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PY9 Evaluation Plan for the Illinois Power Agency Electric Residential and Commercial Energy Efficiency Programs

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CADMUS

NAVIGANT



MichaelsEnergy

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1. Introduction

Ameren Illinois Company (AIC) hired the team of Opinion Dynamics, The Cadmus Group, Navigant Consulting, and Michaels Energy to perform impact and process evaluations for the stand-alone energy efficiency programs adopted through the Illinois Power Agency (IPA) procurement process. These programs were implemented between June 2016 and May 2017 (Program Year 9 [PY9]).

Specifically, the evaluation team will assess the following PY9 IPA programs:

- Residential
 - Lighting
 - Behavioral Modification¹
 - Community Based CFL Distribution
 - Moderate Income Kits
 - Multifamily Major Measures²
 - Rural Efficiency Kits
- Commercial
 - Small Business Direct Install
 - Small Business Cooler Savings
 - Private Sector Enhanced Building Optimization
 - Public Sector Enhanced Building Optimization
 - Small Commercial Lit Signage
 - Small Business Linear LED Lighting
 - Demand Based Ventilation Fan Control

This document provides detailed evaluation plans for each of the 13 programs and serves as the framework for the evaluation of program impacts and process improvements. The overarching evaluation objectives are to determine gross and net energy and demand impacts associated with the programs and to suggest improvements to the design and implementation of the programs.

¹ A gas portion of the program is offered through the AIC portfolio. This evaluation plan contains information pertaining only to evaluation of electric impacts from the Behavioral Modification Program.

² In addition to the IPA Multifamily Program, AIC offers a Multifamily Program focused on in-unit measures.

2. Program-Specific Evaluation Plans

2.1 Residential Lighting

2.1.1 Program Description

The objective of the Residential Lighting Program is to increase awareness and sales of ENERGY STAR® lighting among residential customers. The program provides discounts through a variety of retail channels to reduce the cost of standard and specialty CFLs and LEDs. The program is available throughout the entire AIC service territory through retail stores.

The program seeks to increase awareness of energy-efficient lighting and its benefits through marketing and outreach efforts at participating retailers and the AIC website. The program partners with retailers and lighting manufacturers to sell ENERGY STAR lighting at a discount to bring the cost closer to that of traditional less efficient lighting. The implementer expects the discounts to encourage customers who are reluctant to pay full price for ENERGY STAR lighting to choose energy-efficient lighting over standard efficiency lighting.

According to the program implementation plan, the annual savings target for the PY9 IPA Residential Lighting Program is 49,414 MWh.

2.1.2 Evaluation Approach

The PY9 assessment of the Residential Lighting Program includes both process and impact analyses and also looks to answer several forward-looking questions, as outlined in the following sections.

Research Objectives

Impact Questions

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

Process Questions

3. Did the program change its design in PY9? If so, how and why and were those changes advantageous?
4. Was program implementation effective and smooth?
5. What attributes do customers associate with different lighting technologies?
6. What lighting technologies do AIC customers prefer? What attributes are most important to customers? Which technologies and attributes are most sensitive to price changes?
7. In what areas could the program improve to increase its overall effectiveness?
8. What could the program do to assist customers in understanding energy-efficient lighting options and how to achieve higher energy savings?

Forward Looking

9. How many hours of use is typical for LED light bulbs in residential applications?
10. What light bulb technologies are most often replaced by LEDs? What portion of LEDs are replacing CFLs? What portion are replacing non-energy efficient light bulbs?
11. What is the penetration and saturation by bulb type and room type in customer homes? Did the program cause more customers to consider efficient light bulbs for every light socket in their homes, including specialty sockets? Does efficient lighting saturation lag behind for some uses?
12. What is the profile of AIC customers whose homes have high efficient bulb saturation rates, compared to those who do not? Has that profile changed in the past few years? Was the program reaching new users of energy-efficient lighting products?
13. What types of light bulbs could the program focus on to maximize its effectiveness in future years?
14. What customer segments or demographics could the program target to maximize its effectiveness in future years?
15. How can future marketing and education efforts improve customer understanding or address customer misunderstanding of energy efficient lighting technologies?

Evaluation Tasks

Table 1 summarizes the PY9 evaluation activities conducted for the Residential Lighting Program.

Table 1. Summary of Residential Lighting Program Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Staff Interviews		✓		Conduct interviews with IPA and CLEAResult program managers to understand changes in program design and implementation.
Program Materials Review	✓	✓		Review the PY9 database, relevant administrative program reports, and marketing and outreach materials to document program design and changes since PY8.
Analysis of In-Home Audits		✓	✓	Conduct analysis of the 152 in-home lighting audits completed in early 2017 to reveal quantity and type of lighting in use and in storage in customer’s homes.
Analysis of HOU Study			✓	Conduct analysis of lighting loggers installed on LEDs in 79 AIC homes. Produce estimates of LED HOU and coincidence factors to update TRM.
Consumer Preference Study		✓	✓	Conduct a discrete choice survey with approximately 400 AIC customers to assess customer preferences for different lighting features and to predict future lighting purchase behavior.
Market Share and Lighting Purchaser Study			✓	Examines changes in market share of different lighting technologies from January 2016 through August 2017 using sales data. Conduct a short survey with customers from June through August 2017 on factors impacting purchase.
Impact Analysis	✓		✓	Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Staff Interviews

The evaluation team will conduct up to three in-depth phone interviews with program and implementation staff involved in the design and administration of the Residential Lighting Program (i.e., Leidos, CLEAResult, and EFI staff). These interviews will allow us to fully explore the details of the program design and implementation and to examine the perspective of the people who are in direct contact with participating retailers. We will schedule these in-depth interviews toward the end of the program year and will conduct them over the telephone using experienced Opinion Dynamics analysts. We will record and transcribe all interviews to facilitate analysis.

Deliverable: Conducted interviews

Deliverable Date: May 2017

Task 2: Program Materials Review

The evaluation team will conduct a comprehensive review of all program materials. This includes all materials provided to retailers, as well as mass marketing and in-store materials. We will also request program tracking data, the program’s goals tracker, program marketing materials, and marketing plans. These activities will inform our process assessment.

Deliverable: Data request

Deliverable Date: May 2017

Task 3: In-Home Audits and Hours of Use Study

From December 2016 to February 2017, the evaluation team visited a random sample of AIC customer homes to conduct in-home lighting audits and install light loggers on LEDs. This study was begun in PY8 and is part of a statewide study conducted in conjunction with ComEd. An objective of the study is to estimate LED hours of use (HOU) and coincidence factors to update the IL TRM V7.0.

To date, we have completed all tasks associated with sampling, recruiting participants, conducting audits, and installing light loggers. We conducted lighting audits at 152 AIC homes. During the audits, we placed a total of 184 DENT lighting loggers on LEDs in the 76 homes that had LEDs installed.³ The statewide estimate of the HOU and coincidence factors that will go into the IL TRM V7.0 will meet the desired 90/10 precision for LEDs as a category. Estimates for AIC territory or by room type or bulb type will be less precise due to smaller sample sizes.

Table 2. Illinois Lighting Study Sample Sizes

	Homes Audited	Homes with Loggers Installed	Number of Loggers Installed
Ameren	152	79	184
ComEd	142	77	226
Total	294	153	391

We will leave the lighting loggers in place until late Summer 2017 when we will retrieve them and analyze their data. We will conduct standard procedural testing of loggers prior to removal and will conduct a closing interview with the homeowner about any changes in lighting usage over the course of the logging period. After

³ We also placed 226 loggers in 77 ComEd customer homes with LEDs.

collecting loggers, we will perform data cleaning, analysis, and modeling to estimate HOU and coincidence factors.

The results of in-home lighting audits will also provide valuable information about the number, type, and location of residential lighting products in use in AIC homes. This study builds on similar studies conducted in 2010, 2012, and 2014, and will provide information on the change in the lighting market in AIC territory over that time. We will calculate penetration and saturation rates for the different lighting technologies installed in AIC homes. This study will provide information about the rooms and types of sockets where consumers are using these newer lighting technologies.

We will also use this study to gain information on how customers are using LEDs. Because LEDs are still a relatively new technology, most will have been installed in recent years. As part of the lighting audits, we asked customers with LEDs installed what type of light bulb the LEDs replaced to determine the degree to which they are replacing CFLs versus less efficient technologies.

Deliverable: Results Memo

Deliverable Date: October 2017

Task 4: Consumer Preference Survey

As part of our recruitment of participants for the in-home study, we invited customers to participate in an additional study on consumer lighting preferences. The objective of the study is to predict future lighting purchase behavior based on customer preferences for particular types of, or features associated with, specific types of lighting. The study utilizes a discrete choice survey. Discrete choice survey analysis relies on responses to survey questions about different product trade-offs. The survey asks respondents to select the product that they would purchase from a group of products with different attributes. By randomly varying product attributes and tracking user selections between available options, the relative importance of each attribute is revealed. Modeling this stated-preference information will allow us to predict what customers would buy when faced with actual product choices in the real world. The discrete choice method allows us to vary product features and predict customer purchase decisions when presented with different lighting options. This information can be used to determine what types of products are most influenced by price discounts and what incentive level is most effective for different products.

To understand and predict customer purchase behavior, a discrete choice analysis is superior to traditional surveys that directly ask customers what lighting products they will purchase in the future. Until recently, customers did not have a choice of technology when purchasing light bulbs. At most retailers today, customers can purchase EISA-compliant halogens, CFLs, and LEDs. It is impossible to ask a traditional survey question that captures both customer understanding of these technologies and preferences for certain technologies or attributes. Instead, the discrete choice survey allows us to present different technologies and attributes, allowing the customer to focus on the details they care about. By recording an individual's preferences across multiple sets of choices and aggregating preferences across many customers, we can determine what attributes are most important and thus what types of bulbs customers are likely to purchase when making actual purchase decisions in the future.

A discrete choice survey must be an electronic self-administered survey. It cannot be properly conducted over the telephone. We asked customers who completed the recruitment survey for the in-home study if they would be interested in completing an additional survey via the internet. We sent an email invitation to complete the survey to the 924 customers who said they were interested in April 2017. Some of these customers will have also participated in the in-home lighting audit study. For these customers, we will be able to compare the discrete choice survey results to the lighting products these customers have installed in their homes. For customers who have low efficient bulb saturation, we will determine if price is the real barrier or if there are

other factors that might require more emphasis in marketing and information sharing. The program will be able to use the results to better target customers and sockets that are low on efficient bulb saturation.

Deliverable: Results Memo

Deliverable Date: October 2017

Task 5: Market Share and Lighting Purchaser Study

The lighting market is changing rapidly. To help AIC stay on top of those changes and ensure the lighting program changes with the market as needed, we will conduct a study that examines changes in market share of different lighting technologies from January 2016 through August 2017. The data will come from InfoScout, a market research company, that maintains a panel of consumers who provides copies of their receipts from retail purchases. We will be able to examine market share by retailer type, location, and customer demographics such as income, education, and age. The lighting program only has access to sales data on program-discounted bulbs and not the full lighting category. This study will provide that information and reveal the percentage of bulbs purchased that are less efficient and represent opportunity for the program.

Because the InfoScout panelists are self-selected and are not a random sample of AIC customers, we will compare the demographics of the panelists with those of AIC customers as a whole using U.S. Census data. If we find significant differences between the panelists and the overall customer base, we will construct and apply weights to adjust the panel to match the AIC population.

