don't know if I installed any of the bulbs [SKIP TO B10]
 - 99. Refused [THANK AND TERMINATE]

[IF B2 = 1]

- B3. How many of the CFL bulbs are CURRENTLY installed?
- 1. SPECIFY NUMBER: _____
 - 98. Don't know
 - 99. Refused

[IF B2 = 2]

- B4. Why did you not install the CFL bulbs you received? [DO NOT READ; SELECT ALL THAT APPLY]
- 1. No empty sockets/burned out bulbs [SKIP TO B10]
 - 2. I don't like the light from this type of bulb [SKIP TO B10]
 - 3. I don't like the shape/appearance of this type of bulb [SKIP TO B10]
 - 4. I needed a different type of bulb (dimmable, different wattage, etc.) [SKIP TO B10]
 - 5. The bulbs were lost/broken/given away [SKIP TO B10]
 - 6. Other [SPECIFY: _____] [SKIP TO B10]
 - 98. Don't know [SKIP TO B10]
 - 99. Refused [SKIP TO B10]

[IF #BULBS B3.1 >0]

- B5. What did you do with the CFL bulbs that are not installed? Did you... [READ EACH OPTION AND PAUSE FOR RESPONSE]
- 1. Store some for later use: _____ [number of bulbs]
 - 2. Give some away to someone else: _____ [number of bulbs]
 - 3. Throw some away: _____ [number of bulbs]
 - 4. Something else? [SPECIFY: _____]: _____ [number of bulbs]
 - 98. (Don't know) _____ [number of bulbs]
 - 99. (Refused)

B6. Which utility provides electricity to the property where the bulbs were installed?

1. Ameren Illinois
2. CILCO (pronounced "silco")
3. IP (pronounced as the letters "I" and "p")
4. CIPS (pronounced as "sips")
5. UE Metro East (UE pronounced as the letters)
6. Ameren Missouri
7. Commonwealth Edison
8. Other _____
98. Don't know
99. Refused

B7. Did you remove any of the CFL bulbs after you installed them?

1. Yes
2. No [SKIP TO B10]
98. Don't know [SKIP TO B10]
99. Refused [SKIP TO B10]

B8. How many did you remove?

[RECORD NUMBER] _____

98. Don't know
99. Refused

[IF B7=Yes]

B9. Why did you remove the light bulb(s)? [DO NOT READ; SELECT ALL THAT APPLY]

1. Bulb burned or out stopped working
2. I don't like the light from this type of bulb
3. I don't like the shape/appearance of this type of bulb
4. I needed a different type of bulb (3-way, different wattage, etc.)
5. Other [SPECIFY: _____]
98. Don't know
99. Refused

B10. How satisfied are you overall with the CFL bulbs you received from Ameren Illinois? Would you say you are: [READ OPTIONS]?

1. Very satisfied
2. Somewhat satisfied
3. Not very satisfied
4. Not at all satisfied
98. (Don't know)
99. (Refused)

[IF B10= 3 or 4]

B11. Why do you say that?

[OPEN RESPONSE] _____

- 98. Don't know
- 99. Refused

C. Purchasing Habits

C1. Before receiving these bulbs, had you ever used a CFL light bulb in your home? (A CFL bulb often has a swirled shape, and typically uses less energy than a traditional bulb.)

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

C2. Before receiving these bulbs, had you ever used an LED light bulb in your home? (An LED bulb is the newest type of light bulb and is usually more expensive. LEDs look like a traditional bulb, but are heavier, and typically use less energy.)

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

C3. Think of your most recent purchase of lightbulbs. What type of store were you at? [READ OPTIONS IF NEEDED; SELECT ONLY ONE]

- 1. Large national hardware store such as Home Depot,
- 2. Large national mass market retailer such as Walmart or Costco
- 3. Small hardware store such as ACE Hardware
- 4. Discount retailer such Family Dollar or Goodwill
- 5. Grocery Store
- 6. Online
- 7. Other [SPECIFY: _____]
- 98. Don't remember/Don't purchase light bulbs
- 99. (Refused)

C4. Since receiving the bulbs at the food pantry, have you purchased any additional CFL bulbs? [SELECT ONLY ONE]

- 1. Yes, I have purchased CFL bulbs [How many have you purchased? RECORD NUMBER]
- 2. No, I have not purchased any CFL bulbs
- 98. Don't know
- 99. Refused

C5. Since receiving the bulbs at the food pantry, have you purchased any LED bulbs? [SELECT ONLY ONE]

1. Yes, I have purchased LED bulbs [How many have you purchased? RECORD NUMBER]
2. No, I have not purchased any LED bulbs
98. Don't know
99. Refused

D. Demographics

Now I'd like to ask you a few questions about you and your home. We use this information when we are determining how to set up our programs, and what benefits to offer our customers.