We can also conduct short surveys with InfoScout panelists after their purchase. We will conduct a survey with lighting purchasers from June through August 2017. We will field the survey on a rolling basis, a few days after each purchase is made. We will ask customers about the circumstances surrounding their purchase, the attributes of the bulb that drove their purchase, barriers to efficient bulb purchase, and installation and usage behaviors. We will also ask customers for the name of their electric utility to produce an alternative estimate of program leakage to the one we obtain through in-store intercepts. The intercept-based estimate is highly dependent on the locations of the small number of stores included in the sample. The InfoScout data, while drawn from self-selected panelists, covers the entire territory.

Deliverable: Draft and Final Report

Deliverable Date: October 2017

Task 6: Impact Analysis

The evaluation team will review all records in the program database. We will check to ensure that the correct savings value has been applied for each product type, to verify that the database is providing correct information. We will also assess the database to ensure that project data has been recorded fully and correctly. We will resolve any discrepancies found in the database and report on findings.

We will use the savings parameters outlined in the IL-TRM V5.0 to estimate gross energy and demand savings for PY9. Given assumptions include baseline wattages for specific lumen ranges, in-service rates, and hours of use. The evaluation team will use these values and data from the program tracking database to calculate gross program savings. We will use results from the in-store customer interviews that we conducted in PY8 as the estimate leakage of program-discounted bulbs *out of* AIC territory. We will use the Geographic Information Systems (GIS)-based estimate of leakage *into* AIC territory from the PY7 evaluation. Overall leakage will be leakage out minus leakage in (see Table 3).

Table 3. Lighting Program PY9 Leakage Rate

Type	Percent
Leakage Out (PY8)	13%
Leakage In (PY7)	5%
Overall	8%

We will calculate PY9 ex post net savings by applying SAG-approved NTGRs to ex post gross electric and gas savings. Table 4 presents the NTGRs we will apply to PY9 savings by bulb type.

Table 4. Lighting Program PY9 NTGRs

Measure Description	NTGR
Standard CFLs	0.63
Specialty CFLs	0.72
Omni-Directional LEDs	0.58
Directional LEDs	0.60

Deliverable: Draft and final report

Deliverable Date: October 2017

Task 7: Reporting

The evaluation team will compose a draft report of findings for AIC and ICC staff review. We will then deliver a final report that incorporates any comments from the review.

Deliverable: Draft report

Deliverable Date: October 2017

Deliverable: Final report

Deliverable Date: November 2017

2.1.3 Evaluation Budget and Timeline

Table 5 summarizes the timing and budget associated with each evaluation activity.

Table 5. Residential Lighting Program Evaluation Schedule and Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Program Staff Interviews	May 2017	\$2,000
2	Program Materials Review	May 2017	\$2,100
3	In-Home Audits and Hours of Use Study	October 2017	\$175,000
4	Consumer Preference Survey	October 2017	\$30,000
5	Market Share and Lighting Purchaser Study	October 2017	\$32,000
6	Impact Analysis	October 2017	\$18,900
7	Draft Report	October 1, 2017	\$30,000
	Comments from AIC and ICC Staff	October 15, 2017	
	Final Report	November 1, 2017	
Total Budget			\$290,000

2.2 Residential Behavioral Modification

2.2.1 Program Description

Oracle Utilities administers the Behavioral Modification Program, which is designed to reduce energy consumption among AIC’s residential customers. AIC has offered the Behavioral Modification Program since August 2010, but this is the second year that the electric portion of the program has been adopted through the IPA procurement process. This evaluation plan discusses the evaluation of the electric portion of the program adopted through the IPA procurement process. Overall, the program seeks to:

- Reduce energy consumption by encouraging energy-efficient behaviors.
- Boost customer engagement and education by helping customers understand energy efficiency and how to save energy in their homes.
- Educate customers about no-cost and low-cost energy-saving measures and behaviors.

Table 6 provides a summary of program participation to date.

Table 6. Approximate Behavioral Modification Program Participation in PY9

Cohort Name	Fuel Type	Number of Treated Customers in PY8	Start Date	Program Year
Original Cohort	Dual Fuel	35,147	August 2010	7 th year in the program
Expansion Cohort 1	Dual Fuel	53,431	April 2011	6 th year in the program
Expansion Cohort 2	Dual Fuel	85,967	November 2011	6 th year in the program
Expansion Cohort 4	Dual Fuel	22,410	June 2013	4 th year in the program
Expansion Cohort 5	Dual Fuel	53,791	September 2014	3 rd year in the program
Expansion Cohort 6	Dual Fuel	34,954	April 2015	3 rd year in the program
Expansion Cohort 7	Dual Fuel	37,800	April 2016	2 nd year in the program
Expansion Cohort 8	Dual Fuel	44,000	September 2017	1 st year in the program
Total		367,500		

According to the PY9 Implementation Plan, the expected savings from this program are 34,000 MWh.

2.2.2 Evaluation Approach

As part of the most recent evaluation, we completed an assessment of energy impacts (including equivalency analysis, billing analysis, adjustment for double-counted savings, and review of participation lift over time) coupled with a survey of treatment and control customers. Our evaluation approach for PY9 will build on the findings from these prior activities, and address key questions regarding the energy savings impacts associated with the program. We will also pursue additional analyses for this program during the transition period from PY9 to PY 2018 (June 1, 2017 – December 31, 2017). The evaluation team will provide separate scopes of work for those efforts to AIC and ICC Staff.

Research Objectives

The PY9 Behavioral Modification Program evaluation is focused on the assessment of program impacts, and is structured to answer the following research questions:

1. How has the program changed since PY8? What, if any, changes are planned for PY10 that could be investigated as part of this evaluation?
2. Are the new treatment and control groups equivalent?
3. What are the estimated electric savings from the program for all cohorts in PY9?
4. Is the program achieving savings year-over-year for each of the cohorts?
5. Do estimated program savings need to be adjusted due to the treated population’s participation in other AIC programs? If yes, how much savings should be removed from the program?
6. If needed, what factors may explain the disparity between Oracle’s billing analysis results and the billing analysis results arrived at by the Opinion Dynamics team?

Evaluation Tasks

To achieve our research objectives, we will complete a series of evaluation tasks as outlined in Table 7. Additional detail regarding each task can be found following the table.

Table 7. Summary of Behavior Modification Program Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Staff Interviews	✓	✓	✓	Explore how the program has changed since PY8, as well as what, if any, augmentations are planned for PY10.
Program Materials Review	✓	✓		Review materials to assess program design, implementation, and operations.
Net Impact Analysis	✓		✓	Conduct billing analysis to quantify the changes in energy use among the treatment and control groups. Also perform a channeling analysis to ensure that savings were not double-counted from participation in other AIC residential programs.

Task 1: Program Staff Interviews

We will conduct telephone interviews with key program staff from AIC, Leidos, and Oracle. The interviews will provide us with a comprehensive understanding of the program and its implementation, including insights into the daily workings of the program, program changes in PY9, and areas of success and challenges.

Deliverable: Conducted interviews

Deliverable Date: June 2017

Task 2: Program Materials Review

The evaluation team will review the program-tracking database and other program materials, including the PY9 HERs. Through this review we will determine if there were any gaps present in the data, particularly around information required for the impact analysis.

Deliverable: Data request

Deliverable Date: June 2017

Deliverable: Findings included in annual report

Deliverable Date: October 2017

Task 3: Net Impact Analysis

The primary method used to determine program impacts is a billing analysis. Given the experimental design, the estimated savings are considered net savings. We will utilize treatment and control group monthly billing data to estimate net savings per household over the program period.

Because the evaluation team did not assign the customers to treatment and control groups in the new Expansion Cohorts 7, we will first conduct an equivalency analysis to ensure that the treatment and control groups are comparable.⁴ This review will strengthen the internal validity and defensibility of the research design. To assess equivalency, we will utilize Experian data appended to the treatment and control group's monthly usage data for Expansion Cohort 7, for all other cohorts we will assess equivalency based on prior energy consumption. Finally, we will conduct a review and comparison of Oracle's data cleaning and modeling methods to our data cleaning and modeling methods to understand why the two sets of billing results may differ.

Data sources for the PY9 impact evaluation include:

- For all customer treatment and control groups, electric consumption/billing data from June 2013 to May 2017
- Experian data (including demographic data, housing characteristics, and psychographic data) for Expansion Cohort 7
- AIC program tracking database for all residential programs from June 2016 to May 2017
- Data from Oracle to conduct exploratory analysis, including raw data files, any code used for data cleaning and analysis, final data files and model outputs.

Sampling

The billing analysis will include all cohorts except for Expansion Cohort 8, for which there will be insufficient post-period billing data to model savings. For Expansion Cohort 7, we will look at consumption as well as demographics, housing, and psychographic characteristics across the treatment and control populations, to be sure that the treatment and control groups are relatively comparable. If the populations are equivalent, no sampling will occur for the billing analysis, and we will include all available data in our analysis. However, if the treatment and control groups are found to be dissimilar, we will select two matched samples from the population of treatment and control group members for this analysis.

For the cohorts previously evaluated—Original Cohort, Expansion Cohort 1 through 6—some attrition might have occurred. Therefore, we will compare the treatment and control groups on pre-period usage only to ensure continued equivalence.

⁴ We will not assess Expansion Cohort 8 for equivalency in PY9 because this cohort will not be included in the impact analysis due to insufficient post-period billing data to model savings.

Equivalency Analysis

We will compare the Expansion Cohort 7 treatment customers to controls on demographic and other variables obtained from Experian. This will ensure that the random assignment of customers to treatment and control groups led to relatively comparable groups. A usage-only check will be performed on the earlier cohorts.

Below we detail some sample data points that we will use for the equivalency check.

Demographic Characteristics

Age	Education
Dwelling type	Homeowner/renter indicator
Estimated household income	Number of adults
Occupation group	Number of children

Household Characteristics

Building square footage	Year built
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Psychographic characteristics

Behavior bank (Social causes and concerns – environment)	Behavior bank (Computers – Internet/online subscriber or use Internet services)
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Deliverable: Data request

Deliverable Date: May 2017

Deliverable: Results provided in annual report

Deliverable Date: October 2017

Billing Analysis

The evaluation team will use an approach for PY9 that augments the PY8 approach. Specifically, based on conversations with program implementers, we will conduct an intent to treat (ITT) approach rather than an average treatment effect on the treated (ATT) approach. In implementing this approach, we will estimate savings using a difference-in-differences (DID) approach. The DID refers to the model’s implicit comparison of consumption before and after treatment of both treatment and control group customers. The model includes customer-specific intercepts (i.e., fixed effects) to capture unobserved differences between customers that do not change over time and which affect customers’ energy use.

We will report savings from three different models to aid comparisons to previous evaluations:

1. A simple overall model, as described in Equation 1, which is consistent with previous years’ evaluations
2. An overall model with the addition of weather adjustments, which allows year to year savings comparison
3. An overall model that incorporates post period only (consistent with vendor modeling)

All of these models will use an ITT approach. We will provide impact estimates for the program using the first model. The second model will be used to assess savings year over year. The third model is the model that the program implementer uses to estimate program impacts, as a result, we will run this model to ascertain whether there are any variations in savings due to model specifications.

Model 1: Overall Model

Equation 1: Overall Model Estimating Equation

$$ADC_{it} = \alpha_i + \beta_1 Post_{it} + \beta_2 Treatment_i \cdot Post_{it} + \varepsilon_{it}$$

Where:

ADC_{it} = Average daily consumption (therms) for household i at time t

α_i = Household-specific intercept

β_1 = Coefficient for the change in consumption between pre- and post-periods

β_2 = Coefficient for the change in consumption for the treatment group in the post-period compared to the pre-period, and to the control group. This is the basis for the net savings estimate.

$Treatment$ = Variable to represent treatment and control groups (0 = control group, 1 = treatment group)

$Post$ = Variable to represent the pre- and post-periods (0 = pre-period, 1 = post-period)

Model 2: Weather Adjusted Model

To enable accurate comparisons across program years, we will incorporate weather terms. These weather terms also improve the precision in the modeled results by accounting for possible differences in weather experienced by the analyzed population. Specifically, we will control for weather by entering heating degree days (HDD) and cooling degree days (CDD), using a base of 65 degrees Fahrenheit for HDD and 75 degrees Fahrenheit for CDD.

Equation 2: Weather Adjusted Model Estimating Equation

$$ADC_{it} = \alpha_i + \beta_1 Post_t + \beta_2 Treatment_i \cdot Post_t + \beta_3 HDD_{it} + \beta_4 CDD_{it} + \varepsilon_{it}$$

Where:

ADC_{it} = Average daily consumption (therms) for household i at time t

α_i = Household-specific intercept

β_1 = Coefficient for the change in consumption between pre and post periods

β_2 = Coefficient for the change in consumption for the treatment group in the post period compared to the pre period and to the control group. This is the basis for the net savings estimate.

β_3 = Coefficient for HDD

β_4 = Coefficient for CDD

$Post$ = Dummy variable for pre ($Post=0$) and post ($Post=1$), marked by receipt of the first report

$Treatment$ = Dummy variable for treatment ($Treatment=1$) and control ($Treatment=0$)

HDD_{it} = Sum of heating degree days (base 65 degrees Fahrenheit)

CDD_{it} = Sum of cooling degree days (base 75 degrees Fahrenheit)

ε_{it} = Error

Model 3: Post Only Model

To enable comparisons to vendor supported models, we will employ the following estimating equation. This model can also be used for year to year comparison.

Equation 3: Post-Only Model Estimating Equation

$$ADC_{it} = \alpha_i + \beta_1 Treatment_i + \beta_2 PreUsage_i + \beta_3 PreWinter_t + \beta_4 PreSummer_i + \beta_5 MonthYear_t + \beta_6 PreUsage_i \cdot MonthYear_t + \beta_7 PreWinter_i \cdot MonthYear_t + \beta_8 PreSummer_i \cdot MonthYear_t + \varepsilon_{it}$$

Where:

ADC_{it} = Average daily consumption (therms) for household i at time t

α_i = Household-specific intercept

β_1 = Coefficient for the change in consumption for the treatment group

β_2 = Coefficient for the average daily usage across household i available pre-treatment meter reads

β_3 = Coefficient for the average daily usage over the months of December, January, February, and March across household i available pre-treatment meter reads

β_4 = Coefficient for the average daily usage over the months of June, July, August, and September across household i available pre-treatment meter reads

β_5 = Vector of coefficients for month- year dummies

β_6 = Vector of coefficients for month- year dummies by average daily pre-treatment usage

β_7 = Vector of coefficients for month- year dummies by average daily winter pre-treatment usage

β_8 = Vector of coefficients for month- year dummies by average daily summer pre-treatment usage

$Treatment_i$ = Dummy variable for treatment (Treatment=1) and control (Treatment=0)

$MonthYear_t$ = Vector of month-year dummies

$PreWinter_i$ = Average daily usage for household i over the pre-participation months of December, January, February, and March

$PreSummer_i$ = Average daily usage for household i over the pre-participation months of June, July, August, and September

ε_{it} = Error

Results of the billing analyses conducted by Oracle and Opinion Dynamics have been discrepant in previous evaluations. As such, if we find differences in the vendor and evaluated impact estimates, we will conduct

additional review of data cleaning approaches to identify the source (or sources) of these differences. To do this, we will request raw and cleaned billing analysis data files from Oracle, as well as the corresponding code and model outputs for PY9. These items will be carefully compared to our data cleaning code and model outputs to determine where our processes are differing and how these differences affect billing analysis results.

Channeling Analysis

We will calculate a savings adjustment to account for the portion of net savings estimated from the billing analysis that has been claimed by other AIC programs. Savings from the Behavioral Modification Program reflect both non-purchase behavioral changes, such as turning off lights in unoccupied rooms and adjusting thermostat settings, and investments in energy-saving equipment, such as high-efficiency furnaces and compact fluorescent lamps (CFLs), or other purchase behaviors. Savings from measures that were rebated through AIC's energy efficiency programs appear in both the Behavioral Modification Program and the rebate programs, and thus would be double-counted if an adjustment were not made.

This piece of the savings will be subtracted from the savings estimated by billing analysis. Customers in the treatment and control groups are assumed to receive the same treatment from the utility for the program promoting Measure A (i.e., they face the same marketing and incentives). Because customers were randomly assigned to the treatment and control groups, any difference between the groups in the installation of Measure A can be attributed to the Behavioral Modification Program. We will base the savings associated with participation in other AIC programs on the deemed savings values associated with the measures other programs have claimed in PY7. As such, we will conduct a participation lift and channeling analysis (incorporating historical trend analysis) to assess trends in program participation over time and adjusted net savings estimates. This analysis will also account for and remove channeling savings for current participants from prior program years (PY3-PY8).

Deliverable: Data request

Deliverable Date: June 2017

Deliverable: Results provided in annual report

Deliverable Date: October 2017

Task 4: Reporting

The evaluation team will compose a draft report of findings for AIC and ICC staff review. We will then deliver a final report that incorporates any comments from the review.

Deliverable: Draft report

Deliverable Date: October 2017

Deliverable: Final report

Deliverable Date: November 2017

2.2.3 Evaluation Budget and Timeline

Table 8 summarizes the timing of each evaluation activity, as well as the budget associated with each task. In total, the PY9 budget for the Behavioral Modification Program is \$42,000. Note that all evaluation activities are conducted in conjunction with the AIC Behavioral Modification Program.

Table 8. Behavioral Modification Program PY9 Evaluation Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Review Program Materials and Database	May 2017	\$2,500
2	Program Staff Interviews	May 2017	\$2,500
3	Net Impact Analysis	October 2017	\$24,000
4	Draft Report	October 1, 2017	\$13,000
	Comments from AIC and ICC Staff	October 15, 2017	
	Final Report	November 1, 2017	
Total			\$42,000

2.3 Community Based CFL Distribution Program

2.3.1 Program Description

In PY9, the IPA procurement process approved funding for the distribution of high efficiency light bulbs through food banks via the Community Based CFL Distribution Program in the AIC service territory. The program makes CFL lighting, typically more expensive than less efficient alternatives, available to lower-income customers. Bulbs are distributed in four-packs and eligible households may receive up to two four-packs per program year. The packages are branded with the AIC logo, or distributed with literature to indicate the bulbs are from AIC.

The program expects to distribute 630,000 bulbs in PY9. The implementer coordinates with manufacturers to distribute pallet shipments to each of five participating food banks, which then distribute the bulbs to their agency food pantries. Each food bank has between 13 and 86 pantries.

2.3.2 Evaluation Approach

Research Objectives

Impact Questions

The PY9 Community Based CFL Distribution Program evaluation seeks to estimate gross and net electric and natural gas savings associated with the program. The evaluation team will use the PY9 impact evaluation to answer the following 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 will conduct a limited process evaluation to explore how the program performed during its fourth year and to answer the following process-related questions:

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

Evaluation Tasks

Table 15 summarizes the PY9 evaluation activities conducted for the Community Based CFL Distribution Program.

Table 9. Summary of Community Based CFL Distribution Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Materials Review	✓	✓		Review program materials to understand program design and delivery.
Program Staff Interviews		✓		Interview program staff to gather insights on program implementation, challenges, and future plans.
Participant Survey	✓		✓	Survey bulb recipients to gather satisfaction and installation data.
Impact Analysis	✓		✓	Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Materials Review

The evaluation team will review all program documents, including records of marketing and outreach efforts, instructional materials, and all other paperwork. The data request will include critical program documentation, such as:

- Program tracking database (all available data)
- Specification sheets for each item included in the light bulb kits
- Program instructional materials
- All program marketing materials
- Any documentation of implementation processes

The team will make a data request in April 2017.

Deliverable: Data request

Deliverable Date: April 2017

Task 2: Program Staff Interviews

The evaluation team will perform up to three qualitative interviews with IPA program staff, implementation contractors, and other relevant program stakeholders, focusing on program goals and progress toward meeting these goals. Additionally, the evaluation team will explore:

- Program design and implementation
- Program strengths and weaknesses
- Outreach, marketing, and customer education

Deliverable: Conducted interviews

Deliverable Date: June 2017

Task 3: Participant Survey

Survey Contacts

Food pantries do not like to collect contact data or other information from customers. Therefore, in order to identify bulb recipients to survey, the evaluation team will use a system of voluntary registration. The evaluation team will print and deliver registration cards to the food banks to be distributed along with the bulbs. The card will ask if the respondent is an AIC customer, and what bulbs the customer has received, in addition to their phone number or email address. Participants will be asked to complete and return the card to the food pantry to enter into a drawing for one of five \$200 VISA gift cards.

Pantries and food banks will collect the cards and deliver them to the program implementer. The implementer will send the cards to the evaluation team on a monthly, or rolling basis.

Sample

The evaluation team printed 50,000 postcards that were provided to Food Banks and given out with bulb distributions. The completed cards provide a contact list for follow-up phone or email surveys with participants. The evaluation team will enter data from a random sample of 1,500 completed cards, stratified by food bank, to make up the survey sample frame. We expect a survey response rate of around 5%, making a large number of contacts necessary to achieve a sample of 70 respondents. A sample of 70 will provide 90% confidence with +/-10% precision.

Incentive

To distribute the incentive, the evaluation team will randomly select five postcards from all postcards submitted with customer contact information. Survey participation is not necessary to receive the incentive. (The incentive is offered in exchange for completing and submitting the contact card).

Deliverable: Analysis provided in interim memo

Deliverable Date: June 2017

Task 4: Impact Analysis

The evaluation team will use the IL-TRM V5.0 to estimate the program's PY9 ex post gross savings. The team will use online and phone surveys to determine the installation rate and review all data in the program tracking database (to verify participation). We will, apply the IL-TRM V5.0 to estimate gross savings, and apply the 100% deemed NTGR approved by the SAG.

Deliverable: Analysis included in draft report

Deliverable Date: July 2017

Deliverable: Analysis included in final report

Deliverable Date: August 2017

Task 5: Reporting

The evaluation team will compose a draft report of findings for AIC and ICC staff review. We will then deliver a final report that incorporates any comments from the review.

Deliverable: Draft report

Deliverable Date: July 2017

Deliverable: Final report

Deliverable Date: August 2017

2.3.3 Evaluation Budget and Timeline

Table 10 summarizes the timing of each evaluation activity. Table 10Table 20 also lists the budget associated with each task. The total budget for the PY9 Community Based CFL Distribution Program evaluation is \$50,000.

Table 10. Community Based CFL Distribution Program PY9 Evaluation Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Request and Review Data from Utility	April 2017	\$2,000
2	Program and Implementation Staff Interviews	June 2017	\$2,000
3	Participant Survey	June 2017	\$26,000
4	Impact Analysis	July 2017	\$8,000
5	Draft Report	July 15, 2017	\$12,000
	Comments from AIC and ICC Staff	August 1, 2017	
	Final Report	August 15, 2017	
Total Budget			\$50,000

2.4 Residential Moderate Income Kits

2.4.1 Program Description

The Moderate Income Kits Program was offered for the first time in PY8. The program provides kits containing energy-efficient items to AIC customers with a household income up to 300% of the federal poverty guidelines through an opt-in mail delivery approach. The program seeks to reduce energy consumption among a hard-to-reach population.