D1. In what type of building do you live? [READ OPTIONS]

1. A one-family home detached from any other house
2. A one-family home attached to one or more houses
3. A building with 2 apartments
4. A building with 3 or 4 apartments
5. A building with 5 or more apartments
6. A mobile home
7. Other [SPECIFY: _____]
98. (Don't know)
99. (Refused)

D2. Do you own or rent your home?

1. Own
2. Rent
3. Other [SPECIFY: _____]
98. Don't know
99. Refused

D3. What year were you born?

- [RECORD NUMBER] _____
98. Don't know
 99. Refused

This completes the survey. Your responses are very important to Ameren Illinois. We appreciate your participation and thank you for your time. Have a good [evening/day].

Appendix B. Email Survey Instrument

A. Email Invitation [ONLINE]

Subject: Tell us about your free CFLs from Ameren Illinois!

Hi [NAME]

You recently received CFL light bulbs at a local food pantry. Ameren Illinois would like to know more about how those bulbs worked out for you. Your input is very important to us!

Please take a moment to answer a few short questions about the CFL bulbs you received. Click the link below to take this brief survey.

[TAKE THE SURVEY]

Your feedback will help Ameren Illinois offer more programs like the bulb giveaway in the future. All of your responses will be kept entirely confidential. This survey should take less than 5 minutes.

If you have questions about this survey, contact our survey administrator:

Laura James
Cadmus
Laura.james@cadmusgroup.com

Thank you in advance for your thoughts and time.

Sincerely,

SHARON RUHLAND, AMEREN ILLINOIS
T 309.677.5192
SRuhland@ameren.com

B. Installation and Satisfaction

B1. Our records show you received [REPORTED BULBS] light bulbs from a local food pantry. Is this correct?

[Select one]

1. Yes, I received [REPORTED BULBS].
2. No, I received a different number [SPECIFY: ____]
3. No, I did not receive any light bulbs [TERMINATE]
4. I received some bulbs but I don't know how many
5. Don't know if I received bulbs [TERMINATE]

B2. Have you installed one or more of the bulbs? [DO NOT READ]

1. Yes, I have installed at least one
2. No, I have not installed any of the bulbs I received
3. Don't know if I installed any of the bulbs [SKIP TO B10]

[IF B2 = 1]

B3. How many of the CFL bulbs are currently installed?

1. SPECIFY NUMBER: _____
98. Don't know

[IF B2 = 2]

B4. Why did you not install the CFL bulbs you received? [MARK ALL THAT APPLY]

1. No empty sockets/burned out bulbs [SKIP TO B10]
2. I don't like the light from this type of bulb [SKIP TO B10]
3. I don't like the shape/appearance of this type of bulb [SKIP TO B10]
4. I needed a different type of bulb (dimmable, different wattage, etc.) [SKIP TO B10]
5. The bulbs were lost/broken/given away [SKIP TO B10]
6. Other [SPECIFY: _____] [SKIP TO B10]
98. Don't know [SKIP TO B10]

[IF #BULBS B3.1 >0]

B5. What did you do with the CFL bulbs that are not installed? Did you... [MARK ALL THAT APPLY]

1. Store some for later use: SPECIFY NUMBER: _____
2. Give some away to someone else: SPECIFY NUMBER: _____
3. Throw some away: SPECIFY NUMBER: _____
4. Something else? SPECIFY NUMBER: _____
5. (Don't know) SPECIFY NUMBER: _____

B6. Which utility provides electricity to the property where the bulbs were installed?