Leidos and AM Conservation Group deliver the Moderate Income Kits program. Leidos implements the program and AM Conservation Group provides program management and kit fulfillment services. Marketing and enrollment services are also provided under AM Conservation Group in collaboration with their program partner Direct Options. AIC Provides over all activities and program implementation staff.

According to the program implementation plan, the savings target for the PY9 Moderate Income Kits Program is 1,467 MWh.

2.4.2 Evaluation Approach

The PY9 assessment of the Moderate Income Kits Program includes both process and impact analyses as outlined in the following sections.

Research Objectives

Impact Questions

The PY9 Moderate Income Kits Program evaluation seeks to estimate gross and net electric and natural gas savings associated with the program. The evaluation team will use the PY9 impact evaluation to answer the following 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?
3. What were the installation rates of each kit item?
4. What is the free-ridership and spillover associated with the program?

Process Questions

The team will also conduct a limited process evaluation, designed to explore how the program performed during its second year and to answer the following process-related questions:

5. Program Participation
 - a. How many kits were distributed to participants throughout the year?
 - b. Did the program achieve its PY9 participation and electric energy savings goals?
6. Program Design and Implementation
 - a. Did program design or delivery change in PY9 compared to PY8?

- b. What implementation challenges occurred?
- c. What changes could AM Conservation Group make to improve the program’s effectiveness?
- d. What quality assurance and quality control processes does the program have in place? Are they sufficient to ensure that the program distributes high quality products and that measures are installed by moderate income customers?

Evaluation Tasks

Table 11 summarizes the PY9 evaluation activities conducted for the Moderate Income Kits Program.

Table 11. Summary of Moderate Income Kits Program Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Materials Review	✓	✓		Review the implementation plan, program marketing materials, and kit instructional materials.
Program Staff Interviews		✓		Interview program and implementation staff members to gain insights into the program’s design and delivery, challenges, and future plans.
Participant Survey		✓	✓	Survey kit recipients to gather installation, NTG, and satisfaction data.
Impact Analysis	✓		✓	Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Materials Review

The evaluation team will review all program documents, including records of marketing and outreach efforts, instructional materials, and all other paperwork. The team’s data request will include critical program documentation, such as:

- Program tracking database (all available data)
- Specification sheets for each item included in the energy efficiency kits
- Program instructional materials
- All program marketing and recruitment materials
- Any documentation of implementation processes

The team will make an initial data request in June 2017, with subsequent requests in August 2017 to obtain the final program tracking database.

Deliverable: Data request

Deliverable Date: June 2017 and August 2017

Task 2: Program Staff Interviews

The evaluation team will perform qualitative interviews with IPA program staff, implementation contractors, and other relevant program stakeholders, focusing on program goals and progress toward meeting these goals. Additionally, the evaluation team will explore the following:

- Program design and delivery
- Program strengths and weaknesses
- Outreach and marketing

Deliverable: Conducted interviews

Deliverable Date: June 2017

Task 3: Participant Survey

The evaluation team will conduct a telephone survey with program participants to estimate installation rates and assess free-ridership, spillover, and the program participation process. Process-related issues examined will include participant decision making and satisfaction. The team will use the program tracking database to develop the survey sample. We anticipate fielding the survey in September 2017 after gathering participant data from AIC.

Deliverable: Draft and final surveys

Deliverable Date: July 2017

Task 4: Impact Analysis

The evaluation team will use the program tracking database to verify participation. The team will calculate gross impacts by multiplying the number of verified measures by the deemed unit savings for each measure, as indicated in the IL-TRM V5.0. The team will derive any gross savings inputs not tracked in the program database (e.g., electric water heater saturation) from the participant survey.

The evaluation team will apply verified installation rates from the IL-TRM V5.0, as listed in Table 12. The team may also use the PY9 participant survey to inform program installation rates for future IL-TRM and NTG updates.

Table 12. Moderate Income Kits Program PY9 Installation Rates

Measure Description	Installation Rate
13-watt CFLs	66%
23-watt CFLs	66%
1.5 GPM Bath Faucet Aerator	63%
1.5 GPM Kitchen Swivel Faucet Aerator	60%
1.5 GPM Chrome High-Efficiency Showerhead	65%

To calculate net savings for PY9, the team will apply the SAG-approved NTGR (Table 13) to ex post gross savings.

Table 13. Moderate Income Kits Program PY9 NTGR

Measure Description	NTGR
All Measures	1.00

Deliverable: Analysis included in draft report

Deliverable Date: October 2017

Deliverable: Analysis included in final report

Deliverable Date: November 2017

Task 5: Reporting

The evaluation team will summarize and report on data drawn from the PY9 evaluation activities, provide a draft report for stakeholders’ review, and incorporate responses into the final report.

Deliverable: Draft report

Deliverable Date: October 2017

Deliverable: Final report

Deliverable Date: November 2017

2.4.3 Evaluation Budget and Timeline

Table 14 summarizes the timing of each evaluation activity. Table 14 also lists the budget associated with each task. The total budget for the PY9 evaluation of the Moderate Income Kits Program is \$40,000.

Table 14. Moderate Income Kits Program PY9 Evaluation Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Request and Review Data from Utility	June 2017 and August 2017	\$2,000
2	Program and Implementation Staff Interviews	June 2017	\$2,500
3	Participant Surveys	September 2017	16,000
4	Impact Analysis	October 2017 and November 2017	\$7,500
5	Draft Report	October 2017	\$12,000
	Comments from AIC and ICC Staff	November 2017	
	Final Report	November 2017	
Total Budget			\$40,000

2.5 Residential Multifamily Major Measures

2.5.1 Program Description

The IPA Multifamily Program offers incentives and services that enable energy savings and lower operating costs in market-rate multifamily housing. Program administrators deliver common area and major measures using a hybrid approach that leverages program implementation staff from CLEAResult, as well as program allies:⁵

- **Common areas:** The IPA program offers common area measures to multifamily buildings, including LED exit signs and occupancy sensors, at no cost to the property manager. The program implementer conducts outreach and recruitment of participants for the common area component of the program. Property managers are responsible for the installation of common area measures, which is carried out by the property maintenance staff or a third-party contractor
- **Major measures:** Program staff within the IPA Multifamily Program offer insulation and air sealing to customers with electric heating. Program allies are responsible for generating leads, bringing customers into the major measures component, and performing all major measure installations. IPA provides incentives to participants for the major measures component on a performance basis in terms of total CFM reduction.

According to the PY9 implementation plan, the expected savings from this program are 19,798 MWh.

2.5.2 Evaluation Approach

Research Objectives

Impact Questions

The objective of the PY9 IPA Multifamily Program evaluation is to provide estimates of gross and net electric and gas savings associated with the program. In particular, the PY8 impact evaluation will answer the following 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 will also explore a number of process-related research questions as part of the PY9 evaluation.⁶ Through these questions, we will benchmark the IPA Multifamily Program against other multifamily programs, explore the program design and implementation process, and potential opportunities to improve program participation.

⁵ There is also a Multifamily Program offered through AIC. It focuses on direct install, common areas, and major measures components (see the AIC Plan). The AIC program's common area lighting component includes a different measure mix than the IPA Multifamily Program (Lighting only), whereas its major measures program offers the same types of measures as the AIC program, but to customers with gas heat rather than electric heat.

⁶ The evaluation team will conduct these activities in conjunction with our evaluation of the AIC Multifamily Program.

Program Participation

3. How many projects were completed? By how many different customers? What types of projects?

Program Design and Implementation

4. Has the program changed compared to PY8? If so, how, why, and was this an advantageous change?
5. What implementation challenges have occurred in PY9, and how has the program overcome them?
6. Trade Allies
 - a. Did trade ally participation meet expectations? If not, how different is it and why?
 - b. How do trade allies work with property managers to select and install measures?
 - c. How satisfied were trade allies with different aspects of the program?
 - d. What was the impact of program participation on trade allies' business and practices?
 - e. What changes would trade allies suggest to improve the program?
7. Program Benchmarking
 - a. To set a baseline for benchmarking, what progress towards program goals have the AIC and IPA Multifamily Programs (combined) made since PY1 (2008)? To frame benchmarking results, what changes are anticipated for PY10?
 - b. How do the AIC and IPA Multifamily Programs' outcomes compare to other multifamily programs throughout the United States, in context of factors like multifamily market characteristics, program goals, and program design and implementation?
 - c. What best practices and lessons learned from other programs could enhance the AIC and IPA programs' design and implementation to achieve additional savings?

Evaluation Tasks

Table 15 summarizes the PY9 evaluation activities conducted for the IPA Multifamily Program.

Table 15. Summary of Multifamily Program Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Staff Interviews		✓		Conduct interviews with IPA and CLEAResult program managers to understand changes in program design and implementation.
Program Materials Review		✓		Review the PY9 database, relevant administrative program reports, and marketing and outreach materials to document program design and changes since PY8.
Trade Ally Interviews		✓	✓	Investigate program participation levels, program participation processes, trade ally satisfaction, barriers to participation, and impacts of program participation on trade ally business and practices.
Program Benchmarking Literature Review			✓	Compile changes made to the AIC and IPA programs since PY4; review multifamily program best-practices; gather information about peer programs' market context, goals, processes, and success metrics; and, compare the AIC and IPA programs to peer programs.
Impact Analysis	✓			Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Staff Interviews

We plan to conduct detailed interviews with IPA, Leidos, and CLEAResult program staff at the end of the program year to get staff perspective on program performance and detailed information on program marketing. In total, we expect to complete three interviews with IPA, Leidos, and CLEAResult program staff.

Deliverable: Conducted interviews

Deliverable Date: May 2017

Task 2: Program Materials Review

The team will conduct a comprehensive review of all program materials and tracking data. This includes program marketing and implementation plans, customer and program ally communications, and extracts from the program tracking database. We will review all program materials to document the design and implementation of the PY9 program.

Deliverable: Data request

Deliverable Date: May 2017

Task 3: Trade Ally Interviews

Trade allies play an important role in marketing and implementing the IPA multifamily program. Furthermore, trade allies offer an important perspective on the multifamily property market. The team will conduct up to ten interviews with participating trade allies in PY9. Interviews will investigate such topics as trade allies' success in bringing projects into the program, barriers to participation, trade ally satisfaction, any impacts of program participation on trade ally business and practices, and trade allies' suggestions for program improvement. In particular, the team will use information from these interviews to understand multifamily market saturation from the trade allies' perspective.

Deliverable: Draft and final interview guide

Deliverable Date: June 2016

Deliverable: Results provided in annual report

Deliverable Date: September 2016

Task 4: Program Benchmarking Literature Review

Program benchmarking is the “process of gathering, tracking, and assessing a program’s current performance against past results in order to measure progress over time, or to compare results to a peer group.”⁷ The team will complete a secondary literature review in support of benchmarking the Ameren Multifamily Program (AIC and IPA components). Specifically, the evaluation team will document the AIC and IPA Multifamily Programs’ evolution over time (PY4-PY9) and will compare the PY9 program to other multifamily direct-install programs in the United States. Key sources will include American Council for an Energy Efficient Economy (ACEEE) multifamily energy efficiency program best practice reports and recent program evaluation reports of comparable multifamily programs.

The evaluation team will focus on benchmarking specific program elements, including context (e.g., multifamily market saturation), program design and implementation (e.g., trade ally networks, customer marketing strategies, incentives), measure offerings, and evaluated outcomes (i.e., results of impact and process evaluations). Based on the benchmarking results, we will recommend best practices and lessons-learned that can enhance the AIC and IPA programs’ design and implementation to achieve additional savings moving forward.

Deliverable: Memo provided separately from annual report

Deliverable Date: July 2017

Task 5: Impact Analysis

To determine gross impacts associated with the Multifamily Program, we plan to review contents of the program tracking database to identify database errors and duplicate records and to ensure that the implementer correctly applied savings algorithms and assumptions stated in the IL-TRM V5.0. We will resolve any discrepancies found in the database, report on findings, and provide details related to any gross savings adjustments. We will apply the algorithms and assumptions provided in the IL-TRM V5.0 while using the actual data from the database. We will also provide detailed algorithms and assumptions used to calculate ex post gross energy and demand impacts by measure type.

⁷ Guide for Benchmarking Residential Energy Efficiency Program Progress. 2014. Report prepared for the U.S. Department of Energy. Available online: https://energy.gov/sites/prod/files/2014/11/f19/bbr_program_benchmarking_guide_draft_nov2014_0.pdf

We will calculate PY9 ex post net savings for the IPA Multifamily Program by applying SAG-approved NTGRs to ex post gross electric and gas savings. Table 16 presents the NTGRs that we will apply to PY9 savings, by measure.

Table 16. Multifamily Program PY9 NTGRs

Measure Description	Electric NTGR	Gas NTGR
Common Area - Lighting	0.83	N/A
Major Measures - Insulation	0.88	0.75
Major Measures - Air Sealing	0.96	0.81

Task 6: Reporting

The evaluation team will compose a draft report of findings for AIC and ICC staff review. We will then deliver a final report that incorporates any comments from the review.

Deliverable: Draft report

Deliverable Date: October 2017

Deliverable: Final report

Deliverable Date: November 2017

2.5.3 Evaluation Budget and Timeline

Table 17 summarizes the timing and budget associated with each evaluation activity.

Table 17. Multifamily Program Evaluation Schedule and Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Program Staff Interviews	May 2017	\$1,500
2	Program Materials Review	May 2017	\$2,000
3	Trade Ally Interviews	July 2017	\$8,000
4	Multifamily Program Literature Review	September 2017	\$8,000
5	Impact Analysis	September 2017	\$11,000
6	Draft Report	September 29, 2017	\$9,500
	Comments from AIC and ICC Staff	October 15, 2017	
	Final Report	November 1, 2017	
Total Budget			\$40,000

2.6 Residential Rural Efficiency Kits

2.6.1 Program Description

The Rural Efficiency Kits Program provides unsolicited, direct-mail energy efficiency kits to its rural customers who may not have access to energy-efficient products (i.e., high efficiency light bulbs, faucet aerators, showerheads, and hot water temperature card thermometers [typically found in larger markets and big box stores]). The program seeks to increase sales and awareness of energy-efficient products, along with other energy-saving program opportunities, and to reduce energy consumption. PY9 is the fourth year of the program.

CLEAResult and EFI deliver the Rural Kits Program. CLEAResult implements the program, and EFI mails branded kits and marketing materials directly to customers, drawing on lists created and screened by CLEAResult. The AIC logo brands each kit, which contains installation and usage instructions. According to the program implementation plan, the savings target for the PY9 Rural Kits Program is 5,490.786 MWh

2.6.2 Evaluation Approach

Research Objectives

Impact Questions

The PY9 Rural Kits Program evaluation seeks to estimate gross and net electric and natural gas savings associated with the program. The evaluation team will use the PY9 impact evaluation to answer the following 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 will conduct a limited process evaluation to explore how the program performed during its fourth year and to answer the following process-related questions:

3. Program Participation
 - a. How many kits were distributed to participants?
4. Program Design and Implementation
 - a. How did the program change since PY8?
 - b. What implementation challenges occurred in PY9?
 - c. What changes could CLEAResult make to improve program effectiveness?
 - d. What quality assurance and quality control processes does the program have in place? Are they sufficient to ensure that the program distributes high quality products and that measures are installed by customers?

Evaluation Tasks

Table 18 summarizes the PY9 evaluation activities conducted for the Rural Kits Program.

Table 18. Summary of Rural Kits Program Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Materials Review	✓	✓		Review the implementation plan, program materials, and instructional materials.
Program Staff Interviews		✓		Interview program and implementation staff members to gain insights into the program’s design and delivery.
Impact Analysis	✓			Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Materials Review

The evaluation team will review all program documents, including records of marketing and outreach efforts, instructional materials, and all other paperwork. The data request will include critical program documentation, such as:

- Program tracking database (all available data)
- Specification sheets for each item included in the energy efficiency kits
- Program instructional materials
- All program marketing materials
- Any documentation of implementation processes

The team will make an initial data request in May 2017.

Deliverable: Data request

Deliverable Date: May 2017

Task 2: Program Staff Interviews

The evaluation team will perform up to three qualitative interviews with IPA program staff, implementation contractors, and other relevant program stakeholders, focusing on program goals and progress toward meeting these goals. Additionally, the evaluation team will explore:

- Program changes since PY8, including progress in developing a follow-up procedure for past participants
- Program design and implementation

- Program strengths and weaknesses
- Outreach, marketing, and customer education

Deliverable: Conducted interviews

Deliverable Date: June 2017

Task 3: Impact Analysis

The evaluation team will use the IL-TRM V5.0 to estimate the program’s PY9 ex post gross savings. The team will review all data in the program tracking database (to verify participation), apply the IL-TRM V5.0 to estimate gross savings, and apply deemed NTGRs to participants. The team will apply electric water heater saturation (87%) from the PY7 participant survey and use the installation rates indicated in the IL-TRM V5.0 for all measures.

To calculate net savings for PY9, the evaluation team will apply SAG-approved NTGRs (listed in Table 19) to ex post gross savings for each measure.

Table 19. Rural Efficiency Kits Program PY9 NTGR

Measure Description	NTGR
CFLs	0.851
Showerheads	0.941
Faucet Aerators	1.004
Water Heater Setback	1.000

Deliverable: Analysis included in draft report

Deliverable Date: August 2017

Deliverable: Analysis included in final report

Deliverable Date: September 2017

Task 4: Reporting

The evaluation team will summarize and report on data from the PY9 evaluation activities, providing a draft report for stakeholders’ review, and then incorporating resulting comments into the final report.

Deliverable: Draft report

Deliverable Date: August 2017

Deliverable: Final report

Deliverable Date: September 2017

2.6.3 Evaluation Budget and Timeline

Table 20 summarizes the timing of each evaluation activity. Table 20 also lists the budget associated with each task. The total budget for the PY9 Rural Kits Program evaluation is \$17,000.

Table 20. Rural Efficiency Kits Program PY9 Evaluation Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Request and Review Data from Utility	May 2017	\$2,000
2	Program and Implementation Staff Interviews	June 2017	\$2,000
3	Impact Analysis	August 2017	\$5,000
4	Draft Report	August 1, 2017	\$8,000
	Comments from AIC and ICC Staff	August 15, 2017	
	Final Report	September 1, 2017	
Total Budget			\$17,000

2.7 Small Business Direct Install Program

2.7.1 Program Description

The Small Business Direct Install (SBDI) Program began as a pilot in PY5 as part of the AIC Business Program and was fully launched in PY6 as an IPA program. The program offers AIC business customers in the DS-2 rate code energy-efficient measures, including CFLs, LEDs, LED exit signs, occupancy sensors, and T12 to T8 retrofits.

There are two key entities involved in program delivery: small business energy advisors (SBEAs) and small business program allies (SBPAs). The SBEAs are program staff members who conduct outreach to customers and perform energy assessments for participants. They also work with SBPAs—program-qualified electrical contractors who install eligible measures and, in many cases, provide turnkey services by performing energy assessments as well. The implementation of the SBDI Program remains similar to PY8 with the only major change being an increase in the number of post-inspections conducted. In PY8, Franklin Energy exceeded its target of performing post-inspections on 5% of projects with incentives less than \$10,000. In PY9, Franklin Energy increased the percentage of total projects post-inspected from 5% to 10%; 100% of projects with incentives over \$10,000 were post-inspected.

According to the program implementation plan, the energy savings target for the PY9 SBDI Program is 11,642 MWh.

2.7.2 Evaluation Approach

Research Objectives

This evaluation addresses program performance in PY9. The research objectives, which cover both impact and process analyses, are presented in the following sections. Section 3.1 provides information about cross-cutting research pertaining to small business customers.

Impact Questions

A central objective of the PY9 SBDI Program evaluation is to provide estimates of gross and net electric savings associated with the program. In particular, the PY9 impact evaluation will answer the following 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

We will also conduct a limited process assessment addressing the following questions:

3. Program Participation
 - a. What were the characteristics of participating customers? How many projects were completed? By how many different customers? What types of projects?
 - b. Did customer participation meet expectations? If not, how different was it and why?
4. Program Design and Implementation

- a. Was the program implemented as planned? If not, what changes were made, and why?
- b. What, if any, implementation challenges occurred in PY9, and how were they overcome?

We will explore each of these questions through the activities described in this evaluation plan.

Evaluation Tasks

Table 21 summarizes the PY9 evaluation activities conducted for the SBDI Program.

Table 21. Summary of Small Business Direct Install Program Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Staff Interviews		✓		Explore changes made since PY8, and gather information about program marketing and implementation.
Program Materials Review	✓	✓		Comprehensive review of program data to assess any changes in program processes or impacts.
Impact Analysis	✓			Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Staff Interviews

The evaluation team will conduct up to three in-depth interviews with program and implementation staff (AIC and Franklin Energy) involved in the design and administration of the SBDI Program. These interviews will allow us to fully explore the details of the program design and implementation, and to examine the staff perspective on program performance. We will schedule these in-depth interviews toward the end of the program year and will conduct them over the telephone.

Deliverable: Interviews conducted

Deliverable Date: June 2017

Task 2: Program Materials Review

The team will conduct a comprehensive review of all tracking data and program materials. This includes program marketing and implementation plans, program marketing materials, and extracts from the program tracking database.

Deliverable: Data requests

Deliverable Date: June 2017

Task 3: Impact Analysis

As noted throughout the plan, the team will use the IL-TRM V5.0 to calculate ex post gross savings associated with the measures installed through the program. We will estimate PY9 net savings by applying the SAG-approved NTGR for the program (0.89) to gross electric savings.

Deliverable: Results provided in annual report

Deliverable Date: September 2017

Task 4: Reporting

The team will provide an annual evaluation report containing process and impact results for the SBDI Program.

Deliverable: Draft report

Deliverable Date: October 2017

Deliverable: Final report

Deliverable Date: November 2017

2.7.3 Evaluation Budget and Timeline

Table 22 summarizes the timing and budget associated with each evaluation activity. In total, the PY9 budget for the SBDI Program evaluation is \$32,500.

Table 22. Small Business Direct Install Program PY9 Evaluation Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Program Staff Interviews	June 2017	\$2,700
2	Program Materials Review	June 2017	\$3,800
3	Gross Impact Analysis	September 2017	\$15,000
4	Draft Report	October 1, 2017	\$11,000
	Comments from AIC and ICC Staff	October 15, 2017	
	Final Report	November 1, 2017	
Total Budget			\$32,500

2.8 Small Business Cooler Savings Program

2.8.1 Program Description

The Small Business Cooler Savings Program was first launched as the Small Business Refrigeration Program in PY8. The program provides direct install refrigeration and freezer measures to small business customers in AIC's DS-2 rate class. The program targets independent grocers, bars and restaurants, convenience stores, and liquor stores that have refrigerators and freezers for food and beverages, as well as refrigerated cases for other food or beverage items.