1. Ameren Illinois
2. CILCO
3. IP
4. CIPS
5. UE Metro East
6. Ameren Missouri
7. Commonwealth Edison
8. Other [SPECIFY: _____]
98. Don't know

- B7. Did you remove any of the CFL bulbs after you installed them?
1. Yes
 2. No [SKIP TO B10]
98. Don't know [SKIP TO B10]

[IF B7=Yes]

- B8. How many did you remove?
1. SPECIFY: _____
98. Don't know

[IF B7=Yes]

- B9. Why did you remove the light bulb(s)? [MARK ALL THAT APPLY]
1. Bulb burned or out stopped working
 2. I don't like the light from this type of bulb
 3. I don't like the shape/appearance of this type of bulb
 4. I needed a different type of bulb (3-way, different wattage, etc.)
 5. Other [SPECIFY: _____]
98. Don't know

- B10. How satisfied are you overall with the CFL bulbs you received from Ameren Illinois? Would you say you are:
1. Very satisfied
 2. Somewhat satisfied
 3. Not very satisfied
 4. Not at all satisfied
98. (Don't know)

[IF B10= 3,4]

- B11. Why do you say that?
- [OPEN RESPONSE] _____

C. Purchasing Habits

- C1. Before receiving these bulbs, had you ever used a CFL light bulb in your home? (A CFL bulb often has a swirled shape, and typically uses less energy than a traditional bulb.)
1. Yes
 2. No
98. Don't know
- C2. Before receiving these bulbs, had you ever used an LED light bulb in your home? (An LED bulb is the newest type of light bulb and is usually more expensive. LEDs look like a traditional bulb, but are heavier, and typically use less energy.)
1. Yes
 2. No

98. Don't know

C3. Think of your most recent purchase of lightbulbs. What type of store were you at? [Select one]

1. Large national hardware store such as Home Depot
 2. Large national mass market retailer such as Walmart or Costco
 3. Small hardware store such as ACE Hardware
 4. Discount retailer such Family Dollar or Goodwill
 5. Grocery Store
 6. Online
 7. Other [SPECIFY: _____]
98. Don't remember/Don't purchase light bulbs

C4. Since receiving the bulbs at the food pantry, have you purchased any additional CFL bulbs? [Select one]

1. Yes, I have purchased CFL bulbs [SPECIFY: _____]
 2. No, I have not purchased any CFL bulbs
98. Don't know

C5. Since receiving the bulbs at the food pantry, have you purchased any LED bulbs? [SELECT ONLY ONE]

1. Yes, I have purchased LED bulbs [SPECIFY: _____]
 2. No, I have not purchased any LED bulbs
98. Don't know

D. Demographics

The next few questions are about you and your home. We use this information when we are determining how to set up our programs, and what benefits to offer our customers.

D1. In what type of building do you live? [Select one]

1. A one-family home detached from any other house
 2. A one-family home attached to one or more houses
 3. A building with 2 apartments
 4. A building with 3 or 4 apartments
 5. A building with 5 or more apartments
 6. A mobile home
 7. Other [SPECIFY: _____]
98. Don't know

D2. Do you own or rent your home?

1. Own
2. Rent
3. Other [SPECIFY: _____]

98. Don't know

D3. What year were you born?

[RECORD NUMBER] _____

98. Don't know

This completes the survey. Your responses are very important to Ameren Illinois. We appreciate your participation and thank you for your time. Have a good [evening/day].

Appendix C. Registration Postcard

Win one of five \$200 VISA® gift cards!*

Please fill out this card completely and leave it at the food pantry to be entered in a drawing for one of five **\$200 VISA gift cards**. We may also call you for a short survey about how you use your ENERGY STAR® bulbs. Your responses will help us learn more about how people use products from the Ameren Illinois Energy Efficiency Programs. Please note, submitting this card is **completely voluntary**.



Name _____ Phone (_____) _____ - _____

Email _____

Address _____ City _____ State _____ Zip _____

Number of individual bulbs received _____ Date(s) received _____

Who is your ELECTRIC utility? (Your response will not affect your eligibility for the gift card.)