The Small Business Cooler Savings Program is implemented by Staples Energy and uses a network of program allies to reach potential participants. The participation process begins with a free energy assessment conducted by a program ally using Energy Snapshot, an electronic tablet-based assessment tool, to gather information about the business and to identify potential opportunities for the installation of energy-efficient refrigeration equipment. After the assessment is complete, the customer receives a report that includes a list of recommended measures. If a customer chooses to complete a project, the program pays incentives that cover between some and all of the cost of the measure, including the installation cost.

The implementation of the Small Business Cooler Savings Program is consistent with PY8. The only major change being the addition of four new measures and the removal of eight under-performing measures. According to the program implementation plan, the energy savings target for the PY9 Small Business Cooler Savings Program is 8,205 MWh.

2.8.2 Evaluation Approach

Research Objectives

This evaluation addresses program performance in PY9. The research objectives, which cover both impact and process analyses, are presented in the following sections. Section 3.1 provides information about cross-cutting research pertaining to small business customers.

Impact Questions

The objective of the PY9 Small Business Cooler Savings Program evaluation is to provide estimates of gross and net electric savings associated with the program. In particular, the PY9 impact evaluation will answer the following 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

We will also conduct a limited process assessment addressing the following questions:

3. Program Participation
 - a. What were the characteristics of participating customers? How many projects were completed? By how many different customers? What types of projects?
 - b. Did customer participation meet expectations? If not, how different was it and why?

4. Program Design and Implementation

- a. Was the program implemented as planned? If not, what changes were made, and why?
- b. What, if any, implementation challenges occurred in PY9, and how were they overcome?

We will explore each of these questions through the activities described in this evaluation plan.

Evaluation Tasks

Table 23 summarizes the PY9 evaluation activities conducted for the Small Business Cooler Savings Program.

Table 23. Summary of Small Business Cooler Savings Program Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Staff Interviews		✓		Explore changes made since PY8 and gather information about program marketing and implementation.
Program Materials Review	✓	✓		Comprehensive review of program data to assess any changes in program processes or impacts.
Impact Analysis	✓			Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Staff Interviews

The evaluation team will conduct up to three in-depth interviews with program and implementation staff (AIC and Staples Energy) involved in the design and administration of the Small Business Cooler Savings Program. These interviews will allow us to explore the details of the program design and implementation, and to examine the staff perspective on program performance. We will schedule these in-depth interviews toward the end of the program year and will conduct them over the telephone.

Deliverable: Interviews conducted

Deliverable Date: June 2017

Task 2: Program Materials Review

The team will conduct a comprehensive review of all tracking data and program materials. This includes program marketing and implementation plans, program marketing materials, and extracts from the program tracking database.

Deliverable: Data requests

Deliverable Date: June 2017

Task 3: Impact Analysis

As noted throughout the plan, the team will use the IL-TRM V5.0 to calculate ex post gross savings associated with the measures installed through the program. We will estimate PY9 net savings by applying the SAG-approved NTGR for the program (0.86) to gross electric savings.

Deliverable: Results provided in annual report

Deliverable Date: September 2017

Task 4: Reporting

The team will provide an annual evaluation report containing process and impact results for the Small Business Cooler Savings Program.

Deliverable: Draft report

Deliverable Date: October 2017

Deliverable: Final report

Deliverable Date: November 2017

2.8.3 Evaluation Budget and Timeline

Table 24 summarizes the timing and budget associated with each evaluation activity. In total, the PY9 budget for the Small Business Cooler Savings Program evaluation is \$32,500.

Table 24. Small Business Cooler Savings Program PY9 Evaluation Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Program Staff Interviews	June 2017	\$2,700
2	Program Materials Review	June 2017	\$3,800
3	Gross Impact Analysis	September 2017	\$15,000
4	Draft Report	October 1, 2017	\$11,000
	Comments from AIC and ICC Staff	October 15, 2017	
	Final Report	November 1, 2017	
Total Budget			\$32,500

2.9 Private Sector Enhanced Building Optimization Program

2.9.1 Program Description

The Private Sector Enhanced Building Optimization Program was offered for the first time in PY9. The program provides HVAC optimization strategies to small business customers in AIC's DS-2 rate class. The program targets businesses in the private sector including retail centers, small office buildings, and private schools.

The Private Sector Enhanced Building Optimization Program is implemented by 360 Energy Group and relies on a network of program allies. The program consists of three main components:

- **Tune-Up:** A free comprehensive tune-up of under-maintained packaged roof top units and split systems. Tune-ups include a thorough cleaning/checking of the HVAC equipment and the installation of new filters and cogged V-belts.
- **Direct Install:** Installation of programmable thermostats and scheduling/setting back existing programmable thermostats.
- **HVAC Optimization Assessment:** A free analysis to identify low-cost optimization strategies targeting HVAC energy savings. After the assessment, the customer receives a Customer Selection Form (CSF) detailing cost, energy savings, and incentives for additional optimization measures such as demand controlled ventilation, enthalpy economizer optimization, and dynamic cycle management.

According to the program implementation plan, the energy savings target for the PY9 Private Sector Enhanced Building Optimization Program is 6,258 MWh.

2.9.2 Evaluation Approach

Research Objectives

This evaluation addresses program performance in PY9. The research objectives, which cover both impact and process analyses, are presented in the following sections. Section 3.1 provides information about cross-cutting research pertaining to small business customers.

Impact Questions

The objective of the PY9 Private Sector Enhanced Building Optimization Program evaluation is to provide estimates of gross and net electric savings associated with the program. In particular, the PY9 impact evaluation will answer the following 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

We will also conduct a limited process assessment addressing the following questions:

3. Program Participation

- a. What were the characteristics of participating customers? How many projects were completed? By how many different customers? What types of projects?
 - b. Did customer participation meet expectations? If not, how different was it and why?
4. Program Design and Implementation
- c. Was the program implemented as planned? If not, what changes were made, and why?
 - d. What, if any, implementation challenges occurred in PY9, and how were they overcome?

We will explore each of these questions through the activities described in this evaluation plan.

Evaluation Tasks

Table 25 summarizes the PY9 evaluation activities conducted for the Private Sector Enhanced Building Optimization Program.

Table 25. Summary of Private Sector Enhanced Building Optimization Program Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Staff Interviews		✓		Gather information about program marketing and implementation.
Program Materials Review	✓	✓		Review of program data to assess program operations in PY9
Impact Analysis	✓			Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Staff Interviews

The evaluation team will conduct up to three in-depth interviews with program and implementation staff (AIC and 360 Energy) involved in the design and administration of the Private Sector Enhanced Building Optimization Program. These interviews will allow us to fully explore the details of the program design and implementation, and to examine the staff perspective on program performance. We will schedule these in-depth interviews toward the end of the program year and will conduct them over the telephone.

Deliverable: Interviews conducted

Deliverable Date: June 2017

Task 2: Program Materials Review

The team will conduct a comprehensive review of all tracking data and program materials. This includes program marketing and implementation plans, program marketing materials, and extracts from the program tracking database.

Deliverable: Data requests

Deliverable Date: June 2017

Task 3: Impact Analysis

As noted throughout the plan, the team will use the IL-TRM V5.0 to calculate ex post gross savings associated with the measures installed through the program. We will estimate PY9 net savings by applying the SAG-approved NTGR for the program (1.00) to gross electric savings.

Deliverable: Results provided in annual report

Deliverable Date: September 2017

Task 4: Reporting

The team will provide an integrated annual evaluation report containing process and impact results for the Private Sector Enhanced Building Optimization Program.

Deliverable: Draft report

Deliverable Date: October 2017

Deliverable: Final report

Deliverable Date: November 2017

2.9.3 Evaluation Budget and Timeline

Table 26 summarizes the timing and budget associated with each evaluation activity. In total, the PY9 budget for the Private Sector Enhanced Building Optimization Program evaluation is \$32,500.

Table 26. Private Sector Enhanced Building Optimization Program PY9 Evaluation Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Program Staff Interviews	June 2017	\$2,700
2	Program Materials Review	June 2017	\$3,800
3	Gross Impact Analysis	September 2017	\$15,000
4	Draft Report	October 1, 2017	\$11,000
	Comments from AIC and ICC Staff	October 15, 2017	
	Final Report	November 1, 2017	
Total Budget			\$32,500

2.10 Public Sector Enhanced Building Optimization Program

2.10.1 Program Description

The Public Sector Enhanced Building Optimization Program was offered for the first time in PY9. The program provides HVAC optimization strategies to small business customers in AIC's DS-2 rate class. The program targets businesses in the public sector including municipal buildings, public schools, and park districts.

The Public Sector Enhanced Building Optimization Program is implemented by 360 Energy Group and relies on a network of program allies. The program consists of three main components:

- **Tune-Up:** A free comprehensive tune-up of under-maintained packaged roof top units and split systems. Tune-ups include a thorough cleaning/checking of the HVAC equipment and the installation of new filters and cogged V-belts.
- **Direct Install:** Installation of programmable thermostats and scheduling/setting back existing programmable thermostats.
- **HVAC Optimization Assessment:** A free analysis to identify low-cost optimization strategies targeting HVAC energy savings. After the assessment, the customer receives a Customer Selection Form (CSF) detailing cost, energy savings, and incentives for additional optimization measures such as demand controlled ventilation, enthalpy economizer optimization, and dynamic cycle management.

According to the program implementation plan, the energy savings target for the PY9 Public Sector Enhanced Building Optimization Program is 6,258 MWh.

2.10.2 Evaluation Approach

Research Objectives

This evaluation addresses program performance in PY9. The research objectives, which cover both impact and process analyses, are presented in the following sections. Section 3.1 provides information about cross-cutting research pertaining to small business customers.

Impact Questions

The objective of the PY9 Public Sector Enhanced Building Optimization Program evaluation is to provide estimates of gross and net electric savings associated with the program. In particular, the PY9 impact evaluation will answer the following 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

We will also conduct a limited process assessment addressing the following questions:

3. Program Participation

- a. What were the characteristics of participating customers? How many projects were completed? By how many different customers? What types of projects?
 - b. Did customer participation meet expectations? If not, how different was it and why?
4. Program Design and Implementation
- a. Was the program implemented as planned? If not, what changes were made, and why?
 - b. What, if any, implementation challenges occurred in PY9, and how were they overcome?

We will explore each of these questions through the activities described in this evaluation plan.

Evaluation Tasks

Table 27 summarizes the PY9 evaluation activities conducted for the Public Sector Enhanced Building Optimization Program.

Table 27. Summary of Public Sector Enhanced Building Optimization Program Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Staff Interviews		✓		Gather information about program marketing and implementation.
Program Materials Review	✓	✓		Review program data to assess program operations in PY9.
Impact Analysis	✓			Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Staff Interviews

The evaluation team will conduct up to three in-depth interviews with program and implementation staff (AIC and 360 Energy) involved in the design and administration of the Public Sector Enhanced Building Optimization Program. These interviews will allow us to fully explore the details of the program design and implementation and to examine the staff perspective on program performance. We will schedule these in-depth interviews toward the end of the program year and will conduct them over the telephone.

Deliverable: Interviews conducted

Deliverable Date: June 2017

Task 2: Program Materials Review

The team will conduct a comprehensive review of all tracking data and program materials. This includes program marketing and implementation plans, program marketing materials, and extracts from the program tracking database.

Deliverable: Data requests

Deliverable Date: June 2017

Task 3: Impact Analysis

As noted throughout the plan, the team will use the IL-TRM V5.0 to calculate ex post gross savings associated with the measures installed through the program. We will estimate PY9 net savings by applying the SAG-approved NTGR for the program (1.00) to gross electric savings.

Deliverable: Results provided in annual report

Deliverable Date: September 2017

Task 4: Reporting

The team will provide an evaluation report containing process and impact results for the Public Sector Enhanced Building Optimization Program.