- Ameren Illinois
- Other electric utility: _____
- Don't know

**Ameren Illinois is not the sponsor or administrator of the promotion, drawing or survey.*

Serial # (1-50,000)

Appendix D. Algorithms and Assumptions

Table 12. Input Values for Savings Algorithms

Variable	Input Value	Source of Input
Measure Life	9.1	Manufacturer reported values
Coincidence Factor	8.1%	TRM 5.0 CF for Unknown Location Bulbs
WattsBase	43.00	Manufacturer reported value = 60W, adjusted to the halogen equivalent to account for EISA 2007 (and to conform to the IL TRM)
WattsEE	13.00	Manufacturer reported values
ISR	59.0%	TRM 5.0
Leakage	0.0%	Value is not stated in TRM 5.0, so we applied 0%
Hours	759	TRM 5.0 for Retail (Time of Sale) and Efficiency Kits - Residential Interior and in-unit Multi Family
WHFe	1.06	TRM 5.0 Interior single family or unknown location
WHFd	1.11	TRM 5.0 Interior single family or unknown location
HF	49%	TRM 5.0 for interior or unknown location
η Heat	70%	TRM 5.0 for efficiency of heating system

Below are the algorithms used to calculate savings for the program:

$$\text{kW} = ((\text{WattsBase} - \text{WattsEE}) / 1000) * \text{ISR} * (1 - \text{Leakage}) * \text{WHFd} * \text{CF}$$

$$\text{kWh} = ((\text{WattsBase} - \text{WattsEE}) / 1000) * \text{ISR} * (1 - \text{Leakage}) * \text{Hours} * \text{WHFe}$$

$$\Delta \text{Therms} = - (((\text{WattsBase} - \text{WattsEE}) / 1000) * \text{ISR} * (1 - \text{Leakage}) * \text{Hours} * \text{HF} * 0.03412) / \eta \text{Heat}$$

Appendix E. Cost-Effectiveness Inputs

A. Heating Penalty

Efficient lighting products generate less waste heat compared to baseline lighting products. When customers replace baseline products with more efficient lighting, they must use more space heating to compensate for the “lost” heat from lighting. The heating penalty represents this increased gas usage for space heating—a figure used in analyzing program cost-effectiveness.⁴

B. Heating Penalty Results

In addition to the gross gas-heating penalty from measure installations in PY9, the evaluation team calculated the gross gas-heating penalty from delayed CFL installations, in accordance with the IL-TRM V5.0 shows the gross gas-heating penalty resulting from efficient lighting installations provided to participants in PY9 and realized in PY9 and, given later installations, in PY10 and PY11.

Table 13. Yearly Gross Heating Penalty Impact of Lighting Measures by Assumed Installation Year

Measure	Heating Penalty (Therms)		
	PY9	PY10	PY11
13-watt CFL	-170,342	-37,533	-31,759
Total	-170,342	-37,533	-31,759

Table 14 shows the net gas impacts for cost-effectiveness inputs.

Table 14. Net Gas Impacts

Measure	Reported Ex Ante ISR	Ex Ante Gross Impacts	Reported Measures	Evaluated Ex Post ISR ^a	Verified Measures ^b	Ex Post Gross Impacts	Gross Realization Rate ^c
		Therms				Therms	Therms
13-watt CFL	59%	-180,614	562,896	59%	332,109	-170,342	94%
Total	59%	-180,614	562,896	59%	332,109	-170,342	94%

^a Reported percentages are rounded from their true values.

^b The difference between reported measures and verified measures results from the application of installation rates derived from the PY9 program survey results.

^c Realization rates differing from 1.0 result from differences between ex ante and ex post installation rates and per-unit impacts:
 gross realization rate = ex post gross impacts ÷ ex ante

⁴ The evaluation team followed IL-TRM V5.0’s direction, assuming all homes used gas heating, given that the type of heating fuels in customers’ homes was missing. Thus, this study calculated only a gas-heating penalty.

For more information, please contact:

Hannah Arnold
Managing Director

510 444 5050 tel
510 444 5222 fax
harnold@opiniondynamics.com

1 Kaiser Plaza, Suite 445
Oakland, CA 94612



Boston | Headquarters

617 492 1400 tel
617 497 7944 fax
800 966 1254 toll free

1000 Winter St
Waltham, MA 02451

San Francisco Bay

510 444 5050 tel
510 444 5222 fax

1 Kaiser Plaza, Suite 445
Oakland, CA 94612