Deliverable: Draft report

Deliverable Date: October 2017

Deliverable: Final report

Deliverable Date: November 2017

2.10.3 Evaluation Budget and Timeline

Table 28 summarizes the timing and budget associated with each evaluation activity. In total, the PY9 budget for the Public Sector Enhanced Building Optimization Program evaluation is \$32,500.

Table 28. Public Sector Enhanced Building Optimization Program PY9 Evaluation Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Program Staff Interviews	June 2017	\$2,700
2	Program Materials Review	June 2017	\$3,800
3	Gross Impact Analysis	September 2017	\$15,000
4	Draft Report	October 1, 2017	\$11,000
	Comments from AIC and ICC Staff	October 15, 2017	
	Final Report	November 1, 2017	
Total Budget			\$32,500

2.11 Small Commercial Lit Signage Program

2.11.1 Program Description

The Small Commercial Lit Signage Program, implemented by GDS Associates (GDS), offers incentives for AIC's small business customers to upgrade their existing lighting particularly for signage and billboards. The program targets chain restaurants, banks, small retail, offices, gas stations and convenience stores, among others.⁸ As part of program delivery, Small Business Energy Advisors (SBEA) or local Lit Signage Program Allies (LSPA) provide eligible customers with a free Lit Signage Assessment (LSA), which includes recommendations for lighting retrofits and replacements in the form of an energy efficiency plan. Customers that opt to upgrade or install new measures, can use an approved LSPA at a lower cost.

The Small Commercial Lit Signage Program is new in PY9 and according to the program implementation plan, the energy savings target for the program is 8,480 MWh.

2.11.2 Evaluation Approach

Research Objectives

This evaluation addresses program performance in PY9. The research objectives, which cover both impact and process analyses, are presented in the following sections. Section 3.1 provides information about cross-cutting research pertaining to small business customers.

Impact Questions

The objective of the PY9 Small Commercial Lit Signage Program evaluation is to provide estimates of gross and net electric savings associated with the program. In particular, the PY9 impact evaluation will answer the following 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

We will also conduct a limited process assessment addressing the following questions:

3. Program Participation
 - a. What were the characteristics of participating customers? How many projects were completed? By how many different customers? What types of projects?
 - b. Did customer participation meet expectations? If not, how different was it and why?
4. Program Design and Implementation
 - a. Was the program implemented as planned? If not, what changes were made, and why?
 - b. What, if any, implementation challenges occurred in PY9, and how were they overcome?

⁸ GDS Associates, Inc. Small Commercial Lit Signage Program – Implementation Plan. August 8, 2016.

We will explore each of these questions through the activities described in this evaluation plan.

Evaluation Tasks

Table 29 summarizes the PY9 evaluation activities conducted for the Small Commercial Lit Signage Program.

Table 29. Summary of Small Commercial Lit Signage Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Staff Interviews		✓		Gather information about program marketing and implementation.
Program Materials Review	✓	✓		Review program data to assess program operations in PY9.
Impact Analysis	✓			Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Staff Interviews

The evaluation team will conduct up to three in-depth interviews with program and implementation staff (AIC, GDS and Staples) involved in the design and administration of the Small Commercial Lit Signage Program. These interviews will allow us to explore the details of the program design and implementation, and to examine the staff perspective on program performance. We will schedule these in-depth interviews toward the end of the program year and will conduct them over the telephone.

Deliverable: Interviews conducted

Deliverable Date: June 2017

Task 2: Program Materials Review

The team will conduct a comprehensive review of all tracking data and program materials. This includes program marketing and implementation plans, program marketing materials, and extracts from the program tracking database.

Deliverable: Data requests

Deliverable Date: June 2017

Task 3: Impact Analysis

As noted throughout the plan, the team will use the IL-TRM V5.0 to calculate ex post gross savings associated with the measures installed through the program. We will estimate PY9 net savings by applying the SAG-approved NTGR for the program (0.89) to gross electric savings.

Deliverable: Results provided in annual report

Deliverable Date: September 2017

Task 4: Reporting

The team will provide an evaluation report containing process and impact results for the Small Commercial Lit Signage Program.

Deliverable: Draft report

Deliverable Date: October 2017

Deliverable: Final report

Deliverable Date: November 2017

2.11.3 Evaluation Budget and Timeline

Table 30 summarizes the timing and budget associated with each evaluation activity. In total, the PY9 budget for the Small Commercial Lit Signage Program evaluation is \$32,500.

Table 30. Small Commercial Lit Signage Program PY9 Evaluation Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Program Staff Interviews	June 2017	\$2,700
2	Program Materials Review	June 2017	\$3,800
3	Gross Impact Analysis	September 2017	\$15,000
4	Draft Report	October 1, 2017	\$11,000
	Comments from AIC and ICC Staff	October 15, 2017	
	Final Report	November 1, 2017	
Total Budget			\$32,500

2.12 Small Business Linear LED Lighting Program

2.12.1 Program Description

The Small Business Linear LED Lighting Program is designed to replace T8 and T12 fixtures with high-efficiency linear LED lamps. Matrix Energy Services (Matrix) implements the program, which includes an energy audit to identify energy efficiency opportunities and direct installation of program measures. The small businesses targeted by the program include restaurants, grocery and convenience stores, and others that operate between 10-24 hours per day every day of the week.

If participating customers are not able to support the installation of program measures by having their own maintenance staff assist in the process, or by providing access to key equipment, they are asked to pay a small co-pay. Matrix offers a zero-interest financing option help with this cost.

According to the program implementation plan, the gross energy savings target for the PY9 Linear LED Lighting Program is 11,467 MWh.

2.12.2 Evaluation Approach

Research Objectives

This evaluation addresses program performance in PY9. The research objectives, which cover both impact and process analyses, are presented in the following sections. Section 3.1 provides information about cross-cutting research pertaining to small business customers.

Impact Questions

The objective of the PY9 Small Business Linear LED Lighting Program evaluation is to provide estimates of gross and net electric savings associated with the program. In particular, the PY9 impact evaluation will answer the following 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

We will also conduct a limited process assessment addressing the following questions:

1. Program Participation
 - a. What were the characteristics of participating customers? How many projects were completed? By how many different customers? What types of projects?
 - b. Did customer participation meet expectations? If not, how different was it and why?
2. Program Design and Implementation
 - a. Was the program implemented as planned? If not, what changes were made, and why?
 - b. What, if any, implementation challenges occurred in PY9, and how were they overcome?

We will explore each of these questions through the activities described in this evaluation plan.

Evaluation Tasks

Table 31 summarizes the PY9 evaluation activities conducted for the Small Commercial Linear LED Lighting Program.

Table 31. Summary of Small Business Linear LED Lighting Program Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Staff Interviews		✓		Gather information about program marketing and implementation.
Program Materials Review	✓	✓		Review program data to assess program operations in PY9.
Impact Analysis	✓			Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Staff Interviews

The evaluation team will conduct one in-depth interviews with program and implementation staff (AIC and Matrix Energy Services) involved in the design and administration of the Small Commercial Linear LED Lighting Program. These interviews will allow us to explore the details of the program design and implementation, and examine the staff perspective on program performance. We will schedule these in-depth interviews toward the end of the program year and will conduct them over the telephone.

Deliverable: Interviews conducted

Deliverable Date: June 2017

Task 2: Program Materials Review

The team will conduct a comprehensive review of all tracking data and program materials. This includes program marketing and implementation plans, program marketing materials, and extracts from the program tracking database.

Deliverable: Data requests

Deliverable Date: June 2017

Task 3: Impact Analysis

As noted throughout the plan, the team will use the IL-TRM V5.0 to calculate ex post gross savings associated with the measures installed through the program. We will estimate PY9 net savings by applying the SAG-approved NTGR for the program (0.89) to gross electric savings.

Deliverable: Results provided in annual report

Deliverable Date: September 2017

Task 4: Reporting

The team will provide an evaluation report containing process and impact results for the Small Commercial Linear LED Lighting Program.

Deliverable: Draft report

Deliverable Date: October 2017

Deliverable: Final report

Deliverable Date: November 2017

2.12.3 Evaluation Budget and Timeline

Table 32 summarizes the timing and budget associated with each evaluation activity. In total, the PY9 budget for the Small Commercial Linear LED Lighting Program evaluation is \$32,500.

Table 32. Small Commercial Linear LED Lighting Program PY9 Evaluation Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Program Staff Interviews	June 2017	\$2,700
2	Program Materials Review	June 2017	\$3,800
3	Gross Impact Analysis	September 2017	\$15,000
4	Draft Report	October 1, 2017	\$11,000
	Comments from AIC and ICC Staff	October 15, 2017	
	Final Report	November 1, 2017	
Total Budget			\$32,500

2.13 Demand Based Ventilation Fan Control Program

2.13.1 Program Description

The Demand Based Ventilation Fan Control Program for Small Businesses with High Occupancy Variability (DBVFC Program) is a new program implemented by Matrix Energy Services (Matrix). The program targets facilities with highly variable occupancy, defined by Matrix as “facilities for which HVAC ventilation was designed for maximum assembly-like occupancy in mind, such as restaurants where people assemble at specific times.”⁹ As part of the program, customers receive a free energy audit, identification of recommended energy efficient measures and direct installation of fan controls.

The DBVFC Program is new in PY9 and according to the program implementation plan, the energy savings target for the program is 4,932 MWh.

2.13.2 Evaluation Approach

Research Objectives

This evaluation addresses program performance in PY9. The research objectives, which cover both impact and process analyses, are presented in the following sections. Section 3.1 provides information about cross-cutting research pertaining to small business customers.

Impact Questions

The objective of the PY9 DBVFC Program evaluation is to provide estimates of gross and net electric savings associated with the program. In particular, the PY9 impact evaluation will answer the following 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

We will also conduct a limited process assessment addressing the following questions:

1. Program Participation
 - a. What were the characteristics of participating customers? How many projects were completed? By how many different customers? What types of projects?
 - b. Did customer participation meet expectations? If not, how different was it and why?
2. Program Design and Implementation
 - a. Was the program implemented as planned? If not, what changes were made, and why?
 - b. What, if any, implementation challenges occurred in PY9, and how were they overcome?

⁹ Matrix Energy Services. Demand Based Ventilation Fan Control Program for Small Businesses with High Occupancy Variability – Program Implementation Plan. September 20, 2016.

We will explore each of these questions through the activities described in this evaluation plan.

Evaluation Tasks

Table 33 summarizes the PY9 evaluation activities conducted for the DBVFC Program.

Table 33. Summary of DBVFC Program Evaluation Activities for PY9

Activity	Impact	Process	Forward Looking	Details
Program Staff Interviews		✓		Gather information about program marketing and implementation.
Program Materials Review	✓	✓		Review program data to assess program operations in PY9.
Impact Analysis	✓			Calculate gross and net impacts using the IL-TRM V5.0 and SAG-Approved NTGR values for PY9.

We describe each activity below in detail.

Task 1: Program Staff Interviews

The evaluation team will conduct up to three in-depth interviews with program and implementation staff (AIC and Matrix) involved in the design and administration of the DBVFC Program. These interviews will allow us to explore the details of the program design and implementation, and to examine the staff perspective on program performance. We will schedule these in-depth interviews toward the end of the program year and will conduct them over the telephone.

Deliverable: Interviews conducted

Deliverable Date: May 2017

Task 2: Program Materials Review

The team will conduct a comprehensive review of all tracking data and program materials. This includes program marketing and implementation plans, program marketing materials, and extracts from the program tracking database.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 3: Impact Analysis

As noted throughout the plan, the team will use the IL-TRM V5.0 to calculate ex post gross savings associated with the measures installed through the program. We will estimate PY9 net savings by applying the SAG-approved NTGR for the program (0.89) to gross electric savings.

Deliverable: Results provided in annual report

Deliverable Date: September 2017

Task 5: Reporting

The team will provide an evaluation report containing process and impact results for the DBVFC Program.

Deliverable: Draft report

Deliverable Date: October 2017

Deliverable: Final report

Deliverable Date: November 2017

2.13.3 Evaluation Budget and Timeline

Table 34 summarizes the timing and budget associated with each evaluation activity. In total, the PY9 budget for the DBVFC Program evaluation is \$32,500.

Table 34. DBVFC Program PY9 Evaluation Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Program Staff Interviews	June 2017	\$2,700
2	Program Materials Review	June 2017	\$3,800
3	Gross Impact Analysis	September 2017	\$15,000
4	Draft Report	October 1, 2017	\$11,000
	Comments from AIC and ICC Staff	October 15, 2017	
	Final Report	November 1, 2017	
Total Budget			\$32,500

3. Cross-Cutting Evaluation Activities

Within the following section, we outline key cross-cutting evaluation activities.

3.1 Small Business Research

AIC serves a large number of small businesses, which are generally defined as those with the DS2¹⁰ and/or GDS2¹¹ rates representing over 100,000 unique accounts in the service territory. Over the past several years, AIC has delivered a variety of energy efficiency programs to its small business customers. These programs include AIC's existing C&I portfolio of programs (Standard, Custom, and Retro-Commissioning), which are available to small business customers, as well as the stand-alone, small business-specific programs offered by the IPA described in earlier sections of this plan.

Given the patchwork nature of program delivery to date and the potential for more integrated small business program delivery in PY2018 and beyond, AIC expressed interest in gathering additional information to help them reach these customers with energy efficiency programming moving forward. As a result, we propose two activities to help characterize small business customers and the market for small business energy efficiency programming in AIC service territory.

- **General Population Survey:** We propose a small business general population survey and profiling activities to develop a deeper characterization of these customers.
- **Small Business Trade Ally Interviews.** Building off trade ally research we have conducted in past program years (related to the 8-103/8-104 Business Program offerings, as well as the SBDI Program), we propose conducting interviews with participating trade allies bridging all small business program offerings.

We describe each of these activities in greater detail below.

3.1.1 Small Business Market Actor Interviews

Given the central role that market actors play in the implementation of small business programs, the evaluation team will conduct in-depth telephone interviews with participating and nonparticipating market actors active in the small business energy efficiency space. A central goal of these interviews is to determine best practices from an implementation perspective to support development of an effective trade ally network going forward. We will explore a range of key items as part of these interviews, including the following:

- The sources and extent of trade ally awareness of small business programs
- The likelihood of participation in future small business offerings by type
- An assessment of customer willingness to participate in small business programs at varying incentive levels

¹⁰ DS-2 is AIC's "Small General Delivery Service" rate class for electric service, and contains non-residential electric accounts with peak demand of less than 150 kW. IPA small business offerings are restricted to customers in this rate class.

¹¹ GDS-2 is AIC's "Small General Gas Delivery Service" rate class for gas service, and contains non-residential gas accounts with maximum Average Daily Usage of less than 200 therms per day.

- Satisfaction with existing AIC and IPA programs and suggestions for improvement
- Barriers to participation in energy efficiency programs

We will characterize market actors by type and size, and anticipate conducting interviews with approximately 30 market actors, including some from each of the following groups:

- Active trade allies (trade allies participating in AIC or IPA programs, who have completed projects in the past program year)
- Inactive trade allies (trade allies participating in AIC or IPA programs, who have not completed projects in the past program year)
- Nonparticipating market actors (market actors who have not participated in AIC or IPA programs in the past)

We will analyze our interview results and present findings in a stand-alone memo geared toward providing AIC with actionable findings that can be used to develop a strong trade ally network to support small business programs in PY2018 and beyond.

Deliverable: Draft and final trade ally interview guides

Deliverable Date: July 2017

Deliverable: Memo summarizing trade ally interview results

Deliverable Date: August 2017

3.1.2 Small Business General Population Survey & Profiling

Small business customers have historically been a challenging group to successfully convert into energy efficiency program participants. Existing literature characterizes small business customers as highly price sensitive, and often too busy with the daily operations of their businesses to explore energy efficient upgrades. Energy efficiency programs are designed to overcome these barriers by providing free energy assessments, low or no cost upgrades, and full service installation, and participation among small business will continue to be critical for AIC.

As such, in PY9, we will conduct a general population survey with all DS-2 and GDS-2 customers (including participants and nonparticipants in AIC and IPA programs) to understand their constraints, business characteristics, attitudes towards energy efficiency, and level of interest in potential program offerings. We will combine results from this survey with CIS and usage data (and secondary sources, where possible) to characterize the small business customers by their usage, geography, business types, and program participation records. These business profiles can then be used to assist in targeting future small business offerings to AIC's customer base.

We expect to conduct approximately 140 interviews with DS-2 and GDS-2 customers as part of this research, including 70 participants and 70 nonparticipants.

We will analyze our survey results and existing data and present findings in a standalone memo. We expect to be able to provide a detailed profile of small business customers, including an assessment of their likelihood to participate in future AIC programs by key firmographic characteristics.

Deliverable: Draft and final general population survey instruments

Deliverable Date: July 2017

Deliverable: Memo summarizing general population survey results

Deliverable Date: September 2017

3.1.3 Evaluation Budget and Timeline

Table 35 summarizes the timing and budget associated with each cross-cutting small business evaluation activity. In total, the PY9 budget for cross-cutting small business evaluation tasks is \$80,600.

Table 35. Small Business Cross-Cutting Activities PY9 Evaluation Budget

Activity	Task	Deliverable Date	Budget
Trade Ally Interviews	Trade Ally Interview Guide	July 2017	\$28,000
	Results Memo	October 2017	
General Population Survey	General Population Survey Instrument	July and August 2017	\$53,000
	Results Memo	November 2017	
Total Budget*			\$81,000

*Note: Funds for these tasks come from both the AIC and IPA evaluation budgets. Here we show the total combined budget from both sources.

3.2 Residential General Population Survey

Currently in its ninth year of program operations, AIC conducts general energy efficiency marketing and education in addition to offering discrete energy efficiency programs. Over time, these marketing and education efforts can result in energy savings outside of programs that could count as spillover. Spillover among program participants is captured in individual program evaluation efforts, but nonparticipant spillover is not captured. In PY9, the evaluation team will conduct a residential general population survey to quantify nonparticipant spillover and to collect additional general information that may prove beneficial to AIC (e.g., marketing preferences and satisfaction with AIC).

As nonparticipant spillover is likely to be a rare event, estimating spillover requires a sample of at least 350 respondents to ensure acceptable precision at a desired confidence level.¹² The team will draw a random sample from AIC’s residential customer database, using customer identification numbers to remove those participating in any AIC energy efficiency programs (including the Behavioral Modification Program).

The survey will contain questions about each AIC residential energy efficiency program. The team will ask residential respondents program-specific questions to determine whether they made energy-efficient, program-qualified upgrades, and then determine why they did not participate in the associated AIC program.

In addition, the team will identify installed energy efficiency measures not provided through AIC programs and will collect information to enable reliable savings estimates. To measure nonparticipant spillover, the team will follow the protocol outlined in the IL-TRM V5.0. For potential spillover measures installed, the team will ask consumers about the influence of AIC’s general marketing and education in their decisions to install measures. Installed measures will only qualify as spillover if customers rated AIC’s influence as greater than 7 (on a scale of 0 to 10).

As part of the survey, the evaluation team will also ask questions about motivations and barriers to program participation, preferred communications channels, existing levels of awareness, and satisfaction with AIC. The team will compare the PY9 results with similar surveys that we conducted in PY7 and PY8 and assess any trends.

¹² Illinois Statewide Technical Reference Manual for Energy Efficiency Version 5.0. Volume 4: Cross-Cutting Measures and Attachments. February 11, 2016.

Upon survey completion, the team will analyze the data and present evaluation results in a stand-alone memo. The memo will detail the methods for estimating nonparticipant spillover, as well as how the value will be applied to program savings going forward.

3.3 IL Statewide Technical Reference Manual

The team will continue its involvement in the IL-TRM process, including participation in Technical Advisory Committee (TAC) meetings and NTGR Methodology Working Group meetings as needed. The former includes participation in weekly calls, as well as reviewing and commenting on IL-TRM update items presented to the TAC. The latter includes participation in periodic calls with working group members to discuss any pending issues.

3.4 Review of Cost Effectiveness Test Results

As in prior program years, the evaluation team will work with AIC to audit the company's cost-effectiveness analysis based on PY9 program results. As part of this process, we will prepare evaluation-based model inputs, which include evaluated program savings as determined through the PY9 evaluation effort. Once AIC's contractor, AEG, has conducted the cost effectiveness analysis, we will review the results and the assumptions for avoided costs, discount rates, measure cost information, administrative costs, and other relevant data.

3.5 Quality Assurance and Control Process

Per our contract, the team must hire a separate entity for quality assurance/quality control (QA/QC) review, and work collaboratively with this entity to ensure the quality of our evaluation plans, analysis, and reporting. Since PY4, the team has worked with Dr. Richard Ridge, who has a long history in energy efficiency evaluation. In recent years, Dr. Ridge has used his expertise to help write evaluation protocols and oversee other firms in their evaluation efforts, as well as continuing to perform evaluations across the country. For several years, Dr. Ridge was a consultant to the California Public Utilities Commission (CPUC) evaluation staff, where he worked with them to understand evaluation needs, review contractor plans, and participate in many aspects of a multi-million-dollar evaluation effort. Since 2008, he has been providing similar support to the New York State Department of Public Service.

As part of the PY9 evaluation effort, Dr. Ridge will continue to (1) discuss portfolio evaluation plans with the evaluation team, providing advice as needed; (2) participate in ongoing sampling and evaluation design efforts as requested; (3) review draft evaluation reports to ensure quality and accuracy; and (4) provide the ICC with a report on the efforts in which he was involved.

4. PY9 Evaluation Budget

The following table outlines the expected budget to execute the evaluation plans within this document. Note that some of the budgeted activities have already begun and been invoiced.

Table 36. PY9 IPA Evaluation Budget

Program/Task	Estimated Budget
Program-Specific Activities	
Residential Lighting	\$290,000
Residential Behavioral Modification	\$42,000
Residential Community Based CFL Distribution	\$50,000
Residential Moderate Income Kits	\$40,000
Residential Multifamily Major Measures	\$40,000
Residential Rural Efficiency Kits	\$17,000
Small Business Direct Install Program	\$32,500
Small Business Cooler Savings Program	\$32,500
Private Sector Enhanced Building Optimization Program	\$32,500
Public Sector Enhanced Building Optimization Program	\$32,500
Small Commercial Lit Signage Program	\$32,500
Small Business Linear LED Lighting Program	\$32,500
Demand Based Ventilation Fan Control Program	\$32,500
Total Program-Specific Efforts	\$704,500
Non-Program Activities*	
Small Business Research	\$35,000
Residential General Population Survey	\$26,000
IL Statewide Technical Reference Manual	\$43,000
Cost-Effectiveness Analysis	\$14,000
QA/QC Coordination	\$12,000
Other Non-Program Activities (i.e., Planning, SAG, Collaboration, etc.)	\$181,000
Total Non-Program Efforts	\$311,700
Contingency	\$45,006
Total	\$1,063,206

*Note: Costs for non-program activities are allocated across AIC and IPA budgets.

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